



NOVEMBER 6th-7th
CREMONA
I T A L Y



2014

9th ANNUAL MEETING
EUROPEAN DELIRIUM ASSOCIATION



2014

We are delighted that our 9th Annual Meeting is held in Cremona, an ancient city in the northern part of Italy and in the southern part of Europe. The program covers the latest advances in clinical practice and delirium research, from diagnosis to management and clinical implementation.

Cremona, laying on the banks of the river Po, has been playing a leading role in the Italian history and culture since the Roman times. Its central position in the Po floodplain and the presence of the great river made it a main junction for trade and commerce. As was customary in the past, important cities for trade were destined to become ideal places for the development of art and culture. In this way Cremona, rich in works of art, became a perfect cultural capital for arts and music. Thanks to music and in particular to the art of making stringed instruments, Cremona is a unique place in the world. It's the hometown to renowned musicians and composers like Claudio Monteverdi and Amilcare Ponchielli, after whom the theatre has been named. Cremona is above all a city in violin clef: the tie with the art of making stringed instruments is very old and inseparable from it. Therefore, passion, interest and curiosity can be the hint to an unusual visit following the echo of the notes.

This special journey, historical and sentimental at the same time, enables you to come to know Cremona through the quality of its emotions, which here have a particularly fine and fair hue, though pervading and intimately enthralling. The Town Hall is, together with the Torrazzo, the symbol of the city.

The musical and artistic past of Cremona has left important marks in the city to be looked for in the small streets, rich in history, and the

medieval buildings, in red bricks, which turn bright golden orange at dusk, like the violins themselves. Starting from those linked to the life of the great Antonio Stradivari: the bridal house in Garibaldi Avenue, where he lived and worked since 1667, or the copy of his grave stone, today in the public gardens in Piazza Roma; all these houses were built in 1870 on the place where there had been the church and the convent of the Dominican Friars, which had received his remains.

Quite close to the gardens, in Stradivari Square, a modern statue celebrates the figure of the great master and another one welcomes the visitors at the entrance of the Town Hall. Moreover, the International School for the art of making stringed instruments, at Raimondi Palace, has been named after him, thus uniting to the celebration a wish to all the students, who come to Cremona from all over the world to follow the courses, so that one day they too can equal his skill. Past and present, tradition and research, artisan skill and artistic sensitiveness then intertwine in a harmonious intermixture strengthening one another and being enriched by new colours, just as it happens to the sound in the sound box of a violin. For this reason, five hundred years after Andrea Amati and three centuries after the golden age of Stradivari, Guarneri and Bergonzi, in Cremona the art of making stringed instruments is livelier than ever.

We wish you a stimulating meeting and a pleasant stay in Cremona.

On behalf of the Local Organizing Committee
Alessandro Morandi, President of EDA Cremona 2014

On behalf of the European Delirium Association Board Members
Alasdair MacLulich, EDA President

KEY NOTE SPEAKERS



Dr. David Meagher

from Limerick University (Ireland). He is a distinguished researcher on the phenomenology of delirium

"DELIRIUM PHENOMENOLOGY"



Dr. Sophia de Rooji

from University of Amsterdam (the Netherlands). She is an eminent researcher on geriatrics care and delirium.

"THE FUTURE OF THE PHARMACOLOGICAL TREATMENT OF DELIRIUM"



Dr. James Rudolph

from Harvard University (USA). He is a distinguished researcher on the phenomenology of delirium

"CHANGING DELIRIUM PRACTICE: CHALLENGES AND OPPORTUNITIES"

EUROPEAN DELIRIUM ASSOCIATION BOARD MEMBERS

PRESIDENT: Alasdair MacLulich

VICE-PRESIDENT: Birgitta Olofsson

SECRETARY: Stefan Kreisel

TREASURER: Daniel Davis

IMMEDIATE PAST PRESIDENT: Jouko Laurila

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Alessandro Morandi (**CHAIR**)
Giuseppe Bellelli
Simona Gentile
Marco Trabucchi

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Meera Agar
Colm Cunningham
Daniel Davis
David Meagher
Milisen Koen
Birgitta Olofsson
Wolfgang Hasemann
Alasdair MacLulich
Barbara Kamholz



PROGRAMME



2014

9th ANNUAL MEETING

NOVEMBER 6th

07:30 Registration and poster set-up

GALLERIA DELLE ARMI

08:30 OPENING BY **A. Morandi, M. Trabucchi, A. Mac Lulich**

09:10 Presentation of an Italian survey on delirium
G. Bellelli
COMMENTS BY **M. Trabucchi, K. Neufeld**

09:30 **KEY NOTE LECTURE**
Delirium phenomenology
D. Meagher, CHAIR **B. Kamholz**

10:15 Chair comments and open questions

10:30 **INVITED LECTURE**
Stroke and delirium
A.W. Oldenbeuving, CHAIR **B. Van Munster**

11:00 Coffee break

11:30 **INVITED LECTURE**
Lewy Body Dementia and delirium
A. Padovani, CHAIR **A. Mac Lulich**

12:00 **KEY NOTE LECTURE**
The future on the pharmacological treatment of delirium
S. de Rooij, CHAIR **R. Arora**

12:45 Chair comments and open questions

13:00 Lunch and poster session
(POSTER SESSION WITH JURY FROM 13:00-14:00)

14:30 **Parallel session**

GALLERIA DELLE ARMI

Oral presentations: session 1
CHAIR **S. Kreisel, K. Milisen**

SALA ORO

Oral presentations: session 2
CHAIR **D. Meagher, B. Olofsson**

16:30 **Parallel sessions**

Workshops and Symposia

GALLERIA DELLE ARMI

WORKSHOP 1
Getting involved delirium research - some lessons learned
A. Mac Lulich, R. Arora, K. Neufeld, J. Rudolph



2014

9th ANNUAL MEETING

NOVEMBER 7th

SALA ORO

WORKSHOP 2

Diagnosis of delirium in challenging population
A. Morandi, D. Davis, J. Schieveld, H. Smith

SALA GRADELLINI

SYMPOSIUM 1

Melatonin in older age and delirium
A. De Jonghe, R. Scholtens, I. Maijers, E. Vural

SALA VIOLINI

SYMPOSIUM 2

The use and influence of haloperidol on QTC time
H. Nijboer, N. Lam, B. Van Munster, S. Jansen

18:00 Instructions night-out
A. Morandi

20.30 Conference dinner

07.30 EDA Board meeting

07.30 Registration and poster set-up

GALLERIA DELLE ARMI

08:30 INTRODUCTION BY **A. Morandi, A. Mac Lulich**

08:40 Newsletter Annals of Delirium
V. Page

08:45 INVITED LECTURES

CHAIR **C. Thomas, G. Bellelli**

The circadian rhythm in dementia patients
M. Terzaghi

An advanced approach to the diagnosis of delirium.
From bench to practice
A. Slooter

Management of pain and delirium in palliative care
A. Caraceni

10:15 Coffee break

10:45 **HEADLINE RESULTS**
CHAIR **V. Page, J. Laurila**
Post traumatic stress disorder and delirium in critically ill patients
P. Pandharipande

Delirium prevention program in long-term care
P. Voyer

11:45 **KEY NOTE LECTURE**
CHAIR **S. de Rooij**
Changing delirium practice: challenges and opportunities
J. Rudolph

12:30 Chair comments and open questions

12:45 Lunch and poster session
(POSTER SESSION WITH JURY FROM 13:00-14:00)

GALLERIA DELLE ARMI

14:00 **Oral presentation: session 3**
CHAIR **C. Cunningham, W. Haseman**

SALA ORO

Oral presentation: session 4
CHAIR **A. Slooter, D. Wilson**

SALA GRADELLINI

15:00 **Oral presentation: session 5**
CHAIR **D. Davis, E. Destroyer**

Parallel Sessions

Workshop, Symposium and Oral Presentations

GALLERIA DELLE ARMI

SYMPOSIUM 3
Improving the management of medication burden in delirium
J. Young, P.F. Gallagher, Y. Gustafson, V. Page

SALA ORO

SYMPOSIUM 4
Beyond delirium: the broader impact of Physiological Vulnerability
B. Kamholz, N. Brummel, P. Pandharipande

SALA GRADELLINI

WORKSHOP 3
Time to "Think Delirium" a workshop highlighting a pathway approach to improving delirium care in acute hospitals across Scotland
CHAIR **P. Bond**
P. Bond, L. Wolf

16:45 Announcement EDA 2015
D. Davis

Awards, closing, farewell
A. Morandi, A. Mac Lulich

SPEAKERS

Giuseppe Bellelli

Penny Bond

Nathan Brummel

Augusto Caraceni

Daniel Davis

Annemarieke De Jonghe

Sophia de Rooij

Paul F. Gallagher

Karen Goudie

Yngve Gustafson

Sofie Jansen

Barbara Kamholz

Nicky Lam

Alasdair Mac Lulich

David Meagher

Ingrid Maijers

Alessandro Morandi

Karin Jane Neufeld

Harmke Nijboer

Annemarie W. Oldenbeuving

Alessandro Padovani

Valerie Page

Pratik Pandharipande

James Rudolph

Rikie Scholtens

Arjen Slooter

Michele Terzaghi

Marco Trabucchi

Barbara Van Munster

Philippe Voyer

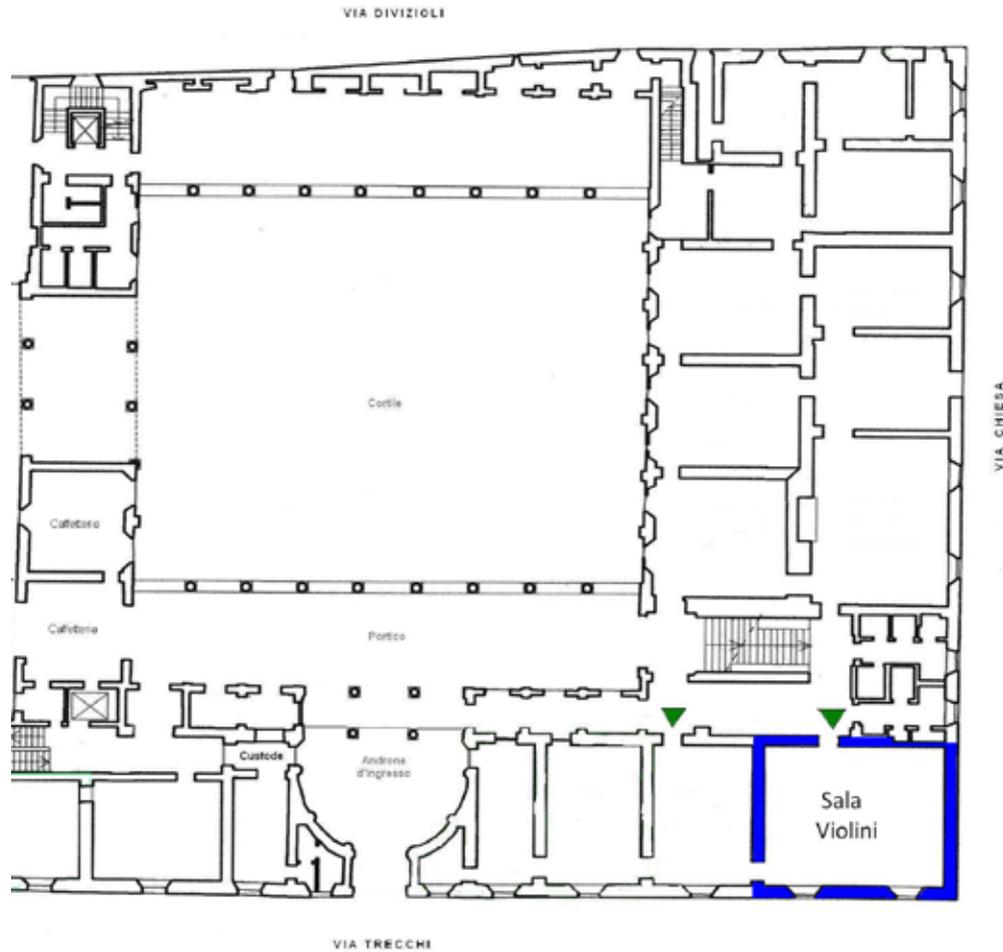
Esmée Vural

Linda Wolf

John Young

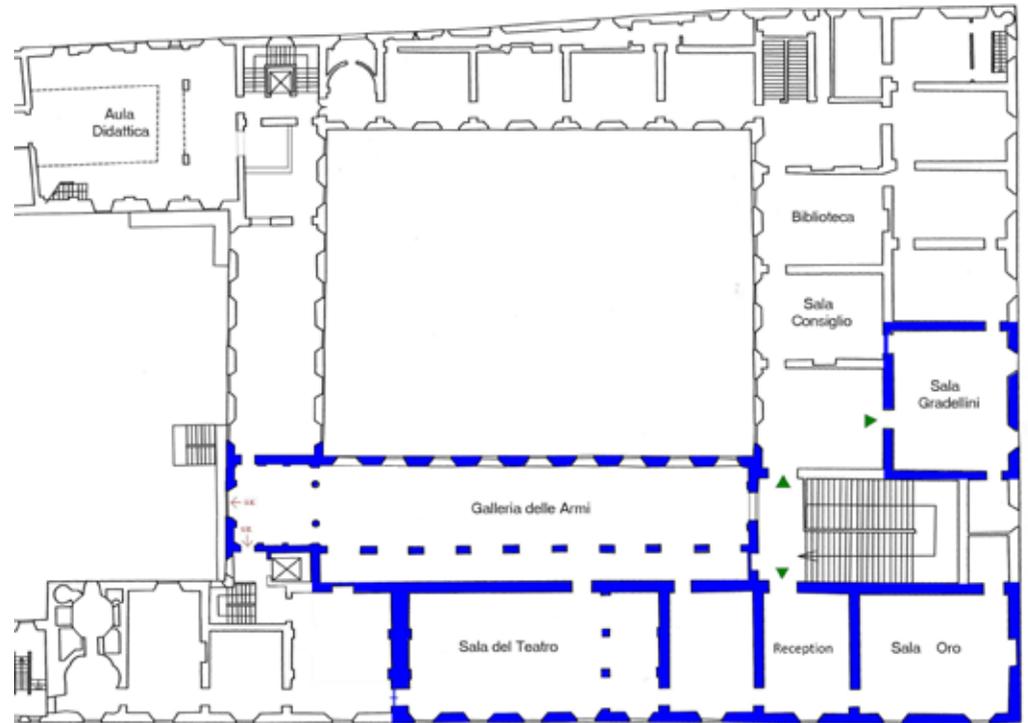
PALAZZO TRECCHI

GROUND FLOOR

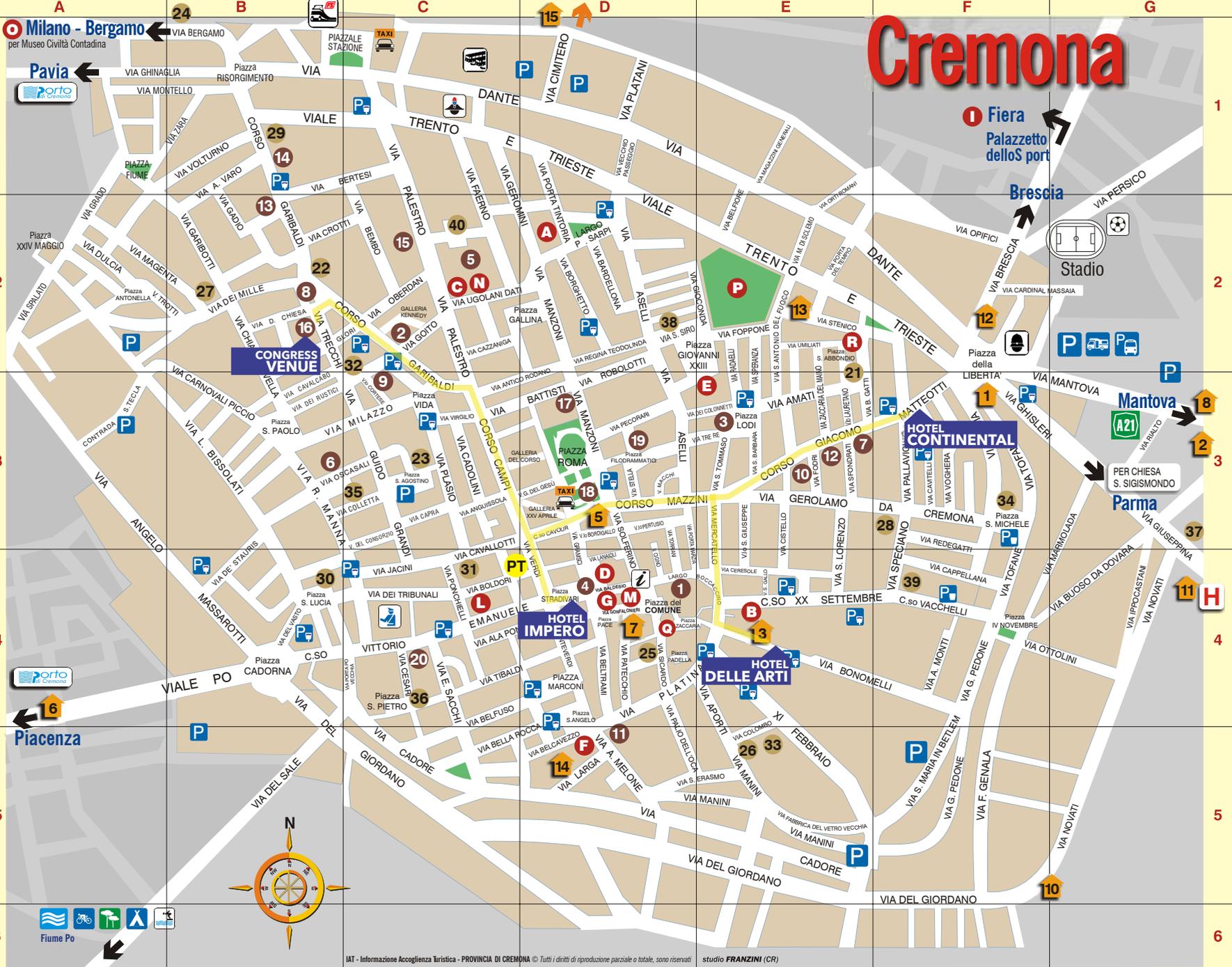


PALAZZO TRECCHI

FIRST FLOOR



Cremona



Principali Uffici e Servizi Pubblici

- Main Offices and Public Services - *Principaux Offices et Services Publics*
 Ämter und Öffentliche Verwaltung - *Principales Oficinas y Servicios Públicos*
- A** Archivio di Stato D2
 - B** ACI - Automobile Club Cremona E2
 - C** Biblioteca Statale C2
 - D** Camera di Commercio D4
 - E** Centro Culturale S. Maria della Pietà E3
 - F** Centro Culturale S. Vitale D5
 - G** Comune - URP D4
 - I** Fiera - Palazzetto dello Sport F1
 - L** Provincia - URP C4

- ## Musei
- Museums - *Musées - Museen - Museos*
- M** Civica collezione di Violini Antichi D4
 - N** Museo Civico "Ala Ponzone" (Pinacoteca, Museo Stradivariano, Sezione Archeologica) C2
 - O** Museo della Civiltà Contadina A1
 - P** Museo di Storia Naturale E2
 - Q** Museo delle Pietre Romaniche D4
 - R** Museo Lauretano E2

- ## Principali monumenti
- Main sights - *Principaux monuments - Wichtige Bauwerke - Principales monumentos*
- 1 Piazza del Comune: Duomo, Torrazzo, Battistero, Palazzo Comunale, Loggia dei Militi D4
 - 2 Casa di Stradivari C2
 - 3 Monumento a Monteverdi E3
 - 4 Monumento a Stradivari D4
 - 5 Palazzo Affaitati C2
 - 6 Palazzo Cattaneo B3
 - 7 Palazzo Cavalcabò E3
 - 8 Palazzo Cittanova B2
 - 9 Palazzo Cortese C3
 - 10 Palazzo Fodri E3
 - 11 Palazzo Mina Bolzesi D5
 - 12 Palazzo Pallavicino E3
 - 13 Palazzo Raimondi B2
 - 14 Palazzo Stanga Rossi S. Secondo B1
 - 15 Palazzo Stanga Trecco C2
 - 16 Palazzo Treccchi B2
 - 17 Palazzo Vidoni Pagliari D3
 - 18 Pietra Tombale di Stradivari D3
 - 19 Teatro Filodrammatici D3
 - 20 Teatro Ponchielli C4

- ## Chiese
- Churches - *Eglises - Kirchen - Iglesias*
- 21 Sant'Abbondio-Santuario Lauretano E2-3
 - 22 Sant'Agata B2
 - 23 Sant'Agostino C3
 - 24 Sant'Ambrogio-Santuario di S. Antonio B1
 - 25 San Gerolamo D4
 - 26 Sant'Imerio E5
 - 27 Sant'Ilario B2
 - 28 San Lorenzo F3
 - 29 San Luca B1
 - 30 Santa Lucia B4
 - 31 San Marcellino C4
 - 32 Santa Margherita C2
 - 33 Santa Maria Maddalena E5
 - 34 San Michele Vetere F3
 - 35 San Omobono C3
 - 36 San Pietro al Po C4
 - 37 San Sigismondo G3
 - 38 S. Siro D2
 - 39 SS. Trinità F4
 - 40 San Vincenzo C2

Utilità - Utilities

- Albergo - Agriturismo - B&B
Hotel - Farm Holidays - B&B
- Autostrada
Motorway
- Carabinieri
- Informazioni Turistiche
Tourist Information
- Parcheggi a pagamento
Pay Car Parking
- Parcheggio libero
Free Parking
- Piscina
Swimming Pool
- Poste Italiane
Post Office
- Stadio
Stadium
- Vigili Urbani
Local Police Station
- Area di sosta Camper
Camper Area
- Campeggio
Camping site
- Ferrovie
Railway station
- Ospedale
Hospital
- Parcheggio Bus turistici
Parking for tourist bus
- Parco al Po
Park on the river Po
- Polizia
Police Station
- Porto turistico
Tourist Harbour
- Stazione Autocorriere
Bus Station
- Taxi

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NOVEMBER 6th

WORKSHOP

WORKSHOP 1

Chair: **A. Mac Lulich**

Getting involved delirium research - some lessons learned

A. Mac Lulich

Studying delirium in cardiac surgery - the wrong way

R. Arora

Measurement of delirium in research

K. Neufeld

After the delirium

J. Rudolph

Small group sessions

Summing up

A. Mac Lulich

WORKSHOP 2

Chair: **A. Morandi**

Diagnosis of delirium in challenging population

Introduction and presentation of data of the DSD survey

A. Morandi

Review of DSD diagnosis and DSM-5 challenges in DSD

D. Davis

DSM-5 challenges in diagnosing pediatric delirium among infants and children

J. Schieveld

Delirium monitoring in critically ill pediatric patients: Two successful approaches for bedside screening

H. Smith

Delirium in dementia patients and children. Overlap and possible role for future diagnosis

A. Morandi

Discussion: questions to the audience or open discussion

A. Morandi, D. Davis, J. Schieveld, H. Smith



NOVEMBER 7th

WORKSHOP

WORKSHOP 3

Chair: **P. Bond**

Time to "Think Delirium" An interactive collaborative workshop between the Scottish Delirium Association and Healthcare Improvement Scotland

P. Bond, L. Wolf, K. Goudie

Patient and carer story: patient with hip fracture and delirium

P. Bond, L. Wolf

Case study of improvement work in hip fracture ward, including report showing staff attitudes changing and carer visits

P. Bond, L. Wolf

Scottish Delirium Association resources: new delirium care pathways, establishing national networks, and collaboration with Scottish Government agency Healthcare Improvement Scotland

P. Bond, L. Wolf

Healthcare Improvement Scotland work in nine national test sites: patient-centred care, implementing new delirium TIME bundle, and results of implementation

P. Bond, L. Wolf

Breakout small group work: discussion of practicalities of implementing improved delirium care in their area, focused on the questions: (a) what do we want to achieve?

(b) what are the barriers? (c) how do we overcome them?

Reporting of work of small groups, and concluding remarks

NOVEMBER 6th

1) MELATONIN IN OLDER AGE AND DELIRIUM

Chair: **A. DE JONGHE**

Melatonin Deficiency Hypothesis in Delirium and treatment in delirium

ANNEMARIEKE DE JONGHE

Academic Medical Center, Amsterdam, The Netherlands

Physiological melatonin levels in healthy elderly

RIKIE SCHOLTENS

Academic Medical Center, Amsterdam, The Netherlands

Melatonin levels in delirious and non-delirious elderly hip fracture patients

INGRID MAIJERS

TweeStedenziekenhuis, Tilburg, The Netherlands

Optimal dosages for melatonin suppletion therapy in older adults - a systematic review of current literature

ESMEE VURAL

Vu Medical Center, Amsterdam, The Netherlands

NOVEMBER 6th

SYMPOSIUM

NOVEMBER 6th

2) THE USE AND INFLUENCE OF HALOPERIDOL ON QTC TIME

Chair: **B. VAN MUNSTER**

Haloperidol use among elderly patients undergoing surgery: a one year study in a whole hospital population

HARMKE NIJBOER

Catharina Ziekenhuis, Eindhoven, The Netherlands

Prevalence and risk factors of QTc interval prolongation in the geriatric outpatient clinic

NICKY LAM

VlietlandZiekenhuis, Schiedam, The Netherlands

Differential changes in QTc duration during in-hospital haloperidol use.

BARBARA VAN MUNSTER

Academic Medical Center, Amsterdam, The Netherlands

Haloperidol does not affect perioperative changes in QTc-duration: a prospective in-hospital study

SOFIE JANSEN

Academic Medical Center, Amsterdam, The Netherlands

Electrocardiographic abnormalities in patients admitted for hip-fracture

SOFIE JANSEN

Academic Medical Center, Amsterdam, The Netherlands

NOVEMBER 7th

SYMPOSIUM



2014

9th ANNUAL MEETING

3) IMPROVING THE MANAGEMENT OF MEDICATION BURDEN IN DELIRIUM

Chair: **V. PAGE**

Multicomponent interventions to prevent delirium

JOHN YOUNG

Elderly Care Medicine and Head of the Academic Unit of Elderly Care and Rehabilitation
Bradford Institute for Health Research

Start and stop inappropriate medications in delirious patients

PAUL GALLAGHER

Director of Nursing, St. James's Hospital

The perioperative management of medications burden in orthogeriatric patients

YNGVE GUSTAFSON

Department of Community Medicine and Rehabilitation, Umeå universitet

The reduction of medications burden in the ICU

VALERIE PAGE

Department of Anaesthesia and Critical Care, Watford General Hospital

4) BEYOND DELIRIUM: THE ROLE OF "FRAILITY"

Chair: **B. KAMHOLZ**

Beyond delirium: the broader impact of Physiological Vulnerability

BARBARA KAMHOLZ

University of California, San Francisco, San Francisco VA Hospital

Longterm functional disabilities among survivors of critical illness

NATHAN BRUMMEL

Department of Medicine, Allergy, Pulmonary, and Critical Care Medicine, Nashville

Longterm cognitive and mental illness among survivors of critical illness

PRATIK PANDHARIPANDE

Department of Anesthesiology, Vanderbilt University Medical Center, Nashville

NOVEMBER 6th

SESSION 1

CLINICAL PRESENTATION
EPIDEMIOLOGY

1. A comparison of cognitive and neurocognitive profiles in elderly medical patients with delirium, dementia, comorbid delirium-dementia, and cognitively intact controls.

SHANE MCINERNEY (1) - JOHN MCFARLAND (1) - MAEVE LEONARD (2) - CANDICE E. CONDON (2) - VERA LONG (2) - FAHAD AWAN (2) - MARGARET O'CONNOR (1) - CATHERINE PETERS (1) - DECLAN LYONS (1) - DIMITRIOS ADAMIS (3) - PAULA T. TRZEPACZ (4) - DAVID J. MEAGHER (5)

University Hospital Limerick, University Hospital Limerick, Limerick, Ireland (1) - Cognitive Impairment Research Group, University Of Limerick Medical School, Limerick, Ireland (2) - Cognitive Impairment Research Group, Research And Academic Institute Of Athens, Athens, Greece (3) - Lilly Research Laboratories Indianapolis, Indiana, And University Of Mississippi Medical School, Tufts University Medical School And Indiana University School Of Medicine, Usa, United States (4) - Cognitive Impairment Research Group And University Of Limerick Medical School, Department Of Adult Psychiatry, University Hospital Limerick, Limerick, Ireland (5)

Background and Objectives: The differentiation of delirium and dementia is a key diagnostic challenge. However, there has been limited study of features that distinguish these conditions in hospitalized elderly.

Methods: Consecutive elderly medical inpatients with DSM-IV delirium, dementia, comorbid delirium-dementia, and cognitively intact controls were assessed using the Revised Delirium Rating Scale (DRS-R98), Cognitive Test for Delirium (CTD) and Neuropsychiatric Inventory (NPI-Q).

Results: 174 patients were assessed of which 49 had delirium alone, 58 had both delirium and dementia, 33 had dementia without delirium, and 34 were deemed cognitively intact. Both delirium and comorbid delirium-dementia groups scored higher than both controls and the dementia group for DRS-R98 and CTD total scores, but all three neurocognitively impaired groups scored similarly in respect of total NPI-Q scores. Delirium groups were distinguished from dementia for a range of non-cognitive symptoms but only for impaired attention of the DRS-R98 cognitive items. No individual CTD item distinguished comorbid delirium-dementia from delirium. Both attention ($p=0.002$) and vigilance ($p=0.01$) distinguished delirium from dementia, while only vigilance significantly distinguished delirium-dementia from dementia ($p<0.001$). There were no differences between the three neurocognitive disorder groups for any individual NPI-Q item severity, but agitation/aggression, irritability/lability and aberrant motor behaviour were more prominent in the two delirium groups, while depression/dysphoria sleep disturbances, and apathy/indifference were more severe in the dementia groups.

Conclusions: The Neurocognitive profile of delirium is similar with or without comorbid dementia and differs from non-delirious patients, including those with dementia. In particular, simple tests of attention and vigilance can help to distinguish delirium from other presentations. The NPI-Q does not distinguish between the severity of overall neuropsychiatric disturbances in delirium versus dementia.

NOVEMBER 6th

ORAL PRESENTATIONS



2014

2. Incidence, time of onset and course of postoperative delirium in octogenarians after transcatheter aortic valve implantation or surgical aortic valve replacement

LESLIE S. P. EIDE(1) - ANETTE H. RANHOFF(2) - BENGT FRIDLUND(3) - RUNE HAAVERSTAD(4) - KARL O. HUFTHAMMER(5) - KAREL KUIPER(6) - JAN E. NORDREHAUG(7) - TONE M. NOREKVÅL(4)

Department of Clinical Science, University of Bergen, Bergen, Norway (1) - Kavli Research Center for Geriatrics and Dementia / Department of Clinical Science, Haralds plass Hospital / University of Bergen, Bergen, Norway (2) - School for Health Sciences, Jönköping University, Jönköping, Sweden (3) - Department of Heart Disease / Department of Clinical Science, Haukeland University Hospital / University of Bergen, Bergen, Norway (4) - Centre for Clinical Research, Haukeland University Hospital, Bergen, Norway (5) - Department of Heart Disease, Haukeland University Hospital, Bergen, Norway (6) - Department of Cardiology / Department of Clinical Science, Stavanger University Hospital / University of Bergen, Stavanger, Norway (7)

Background: Transcatheter aortic valve implantation (TAVI) is an alternative to surgical aortic valve replacement (SAVR) for high risk patients with severe aortic stenosis. Postoperative delirium (PD) has not been systematically assessed after TAVI. The aim of this study was to determine incidence, time of onset and the course of PD after TAVI or SAVR.

Methods: This was a prospective cohort study of elective patients 80+ years receiving SAVR or TAVI in a major university hospital. PD was measured daily for five days in 126 patients with the Confusion Assessment Method (CAM). Other measurements included Mini Mental State Examination (MMSE), European System for Cardiac Operative Risk score (EuroScore) and American Society of Anesthesiologist (ASA) score.

Results: Mean age of patients was 83.5 years (SD 2.7) and 57% was female. TAVI was performed in 46% of patients. TAVI patients were older ($p \leq 0.001$); had lower MMSE ($p = 0.007$), more comorbidities ($p \leq 0.001$), higher EuroScore ($p \leq 0.001$) and more often ASA score IV ($p \leq 0.001$). PD was present at least once in 56% of the sample. In the TAVI group, 44% of patients developed PD compared to 66% of those treated with SAVR ($p = 0.01$). The average number of days with PD did not differ between patients treated with TAVI and SAVR (1.1 vs. 1.5, $p = 0.20$) but the course of PD was different. Of patients who experienced PD at least once, 74% of patients in the TAVI group experienced this on the first day, compared to 46% of patients in the SAVR group.

Conclusions: The incidence of PD was higher after SAVR. No differences in the number of days with PD were found. However, time of onset and the course of PD was more unpredictable in the SAVR group. We recommend assessment of PD at least once daily during the first two postoperative days for TAVI and for five days after SAVR.

3. A longitudinal study of delirium motor subtypes in elderly hip surgery patients: frequency and determinants.

BARBARA VAN MUNTER(1) - SOPHIA DE ROOIJ(1) - ANNEMARIEKE DE JONGHE(2) - DIMITRIOS ADAMIS(3) - DAVID MEAGHER(4)

UvA, AMC, Amsterdam, Netherlands (1) - Uva, AMC, Amsterdam, Netherlands (2) - Research and Academic Institute of Athens, Research and Academic Institute of Athens, Athens, Greece (3) - University of Limerick Medical School, University of Limerick Medical School, Limerick, Ireland (4)

Objectives: Delirium is a common neuropsychiatric syndrome with considerable heterogeneity that includes a variety of clinical (motor) subtypes. These subtypes differ for a variety of clinical parameters but because delirium is typically highly fluctuating, understanding the longitudinal stability of subtypes is crucial to evaluating their relevance to treatment and outcome.

Methods: We studied motor subtype profile of patients with delirium (using the Delirium Motor Subtype Scale: DMSS) assessed daily over a week in elderly patients undergoing orthopaedic surgery. A GEE Model examined possible predictors of change in motor subtype status, including baseline variables and delirium course.

Results: We included 118 patients developing DSM-IV delirium after hip-surgery [mean age 87.0 ± 6.5 years; range 65-102; 66% females]. At first assessment, hyperactive subtype was most common (49%), followed by hypoactive (31%) and mixed subtype (14%), with 6% of delirious patients without evidence of a DMSS-defined motor subtype. Almost two-thirds ($n = 69$) of these patients underwent at least one more assessment, and for these 45 (57%) remained stable in motor subtype over time, while the rest 34 (43%) underwent change. A range baseline characteristics (Katz score, Charlson comorbidity score, MMSE, Previous cognitive impairment, fracture type, anaesthesia type, number of medications, use of psychotropics, length of stay and demographic variables) or delirium duration or severity were not significant predictors of variability in subtype profile.

Conclusions: Motor subtype profile is typically stable for more than half of elderly orthopaedic patients with delirium. Changes in motor subtype profile do not appear to be predicted by demographic, clinical or treatment variables, or by the severity or duration of delirium. These findings suggest that evidence from cross-sectional studies of motor subtypes can be applied to most patients with delirium. Further longitudinal studies can clarify the stability of motor subtypes across different clinical populations.

4. Early PREdiction of DELIRium in ICu patients (E-PRE-DELIRIC): Multinational development and validation of an early delirium prediction model for intensive care patients

MARK VAN DEN BOOGAARD(1) - ANNELIES WASSENAAR(2) - THEO VAN ACHTERBERG(2) - ARJEN J.C. SLOOTER(3) - MICHAEL A. KUIPER(4) - MARGA E. HOOGEN-DOORN(5) - KOEN SIMONS(6) - EMILIO MASEDA(7) - NUNO PINTO(8) - CHRISTINA JONES(9) - ALAWI LUETZ(10) - ANNA SCHANDL(11) - WALTER VERBRUGGHE(12) - LEANNE AITKEN(13) - FRANK VAN HAREN(14) - ROGIER DONDEERS(15) - LISETTE SCHOONHOVEN(2) - PETER PICKKERS(1)

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OBJECTIVES: Delirium incidence in Intensive Care Unit (ICU) patients is high and associated with poor outcome. Identification of high-risk patients may facilitate its prevention. The objective of our study was to develop and validate an early ICU delirium prediction model.

METHODS: Prospective cohort study in thirteen ICUs from seven countries. Data of eighteen candidate delirium predictors were collected at ICU admission. Delirium was assessed using the confusion assessment method-ICU (CAM-ICU). Multiple logistic regression analysis was used to develop the early prediction (E-PRE-DELIRIC) model on data of the first two-thirds and validated on data of the last one-third of the patients from every participating hospital. The performance of the model was determined using the area under the receiver operating characteristic curve (AUROC) and calibration was assessed graphically.

RESULTS: 2,914 patients were included. The E-PRE-DELIRIC model consists of nine predictors assessed at ICU admission: age, history of cognitive impairment, history of alcohol abuse, urea level, admission category, urgent admission, mean arterial blood pressure, use of corticosteroids, and respiratory failure. The AUROC to predict delirium for the complete ICU length of stay was 0.75 (95%CI 0.73-0.77) in the development and validation data set. The model was well calibrated. Delirium that occurred later during ICU admission could be predicted more accurately, AUROC increased from 0.70 (95%CI 0.67-0.74, <2 days) to 0.81 (95%CI 0.78-0.84, >6 days).

CONCLUSIONS: Using the E-PRE-DELIRIC model patients' risk for ICU delirium can be predicted at admission, allowing early delirium preventive interventions in patients with a high delirium risk.

5. To characterise features of delirium in elderly medical in-patients in a sub-acute and rehabilitation hospital in Hong Kong

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OBJECTIVES:

This study aims to study the incidence, prevalence, features, risk factors and outcomes of patients with delirium managed in a sub-acute and rehabilitation hospital.

METHODS:

Shatin Hospital (SH) is the only sub-acute and rehabilitation hospital supporting the regional acute tertiary hospital. A cohort study was done in SH from January to June 2013. Delirium patients were screened by ward visits and performing the CAM (confusion assessment method) score. The background demographics, comorbidities, drug lists, features of delirium and the reported delirium onset time were recorded. Each subject was reviewed at least daily until discharge, to determine the duration of delirium, the features of delirium and complications arising from the delirium. A same number of non-confused subjects were recruited for comparison.

RESULTS:

Prevalence rate of delirium was 1.37% (47/3437), with an incidence rate of 0.73% (25/3437). Background dementia was the most relevant background predisposing comorbidity ($p < 0.05$). In the incident cases, precipitating factors within 2 weeks of delirium onset were any falls or trauma ($p < 0.05$), faecal impaction ($p < 0.05$) and pain ($p < 0.05$). Incident delirium patients used more physical restraints in the acute hospital ($p < 0.05$) and more chemical restraints in the sub-acute and rehabilitation hospital ($p < 0.01$). There was no difference in the length of stay, 28-day readmission, in-patient and 6-month mortality rates between the 2 groups.

CONCLUSIONS:

Some precipitants of delirium could be preventable by good nursing care. Iatrogenesis, especially restraints use, still needs to be further studied in larger scale studies on its role in precipitating incident delirium as they are important preventable risk factors.

6. Does a Femoral Nerve Block in Hip Fracture Patients reduce the incidence of delirium?—a randomized controlled trial

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Background

Hip fracture is one of the most common and difficult-to-treat injuries. One-year mortality is around 20% and most patients never regain their former functional level because of local and general complications. Delirium is a common complication, predisposing for other complications, such as infection and fracture repair failure. We studied if femoral nerve block gave less pain and delirium and other complications than conventional peroral and intravenous analgesia.

Patients and methods

In a prospective randomized controlled trial, we compared femoral nerve block with conventional pharmacologic perioperative analgesia in 240 consecutive hip fracture patients 70 years or older. The block was given as soon as possible after admission. Delirium was registered every day with the Nursing Delirium Screening Scale (Nu-DESC). In addition, Mini Mental State Examination (MMSE), Organic Brain Syndrome Scale (OBS) and Geriatric Depression Scale (GDS-15) were assessed on day 3-5 postoperatively. A specialist in geriatric medicine examined all assessments and used them to diagnose delirium according to DSM-IV criteria. Pain, physical function and complications were also registered.

Results

Preliminary results will be presented on the meeting.

Conclusion

Femoral nerve block is a safe, efficient and inexpensive treatment for patients with hip fracture, but the question is whether the block can reduce the incidence of delirium.

7. Delirium is a Risk Factor for Further Cognitive Decline in Cognitively Impaired Hip Fracture Patients

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OBJECTIVES: Delirium is a risk factor for dementia in cognitively intact patients. Whether an episode of delirium accelerates cognitive decline in patients with known dementia, is less explored.

METHODS: Prospective follow-up study of 287 hip fracture patients with pre-fracture dementia (defined as pre-fracture Informant Questionnaire on Cognitive Decline in the Elderly Short Form (IQCODE-SF) score of 3.44 or higher). At follow-up after 4 to 6 months, the caregivers rated cognitive changes added after the fracture using the IQCODE-SF questionnaire, and the patients were tested using Mini Mental State Examination (MMSE). A sub-group of the patients had a pre-fracture MMSE score which was used to calculate the yearly decline on the MMSE in the patients with and without delirium.

RESULTS: 201 of the 287 patients developed delirium in the acute phase. Using linear regression, delirium was a significant predictor of a more prominent cognitive decline at follow-up measured by the IQCODE-SF questionnaire ($p=0.002$). Among patients having a pre-fracture MMSE score, the patients developing delirium had a median (IQR) yearly decline on the MMSE of 2.4 points (1.1-3.9), compared to 1.0 points (0-1.9) in the group without delirium ($p=0.001$, Mann-Whitney test).

CONCLUSIONS: Hip fracture patients with pre-fracture dementia run a high risk of developing delirium. Delirium superimposed on dementia is a significant predictor of further cognitive decline measured by the IQCODE-SF questionnaire, as well as by the MMSE in a subgroup of our patients.

8. Hospital characteristics affect the prevalence of dementia in older people, and delirium prevalence on admission to hospital: a multi-hospital study

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OBJECTIVES: Delirium is common in older people admitted to hospital. We examined the prevalence of delirium and dementia in older people, in a prospective, multi-hospital study, to demonstrate hospital-related differences and provide generalisable prevalence data for Ireland.

METHODS: The Cork Dementia Study recruited 606 people over 70 years of age, admitted to six regionally-clustered Irish hospitals (one large private hospital; two small, rural hospitals; and three large, urban hospitals). Identical across-hospital assessments by a single research team included dementia and delirium testing within 36 hours of admission (Mini Mental State Examination, MMSE; Informant Questionnaire on Cognitive Decline in the Elderly, IQCODE; Clinical Dementia Rating Scale, CDR; Delirium Rating Scale Revised-98, DRS-R98; Confusion Assessment Method, CAM), with expert panel review of equivocal cases.

RESULTS: In total, 597 older patients had delirium and dementia status determinable (98.5%). Delirium prevalence varied markedly between hospitals: 6% in the private hospital, 20.6% in rural hospitals and 22.8% in urban, tertiary-care hospitals ($p < 0.001$). Similarly, dementia ranged from 7.9% (private) to 27% (urban) and 37% (rural), and dementia-with-delirium ranged from 33% (private) to 50% (rural) and 62.5% (urban). Dementia and delirium severity were also highest in rural hospitals (23% severe dementia); median DRS-R98 total score in delirium patients: rural: 24; urban: 21; private: 20). Rural hospital admissions were older and more commonly acute rather than elective, and more commonly a long-term care resident (9.3%, versus 1% in the private hospital, $p < 0.01$). Regression modelling demonstrated that the higher delirium prevalence in public hospitals was explained by patient characteristics (dementia, pneumonia and functional dependency), although delirium severity remained independently associated with public versus private hospitals, $p = 0.04$.

CONCLUSIONS: The prevalence of dementia and delirium varies across hospitals, reflecting differing hospital remits and admission practices. This study provides the first prospective, multi-hospital dementia/delirium prevalence data for Ireland.

9. The footprint of delirium in a general hospital: frequency and prognostic implications of delirium and subsyndromal delirium in an adult acute hospital population

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Background: The frequency of full syndromal (FSD) and subsyndromal (SSD) delirium is understudied. There is a lack of clear definition for SSD, such that previous studies have defined SSD both categorically and dimensionally. The reported frequency of SSD varies according to the definition applied and clinical population studied. We conducted a point prevalence study in a general hospital.

Method: Possible delirium identified by testing for inattention was evaluated regarding delirium status (FSD / SSD) using categorical (Confusion Assessment Method [CAM], DSM-IV) and dimensional (Delirium Rating Scale-Revised-98 [DRS-R98] scores) methods in Cork University Hospital, a tertiary referral centre with 500 acute beds over a 36 hour weekend period.

Results: 162/311 patients (52%) screened positive for inattention. Formal evaluation with three diagnostic tools (DRS-R98, CAM and DSM-IV) was conducted for 133 patients (85% of those with possible delirium; 43% of the total study group). Delirium was diagnosed in 55 (17.7%:DSM-IV), 52 (16.7%:CAM) and 58 (18.6%:DRS-R98 \geq 12) with concordance for 38 (12.2%) cases. SSD was identified in 24 (7.7%: DRS-R98 score 7-11) and 41 (13.2%: 2/4 CAM criteria) patients. SSD with inattention (versus without) had greater disturbance of multiple delirium symptoms.

Conclusions: The point prevalence of delirium and SSD was 25%. DRS-R98, DSM-IV and CAM delirium diagnoses have modest concordance. We describe a definition of subsyndromal delirium that can facilitate more systematic and comparable studies of SSD. Inattention should be central to SSD definitions.

1. Prevalence, risk factors and prognosis of delirium in elderly outpatients: a cohort study

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Introduction

Delirium occurs frequently in elderly patients admitted to hospital and nursing homes. Little is known about delirium in elderly outpatients. The aim of our prospective study was to assess prevalence, risk factors and prognosis of delirium in outpatients of a department for old age psychiatry.

Methods

Between March 2013 and March 2014, 444 patients with cognitive impairment were referred. The in-home assessment covered auto- and hetero-anamnesis, medical history, psychiatric and somatic examination, medication use, and daily functioning. Symptoms and severity were recorded with the Delirium Rating Scale - Revised 98. Delirium was diagnosed according to DSM-IV criteria. Standardized blood and urine tests were performed. Patients with delirium at baseline were re-assessed three months later.

Results

At baseline, 81 patients were found to have delirium (18%). Sixty-five of these patients did not have pre-morbid dementia. The most common contributing or precipitating factors were metabolic disturbance (49%), infection (41%), and medication (21%). Delirium was the first sign of disease in four persons with cancer. Three of 81 patients were admitted to hospital for treatment. At three months follow-up, five persons had died (6%), delirium had remitted fully in 58 patients (72%), persisted (partially) in 21 patients (26%), and re-occurred in 2 patients (3%). Twenty-four patients had moved to a nursing home because cognitive daily functioning did not return to pre-delirium status.

Conclusions

Delirium was present in almost 1 of 5 outpatients referred to an outpatient department of old age psychiatry for cognitive assessment. Most underlying diseases could be treated successfully at home, but in one third of patients prognosis was poor.

2. Lessons learnt from a pilot study assessing neuropsychiatric symptoms to detect depression, delirium and dementia in homes for the aged.

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OBJECTIVES: Pilot study to assess the feasibility of systematically detecting neuropsychiatric symptoms, delirium, depression and dementia in homes for the aged.

METHODS: A prospective observational pilot study, including evaluation of feasibility aspects. Seventy inhabitants of a Dutch home for the aged were approached to participate. At baseline the Neuropsychiatric Inventory, the Mini Mental State Examination, the Geriatric Depression Scale, the Cornell Scale of Depression in Dementia and the Confusion Assessment Method were taken from all participants. During a three-month's observation period all participants who needed a GP's home visit concerning new neuropsychiatric symptoms, were re-tested using the same tests as in baseline. GP's medical files were evaluated concerning neuropsychiatric diagnoses and symptoms and geriatric nurses were interviewed about their observations.

RESULTS: Cooperation of the GPs and the homes for the aged was acceptable. Forty percent of the eligible residents agreed to participate. Elderly for whom informed consent had to be retrieved from their relatives, hardly participated in our study. At baseline 75% of participants showed one or more neuropsychiatric symptoms, 46% showed cognitive decline and about 25% had signs of depression. Hardly any of these findings were recorded in the GP's medical file. The geriatric nurses observed behavioral changes, but tended not to report all observations to the GP.

CONCLUSIONS: Inclusion of cognitively impaired elderly in research is difficult. The already high- prevalence- and incidence-numbers of neuropsychiatric symptoms found are probably an underestimation due to underreporting and selection bias. Most of these signs or diagnoses were not registered in the GP's medical file.

REFERENCES: De Lange, E., Verhaak, P.F.M, van der Meer, K. (2013). Prevalence, presentation and prognosis of delirium in older people in the population, at home and in long term care: a review. *International Journal of Geriatric Psychiatry*, 28(2), 127-34. doi: 10.1002/gps.3814.

3. Delirium risk is associated with hospital falls**MARIANNE SHAUGHNESSY (1) - KELLY DOHERTY (2) - ELIZABETH ARCHAMBAULT(3) - RUDOLPH JAMES (2)**

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OBJECTIVES:

Hospital falls result in increased morbidity, mortality, and cost. The risk factors for falls overlap with delirium risk factors. The purpose of this analysis was to examine the value of a delirium prediction rule and hospital falls

METHODS:

A validated medical record review of delirium risk upon admission and evidence of falls was conducted on a random sample of US Veterans admitted from October 2010 to September 2012. The medical record review included four delirium risk factors with one point given for each factor: cognitive impairment, sensory impairment, severity of illness, and dehydration. In addition to examining the risk for falls with each delirium factor, we also examined the association of the count of delirium risk factors with falls and the area under the ROC (AUROC) curve.

RESULTS:

The patients reviewed (n=46,626) were largely older (age=76-8) and male (99%) and falls occurred in <1% (n=375). Veterans with the following delirium risk factors were more likely to fall: cognitive impairment (RR=1.9, 95%CI 1.5, 2.4), visual impairment (RR=1.2 95%CI 0.98, 1.5), severity of illness (RR=1.3 95%CI 1.02, 1.5), but not dehydration (RR =1.1 95%CI 0.9, 1.3). An increasing number of risk factors was associated with falls (IRR=1.1 95%CI 1.0, 1.3 per additional risk factor). The AUROC was 0.56 95%CI 0.54, 0.59.

CONCLUSIONS:

Delirium risk factors are associated with increased fall risk. The chart review methodology is less optimal relative to in-person assessment and the predictive value suggests other elements may contribute to falls prediction. As electronic records become more developed and searchable, the role of identifying delirium risk should include the prediction of falls.

4. Predictors of recurring delirium among older patients in a rehabilitation setting**VINCENZA FRISARDI (1) - ELEONORA MARELLI (2) - GIUSEPPE ANTONIO PROCINO (2) - SILVIO GIORGI (2) - SANTINA BRUNO (2) - MARIA COTTINO (2) - GIORGIO PREVIDERÈ (3) - DAVIDE DELL'ACQUA (2) - DANILA FERRARI (2) - ROSARIA TARARÀ (2) - ANGELA MERCANTI (2) - ADRIAN PERIN (2) - ANTONIO GUAITA (4) - MAURO COLOMBO (2)**

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OBJECTIVES: Delirium is a complex neuropsychiatric syndrome. Its prevalence can reach about 60% in rehabilitation departments¹. Risk factors for incident delirium have been identified² while they are underinvestigated for its recurrence. The aim of this study is to detect potential predictors of recurring delirium.

METHODS: A total of 1,563 subjects admitted to Rehabilitation departments of "Camillo Golgi" Institute during the period from 2007 to 2011 have been examined. People were evaluated by a comprehensive multi-dimensional assessment and delirium was identified using the Confusional Assessment Method. We have defined "recurring delirium" as a relapsing delirium after total recovery from a first episode. A logistic regression analysis was performed with SPSS 11.0. Potential predictor factors have been identified with contingency table (for categorical variables) or comparison between averages (for continuous variables).

RESULTS: At admission, 54 persons (3,5 %) had delirium only at admission without relapses, 89 subjects (5,7%) had only incident delirium, while 73 (4,7%) presented recurring delirium. Baseline variables associated with the occurrence of delirium (p< 0.05) were age, sex, global cognition [Mini Mental Status Examination], mood [Geriatric Depression Scale], pain [verbal numerical scale], number and severity of pressure ulcers [European Pressure Ulcers Advisory Panel (EPUAP) stage ≥ 2nd], nutritional status [Mini Nutritional Assessment short form (MNA-SF)], motor and functional performances [Tinetti Scale and Barthel Index], clinical status [Cumulative Illness Rating Scale - Severity Index and Comorbidity Index (CIRS-SI and CIRS-CI)]. Among these, sex [Odds Ratio (OR) = 4,213; confidence interval (CI) 95 % = 1,697 - 10,457; p = 0,002], MMSE (OR = 0,841; CI 95 % = 0,782 - 0,904; p< 0.001) and MNA-SF (OR = 0,787; CI 95 % = 0,672 - 0,922; p = 0,003) have been associated with recurring delirium.

CONCLUSIONS: Detecting predictive factors of recurring delirium could be clinically advantageous in successful multicomponent interventions in clinical rehabilitation settings.

5. RADAR: a screening tool for signs of delirium and a potential measure of the sixth vital sign

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OBJECTIVES:

- The primary objective was to develop a new screening tool to increase recognition of delirium symptoms during nursing care.
- The second objective was to assess the potential of RADAR as a measure of the sixth vital sign.

METHODS:

To ensure the correct balance between validity and feasibility issues, RADAR was mapped out in a 5-step process. Nursing staff provided input at every step in the testing process. Steps 1 to 3 ended in early 2011 and consisted of compiling the questions for RADAR, pre-testing the questions among nursing staff and determining content validity with independent experts in delirium research. Step 4, completed in June 2012, served to test the validity of the first version of RADAR (5 items). Step 5 concentrated on training the nursing staff in an acute care hospital and a nursing home to use RADAR. Training comprised a 5-minute oral presentation, followed by a 13-minute video and a series of bedside coaching sessions. In addition, the number of RADAR items was reduced from five to three. Step 5 ended in November 2013.

This presentation focuses on the validity and reliability of the 3-item RADAR and its acceptability by the nursing staff.

RESULTS:

Reliability of RADAR is very good to excellent. Percentages of agreement varied from 84% to 100%. RADAR has only three items; when one item is scored positive, it predicts a DSM-IV-TR delirium with a sensitivity of 73% and a specificity of 67%. RADAR was favorably received ($\geq 95\%$) by the participating nursing staff who took seven seconds on average to complete it. Whenever nurses scored one item of the RADAR as present, the tool predicted an acute cognitive impairment in the older adult 98% of the time.

CONCLUSIONS:

RADAR is quick to administer, reliable and sensitive, and very well accepted by nursing staff. Implementing RADAR is an appropriate delirium screening option for acute care hospitals and nursing homes.

6. Validation study of cerebral blood flow in delirium superimposed on dementia and individual patient data meta-analysis

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OBJECTIVES:

It has long been known that cerebral blood flow is decreased in delirium and in dementia. We recently showed in a study of 44 patients that middle cerebral artery blood flow velocity measured by transcranial doppler can accurately diagnose delirium superimposed on dementia, and correlates with delirium severity and improves after resolution of delirium. We conducted a validation study in a new group of patients to determine whether we could replicate these findings.

METHODS:

Prospective cohort study of 41 Geriatric Medicine patients in four groups: 1. delirium - no history of dementia; 2. DSD; 3. acute illness without delirium or dementia; and 4. Alzheimer's Dementia (AD), no delirium. We measured CBF using transcranial doppler (TCD) to assess flow velocity (FV) and pulsatility index (PI) in the middle cerebral artery (MCA). We combined the individual patient data in a meta-analysis of all 85 subjects.

RESULTS:

DSD has lower FV than either AD or delirium alone, or acute illness (30.0 ± 8.2 v AD: 40.0 ± 14.4 ; $p = 0.014$; v delirium 38.4 ± 14.0 ; $p = 0.029$; v acute illness 41.8 ± 11.2 ; $p < 0.001$). Using the previously identified mean MCA FV cut-off of 32.25 cm/sec diagnoses DSD with a sensitivity of 0.696 and specificity of 0.712, Positive Predictive Value of 48.5% and Negative Predictive Value of 85.7%. Area Under the Curve 0.788; $p = 0.001$.

CONCLUSIONS:

With extended data transcranial Doppler still performs reasonably well as a diagnostic test for DSD. The continued strength of this relationship suggests pathophysiological significance.

7. Cognitive Predictors of Incident Delirium

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INTRODUCTION: Delirium is common, under-recognised, and independently leads to poor outcomes. Identification of a delirium prodrome would facilitate prompt detection and early intervention. A prospective study of incident delirium was conducted aiming to characterise prodromal features.

METHODS: Medical inpatients of 70 years and older were assessed for delirium within 36 hours of admission using the Delirium Rating Scale-Revised '98 (DRS-R98). Consenting subjects without prevalent delirium were then assessed daily for delirium development. Additionally, other cognitive tests were performed daily including 6-item cognitive impairment test (6CIT) (scores ≥ 8 indicate cognitive impairment), spatial span forwards (SSF), days of the week backwards (DOTWB) and a score of visuospatial function. Control subjects remained non-delirious over at least 4 consecutive assessments.

RESULTS: Overall, 191 patients were included, mean age 80 years \pm 5.85, 52.9% male. Incident delirium was diagnosed in 61 patients, 30 of whom developed delirium on the second day of admission. Taking a subgroup of all patients who developed delirium on day two and control patients (total $n=160$), a preliminary logistic regression analysis was used to examine if cognitive tests on first assessment predicted delirium diagnosis the following day. On univariate analysis, 6CIT, SSF, DOTWB and visuospatial score were all significant predictors of impending delirium. Controlling for sex, age, dementia, Barthel Index, Cumulative Illness Rating Scale and hearing impairment, a 6CIT score of ≥ 8 still predicted delirium on the day preceding diagnosis (OR 6.94, 95% CI 1.22-39.45, $p=0.03$).

CONCLUSIONS: The 6CIT is a quick, simple test which requires minimal training. It incorporates tests of orientation, logical memory and two tests of attention (months of the year backwards and counting backwards from twenty to one). Our preliminary findings indicate that impairment on the 6CIT within 36 hours of admission heralds impending delirium and hence may act as a cognitive marker of the delirium prodrome.

8. The Letter and Shape Drawing (LSD) Test: a Novel Test of Visuospatial function

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Cognitive Impairment Research Group (CIRG), Graduate entry Medical School University of Limerick, University Hospital Limerick / University of Limerick, Limerick, Ireland (1)

OBJECTIVES:

The Clock Drawing (CDT) and Intersecting Pentagons (IP) are simple tests used to assess visuospatial abilities in the clinical scenario. However, there is considerable inconsistency in the delivery and interpretation of these tests such that a computerised alternative may have significant advantages. The Letter and Shape Drawing Test (LSD) is being developed as a new test to address shortcomings in the administration and scoring of these tests.

The aim of this study is to investigate how the LSD performed in comparison with conventional bedside tests of cognition, in identifying cognitive impairment in the elderly hospitalised patients.

METHODS:

A cross-sectional study with sample size of 100 patients aged 65 years and above admitted to the general wards of University Hospital Limerick with and without evidence of cognitive impairment. All participants were assessed with the Revised Delirium Rating Scale-R98 (DRS-R98); Cognitive Test for Delirium (CTD); and the MMSE, as well as the CDT, IP, and the LSD test.

RESULTS:

Performance on the LSD test significantly correlated with tests of general cognition and visuospatial function. Specifically, for the LSD and MMSE ($k=0.67$), the LSD and CDT ($k=0.73$), and the LSD and IP ($k=0.80$).

CONCLUSIONS:

The LSD is a novel test that can provide a simple and efficient means of assessing visuospatial function across a range of clinical populations. These findings indicate high correlation with conventional tests of general cognitive function and visuospatial performance. The LSD test has the added advantage of being designed to allow for ease of presentation via smartphone technology thus creating a highly reliable digital record of subject performance.

9. Continuous EEG monitoring for delirium detection in the ICU

**MARTINE J.M. BRETELER (1) - ESTHER M. VAN DER HEIDE (2) - SIMONE P. SMOOK (3)
- BERT BEISHUIZEN (4) - MICHEL J.A.M. VAN PUTTEN (5)**

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BACKGROUND: Recognition and diagnosis of delirium in ICU patients is difficult due to the fluctuating character and the subjective and discontinuous nature of clinical assessment such as CAM-ICU screening. Hence, there is clear need for an objective, continuous measurement method. It is known that delirium is associated with changes in the electroencephalogram (EEG), reflected as an increase in theta and delta and reduction in alpha power. This makes EEG a candidate tool for delirium detection and monitoring. **OBJECTIVES:** to determine if changes in EEG are indicative for delirium in the ICU and whether EEG can be used for delirium detection.

METHODS: In a case-control observational study, continuous EEG recording was applied (maximum 5 days). Exclusion criteria were RASS \leq -3 and neurological disorders. Patients were screened using CAM-ICU 3x/day. Around each CAM-ICU score a window of 1 hour was defined within 5 minutes of artifact-free EEG was selected and divided in 30 epochs of 10 seconds. Five EEG features were combined into a learning K-Nearest Neighbor Classifier (KNNC).

RESULTS: 20 patients, mean age of 67 ± 7.0 years, were included of which 10 were delirious and 10 were not. Delirious patients showed higher theta power (delirious: 0.29 [IQR 0.24-0.36], non-delirious: 0.26 [IQR 0.21-0.31]), increased alpha power (delirious: 0.19 [IQR 0.08-0.26], non-delirious: 0.10 [IQR 0.07-0.14]) and reduced delta power (delirious: 0.48 [IQR 0.36-0.66], non-delirious: 0.61 [IQR 0.54-0.68]). KNNC achieved a sensitivity of 79% and a specificity of 93%.

CONCLUSIONS: In line with literature we showed an increased theta power in delirious patients. However, delta was decreased and alpha increased as opposed to other studies. This could be due to sedatives or severity of illness for which no correction was made. The classifier is able to distinguish delirious and non-delirious patients with high sensitivity and specificity. This method could have potential for continuous delirium detection.

ORAL PRESENTATIONS

SESSION 3ETIOLOGY - PATHOPHYSIOLOGY
MISCELLANEOUS**1. DelTAC: Development of the Delentia Tests of Attention and Comprehension****VERA LONG (1), DR MARIA SEMKOVSKA, PROFESSOR DAVID MEAGHER, DR CHRIS EXTON, DR MAEVE LEONARD, DR OLUGBENGA WILLIAMS, DR FAHAD AWAN**

Cognitive Impairment Research Group, University of Limerick, Limerick, Irlanda (1)

OBJECTIVES:

Our objective was to develop an individual test of comprehension and attention to distinguish disorders of attention from comprehension disorders in delirium and dementia. Comprising a series of items modified from the Revised Token Test (RTT), Cognitive Test for Delirium (CTD) and researcher's own items resulted in the Delentia Test of Attention and Comprehension (DelTAC).

METHODS:

We developed the test by modifying and refining items from the RTT, CTD and additional items based on extensive research of cognitive impairment and rehabilitation. Pilot testing and precise item reconstruction resulted in the current 10 item version. We assessed hospitalised patients (N = 27) aged 68 to 93 years using a standard pen and paper method alongside a number of well-validated psychometric tools (DRS-R98, CTD, IQCode, DMSS & CSDD).

RESULTS:

A total of 27 patients completed the study; 10 females and 17 males. Patients were hospitalised in medical (23), surgical (1) and coronary care (3) wards with the following diagnoses; pure delirium (8), pure dementia (6), dementia + delirium (11), neither (2). No significant differences were found between the 3 groups (pure delirium, pure dementia, dementia + delirium) on any of the cognitive tests, this may be attributable to the small sample size. However, correlational analysis between the DelTAC and the CTD resulted in the following significant findings; CTD attention item and DelTAC comprehension (p = .744), CTD attention item and DelTAC attention (p = .641), CTD comprehension item and DelTAC comprehension (p = .566), CTD comprehension and DelTAC attention (p = .642). CTD vigilance item and DelTAC attention (p = .646).

CONCLUSIONS:

Our findings suggest the DelTAC is a valid and sensitive test to distinguish disorders of attention from comprehension disorders in delirium and dementia. We hypothesise increased data volumes will result in higher sensitivity and validity.

2. Does melatonin play a crucial role in delirium pathophysiology?**KAROLINA PIOTROWICZ (1) - ALICJA KLICH-RĄCZKA (1) - AGNIESZKA PAC (2) - TOMASZ GRODZICKI (1)**

DEPARTMENT OF INTERNAL MEDICINE AND GERONTOLOGY, JAGIELLONIAN UNIVERSITY MEDICAL COLLEGE, KRAKÓW, Poland (1) - CHAIR OF EPIDEMIOLOGY AND PREVENTIVE MEDICINE, JAGIELLONIAN UNIVERSITY MEDICAL COLLEGE, Kraków, Poland (2)

Background: Melatonin hormone circadian rhythm imbalance is one of the proposed theories for delirium.

Methods: Elderly patients of the general medical ward were screened for acute delirium.

The concentration of melatonin was measured in the serum samples by radioimmunoassay method. Blood samples were collected 4 times on the day when delirium was diagnosed and 72 hours after delirium subsidence (at 12 p.m., 6 p.m., 12 a.m. and 6 a.m.).

The area under a curve (AUC) was calculated for melatonin and a difference between AUC on delirium and after its resolution was calculated (Δ AUC). In order to compare change in melatonin concentration in the period of time, on the day of delirium and after resolution, an absolute difference and ratio being a quotient between 2 melatonin levels (06 p.m. and 12 p.m., 12 a.m. and 12 p.m., 6 a.m. and 12 p.m.) were calculated. Results were presented as mean \pm SD values.

Results: 30 delirious patients of the mean age (\pm SD):86.5 \pm 5.2 years; age range:78-98; 73.3% women. Delirium was diagnosed most often on the 2,3 and 4th days of hospitalization (57% of cases); dementia was suspected in 63.3%.

There was no difference between AUC for melatonin on delirium and 72 hours after its resolution in the whole group (AUC_delirium:624.8 \pm 401.4 vs AUC_after72h:584.4 \pm 415.4; Δ AUC:40.4 \pm 444.9). There were no significant differences when compared absolute differences in melatonin concentration between 2 time points, in those with delirium and after its resolution. Significant difference was observed if compared ratios (melatonin_concentration_12a.m./melatonin_concentration_12p.m.), measured on delirium and after 72 hours of its subsidence (2.47 \pm 2.0 vs 3.75 \pm 4.8, p=0.03). Such a difference was statistically significant also in subgroup of non-demented delirious patients (1.78 \pm 1.5 vs 4.27 \pm 7.2, p=0.04).

Conclusion: Delirium was associated with alteration in melatonin diurnal profile in spite of preserved total production. That effect seemed to be more pronounced in patients without dementia.

3. The role of established and novel CSF biomarkers for Alzheimer's disease in delirium

LEIV OTTO WATNE (1) - ANE-VICTORIA IDLAND (1) - NENAD BOGDANOVIC (1) - HENRIK ZETTERBERG (2) - OSKAR HANSSON (3) - KAJ BLENNOW (2) - TORGEIR BRUUN WYLLER (1)

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OBJECTIVES: Cerebrospinal fluid (CSF) biomarkers for Alzheimer's disease have to some extent been measured in delirium. The results are inconclusive, and only established biomarkers have been measured. We wanted to investigate the role of established and novel CSF biomarkers for Alzheimer's disease in delirium.

METHODS: From September 2009 to January 2012, 329 hip fracture patients admitted to Oslo University hospital were included in an RCT evaluating the effect of an orthogeriatric service. Delirium was assessed with CAM and MDAS. Cognitive function was assessed 4 and 12 months after surgery. Blood samples were taken pre- and postoperatively, and CSF was drawn at the onset of spinal anesthesia.

A reference material of CSF and blood taken from elderly patients undergoing elective surgery in spinal anesthesia was also collected. Patients were included from different hospitals in Oslo from February 2012 to June 2013. These patients were comprehensively cognitively tested preoperatively and will be followed with repeated cognitive tests in the future.

RESULTS: CSF was available from 130 hip fracture patients (delirium = 71) and 150 elective patients. More specifically we have measured:

- Different markers of plaque pathology (A-beta 1-38, A-beta 1-40, A-beta 42) and neuronal injury (tau and p-tau).
- YKL-40 a potential marker of microglial activation.
- NFL (neurofilament light) a marker of myelinated axons.
- HFABP (heart-type fatty acid binding protein) a marker of neuronal cell death in several neurodegenerative disorders.

CONCLUSIONS: The analyses have just been carried out, and the results are now being interpreted. Preliminary results will be presented at the conference.

4. Decreased functional connectivity similar in delirium and mild sedation, directionality shows the opposite

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Department of Intensive Care Unit, University Medical Center Utrecht, Utrecht, Netherlands (1)

OBJECTIVES:

The EEG of delirium after cardiac surgery was found to be characterized by decreased functional connectivity in the alpha frequency band, combined with shifted directionality of information flow. Both phenomena indicate a disturbed global brain function. To further improve our understanding of the neuronal network changes in delirium, we evaluated these measures in patients with mild sedation, who show comparable features, like attention deficits. The aim of this study was to evaluate connectivity and directionality of information flow in mildly sedated patients, patients with hypoactive delirium and patients without delirium.

METHODS:

EEG recordings were obtained in 15 patients immediately after cardiac surgery, and in patients with hypoactive delirium (n=20), and non-delirious controls (n=20), classified by a delirium expert based on DSM-IV criteria. The phase lag index (PLI) was used to assess functional connectivity between EEG time series. The PLI estimates synchronization between time series and ranges between 0 (no phase locking) and 1 (total synchronization). The directed PLI was calculated to obtain the direction of synchronization. For each subject, the average PLI between all EEG channels and dPLI between three regions (anterior, central, posterior) were computed in four EEG frequency bands.

RESULTS:

Mildly sedated patients had a similar level of consciousness as patients with hypoactive delirium. The PLI was significantly lower in the alpha band in delirium (median; 0.12 (Inter Quartile Range; 0.11-0.14)) and sedation (0.13 (0.11-0.14)) compared to controls (0.15 (0.13-0.18), p=0.006). In the delta, theta, and beta frequency bands no differences were found. The dPLI was significantly different between delirium and mild sedation in the theta frequency band (p=0.011), delirium showed a back-to-front pattern whereas mild sedation showed a front-to-back pattern, no differences were found with controls.

CONCLUSIONS:

Patients with hypoactive delirium and patients with mild sedation share loss of alpha band functional connectivity, but have an opposite direction of synchronization.

5. A reduction of Neutrophil Extracellular Traps may contribute to systemic inflammation in delirium and could contribute to poorer clinical outcomes

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OBJECTIVES: Delirium is an acute neuropsychiatric syndrome associated with poor health outcomes with increasing prevalence in older people. Despite its clinical importance its pathophysiology remains uncertain. A proposed mechanism causally links systemic inflammation with central neuroinflammation. Neutrophils, as vital components of the innate immune response known to undergo an age-related decline in function, may be a mediator of this link. Bacteriocidal neutrophil extracellular traps (NETs) are released from activated neutrophils and may also limit inflammation by degrading systemic pro-inflammatory cytokines. Neutrophil maturity and activation status may favour or inhibit NET release. These experiments sought to explore whether neutrophil NET release is altered in delirium and whether this is associated with an altered surface expression of markers of activation and maturity.

METHODS: Neutrophils were isolated from patients over 65 years old admitted with delirium (n=11), sepsis without delirium (n=18) (both within 24 hours of admission) and healthy age matched controls (n=20). NET release was measured on isolated cells using fluorometry. Expression of surface markers CD16/CD11b/CD62L/CD63/CD66b was measured on neutrophils in whole blood by fluorescence-activated cell sorting.

RESULTS: NET release was decreased in neutrophils isolated from patients with delirium compared with septic patients without delirium and healthy controls (healthy elderly: 9538 AFU (± 804), sepsis without delirium: 7606 AFU (± 619) delirium patients: 5519 AFU (± 392), $p = <0.05$). CD16 expression, which is reduced in apoptotic cells that cannot form NETS, was decreased on neutrophils isolated from patients with delirium (Healthy elderly: 255795 AFU (± 13343), delirium: 172026 AFU (± 23017), $p = 0.014$). There was no difference in CD11b/CD62L/CD63/CD66b.

CONCLUSIONS: Delirium was associated with decreased NET release. This may contribute to increasing systemic inflammation and lower bacteriocidal function. Both functions could contribute to the pathology of and poorer outcomes in delirium.

6. Anticholinergic drugs and the transition to delirium in critically ill patients

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OBJECTIVES:

Cholinergic deficiency is supposed to be an important factor in the development of delirium. Drugs with anticholinergic effects may therefore be a potential modifiable risk factor for delirium, but this has never been studied in Intensive Care Unit (ICU) patients. We aimed to investigate whether exposure to drugs with anticholinergic effects increase the risk of transitioning to delirium in ICU patients.

METHODS:

A prospective cohort study was conducted. Exposure to drugs with anticholinergic effects was scored using the Anticholinergic Drug Scale (ADS). Mental status classification was performed daily, into 'awake and not delirious', 'delirious' or 'comatose', using an algorithm with high sensitivity and specificity based on the CAM-ICU for bedside nurses, start of haloperidol/quetiapine, chart review, and the CAM-ICU administered by researchers in selected patients. A first order Markov multinomial log linear regression model was used. Adjustments were made for age, gender, type of admission, presence of severe sepsis and septic shock, use of mechanical ventilation and length of stay until the concerning transition. We further adjusted for severity of illness at admission and during ICU stay, using the APACHE-IV score and the daily SOFA score.

RESULTS:

The patient population consisted of 1112 patients admitted to the ICU, and represented 9867 days of observation. The transition from awake and not delirious to delirious was seen 562 times (6%). The daily ADS score ranged between 0 to 79, with a median score of 5 (IQR 2-9). A one unit increase in ADS score was associated with a significant increase in relative risk of 1.02 (95% CI 1.01-1.04) for becoming delirious the next day, when awake and not delirious the previous day.

CONCLUSIONS:

In ICU patients, the daily exposure to drugs with anticholinergic effects significantly increased the risk of transitioning to delirium from an awake and not delirious state.

1. Risk and precipitating factors (e.g. dementia, infection)
Anticholinergic burden at ICU admission provokes the onset of delirium

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OBJECTIVES:

To assess the influence of anticholinergic medication prior to ICU admission on the incidence and duration of delirium.

METHODS:

We conducted a single-center prospective cohort study in ICU patients in a large academic hospital in the Netherlands between 2011-2013. Delirium was daily assessed using a validated protocol based on the CAM-ICU. Anticholinergic burden was estimated with the Anticholinergic Drug Scale (ADS). A multivariable Cox regression with competing risk (death and discharge) analysis was used to estimate cause-specific Hazard ratio's (SHRs) and taking potential confounders into account. The cumulative days of the first delirium episode was compared using Poisson regression analysis. Because of expected effect modification we stratified by age.

RESULTS:

Among 1090 patients evaluated, 27% scored ≥ 2 points on ADS and 513 (48%) developed delirium. Overall SHR for ADS ≥ 2 points compared to those with ADS 0 points was 1.37 (1.11-171). In patients aged ≥ 65 years this remained significant with SHR 1.50 (1.10-2.04) and lost significance in those aged < 65 years with SHR 1.21 (0.88-1.66). In patients scoring ≥ 2 on the ADS the duration of the first delirium episode was 1.63 (1.24-2.15) times longer compared to patients scoring 0 points.

CONCLUSIONS:

Anticholinergic burden is associated with onset and longer duration of delirium in ICU patients. These effects are stronger in patients ≥ 65 years old.

2. The relationship of hemoglobin levels, delirium and cognitive status in hospitalized geriatric patients: results from the CRIME study.

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BACKGROUND:

Delirium is a frequent clinical complication in geriatric patients admitted to the hospital, because of the simultaneous presence and synergistic effect of predisposing and precipitating factors. Also anaemia is a common concern in geriatric population. The aim of this study was to investigate the association between anaemia (precipitating factor) and delirium in a sample of Italian older hospitalized patients with different degree of cognitive impairment (predisposing factor).

METHODS:

Cross-sectional analysis of 1069 participants enrolled in the CRIME study, with assessment of hemoglobin levels at hospital admission. Delirium was assessed using DSM-IV criteria, whereas cognitive status was categorized as dementia, cognitive impairment or normal, according to clinical history, specific treatment and MMSE score. Anaemia was defined according to sex-specific WHO criteria. The association of hemoglobin levels and delirium was investigated with multivariable logistic regression models.

RESULTS:

Mean age of study participants was 81.4 ± 7.2 years, 52.2% had prevalent anaemia, 6.1% had delirium. According to cognitive status 20.8% had dementia and 40.9% had cognitive impairment. Overall there was no association between anaemia and delirium. However, among patient with cognitive impairment (MMSE < 24 , no dementia) anaemia was significantly associated with the likelihood of delirium ($p < 0.006$). Multivariate logistic regression analysis, adjusted for potential confounders, showed in these patients a graded increased risk of delirium according to anaemia severity with a fivefold increased risk of delirium in moderate-severe anaemia (OR 5.49, 95% CI:1.07-28.18).

CONCLUSION:

In older patients with cognitive impairment moderate-severe anaemia is independently associated with the likelihood of delirium. Further studies should investigate if anaemia correction would translate in delirium risk reduction.

3. The impact of frailty on post-operative delirium in cardiac surgery patients

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OBJECTIVES:

We sought to determine if frailty is associated with an increased occurrence of post-operative delirium and if the incorporation of frailty to the traditional cardiac surgery risk prediction tool EuroSCORE II would improve model performance with respect to predicting post-operative delirium.

METHODS:

A prospective observational cohort study was conducted. Study participants underwent a detailed assessment of frailty. A dichotomous determination of "frail" or "not frail" was made based on the Modified Fried Criteria and the Short Physical Performance Battery. Placement along a gradient of frailty was done based on a 35-item Frailty Index. The primary outcome variable was post-operative delirium, as assessed by the Confusion Assessment Method.

RESULTS:

Seventy-two (54.1%) of the 133 study participants met the Modified Fried Criteria for frailty and 69 (51.9%) met the Short Physical Performance Battery criteria. Eighty-eight (66.2%) participants had a Frailty Index score ≥ 0.2 , 61 (45.9%) had score ≥ 0.25 , and 47 (35.3%) had score ≥ 0.3 . After adjusting for the EuroSCORE II, those deemed frail under the Modified Fried definition were at increased risk of delirium (adjusted OR 5.05, 95% CI 1.58-16.13). Participants meeting the Short Physical Performance Battery definition of "high risk frailty" were at greater risk (adjusted OR 8.26, 95% CI 2.23-30.64). With the Frailty Index, there was a gradient of risk depending on the individual's degree of frailty. The inclusion of any of these definitions of frailty improved the discrimination of the EuroSCORE II in predicting for post-operative delirium.

CONCLUSIONS:

In this prospective study, we found that frailty results in a three- to eight-fold increase in risk of post-operative delirium, independent of the EuroSCORE II. "Frail" and "not frail" may be considered two ends of a continuum, and the risk of post-operative delirium grows as one becomes increasingly frail. The addition of frailty improves the ability of the EuroSCORE II to predict post-operative delirium. While additional study is needed, frail cardiac surgery patients with should be closely followed for postoperative delirium.

4. Frailty and Delirium in hospitalized older patients

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VA Boston Healthcare System, Harvard Medical School, Boston, United States (1)

Background:

While cognitive impairment is a known risk factor for delirium, less is known about physical frailty. The purpose of this secondary analysis is to look at frailty components as risk factors for delirium, as well as, look at the inter-relationship of frailty and delirium on length of stay.

Methods:

The prospective study recruited 250 participants who were admitted to the hospital and provided written informed consent. Frailty was measured with 4 factors: exhaustion, weight loss, grip strength, and self-reported physical ability. Delirium was assessed with clinical expert interview and assessment upon enrollment and daily thereafter and diagnosed according to the DSM-IVtr criteria. The inter-relationship of delirium and frailty was examined using a Chi-Square. Length of stay analyses were highly skewed and utilized nonparametric comparison methods.

Results:

Of the 250 participants consented, 225 did not have prevalent delirium and were included in this analysis. Frailty risk factors were common: exhaustion, weight loss, grip strength, and physical ability. Overall, 69 (31%) participants were considered frail. Incident delirium developed in 44 (20%). Frail patients were more likely to develop delirium (28% vs. 16%, $p=.05$). Delirium was associated with length of stay in non-frail patients (No Delirium 3.9 ± 2.7 vs. Delirium 7.8 ± 5.4 $p<.001$) and frail patients (No Delirium 4.8 ± 4.5 vs. Delirium 9.2 ± 10.2 $p<.001$). However, there was a longer length of stay in those with frailty, but after accounting for delirium, the increase was not significant.

Conclusion:

Physical frailty may be a risk factor for delirium. The relationship between physical and cognitive frailty needs further exploration

5. The Hospital Elder Life Program in Dutch hospital care: experiences of volunteers, patients and professionals.

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OBJECTIVES: The Hospital Elder Life Project (HELP) is a USA proven effective program to prevent delirium in hospitalized older patients. HELP introduces extensive delirium diagnostics and trained volunteers. Starting in 2012 we introduced HELP in three hospitals in the Netherlands. Trained volunteers in hospital care are a novelty in the Netherlands, therefore we investigated the characteristics and motivation of the HELP volunteers. Secondly, we studied the added value of introducing HELP to regular hospital care as perceived by volunteers, patients and their next of kin and staff.

METHODS: The data collection of this mixed method study consisted of; questionnaires, focus groups and interviews. HELP volunteers received a questionnaire regarding their personal characteristics and motivation for HELP. The added value of HELP was examined by using focus groups for volunteers, structured interviews with patients and their next of kin, questionnaires for the HELP nurse practitioners and focus groups for staff. Data were analyzed using a grounded theory approach.

RESULTS: 94 volunteers (69,6%) returned the questionnaire, the average age of the volunteers was 54 years old and 93,6% was female. 70% of the volunteers had previously encountered a delirium and this was the most frequent reason for becoming a HELP volunteer. Other reasons were; satisfaction in helping others, improving health care, building up experience in hospital care and contributing to a scientific study. Volunteers (2 focus groups), patients (32 were interviewed) and staff (2 focus groups with representatives from participating hospitals) considered HELP to be an improvement of quality of care. The following categories on the added value of HELP were found: multidisciplinary collaboration, delirium care, communication, interventions, staffs awareness, volunteers and organization.

CONCLUSIONS: All respondents described added value in HELP and considered it to be a good addition to care-as-usual. This is the first study to the characteristics and motivation of volunteers. The results of this study can be used when implementing or sustaining HELP to regular hospital care.

6. Impact of Delirium And Hepatic Encephalopathy in Patients with Cirrhosis

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BACKGROUND: Overt hepatic encephalopathy (HE) occurs frequently in patients with cirrhosis and portends a poor prognosis. Delirium may be related to HE but has not been formally assessed in this population. The Confusion Assessment Method for the ICU (CAM-ICU) is a widely-used, valid instrument that reliably identifies delirium. We examined the relationships between delirium, HE and clinical outcomes in critically ill patients with cirrhosis.

METHODS: We performed a prospective cohort study of consecutive adult patients with cirrhosis admitted to the ICU from May 2009 to October 2012. The Richmond Agitation Sedation Scale (RASS) and CAM-ICU were performed twice daily during the ICU admission to assess coma and delirium, respectively. Two hepatologists (blinded to delirium assessment) independently reviewed the medical record for ascertainment of HE at the time of first positive delirium/coma screen, or at the time of first delirium/coma screen for those who screened negative. Delirium/coma and HE were compared, and logistic regression was used to determine the relationship between delirium/coma and mortality, accounting for disease severity and HE.

RESULTS: 91 patients with cirrhosis were assessed. 26 (28.6%) developed delirium/coma during their ICU stay, and 22 (24.2%) had overt HE. Age, sex, race, Child-Pugh score and MELD were similar in those with and without delirium/coma. Concordance between delirium/coma and HE assessment was fair (Kappa 0.38). Of the 22 patients with HE, 13 had delirium/coma (sensitivity of RASS/CAM-ICU for HE=59%), whereas out of 69 patients without HE, 56 did not have delirium/coma (specificity of RASS/CAM-ICU=81%).

Inpatient mortality was 23.1% and 7.7% for those with and without delirium/coma, respectively ($p=0.053$), and 90-day mortality was 30.8% and 18.5% ($p=0.21$). Median hospital length of stay was 19.5 and 6 days for those with and without delirium/coma, respectively ($p<0.001$). Delirium/coma was associated with increased inpatient mortality, independent of MELD and HE (unadjusted OR 3.6; 95% CI, 0.99-13.1; MELD-adjusted OR 5.4; 95% CI, 1.3-23.8; MELD and HE-adjusted OR 4.8; 95% CI, 1.01-23.1). Delirium/coma also trended toward increased 90-day mortality (unadjusted OR 2.0; 95% CI, 0.69-5.6; MELD-adjusted OR 2.4; 95% CI, 0.79-7.5; MELD and HE-adjusted OR 1.7; 95% CI, 0.48-5.8).

CONCLUSION: Delirium/coma as measured by the RASS and CAM-ICU is associated with HE in critically ill patients with cirrhosis. These measures provide valuable prognostic information which cannot be obtained with standard assessment of HE. Further studies comparing RASS and CAM-ICU to HE-specific measures are needed.

SESSION 5PREVENTION - TREATMENT
MANAGEMENT - EDUCATION TRAINING

1. A pilot cluster randomised trial of delirium prevention in care homes for older people

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BACKGROUND: Delirium is a common acute illness in the elderly associated with considerable distress, hospitalisation and mortality. Evidence suggests that delirium can be prevented in one-third of hospital patients but there is little research to guide practice in care homes. In previous work, we used the MRC framework to develop and establish feasibility of an intervention for delirium prevention, termed "Stop Delirium!" This pilot study was undertaken to obtain information needed to design a trial to test the effectiveness and cost effectiveness of Stop Delirium!

METHODS: We conducted a pilot cluster randomised trial in 14 care homes. Homes were randomised to receive Stop Delirium! for 16 months or usual care. We assessed residents at baseline and measured outcomes, including delirium episodes and hospital admissions after the intervention. We also collected information on rates of recruitment; attrition; completion of planned assessments; adherence to the intervention; and costs.

RESULTS: There were significant challenges in conducting this pilot trial, with high attrition rate (almost 40%) over the lengthy period between recruitment and outcomes assessment. Repeated assessments in frail older people were difficult with around 40% of planned cognitive tests not completed. Obtaining routinely collected data from care homes was problematic with little consistency between homes. We were able to recruit residents successfully; conduct baseline assessments to a high level of completion; deliver the intervention to all seven homes. Costs for health and social care resource use for homes in the usual care arm were more than twice that of the intervention homes (£7,210 compared to £3,281.30). Cost of delivering Stop Delirium! was approximately £138.27 per care home resident. Delirium occurrence rates were 3.6% in intervention and 6.4% in control homes using CAM assessments alone, but 18.1% and 9.6% respectively when combined with information from case note reviews. Hospital admission rates per 100 residents were 14.6 in intervention and 24.2 in control homes.

CONCLUSIONS: Trials in this population are challenging but feasible. We were able to obtain detailed information to help optimise the design of a definitive cluster trial of delirium prevention in care homes and useful to other delirium research.

2. To characterise and compare delirium patients managed in a Geriatric ACE unit versus in general medical wards in a tertiary acute hospital - a cohort study

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OBJECTIVES:

To study the prevalence of delirium in a tertiary acute hospital, and to compare features, risk factors and outcomes of delirium patients managed in the acute care for the elderly (ACE) unit versus other medical wards.

METHODS:

A cohort study was done in Prince of Wales Hospital (PWH) from January to November 2013. Delirium patients were screened by ward visits and performing the CAM (confusion assessment method). Background demographics, comorbidities, features of delirium, physical restraints and drug usages were recorded. Each subject was reviewed daily until discharge, to determine the duration of delirium, its features and its complications.

RESULTS:

Prevalence was 1.27% (225/17714). Delirium patients managed in non-ACE medical wards used more physical restraints than in ACE unit ($p < 0.05$). More chemical restraints were required in managing delirium patients in the ACE unit ($p < 0.01$) and designated delirium cubicles ($p < 0.01$) than other medical wards. The ACE unit managed more hypoactive delirium patients than controls ($p < 0.05$). There was no difference in the length of stay, 28-day readmission, in-patient and 6-month mortality rates between the 2 groups.

CONCLUSIONS:

The Geriatric ACE unit of PWH accommodated delirium patients which were generally considered more "difficult to manage" by medical and nursing staff in other non-ACE medical wards. More staff should be trained, deployed and designated to provide care for these delirious patients. They should be readily available at the proximity of the patient to offer any immediate response, in order to shorten the duration of delirium and eradicate the use of physical and chemical restraints as far as possible. Best practice guidelines will develop from the ACE unit for use in all medical wards to improve care for delirium patients.

3. The mortality risk of haloperidol in elderly patients: a meta-analysis of placebo-controlled randomized trials

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Objective:

Numerous cohort studies have found an association between conventional antipsychotics and an increased risk of mortality in elderly patients. In 2008, health authorities have warned against the use of these antipsychotics in patients with dementia. However, severity of illness and delirium were not taken into account in any of the cohort studies. The aim of this study was to assess the mortality risk of haloperidol, the most popular conventional antipsychotic, in placebo-controlled randomized trial in elderly patients with dementia or delirium.

Methods:

Studies were sought in 1) electronic databases; Pubmed, Embase and Cinahl, 2) references of published reviews and meta-analyses, and 3) online trial registers. Original trials were included when they compared haloperidol to placebo. Patients had to be 55 years or older with dementia or (a high risk of) delirium. Three researchers assessed the quality of the individual trials with the Cochrane risk of bias assessment tool. We calculated the pooled risk difference (RD), and performed five sensitivity analyses for dementia trials only, delirium trials only, and studies with low risk of baseline differences, inadequate blinding and differential drop-out.

Results:

Eleven trials with a total of 1799 participants were included. The trials had been published before 2008, except one. Eight trials had been performed among patients with dementia, and three were delirium prevention trials in surgery patients. The percentage of deaths for haloperidol (1,6%) was not higher than that of placebo (1,3%) (RD 0.3; 95% CI-0.9 to 1.6). The sensitivity analyses yielded similar results, although in studies with low risk of bias due to baseline differences or drop-out, the risk difference was somewhat lower.

Conclusion:

The use of haloperidol compared to placebo was not associated with a higher risk of mortality in elderly patients with dementia or high risk of delirium in this meta-analysis of trials.

4. Postoperative Delirium: what we should relearn in this Babylon Tower

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OBJECTIVES: In the Italian reality, in which patients are increasingly chronically ill and elder, every branch of Medicine needs to rethink its philosophy of approach to improve the quality of care. It is known that Delirium is a widespread issue, but widely misunderstood and that the cause of this situation is the poor knowledge of the phenomenon as nosographic entity. We therefore decided to reach the goal of raising awareness among health professionals of our hospital on the topic and spreading tools for its diagnosis, treatment and prevention.

METHODS: In 2012 we created a multidisciplinary working group, that we called DIOGENES, to evocate its purposes, composed of surgeons, psychologists, anesthesiologists, neurologists and nurses. The group met once a month to discuss literature on Delirium, share knowledge about it, roll out an interventional research project, produce adequate papery and informatics support materials to improve diagnosis, treatment and prevention of Delirium, with particular attention to Postoperative Delirium because the need to address the issue arose first among surgeons.

RESULTS: The first outcome of the Diogenes group was to identify the educational workshop as the more suitable mean for spreading the knowledge about Postoperative Delirium. A four hours course, in three editions, accredited for Continuing Medical Education was held with the following program: introduction and anonymous survey of awareness; Delirium and state of the art; tools of diagnosis and treatment; Delirium and surgery; point of view of the Anesthetist; role of the Psychologist; role of the Neurologist; nursing and non-pharmacological approach; case report; returning the survey and discussion; satisfaction questionnaire. The preliminary questionnaire of the workshop showed a gross lack of awareness about the Delirium and according to 91% of the participants the workshop reached its educational target; 45% of participants asked for a supplementary training course about Delirium diagnostic tools and their operative use; 64% asked for field training. The second main result of the Diogenes group was to develop a protocol for detection of Postoperative Delirium within the hospital, a detection paper sheet and an information brochure for patients, their families and General practitioners.

CONCLUSIONS: The Diogenes group initiatives have been attended with surprising participation and extreme interest. Thanks to participants suggestions, we have started mentoring activities within the hospital and timetabled a two-monthly journal club, opened to all health professionals, to read and critically discuss recent scientific articles on Delirium topic.

Finally, we decided to finalize our improvement activities to the recognition of the real incidence of Postoperative Delirium in our hospital. To this purpose we designed and submitted to the Ethics Committee a 6 months prospective observational study called "Identification of Postoperative Delirium in Emergency Surgery".

In the future we intend to spread the project to non-surgical departments, begin studies of feasibility on non-pharmacological treatment of Delirium, based on widely known models, and lastly carry out an experimental study on pharmacological prophylaxis.

5. Effectiveness of Implementing a Wake up and Breathe Program on Sedation and Delirium in the Intensive Care Unit

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Background: Mechanically ventilated critically ill patients receive significant amounts of sedatives and analgesics that increase their risk of developing coma and delirium. We evaluated the impact of a "Wake-up and Breathe Protocol" at our local ICU on sedation and delirium.

Methods:

Design: A Pre-Post implementation study.

Setting: 22 beds mixed surgical and medical ICU.

Patients: 702 consecutive mechanically ventilated patients from June 2010-January 2013.

Intervention: Implementation of daily sedation vacation plus spontaneous breathing trials as a quality improvement project.

Results: After implementation of our program, there was an increase in the mean Richmond Agitation Sedation Scale (RASS) scores on weekdays of 0.88 ($p < 0.0001$), and on weekends of 1.21 ($p < 0.0001$). The incidence of delirium pre-protocol was 23.0% (14/61) and the prevalence was 66.7% (94/141). Post protocol, the incidence and prevalence were 19.6% (33/168) and 55.3% (167/302) with prevalence decreasing significantly (incidence; $p: 0.58$; prevalence; $p: 0.02$). Coma did not decrease significantly [pre-protocol: 78.2% (205/262), post-protocol: 73.4% (323/440); $p: 0.15$]. When both delirium and coma were considered together as acute brain dysfunction, the prevalence decreased from 90.8% (238/262) pre-protocol to 85% (374/440) post-protocol ($p: 0.02$). After adjusting for age, race, gender, severity of illness, primary diagnosis, and ICU unit, the odds-ratios post-protocol relative to pre-protocol were: incident delirium 0.718 (95% CI: 0.326-1.578; $p: 0.40$); prevalent delirium 0.650 (95% CI: 0.413-1.022; $p: 0.06$); coma 0.659 (95% CI: 0.446-0.974; $p: 0.04$); acute brain dysfunction 0.505 (95% CI: 0.299-0.853; $p: 0.01$). Mechanical ventilator days were higher post-protocol (median pre: 4; post: 5; adjusted $p: \leq 0.01$). There were no differences in hospital length of stay (median pre: 14 days; post: 14 days, $p: 0.56$), and in-hospital mortality (pre: 19.5%; post: 19.6%, $p: 0.97$).

Conclusion: Implementing a "Wake-up and Breathe Program" resulted in reduced sedation and acute brain dysfunction among critically ill mechanically ventilated patients.

6. Selection bias in a trial with elderly patients

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Medical Centre Alkmaar, Medical Centre Alkmaar, Alkmaar, Netherlands (1)

OBJECTIVES:

Clinical trials often exclude frail elderly persons. It may threaten external validity of results for geriatric patient samples. Our goal was to identify predictors of exclusion in geriatric participants of an RCT.

METHODS:

We examined excluded and included patients from the TAUP-trial. This study examined effects of taurine administration on outcomes in hip fracture patients aged ≥ 75 years. Inability to give informed consent because of apparent cognitive impairment upon presentation, was an exclusion criterion. Included and excluded patients entered a trial on delirium. We used multiple logistic regression analysis of baseline frailty indicators and risk factors for delirium. Secondly, we examined prevalent and incident delirium in included and excluded patients.

RESULTS:

Excluded patients ($n = 77$) were older, were more frail, had more risk factors for delirium and frailty, and more often had delirium at admission than the included group ($n = 115$). Independent predictors for exclusion were low MMSE, high IQCODE, poor vision and polypharmacy.

CONCLUSIONS:

This is one of few studies testing different risk factors for excluding elderly patients from an RCT. Inability to give informed consent was an a priori risk factor, but also other frailty indicators independently raised the risk of exclusion. Findings suggest that taurine was tested in a group of patients that may not be representative of the geriatric hospital population.

NOVEMBER 6th

1. Does the Informant Questionnaire of Cognitive Decline in the Elderly (IQCODE) predict dementia in patients admitted with delirium?

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OBJECTIVES:

Dementia is common in older people admitted to hospital (40%) but only half will have been previously diagnosed. Delirium is similarly common (20%) and an episode of delirium presents an opportunity to identify previously undiagnosed people with dementia. However, it is difficult to distinguish between delirium with or without underlying dementia. This study evaluated the performance of the IQCODE questionnaire in detecting dementia in delirium.

METHODS:

Patients aged >70 screened for delirium on admission to hospital meeting DSM-IV criteria were recruited. An informant completed the IQCODE on index admission. Follow-up by interview at 3 months was conducted to ascertain the diagnosis of dementia.

RESULTS:

67 patients were recruited, 8 declined follow-up, and at 3 months 15 had died and 4 had persistent delirium - leaving a sample of 40 (mean age 85, 58% female). At follow up, 7/40 had MCI and 27/40 (65%) had dementia, 9 (22.5%) of whom had not previously been diagnosed. The area under the curve of a receiver operating characteristic curve of the IQCODE and diagnosis of dementia demonstrated an area under the curve of 0.88 ($p < 0.001$). The optimal cut-off of >3.65 demonstrated a sensitivity of 96.2%, a specificity of 85.7%, a positive likelihood ratio of 6.73 and a negative likelihood ratio of 0.04. 8 of the 9 were identified with dementia using the IQCODE at this cut-off

CONCLUSIONS:

The IQCODE is a sensitive and specific indicator of dementia in people with delirium and can be used to identify people with previously undiagnosed dementia.

NOVEMBER 6th

POSTER



2014

2. Critical Care Recovery Center—Making the Case for an Innovative Collaborative Care Model for ICU Survivors of Delirium

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Background:

Five million Americans require admission to ICU annually due to life-threatening illnesses. Advances in critical care medicine have led to an increase in patients surviving critical illness, with resultant cognitive, physical and psychological morbidity that impact their quality of life. We implemented a critical care recovery center (CCRC) to maximize the cognitive, physical, and psychological recovery of ICU survivors of delirium, utilizing an interdisciplinary team.

Methods:

CCRC was initiated using principles of implementation science and by treating the health care system as a complex adaptive model. Each patient in CCRC undergoes a) Pre-CCRC patient/caregiver needs assessment; 2) CCRC initial visit (complete diagnostic work-up with comprehensive cognitive/psychological/physical assessment); and 3) CCRC follow-up visit (family conference involving physician, patient, caregiver, and care coordinator to initiate a personalized care plan).

Results:

From July 2011-June 2012, CCRC provided care for 52 ICU survivors of delirium in half day of clinic/week. Patients were 56.6 years (SD 16.3) old, and females/African Americans represented half of the patients. Only 6 (11.5%) had normal cognition; 21 (45.6%) had multi-domain amnesic cognitive impairment (CI); 11 (23.9%) had multi-domain non-amnesic CI; 7 (15.2%) had single domain amnesic CI; 6 (13%) had single domain non-amnesic CI; and one had dementia. 58.8% (30/51) of patients exhibited signs of depression with 80% having moderate to severe depression. Twenty-four patients had at least two visits with standardized monitoring through the Healthy Aging Brain Center Monitor to compare their functional, cognitive, and psychological symptoms longitudinally. The overall scores showed improvement (p: 0.01) with improved cognitive (p: 0.04) and functional (p: 0.02) scores, but not psychological (p: 0.65) scores.

Conclusion:

CCRC presents an innovative step to modify the post critical illness morbidity and to improve the ICU survivor's quality of life. Our prototype shall serve as an example to institute similar post-ICU clinics.

3. Serum markers of inflammation and abnormalities of the HPA axis are not associated with poor outcome in delirium

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OBJECTIVES:

Delirium is a serious acute neuropsychiatric syndrome associated with poor outcomes. Clinical factors and biomarkers associated with these poor outcomes have not been fully explored. Understanding differences between outcome groups may inform understanding of the pathophysiology of delirium.

METHODS:

Patients were screened for delirium on admission to an acute hospital and recruited if they met DSMIV criteria. Data were collected including demographics, disease severity, and length and type of delirium. Serum was taken for inflammatory cytokines (IL-1 beta, IL-1ra, TNF alfa, IL-6, IL-8, IL-10) and assessment of the HPA axis. Outcome data was collected at 3 month follow up. Patients were divided into outcome groups at 3 months: those alive, without persistent delirium and in their previous residence were classified into the good outcome group, and the rest were classed as poor outcome.

RESULTS:

67 patients with delirium were recruited: 8 declined follow-up, leaving a study group of 59 (mean age 85yrs, 56% female). At 3 months, 15 (25.4%) had died, 4 (6.8%) had persistent delirium and 11 (18.6%) were in a new care home. 30 (50.9%) had a good outcome and 29 (49.1%) had a poor outcome. On univariate analysis, only longer duration of delirium and type of delirium (hypoactive) were associated with poor outcome (Table 1). On logistic regression analysis, controlling for age and disease severity, only hypoactive delirium sub-type remained significantly associated with poor outcome, (OR 4.44 (1.35-14.57), p=0.04).

CONCLUSIONS:

Hypoactive subtype was associated with poor outcome in delirium, but inflammatory and HPA axis biomarkers were not.

4. Detection of intensive care delirium: a descriptive study of the Intensive Care Delirium Screening Checklist (ICDSC) administered by bedside nurses

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OBJECTIVES: The Intensive Care Delirium Screening Checklist (ICDSC)1 is designed to improve the detection of delirium by bedside observations and has shown good psychometric properties. The use of the Flemish version of the ICDSC in intensive care unit patients has not been studied. This study determined the diagnostic validity, internal consistency and user-friendliness of the ICDSC administered by bedside nurses in intensive care unit patients.

METHODS: Seventy-seven patients from one surgical intensive care unit of a general hospital were included, and underwent 143 paired delirium observations by bedside nurses and researchers. The psychometric properties of the ICDSC were tested by comparing the performance on the ICDSC (bedside nurses) to the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) (researchers, gold standard). The paired observations were collected at 4 time points. Afterwards, the user-friendliness of the ICDSC was determined by 34 of the 49 intensive care unit nurses using a questionnaire.

RESULTS: Delirium occurred in 17 of the 77 patients (22.1%), or in 21 of the 143 paired observations (14.7%). Diagnostic validity of the ICDSC was good (area under the curve = 0.843), with 81.0% sensitivity, 87.7% specificity, 53.1% positive, and 96.4% negative predictive value. The Cronbach's Alpha coefficients for the ICDSC scores varied between 0.67 and 0.96. Generally, intensive care unit nurses experienced the ICDSC as user-friendly. They were able to use the scale in intensive care unit patients, but some nurses (11.8%) experienced problems in rating the items 'inappropriate speech' and 'symptom fluctuation' in intubated patients.

CONCLUSIONS: The ICDSC can be used for delirium screening in intensive care unit patients. The scale was rated as easy-to-use and relevant. Further validation studies in this population are required.

5. Is preoperative state anxiety a risk factor for postoperative delirium?

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BACKGROUND:

State anxiety, a temporary and acute reaction with feelings of tension and apprehension, and its relation to postoperative delirium has only been investigated in a few studies. However, inadequate statistical power and less reliable delirium assessment have hampered any conclusion. The aim of this study is therefore to determine if preoperative state anxiety is a risk factor for postoperative delirium.

METHODS:

A secondary analysis comprising data from two studies was performed. Patients (≥ 65 years) admitted for elective cardiac surgery or presenting with a hip fracture at the emergency department were included. State anxiety was measured preoperatively using the State-Trait Anxiety Inventory (STAI). Delirium was measured pre- and postoperatively by trained research nurses using the Confusion Assessment Method (CAM). The severity of delirium was measured using the Delirium Index.

RESULTS:

Eighty six patients with a hip fracture and 83 patients undergoing cardiac surgery were included ($n=169$). Forty two patients (24.9%) developed delirium postoperatively (24 (27.9%) hip fracture patients and 18 (21.7%) cardiac surgery patients). State anxiety was not associated with postoperative delirium ($r=0.027$, $p=0.267$), its duration ($\rho=-0.19$, $p=0.906$) or its severity ($\rho=0.183$, $p=0.278$). State anxiety was not an independent predictor of postoperative delirium (OR 1.06 (0.89-1.25)) using multivariate logistic regression analysis. Independent predictors for the total sample were MMSE, lowest intraoperative diastolic blood pressure and valve or osteosynthesis surgery. A subgroup analysis identified MMSE, osteosynthesis surgery and lowest intraoperative diastolic blood pressure as independent predictors among hip fracture patients and valve surgery, intraoperative systolic blood pressure and number of home medications among cardiac surgery patients.

CONCLUSIONS:

No significant relationship between state anxiety and delirium was found. However, methodological problems, i.e. considerable missing data for state anxiety, multicollinearity and low statistical power was observed and should be taken into consideration for further research.

6. Autonomic cardiovascular control in delirium**BJØRN ERIK NEERLAND (1) - MARTE MELLINGSÆTER (2) - TORGEIR BRUUN WYLLER (1) - VEGARD BRUUN WYLLER (3)**

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Background: The pathophysiology of delirium is poorly understood. Delirium may be the result of aberrant stress responses, involving alterations in the autonomic nervous system activity. We are studying aspects of autonomic cardiovascular control in patients acutely admitted to an acute geriatric ward with an infection, with and without delirium.

Methods: Patients admitted acutely with an infection to the acute geriatric ward at Oslo University Hospital are eligible. We exclude patients with atrial fibrillation, pacemaker rhythm, or on current treatment with betablockers, calcium channel blockers or cholinesterase inhibitors. Informed consent or consent from a legal proxy is obtained from all patients.

Delirium is diagnosed by the Confusion Assessment Method and delirium severity is assessed by the Memorial Delirium Assessment Scale.

A head-up tilt-test (HUT) is performed in the morning, between 9 and 10 a.m, in a quiet room with comfortable temperature. The patient is lying supine in the hospital bed and is attached to a Task Force Monitor (CNSystems, Graz, Austria) (TFM). Baseline registrations are done when the patients are resting horizontally, then after tilt to 15 degrees in 10 minutes.

The TFM provides accurate, multivariate, real-time, non invasive recordings of blood pressure, stroke volume and heart rate, and compute secondary hemodynamic variables (cardiac output, total peripheral resistance). Analyses of sympathetic and vagal tone are derived from heart rate and blood pressure variability.

Results: We have included (June 2014) 12 patients, 4 of them with delirium or sub-syndromal delirium. We continue to include patients. Preliminary results will be presented on the meeting.

Conclusion: Measurement of autonomic cardiovascular control by head-up tilt-testing is possible to carry out in delirium studies, and may shed light on the possible underlying pathophysiology of delirium.

7. 'Think Delirium'

An education intervention on acute wards in University Hospital of North Tees and Hartlepool

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OBJECTIVES:

The prevalence of delirium in people on hospital medical wards is 20% to 30% with a growing requirement of input within mental health liaison services. Even so the numbers of undetected cases remain at 30% to 67%.

Research indicates that a focused and inexpensive educational programme can decrease the prevalence of delirium among older inpatients.

The aim of the study was to roll out an education programme, 'Think Delirium', to hospital staff who lack confidence in knowledge of delirium recognition and management which leads to increased patient morbidity.

METHODS:

Initially wards were identified that produce a higher percentage of delirium referrals and an initial survey conducted to assess staff confidence in recognising and managing delirium.

Secondly, 20 minute on ward teaching sessions were held. Multi-media teaching aids and posters promote delirium awareness on the wards. Following this intervention benefits were analysed via a follow up survey.

Lastly refresher courses will be held 6 monthly to consolidate knowledge

RESULTS:

Analysis of the teaching sessions are made following pre and post teaching survey relating to the confidence of ward staff in predicting, recognising and managing delirium. A likert scale was used to identify confidence levels. 32 staff took the pre teaching survey across 6 hospital wards. 15% had attended previous teaching on delirium. 100% stated teaching on delirium would be of use.

A total of 91 staff have attended the teaching sessions from 8 identified 'at need' wards. 75 staff responded to the follow up survey. The results indicate 84% staff found the teaching very useful, and demonstrated an increase in confidence in all domains

CONCLUSIONS:

NICE guidelines highlight promoting a culture of delirium prevention, awareness and recognition. We have identified poor confidence surrounding delirium on the wards. More teaching session across the acute trust are planned in the future.

8. A multiprofessional educating intervention on Delirium in nursing -home "E.Cialdini" in Modena

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AUSL Modena, Modena, Modena, Italy (1)

OBJECTIVES:

Delirium is clinic syndrome that manifests as a severe confusion and disorientation developing with rapid onset and fluctuating in intensity. It often occurs in the course of illness and rarely has identified. Probably it caused by lack of knowledge about delirium or caused by lack of staff-connection, getting on functional and clinic outcomes worse.

Our aim is to analyze differences between homecare staff that had and not had nursing training in recording and managing Delirium. In particular analyze outcome after a nursing behavioural approach to Delirium.

METHODS

98 aged people (M:F=40:58 mean aged 84.9 years old) in "E. Cialdini" nursing home in Modena were studied between 1 January to 30 April 2014.

We had two groups: in the first group (composed in 67 patients) nurse-staff benefit from a training about diagnosis and non-pharmacological approach to Delirium. The other control group kept on usual method.

In Both groups older p. were undergone to analysis: drugs and comorbidity evaluation, Delirium duration, triggering events, presence of restraints, kind of pharmacological or behavioural approach. Outcomes measured: mortality rate, hospitalization, drug reduction, falls, incontinence or bedsore onset.

RESULTS

Staff- training group observed 20.89% case of Delirium onset in their unit. Most engendered by pain and urinary tract infection. In the same period control group didn't record any event. A combined pharmacological and behavioural approach solved Delirium symptoms in mean 4 days without detrimental outcomes.

CONCLUSIONS:

delirium is a typical geriatric syndrome that needs educated staff and multiprofessional team to have good outcomes.

9. Evaluation of a Delirium Dementia Outreach team (DDOT)

LESLEY YOUNG (1) - EMILY LYON (1) - JUNE LAWSON (1) - CHRISTOPHER CAIRNS (1) - DAVID HELLENS (1) - ANDREA HINTON (1) - CLAIRE KHAN (1) - JACKIE LYNCH (1)

Care of the Elderly Department, Sunderland Royal Hospital, Sunderland, United Kingdom (1)

OBJECTIVES: To evaluate the impact of a new multidisciplinary team (DDOT) in detecting delirium and dementia in a large general hospital.

DDOT aims to identify the presence and nature of cognitive problems in older acute admissions, identify causes of delirium, advise appropriate investigation and management, liaise with mental health (MHLT) and educate about delirium.

METHODS: Retrospective Before-After study of emergency admissions aged 70+. 60 consecutive admissions over 2 time periods 1 year apart (August 2012 and August 2013) were reviewed, before and after introduction of DDOT. Data was extracted from clinical notes. Exclusions: discharged or died <72 hours.

Data was collected on age, sex, admission specialty, use of antipsychotics and diagnosis of dementia or delirium, DDOT and MHLT input.

Primary outcomes were admission cognitive screen, repeat cognitive tests during admission, documentation of delirium in case notes and discharge summary and referrals to MHLT. Secondary outcome measures include length of stay, use of psychotropic medications and mortality.

RESULTS: The cohorts were comparable (Before n=62, After n=61): %male: 47% v 42% ; mean age 83 v 83yrs. Delirium present 42% v 30% (ns). Dementia present 29% v 22% (ns). Admission specialty: (before, after) geriatrics (52%, 46%), medicine (21%, 16%), orthopaedics (6.5%, 11.5%), surgery (10%, 18%), other (11%, 8%).

Comparing Before and After cohorts: Completion of cognitive testing on admission: 35.5% v 90.2% (p<0.001), repeat cognitive test: 28% v 36% (p=0.2), delirium recorded on admission: 11.3% v 30% (p=0.012) and discharge 8/26 v 9/18 (p=0.1). Referrals to MHLT: 6.5% v 4.9% (ns).

There was no difference in Length of stay: mean 15 v 15 days (ns), mortality: 1.6% v 4.9% (ns) or new use of antipsychotics: 6.5% v 6.6% (ns)

After cohort, DDOT reviewed 38% patients. Interventions included: diagnosis (n=20), collateral history (n=17), investigation/management (n=20), education (n=19), medication review, (n=13).

CONCLUSIONS: DDOT reviewed a high proportion of unselected acute admissions providing a range of interventions. The process of care for older patients with cognitive problems has improved. Identification and documentation of delirium and dementia on admission has increased.

10. Standardization of the methods to evaluate ICU survivors in clinical practice**PATRIZIA D'OTTAVI (1) - FEDERICA RODELLA (2) - SILVIA COBELLI (2) - FEDERICO LORUSO (2) - MAIA HUNG NGUYEN (2) - NAZZARENO FAGONI (2) - NICOLA LATRONICO (2)**

Università degli Studi di Brescia, Spedali Civili di Brescia, Gussago (BS), Italy (1) - Università degli Studi di Brescia, Spedali Civili di Brescia, Brescia, Italy (2)

OBJECTIVES:

In the latest years the survival rate after ICU hospitalization has considerably increased thanks to rapid progress of intensive care. ICU-acquired delirium, a common complication, can lead to a worse cognitive outcome after ICU discharge. ICU survivors can develop a Post Intensive Care Syndrome, featured by cognitive impairment, depression, post traumatic disorder, functional disability and a worsening quality of life. It is therefore important to investigate the magnitude of the problem, the potential growing cost of public healthcare and the strategies to prevent and to treat post- ICU long-term disability.

METHODS:

We reviewed the available literature and consulted experts to define the tests to evaluate physical and cognitive impairment in a scheduled follow-up at 3-6-12 months for ICU survivors.

Moreover, tools for cognitive evaluation have been verified to be used during ICU hospitalization, or rather CAM-ICU for delirium screening and IQCode plus Wrat3 (administered to patient if self conscious or to relatives if not) for baseline cognitive status.

As of 14th July 2014, all patients admitted to ICU for at least 72 hours are going to be enrolled in the study.

RESULTS:

We selected the following scales for cognitive impairment: MMSE, Clock Drawing test, Rey Test, Trial Making test, Geriatric Depression scale, SF-36 (a questionnaire delivered at the moment of discharge, completed at home by the patient and collected by the investigator at the first outpatient visit). We selected the following tests for physical dysfunction: MRC, dynamometer, 6'-Walking Test, Maximum Oxygen Consumption.

CONCLUSIONS:

Overall assessment of ICU patients during hospitalization, at discharge and during follow-up is due so as to promote health and quality of life and besides it is possible using specific evaluation scales. The selected tools will be implemented in the clinical practice to evaluate their feasibility in routine follow-up of ICU-survivors.

11. Development of a Novel Computerised Version of the Month Backwards Test: a Comparison of Performance in Hospitalised Elderly Patients and Final Year Medical Students**LAURA DONOGHUE (1) - MAEVE LEONARD (1) - CHRIS EXTON (2) - COLUM DUNNE (2) - AILISH HANNIGAN (1) - DAVID MEAGHER (1) - FAHAD BAKHSH AWAN (1)**

GRADUATE ENTRY MEDICAL SCHOOL, UNIVERSITY OF LIMERICK, LIMERICK, Ireland (1) - COGNITIVE IMPAIRMENT RESEARCH GROUP, UNIVERSITY OF LIMERICK, LIMERICK, Ireland (2)

OBJECTIVES:

To explore how cognitively intact young persons and hospitalised elderly patients perform in verbal and computerized approaches of the Months backwards Test and to investigate for difference in performance on the verbal and computerised versions within each group.

METHODS:

A total of 100 participants took part in the study. This included fifty acute elderly medical inpatients aged ≥ 65 at University Hospital Limerick and fifty final year medical students. All participants undertook a battery of neuropsychological tests. Completion time and errors were recorded for all participants.

RESULTS:

The elderly medical patients had significantly lower mean MoCA scores (23.6 ± 3.4 ; range 13-28 versus 29.2 ± 0.6 ; range 28-30: $p < 0.01$). Performance on the verbal months backwards test (MBTv) was significantly different in the two groups with significantly more errors and longer completion times in the elderly medical patients (25.1 ± 20.9 vs 10.5 ± 4.5 ; $p < 0.05$). Performance on the MBTc also differed with completion times averaging 2-3 times longer than for the MBTv (patients: 63.5 ± 43.9 vs students 20.3 ± 4.4 ; $p < 0.05$). There was high correlation between the two versions of the MBT ($r = 0.84$) and also between the MBTc and the MoCA ($r = 0.85$). The MBTc had higher correlation with visuospatial function (MBTc $r = 0.70$, MBTv $r = 0.57$). With a cutoff time of 30 seconds for distinguishing performance, the MBTc had excellent sensitivity (100%) for cognitive impairment in the overall group and elderly medical patients. However, specificity was modest in the latter (44%).

CONCLUSIONS:

The computerised MBT is a brief and simple tool which can allow for rapid and efficient testing of cognition in clinical populations.

12. Whole brain and hippocampal atrophy as predictors of delirium and subsyndromal delirium in older elective arthroplasty patients: a preliminary study

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Edinburgh Delirium Research Group, University of Edinburgh, Edinburgh, United Kingdom (1) - School of Psychological Sciences, University of Manchester, Manchester, United Kingdom (2) - Brain Research Imaging Centre, Centre for Clinical Brain Sciences, University of Edinburgh, Edinburgh, United Kingdom (3)

OBJECTIVES: Prior reports suggest that brain atrophy as assessed by neuroimaging may predict delirium, but prospective studies are lacking. Here we hypothesised that whole brain and hippocampal atrophy as assessed by pre-operative MRI predict a higher risk of delirium and subsyndromal delirium.

METHODS: Participants were 86 patients (38 women) aged 65 or over (mean 75(5.2)) awaiting hip or knee arthroplasty with no dementia. Each underwent pre-operative neuropsychological assessment and T1 MRI. Whole brain and hippocampal atrophy were assessed (blind to delirium status) qualitatively (using validated rating scales; higher ratings indicate greater atrophy) and quantitatively (volumes adjusted for intracranial size). Post-operative delirium assessment used DSM-IV criteria; subsyndromal delirium was considered present if some new onset DSM-IV features were found. In analyses (i) syndromal delirium was compared with all other participants, and (ii) also subsyndromal delirium was combined with syndromal delirium (DelSSD group) then DelSSD compared with remaining participants. Non-parametric and parametric group tests were used for qualitative and quantitative analyses, respectively.

RESULTS: Seven (8%) patients developed delirium (mean age 79.9(3.8)) and 26 developed subsyndromal delirium, giving 33 (38%) in the DelSSD group (mean age 75.6(5.1)). Controls had a mean age of 73.6(4.8); ages were significantly different between groups (p -values <0.05). In qualitative analyses, only higher right hippocampal atrophy ratings predicted delirium ($p=0.011$); whole brain atrophy ratings, and left and right hippocampal atrophy ratings were higher in patients in the DelSSD group (p -values 0.031, 0.006, 0.009, respectively). Age was significantly associated with higher whole brain and hippocampal atrophy ratings. Quantitative measures did not significantly predict delirium or subsyndromal delirium.

CONCLUSIONS: Brain atrophy as measured qualitatively may predict delirium and subsyndromal delirium. These associations may be related to increased age. Future studies with larger samples should assess in more detail the interplay among neuroimaging features, cognition and age as risk factors for delirium.

13. Implementing the 4 'A's Test: Detecting delirium in acutely admitted older adults in a London Teaching Hospital

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OBJECTIVES: The 4 A's Test (4AT) was developed in 2011 as a screening tool for delirium and cognitive impairment in acute general hospital settings. A recent validation study (2014) shows 89.7% sensitivity and 84.1% specificity of the 4AT for delirium. King's College Hospital (KCH) introduced the 4AT in 2013 to fulfil the aims of national delirium and dementia guidelines. This study aims to review the implementation of 4AT in a London teaching hospital and analyse specific characteristics of patients presenting with positive 4AT screens.

METHODS: The study sample ($n=167$) included all emergency admissions ≥ 75 y discharged from KCH in June 2013. Eligible patients were screened on admission by the King's Older People's Assessment and Liaison service. A retrospective clinical picture assessment was conducted from patient case-notes; correlation analyses were performed with scores from this assessment and patients' 4AT scores. Statistical means analyses (Mann-Whitney-Wilcoxon/ Kruskal-Wallis) were conducted with anonymised 4AT scores, demographic, health and social data obtained from the electronic patient records system.

RESULTS: 1. The rate of 4AT screening was 89% ($n=149$).
2. 48% of patients scored 0 (no cognitive impairment), 23% scored 1-3 (suspected cognitive impairment) and 29% scored 4-12 (suspected delirium) on the 4AT.
3. A strong correlation between 4AT score and the clinical picture (Spearman's $\rho = 0.804$, $p<0.001$) was found.
4. The 4AT score was significantly associated with gender ($p= 0.003$), residential status ($p= 0.005$), package of care ($p= 0.003$), and dementia diagnosis ($p= 0.005$). Significant associations remain with covariate analysis.

CONCLUSIONS: This study demonstrates the feasibility of 4AT implementation as an accurate delirium-screening tool and identifies female gender, care home resident and established dementia diagnosis as patient characteristics associated with a higher risk of delirium. Effective screening and identification of specific patient cohorts will strengthen efforts to prevent and manage delirium, leading to better patient outcomes.

14. Development of an Android Application for the Detection and Assessment of Delirium

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Medical Devices Unit, NHS Greater Glasgow and Clyde, Glasgow, United Kingdom (1) - Centre for Cognitive Ageing and Cognitive Epidemiology, University of Edinburgh, Edinburgh, United Kingdom (2) - Department of Psychology, University of Edinburgh, Edinburgh, United Kingdom (3)

OBJECTIVES: The ability to obtain accurate assessment of patients for delirium and other cognitive disorders remains a significant challenge in the healthcare profession. Although several validated tools for the assessment of delirium are available they do not adequately discriminate from dementia and there is a lack of detailed research on their objectivity. The use of software applications on smart-phones and tablet computers can help in providing objective, accurate and reproducible results for such assessments.

METHODS: The Edinburgh Delirium App has been developed to provide a suite of simple cognitive tests for use in the assessment of delirium. This includes visual acuity, counting visual stimuli and word building tasks. A visual acuity pre-test is used to confirm the patient has no visual problems that may affect test results. Before proceeding with the cognitive test, an assessment is made of the patients alertness based on whether they can fixate upon and track an object. The main counting tests consist of a series of stimuli presented on screen which the patient is asked to count; there are both ICU and non-ICU versions of the counting test.

RESULTS: The prototype version of the app has been developed using the Eclipse integrated development environment and Google tools for use on a 5 inch Mobile Smart-phone running Android operating system. Patient testing has focussed on the counting test where results have been compared with the Edinburgh Delirium Test Box MkII. Tests on 20 hospital patients demonstrated highly comparable performance. Further tests in 47 patients in an ICU (20 diagnosed with delirium) found the app achieved a sensitivity accuracy of 0.98.

CONCLUSIONS: An Android smart-phone app has been developed for the diagnosis and assessment of delirium. First tests of the App have shown good results when compared to existing methods of assessment.

15. CUNNINGHAM**BACKGROUND:**

Inattention is a cardinal feature of delirium. Simple bedside tests such as asking a patient to recite the months of the year backwards are increasingly utilised in attempts to provide objective tests of attention.

In testing attention with months of the year backwards patients are currently considered to have passed if they reach June-July correctly (1,2).

The aim of this study was to test the hypothesis that navigation to January is the norm in an elderly population.

METHODS:

As part of a wider study investigating post-operative delirium following elective primary arthroplasty patients over 65 years of age, without a pre-existing diagnosis of dementia, were assessed pre-operatively.

Patients were asked to recite the months of the year backwards starting with December. The number of months correctly navigated from December prior to an error was recorded. Self-corrections were permitted.

RESULTS:

Of 100 patients assessed 87 were able to complete months of the year backwards to January.

Mini Mental State Examination (MMSE) scores were lower for those patients scoring less than 12 compared to those completing all 12 months correctly with mean (standard deviation) of 25.5 (2.9) and 27.4 (2.0) respectively ($p = 0.045$).

CONCLUSIONS:

When testing ability to navigate the months of the year backwards June/July cut off may be a reasonable screening tool for the detection of inattention but correct navigation to January is more common in an elderly population without a prior diagnosis of dementia. The diagnosis of inattention and delirium in the setting of pre-existing cognitive impairment remains challenging and further work is needed.

16. Reliability and validity of the Observational Scale of Level of Arousal in delirium**ROANNA HALL (1) - ZOE TIEGES (1) - MIKE ALLERHAND (2) - ANTAINE STIOBHART (3) - ALASDAIR MACLULLICH (1)**

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OBJECTIVES: A bidirectional change in level of arousal (LoA), encompassing drowsiness and hypervigilance, is extremely common in acutely unwell patients. We devised a new scale to enable more detailed assessment of LoA, the Observational Scale of Level of Arousal (OSLA). Here we provide initial validation of the OSLA in identifying abnormal LoA associated with delirium, and in monitoring changes in arousal over time.

METHODS: The OSLA has four graded items assessing eye opening, eye contact, posture, and movement. Total scores range from 0-15, with zero reflecting normal arousal. Patients with hip fracture (N=108, median age 82(IQR 74-87)) were assessed peri-operatively by a geriatrician for delirium up to seven times with the Confusion Assessment Method, the Richmond Agitation-Sedation Scale (RASS), the Delirium Rating Scale-Revised-98 and the OSLA.

We assessed the psychometric characteristics of the OSLA. We compared the diagnostic performance of the OSLA and RASS using DeLong's method. Longitudinal changes in OSLA scores were assessed using a mixed-effects model with two time-varying predictors (delirium diagnosis and severity).

RESULTS: Forty-four patients (41.5%) were diagnosed with delirium. OSLA scores ranged between 0 and 9. The OSLA had good internal consistency (Cronbach's $\alpha=0.62$, 95%CI=0.56-0.67, $p<0.001$).

The Area under the Receiver Operating Characteristic Curve (AUC) for the RASS was 0.73 (95% CI=0.68-0.78, $p<0.001$), and for the OSLA 0.82 (95% CI=0.77-0.86, $p<0.001$). The AUCs were greater for OSLA than for the RASS ($p<0.001$).

Mixed model analyses showed that OSLA scores were higher with a diagnosis of delirium relative to no delirium within patients ($\beta=-3.09$, S.E.=1.41, $p<0.03$). OSLA scores were higher with increased delirium severity ($\beta=0.50$, S.E.=0.13, $p<0.001$).

CONCLUSIONS: This study provides initial validation of the OSLA as a brief, accurate instrument for monitoring changes in LoA in delirium. Further validation in larger cohorts, using blinded raters is required.

17. Effectiveness of postgraduate education about Delirium**CRISTINA BRAÇO FORTE (1) - MARIA JOÃO SERPA (1) - SOFIA DUQUE (2) - JOSÉ PIMENTA DA GRAÇA (1)**

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BACKGROUND

Delirium is a frequent condition in hospitalized elderly patients, as a complication of acute medical diseases. However, it is underestimated in medical and paramedical pre- and post-graduate curricula and consequently underdiagnosed and undertreated, contributing to poor prognosis. Therefore, post graduate education is crucial to improve health professionals awareness about importance of delirium, how to prevent, diagnose and treat it. Our goal was to assess efficacy of a lecture about Delirium directed towards hospital healthcare staff.

METHODS:

A questionnaire was completed before and after the lecture, assessing knowledge about diagnostic criteria, risk factors, prevention, pharmacological and non pharmacological treatment and prognosis.

RESULTS:

Twenty six healthcare professionals completed the questionnaire (42% nurses, 46% doctors). Comparing answers before and after the lecture there was improvement of knowledge about diagnosis (56 vs 63%), risk factors (66 vs 82%) and treatment (74 vs 94%). There was no improvement in knowledge about prevention and prognosis but just one question was included about each topic. Improvement in knowledge was best achieved in recognizing: fluctuation of symptoms as a feature of delirium; hydroxyzine, antidepressants, antipsychotics and immobilization as precipitants of delirium; low doses of haloperidol per os as the preferred treatment. Most respondents continued to consider agitation, aggressiveness and circadian rhythm disruption as core features of delirium and did not recognize social support as a protective factor.

CONCLUSIONS:

Post graduation education about delirium might be effective in improving its knowledge. Awareness about preventive strategies of delirium might be better accomplished by other type of education activities such as interactive workshops instead of purely expository lectures. Evidence is needed about decline of awareness of delirium with time after post graduated education activities to implement scheduled assessment and content review. Therefore, a reassessment survey is planned to take place 2 months after the lecture.

18. Underdetection of delirium in acute geriatric and medical wards: data from the REPOSI (REgistro POLiterapie SIMI) Italian registry

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OBJECTIVES: Delirium is a serious and common neuropsychiatric condition, with prevalence ranging from 15 to 24% in medical wards. Despite prevalence and negative outcomes associated, delirium continues to be underdetected in clinical practice, especially when screening tools are not used. There are no multicenter studies in Italy, which have evaluated the ability of physicians to recognize delirium in patients admitted to acute geriatric and medical wards. The aim of this study is fill this gap by measuring the attitude of physicians working in 70 Italian hospitals wards to diagnose delirium.

METHODS: This was a prospective cohort study using data of the REPOSI (REgistro-POLiterapie SIMI) Italian registry, a collaborative and independent joint effort of the Italian Society of

Internal Medicine and the IRCCS Mario Negri Institute of Pharmacological Research. The registry was designed with the purpose to create a network of internal medicine and geriatric wards in order to evaluate elderly patients with comorbidity and polypharmacy. All physicians were asked to fill in a standardized web-based case report form, including demographics, reasons for hospitalization, clinical parameters, drugs prescribed and adverse clinical events.

RESULTS: In the years 2010 and 2012, a total of 2703 patients (mean age =79.2+7.4 years) were recruited. Nearly half of them (50.6%) were female. The diagnosis of delirium was detected by retrieving "meaningful" words from ICD-9-CM codes and reasons of hospital admission (i.e., delirium, acute confusional status, drowsiness, agitation), being reported in 49 (1.8%) of the total sample. Patients with delirium were more disabled, comorbid, malnourished and had more frequently indwelling bladder catheter and pressure ulcers already at home. Furthermore, they fell more frequently during hospitalization than non delirious.

CONCLUSIONS: Delirium is markedly underdetected among acute medical and geriatric wards. Patients with a diagnosis of delirium had poorer outcomes than those without. Further data will be presented at the EDA Congress.

19. Improving screening and interventions for delirium in hip fracture patients over the age of 75 in acute care

BARBARA POWER (1)

The Ottawa Hospital, University of Ottawa, Ottawa, Canada (1)

BACKGROUND:

Delirium occurs in up to 61% of older adults with a hip fracture. The Ottawa Hospital (TOH) cares for over 300 people a year over the age of 75 with hip fractures.

OBJECTIVES:

The goal of this study is to identify delirium in hip fracture patients ≥ 75 years and to introduce a collaborative approach to care between Geriatrics and the Orthopaedics teams with the goal of enhancing education, reducing length of stay, and facilitating communication with patients and families about their diagnosis

METHODS:

A preliminary chart audit and patient assessment revealed a lack of consistent screening for delirium by clinical staff. This project involved the following approach: All patients admitted with a hip fracture to Orthopedics at both campuses of TOH are screened using the CAM. The Geriatric Nurse Specialist goes to the Orthopedic wards each day to review newly admitted hip fracture patients over 75yrs and their CAM status. If they are CAM +ve (i.e. have a Delirium) she evaluates the patients to determine potential risk factors and causes for delirium. She recommends strategies for intervention and management to the attending Orthopedic medical and interdisciplinary teams. A Geriatrician is also involved if medically indicated.

RESULTS:

In the first six months of the program, 189 patients were seen. The age ranged from 75 to 89 (average age 85.2 yrs) and ~70% were female. 175 patients were screened for delirium using the CAM (the staff used the CAM in 92% of cases) and 21% of the patients were found to be CAM positive. The patients were followed throughout their stay, and 45.5% were CAM +ve at some point during their stay. An additional six months of data is in review. 32.8% of the patients screened had a pre-existing diagnosis of dementia.

CONCLUSIONS:

Delirium is common in elderly patients admitted to an orthopedic ward with a hip fracture. Dementia is a major risk factor for delirium and a common diagnosis in this patient population. An educational intervention resulted in an increase by the staff in the recognition and appropriate management of delirium.

20. THINK delirium, write delirium, treat delirium! An elearning collaboration to improve the detection, diagnosis and management of delirium

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RCPI, RCPI, Dublin, Ireland (1) - Adelaide and Meath Hospitals, Tallaght, Tallaght, Dublin, Ireland (2) - Dublin North City Psychiatry of Old Age Service, University College Dublin, Dublin, Ireland (3) - Cork South Lee Old Age Psychiatry Service, UCC, Cork, Ireland (4) - UCC, University College Cork, Cork, Ireland (5)

BACKGROUND: There is some international evidence that educational interventions may have a positive effect on detection/prevention of delirium and improved patient outcomes including length of hospital stay in specific clinical settings. The aim of this e-learning module was to improve detection, diagnosis and delirium among all doctors, particularly doctors in training, in Irish healthcare settings.

METHODS: This collaborative module was designed by consultants in Geriatric Medicine and Psychiatry of Old Age with a special interest and/or academic expertise in delirium, along with a Specialist Registrar in Geriatric Medicine who is completing a PhD in this area. Best-practice principles in online education were used to develop a set of learning outcomes, agree the key messages of the module and develop the content.

RESULTS: The project resulted in a 70-minute e-learning programme, presented in four sections with a stop/start function to maximise its 'user-friendliness'. A number of mnemonics were developed to facilitate learning, arouse suspicion of the presence of delirium and provide an algorithm for the initial management including 'FIAT' (cardinal signs of delirium) and 'Think Delirium, Write Delirium, Treat Delirium'. Video clips and interactive quizzes were designed to illustrate the fluctuating patterns of delirium and prevent misdiagnosis particularly in the case of a patient with a hypoactive delirium presentation. The module content was reviewed by an additional panel of five academic and clinical experts.

CONCLUSION: The aim of this project was to provide trainees and all doctors with a cohesive and streamlined approach to delirium detection and diagnosis. Prevention and management of this significant health problem is dependent on effective inter-professional team working, mirroring the interprofessional nature of this e-learning collaboration. A follow-up workshop for trainees in medicine and psychiatry will take place in Autumn 2014, facilitated by geriatric medicine consultants and consultant psychiatrists and focused on the practical aspects of cognitive screening and problem-based discussions.

21. A Questionnaire study to assess knowledge about Delirium amongst allied health professionals.

AOIFE NICHORCORAIN (1), DR HARISH PARVATHIAH, DR CARA DALY

South Lee Mental Health Services, cork University Hospital, cork, Ireland (1)

Background

Delirium is under recognised in the acute hospital setting. There is a limited literature on the role of Allied health professionals in recognition and detection of delirium. Educational intervention would play an important role in increasing awareness and recognition of delirium amongst allied health professionals.

Method

We undertook a study of the knowledge of Allied health professionals in a large university teaching hospital of delirium and its risk factors. A questionnaire used in nursing research was modified and distributed to allied health professionals in a large university teaching hospital.

Results:

Results were analyzed using SPSS. 40 allied health professionals participated in the study, which included social workers, speech and language therapists, social workers and occupational therapists. 35 were female and 5 were male. 90 % of the respondents knew the definition of delirium. 55% knew that CAM scale can be used to identify delirium and 97.5% knew about DRS scale. There was general lack of awareness regarding delirium and its risk factors amongst all professionals, with Occupational therapists most likely to accurately identify the features of delirium and also the group most likely to correctly identify screening tools for dementia and delirium.

Conclusion

Occupational therapists were the professionals most likely to recognize the features and risk factors for delirium. Given the outcome of this there is need for educational intervention to improve knowledge and recognition of delirium amongst allied health professionals.

22. Improving understanding of delirium in surgical allied healthcare professionals.**GEORGINA MYNOTT (1) - ALTAF AKHTAR (1) - GEORGE COLLINS (1) - DUNCAN FORSYTH (1)**

Cambridge University Hospitals Foundation Trust, Addenbrooke's Hospital, Cambridge, United Kingdom (1)

BACKGROUND:

Delirium affects 10-50% of surgical patients. With an increasingly aged and co-morbid population its prevalence is set to increase. During our Foundation Year (FY1) we noticed a wide variation in the management of confused patients between wards. Effective nursing care is central to the successful management of delirium, however, historically it is a subject poorly taught at nursing schools. N. Tabet et al demonstrated that simple educational interventions aimed at nursing staff have been shown to reduce the prevalence of delirium in medical inpatients.

OBJECTIVE:

We aimed to assess the level of knowledge of delirium amongst surgical allied healthcare professionals and to determine the impact of a simple educational programme focussed on prevention, detection and management of delirium. Ultimately we hope that improved understanding and recognition of delirium will lead to better management and better patient outcomes.

METHOD:

A one hour, ward-based, interactive teaching session was delivered, by two FY1 doctors, to 45 surgical nursing staff; including ward managers and healthcare assistants on 3 surgical wards. Participants' understanding pre- and post-teaching was surveyed, as was a subjective score of staff confidence.

RESULTS:

Post-teaching questionnaires showed a 52% increase in the understanding of delirium. Confidence was also greatly improved. General feedback highlighted a hunger for teaching on the topic and an appreciation of its relevance to the surgical unit.

CONCLUSIONS:

The intervention was focussed, easily reproducible and effective. Delirium was seen as an important educational topic by this group of staff. We believe it would be well received in other groups, clinical areas and institutions.

23. Pilot Prevalence of Inpatient Delirium in Low Resource African Setting**DENNIS MAKOWA (1) - NIENKE LEGDEUR (1) - ELEANOR M FOWLER (1) - ELIZABETH C LONG (1) - OLIVER M TODD (1)**

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Background:

Delirium prevalence in Sub-Saharan African remains largely unreported. Recent advances have been made in developing a cognitive score which is suitable to discern cognitive impairment amongst people who are illiterate and have minimal or no schooling at all (Gray et al; 2014). The aim of this study was to validate the effectiveness of the IDEA score, validated in Tanzania and use it to estimate the prevalence of delirium in patients aged over 60 at a medical department in another Sub-Saharan African country.

Methods:

This study was conducted at a rural hospital in a largely arable society in Eastern Zambia. The IDEA cognitive screening score was translated into Chichewa, the local language, and was validated amongst 30 well-functioning people aged over 60 years. In addition, 30 serial medical admissions aged over 60 years were screened using the IDEA score and in combination with any collateral history of cognitive impairment we determined the prevalence of delirium among these 30 patients. We also recorded age, occupation, educational level, and subjective sense of memory problems.

Results:

In total we included 60 people. Amongst well-functioning people the score gave an average of 13 (Range 12-15) out of a full 15 points and no one scored less than 12 points. The prevalence study in hospital is currently in progress and we will report results at conference.

Conclusion:

This is the first study to assess prevalence of delirium using validated cognitive scores in Sub-Saharan Africa. The IDEA cognitive screening score demonstrated effectiveness at eliciting cognitive impairment in this particular population. A larger study is planned to determine whether delirium is predictive of higher inpatient mortality and length of stay as is reported elsewhere worldwide.

24. Phosphate levels in cerebrospinal fluid are elevated in hip fracture patients with ongoing delirium.

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Department of Geriatric Medicine, Oslo University Hospital/ University of Oslo, Oslo, Norway (1) - Department of Geriatric Medicine, Oslo University Hospital, Oslo, Norway (2) - Department of Anesthesiology, Oslo University Hospital, Oslo, Norway (3) - Department of Anesthesiology, Diakonhjemmet hospital, Oslo, Norway (4) - Department of Neurology, Oslo University Hospital, Oslo, Norway (5)

BACKGROUND: Phosphate is an essential compound in several cellular processes, including cellular energy metabolism and enzyme regulation. Thus, deranged phosphate levels could indicate altered cellular processes in delirium.

OBJECTIVES: We wanted to assess whether delirium is associated with deranged levels of phosphate levels in cerebrospinal fluid (CSF).

METHODS: A subgroup of hip fracture patients (N=72) from the Oslo Orthogeriatrics trial was included. Delirium was assessed daily using the Confusion Assessment Method. The hip fracture patients were divided into three groups:

- preoperative delirium (N=29)
- incident delirium (N=21, postoperative onset)
- no delirium (N=22, never signs of delirium)

As a reference group, we recruited cognitively healthy controls (N=28) amongst patients undergoing elective surgery in spinal anesthesia who performed well on several cognitive tests done preoperatively.

CSF was collected at the onset of spinal anesthesia. Reflectance spectrophotometry (Kodak DT60II) was used for the analysis. Kruskal-Wallis test was used for group comparisons.

RESULTS: Median phosphate levels (interquartile range (IQR)) were 0.63 (0.59-0.72) mmol/L in preoperative delirium, 0.55 (0.50-0.60) mmol/L in incident delirium, 0.52 (0.47-0.59) mmol/L in no delirium and 0.64 (0.57-0.73) mmol/L in cognitively healthy controls. There was an overall difference in phosphate levels between the four groups ($p < 0.001$), and patients with preoperative delirium ($p = 0.001$) and the cognitively healthy controls ($p < 0.001$) had higher phosphate levels than those with no delirium. However, there was no difference in phosphate levels between patients with incident delirium and those with no delirium ($p = 0.46$).

CONCLUSION: Phosphate levels are higher in CSF in hip fracture patients with ongoing delirium than in hip fracture patients without ongoing delirium. The high phosphate levels might be a marker of altered cellular processes in delirium. Cognitively healthy controls had phosphate levels of similar magnitude as hip fracture patients with preoperative delirium.

believe it would be well received in other groups, clinical areas and institutions.

25. Can a hospital monitor its care of delirium using NICE quality standards?

BACKGROUND:

Delirium is an important clinical condition characterised by inattention and global cognitive dysfunction, which despite its serious nature and burden on the healthcare system, still remains variably recognised and poorly understood. NICE has developed Quality Standards (QS) to help hospitals and care homes to assess the quality of their detection and management of delirium. We wished to evaluate the feasibility of measuring these QS in an acute hospital setting.

METHODS:

We audited the five NICE QS across five Department of Medicine for the Elderly wards in Addenbrooke's hospital over a period of just over a month. Inpatient records were examined in 2 separate cohorts: (a) patients who had been admitted for less than four days and (b) patients who had been in hospital for a longer period. Discharge summaries were also examined for both of these cohorts. Notes and discharge summaries were reviewed according to a data collection sheet with a range of criteria.

RESULTS:

In our hospital, for each of the 5 quality standards, it was possible to assess in some measure the adherence to these standards. The hospital performed to a high standard when proxy measures were used such as use of a dementia screening tool, evaluation of nursing notes for basic care and discharge summaries for evidence of GP communication.

CONCLUSION:

It does seem possible to monitor care of delirium against NICE Delirium Quality Standards, using systems already in place or perhaps using electronic systems which may appear in the future. Recording of whether information is given to patients and their carers was the main area for improvement in documentation.

26. An evaluation of the documentation in clinical records and follow up after discharge of patients with delirium

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Background

The Department of Health's 2012 dementia CQUIN (Commissioning for Quality and Innovation) aims to identify and screen all patients aged 75 years and over admitted as an emergency for cognitive impairment and to prompt appropriate follow up on discharge. This is applied in the Newcastle-upon-Tyne Hospitals via an electronic cognitive assessment tool which is completed during admission and includes screening for delirium. It is frequently reported that delirium is poorly documented and with emerging evidence that these patients are more likely to experience cognitive decline, their follow up is becoming increasingly relevant.

Objectives

To review the documentation of delirium in discharge letters and hospital coding in patients screening positive for delirium according to the Newcastle-upon-Tyne Hospitals' cognitive assessment tool and to review their follow-up arrangements after discharge.

Methodology

Patients screening positive for delirium from January to December 2013 inclusive were identified using the locally developed Cognitive Assessment Tool based on the Confusion assessment method. An e-learning package supported the use of the tool. Their discharge letters were reviewed to assess whether a diagnosis of delirium was documented and whether follow up arrangements were recorded. Hospital coding was also reviewed for these patients.

Results

Of the 6446 patients screened, 481 screened positive for delirium (7.46%). Of these patients, 171 (36%) had a discharge letter containing a diagnosis of delirium and 112 (23%) had delirium documented in hospital coding. 21 patients were followed up after discharge, 43 were referred to their General Practitioner and 61 were referred to psychiatry.

Conclusions

The diagnosis of delirium is poorly documented in discharge letters and there is a disparity in the figures obtained from different sources. This is consistent with previous work. Few patients with delirium are followed up on discharge. Further work is required to assess optimal methods of ascertaining a diagnosis of delirium.



27. Delirium and depression: Inter-relationship and overlap in elderly people**ROISIN O'SULLIVAN(1) - MAS MAHADY MOHAMAD(1) - SHARON INOUYE(2) - DAVID MEAGHER(1)**

Cognitive Impairment Research Group, University of Limerick, Limerick, Ireland (1) - Institute for Aging Research, Hebrew Senior Life, Boston, Massachusetts, United States (2)

BACKGROUND:

Delirium and depression are complex neuropsychiatric syndromes that are common in the elderly and associated with a variety of poor healthcare outcomes. Accurate detection is key to providing optimal care for these conditions but is complicated by their considerable overlap; the exact nature and significance of which is unclear.

METHODS:

We conducted a systematic review of the literature relevant to delirium and mood disturbance in order to examine possible phenomenological, aetiological, pathophysiological, therapeutic and prognostic implications of reported overlap.

RESULTS:

A total of 31 articles were identified. Over 50% (n=17) addressed the relationship between depression and delirium, with fifteen reporting positive evidence that depression is a risk factor for delirium. Seven studies, with follow up periods ranging from two weeks to two years, found varying evidence that delirium may be a risk factor for depression. Four studies highlighted how delirium (especially hypoactive) is commonly misdiagnosed as depression in referrals to consultation-liaison psychiatry services. The remaining four studies addressed the overlap of depression and delirium and the presence of depressive symptoms as part of delirium. Affective disturbance is reported in 43-86% of episodes of delirium. Two studies have identified poorer prognosis in patients with so-called 'overlap syndrome' where features of both depression and delirium are evident.

CONCLUSIONS:

There is significant overlap between delirium and depression that may have important implications for our understanding of these conditions as well as everyday clinical detection and management. Detailed longitudinal studies can further clarify the relationship.

28. 'Delirium' at the end of life: Developing a strategy for a bibliometric study**SHIRLEY H. BUSH (1) - TAMMY TSANG (2) - LINDSEY SIKORA (3) - PETER G. LAWLOR (1)**

Division of Palliative Care, Department of Medicine and Bruyère Research Institute, University of Ottawa/Bruyère Continuing Care, Ottawa, Canada (1) - Bruyère Research Institute, Bruyère Continuing Care, Ottawa, Canada (2) - Health Sciences Library, University of Ottawa, Ottawa, Canada (3)

BACKGROUND/OBJECTIVES:

The prevalence of delirium at the end of life has been reported as 88% in adults. However over the years the terminology for this syndrome has varied in the growing palliative care literature, and loosely defined terms such as terminal restlessness or terminal anguish have been used. The use of inconsistent terminology and varying definitions creates ambiguity when making interpretations and comparisons of studies and case reports, yielding it problematic. There is an outstanding need to map this literature in order to produce conceptual clarity, and to attempt to standardize the terminology related to end-of-life delirium. The aim of this study is to present a bibliometric analysis of the scientific publications on delirium in the terminal phase.

METHODS:

A systematic search (with no date or language restriction applied) was performed in multiple electronic databases: Cochrane Library and DARE, OVID Medline, PubMed, Embase, CINAHL, PsycINFO, AgeLine and NHS EED, for delirium and synonymous search terms. Pediatric delirium, alcohol (delirium tremens) or substance withdrawal, and euthanasia were excluded.

RESULTS:

The librarian-assisted search identified 3886 citations after removal of duplicates. These were screened (by SB and PL) yielding 665 eligible articles. Two teams of reviewers are currently evaluating the retrieved eligible articles to extract information for a specifically developed data collection sheet. Both a qualitative and quantitative bibliometric analysis will be undertaken.

CONCLUSIONS:

Uniform terminology is required for delirium in the terminal phase. This bibliometric study will demonstrate the variability of published terminology and describe how it has evolved over time. This will help inform future inclusive literature search strategies, as well as help establish a common language between researchers and clinicians for delirium at the end of life.

29.**OBJECTIVES:**

Stop Delirium![1] is a multi-component intervention designed to prevent delirium in care home residents. It is an enhanced educational package based on the best delirium prevention and practice change evidence[2]. As part of a pilot trial we examined integration and sustainability of Stop Delirium![3] in care routines to inform future research.

METHODS:

We undertook qualitative analysis of practitioner logs, staff interviews and follow up questionnaires. Emerging themes were mapped to the constructs of NPT, a toolkit used to understand the dynamics of implementing, embedding, and integrating new technologies or complex interventions.[4][5].

RESULTS:

All staff noted that delirium education made more sense of their job role (coherence) although the focus was primarily on management, not prevention. Most managers were initially enthusiastic in identifying Delirium Champions but ongoing support was needed to legitimise the work and engage the wider staff group in initiatives. Working groups provided a conduit for collective action however the extent to which initiatives changed practices was limited because of lack of engagement of nursing staff and different priorities of managers (cognitive participation). Delirium work was largely delegated to care staff and was perceived primarily as early recognition and action on delirium to reduced severity and duration. Care staff, more aware of delirium cues, initiated investigations (e.g. 'dipsticks'); whether and how this was pursued depended on the legitimacy accorded care staff's knowledge by nursing staff. The intervention was more likely to be embedded into practice when it was part of existing work or contributed to another initiative, although the majority of activation activity was passive e.g. poster displays. Even so, there were no formal systems in place to appraise outcomes (reflexive monitoring). And, there was limited evidence of specific tangible resource allocation to sustaining action on delirium (contextual integration) across the care homes.

CONCLUSIONS:

The NPT framework was useful in helping to identify barriers and facilitators to integrating delirium work in the care home setting. The most improvement was in the areas of detection and treatment. Emphasis on contextual integration and reflexive practice could facilitate early identification of risk factors and sustainability.

30. Relation Between Urinary Catheter and Delirium

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OBJECTIVES: Urinary catheters (UCs) are commonly used in acute hospital wards, with nearly 25% of hospitalized patients receiving an UC during their in-hospital stay. The prevalence of UCs is even higher in acute geriatric settings, as its placement tends to be more frequent in patients with disability, cognitive impairment and malnourishment(1). These conditions are well-known predisposing factors, while UC placement is a precipitating factor for delirium(2). The aim of this work is to study the relationship between catheterization and incidence of delirium at admission in a large population of elderly patients admitted to an Acute geriatric Unit (AGU).

METHODS: This is a retrospective analysis of all the patients aged 65 years and over who were consecutively admitted to our AGU from September 2012 to June 2014. Exclusion criteria were: a) having an UC already at home; b) being admitted with a diagnosis of hip fracture or any other diagnosis that brought to undergo surgical operation within 48h from the admission. Data recorded included baseline clinical characteristics and geriatric multidimensional assessment. Delirium was defined according to DSM-IV-TR. We compared clinical characteristics of patients with and without delirium and those with and without UC using univariate analyses. Then, we created a directed acyclic graph and performed a binomial log-linear regression to evaluate potential confounders.

RESULTS: We recruited 1633 patients: 40.9% had a UC placed at admission and 39.3% of them had delirium (vs 19.8% in no-UC group). Age, dementia, functional decline, malnutrition and pressure ulcers were significantly different in both delirium/non delirium and UC/non UC groups at the univariate analyses. In a model adjusted for age and gender, patients with a UC placed at admission had a 1.67 times the risk of developing delirium (RR 1.67, CI 1.42-1.86). After adjusting for dementia, functional decline, malnutrition and pressure ulcers, RR lowered to 1.38.

CONCLUSIONS: In our study UC confirmed to be a risk factor for incident delirium. Cognitive, functional and nutritional status may be confounders. Further studies are required to elucidate the relationship between UC, incident delirium and potential confounders and mediators.

31. Delirium assessment in palliative care: a systematic review of diagnostic best practices**BRID AINE DAVIS (1) - PROFESSOR DAVID MEAGHER (2) - DR MAS MOHAMAD (1)**

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Background and Objectives:

Delirium is a common issue in acute care settings. Findings from one prospective study indicated that the prevalence of severe cognitive failure was between 28%-42% on admission to a palliative care unit and occurred in up to 90% of patients with terminal illness. Moreover, findings from a substantial body of research has demonstrated that delirium can adversely impact patient management and outcome, wherein patients who experience such cognitive issues pose particular challenges regarding optimal pain management and have poorer outcomes in respect to survival time, patient and carer distress, and management burden. Thus, it stands to reason that improved diagnostic accuracy can greatly facilitate more optimal overall patient care, and given that delirium can oftentimes be reversible in palliative care patients, such interventions could contribute crucially to quality of life and end-of-life decision making. The current review, conducted in response these needs, aimed to: evaluate the prevalence of delirium and identify issues with regards to instrument suitability and sensitivity for palliative care populations.

Methods:

A systematic review was utilized to synthesize evidence from the current literature base in a coherent and methodical manner, wherein a number of high quality research articles sourced from academic databases were appraised.

Results:

This review demonstrated that whilst episodes of delirium were a common occurrence in palliative care settings, there is significant variance among the types of instruments utilized to diagnose delirium in the literature. Moreover, results from this review also revealed that delirium is often misdiagnosed, whereby the relative sensitivity of the various instruments differed considerably.

Conclusion:

Findings from this review suggest that there is little consensus regarding the screening and assessment of delirium in palliative care settings. We argue that a more systematic screening approach could lead to earlier diagnoses and treatment pathways, in turn minimising medical risk.

32. Differences in Frailty Scoring Between Health-Professionals In Patients Undergoing Cardiac Surgery**THOMAS BEGGS (1) - BRETT HIEBERT (1) - NAVDEEP TANGRI (2) - RAKESH ARORA (1)**

University of Manitoba, St. Boniface Hospital, Winnipeg, Canada (1) - University of Manitoba, Seven Oaks Hospital, Winnipeg, Canada (2)

Objectives:

Frailty is a syndrome that encompasses the dimensions of malnutrition, wasting, weakness, slowness and inactivity leading to a vulnerable state and adverse clinical outcome. The Clinical Frailty Scale (CFS) has been used to assist healthcare professionals in determining those who are frail, however involves some subjective judgment of the scoring system administrator. We sought to determine if a user's "semi-subjective" assessment using a CFS correlates with post-operative outcomes in a frail patient undergoing cardiac surgery.

Methods:

Patients undergoing elective cardiac surgery were assessed preoperatively for frailty status using a CFS. Registered nurses and cardiac surgeons used the CFS to assign a score that ranged from fit (score of 1) to extremely frail (score of 9). These CFS scores were then compared to hospital and intensive care unit (ICU) length of stay (LOS) after surgery and in-hospital delirium.

Results:

CFS scores were recorded on 186 patients and ranged from fit (1) to moderately frail (6). The surgeon and nursing CFS scores were identical in only 30% (N=55) of the cases. When the CFS scores were differed between assessors, the spearman correlation between the CFS and hospital LOS or ICU LOS was poor. The AUC in predicting delirium from the physician and nursing CFS scores were 0.688 and 0.586 respectively. When there was agreement in the CFS assessment, correlations with hospital and ICU LOS were higher (0.512 & 0.357 respectively). In addition, the AUC for predicting postoperative delirium was higher (0.725).

Conclusions:

Inter-observer discrepancy in CFS scores occurs frequently between health professionals. The use of a pre-operative CFS was only useful in helping to predict post-operative outcomes when multiple evaluators were in agreement in their assessment of a patient's level of frailty. Further investigation in to what factors result in this discrepancy will be the subject of future studies.

33. Improving Delirium Screening Rates using short-CAM in Patients with a Neck of Femur Fracture**MINA NISA (1) - SARAH CHAMBERLAIN (1) - SHULI LEVY (1) - MICHAEL FERTLEMAN (1)**

St Mary's Hospital, Imperial College Hospital NHS Trust, London, United Kingdom (1)

OBJECTIVES:

Delirium is the commonest complication of a fractured neck of femur (NOF), affecting up to 65% of patients during their admission. The National Institute for Health and Care Excellence (NICE) recommend delirium assessment for all patients over 65 with a current hip fracture, using the short Confusion Assessment Method (short CAM) where indicated. The English NOF Best Practice Tariff (BPT) mandates pre- and post-operative abbreviated mental test scoring (AMTS) for all patients but not routine screening for delirium, which may subsequently go unrecognised. Our team, led by an Orthogeriatrician, manages over 300 NOFs a year, all of whom undergo cognitive assessment, but rates of short CAM testing remain low. We undertook an audit cycle to improve this.

METHODS:

All NOF patients admitted in a London major trauma centre over a 2 week period were audited for presence of short CAM assessment in their management. We then designed training sessions in using short CAM as a screening tool which was delivered to orthogeriatric doctors. In clinical practice, we attached the short CAM assessment to pre and post-operative AMTs scoring which was already a well-established part of the assessment. We re-audited one month later.

RESULTS:

Our initial audit found that no patients had a short CAM performed even when delirium was suspected. Following re-audit there was an 87% improvement. We also found the incidence of delirium was 12% in the initial audit sample; 6% in the re-audit cohort.

CONCLUSIONS:

Training all team members in how to use short CAM and linking it to the routine cognitive assessment of NOF patients increased the rate of delirium screening by 87%. Since NOF patients are at such high risk of delirium, we suggest the BPT standard of AMTS scoring is widened to include routine short CAM testing in all NOF patients.

34. Detecting delirium in patients with fractured neck of femur - is short CAM the best test?**SARAH CHAMBERLAIN (1) - MINA NISA (1) - SHULI LEVY (1) - MICHAEL FERTLEMAN (1)**

St Mary's Hospital, Imperial College Hospital NHS Trust, London, United Kingdom (1)

OBJECTIVES:

Elderly patients with fractured neck of femur (NOF) are at high risk of developing delirium, thought to be due to a summation of contributing factors. Estimates of occurrence rates of delirium vary from 9.5 to 41% between studies which employ a range of diagnostic tools. The most frequently used of these is the short confusion assessment method (short CAM), however this has not been specifically validated in the NOF population and there is a general paucity of high quality data originating from the UK for this instrument. Presently, the National Institute for Health and Care Excellence (NICE) recommend the use of short CAM to detect delirium where suspected, but the UK National Clinical Guideline Centre has recommended the development and validation of a new test. We wished to establish rates of delirium detected using the short CAM as a screening tool in our Orthogeriatric unit and to consider whether or not our data supported the ongoing use of short-CAM as the test of choice.

METHODS:

Following training in the use of short CAM, Orthogeriatric doctors undertook screening for delirium in all new NOF presentations. We audited rates of screening and rates of detected delirium for two separate two week periods.

RESULTS:

In the initial period, 87% of patients had a short CAM test, 7% were positive. Subsequently 100% of patients were tested, 13% were positive.

CONCLUSIONS:

Our low rates of delirium detection using the short CAM as a screening tool in NOFs are consistent with findings from larger trials that demonstrate a wide variation in results. This reinforces the suggestion that a new test for delirium, specifically validated in NOF patients, is needed. One possibility is the 4AT instrument, a rapid screening tool for clinical practice currently being trialled in Europe, with initial data suggesting high sensitivity and specificity in detecting delirium.

35. Identifying barriers to the integration and sustainability of Stop Delirium! Using Normalisation Process Theory (NPT)

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OBJECTIVES: Stop Delirium! [1] is a multi-component intervention designed to prevent delirium in care home residents. It is an enhanced educational package based on the best delirium prevention and practice change evidence [2]. As part of a pilot trial we examined integration and sustainability of Stop Delirium! [3] in care routines to inform future research.

METHODS: We undertook qualitative analysis of practitioner logs, staff interviews and follow up questionnaires. Emerging themes were mapped to the constructs of NPT, a toolkit used to understand the dynamics of implementing, embedding, and integrating new technologies or complex interventions. [4][5].

RESULTS: All staff noted that delirium education made more sense of their job role (coherence) although the focus was primarily on management, not prevention. Most managers were initially enthusiastic in identifying Delirium Champions but ongoing support was needed to legitimise the work and engage the wider staff group in initiatives. Working groups provided a conduit for collective action however the extent to which initiatives changed practices was limited because of lack of engagement of nursing staff and different priorities of managers (cognitive participation). Delirium work was largely delegated to care staff and was perceived primarily as early recognition and action on delirium to reduced severity and duration. Care staff, more aware of delirium cues, initiated investigations (e.g. 'dipsticks'); whether and how this was pursued depended on the legitimacy accorded care staff's knowledge by nursing staff. The intervention was more likely to be embedded into practice when it was part of existing work or contributed to another initiative, although the majority of activation activity was passive e.g. poster displays. Even so, there were no formal systems in place to appraise outcomes (reflexive monitoring). And, there was limited evidence of specific tangible resource allocation to sustaining action on delirium (contextual integration) across the care homes.

CONCLUSIONS: The NPT framework was useful in helping to identify barriers and facilitators to integrating delirium work in the care home setting. The most improvement was in the areas of detection and treatment. Emphasis on contextual integration and reflexive practice could facilitate early identification of risk factors and sustainability.

36. Danish intensive care nurses' experience of using CAM-ICU for identifying delirium: A qualitative multicentre study.

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OBJECTIVES: The aim of this study was to identify which perceived barriers Danish intensive care nurses experience regarding the use of the CAM-ICU for delirium screening in their daily clinical practice.

The CAM-ICU (Confusion Assessment Method for ICU) is an evidence-based tool for detecting and evaluating intensive care delirium. In Denmark, the CAM-ICU was implemented in order to detect and evaluate delirium. Despite this, nurses still neglect to use the CAM-ICU systematically to screen patients for delirium in their everyday clinical practice.

Identification of potential barriers is essential for optimal re-implementation of the CAM-ICU as a detection and evaluation tool in the ICU.

METHODS: Focus group interviews with ICU nurses from 3 hospitals in Denmark. Informants were sampled using strategic sampling. Prior to conducting the interviews, a semi-structured interview guide was developed in order to structure the interviews. The interview guide covered the following topics: positive and negative experiences with CAM-ICU, how they detected delirium, any other ideas for detecting delirium and other constraints in the CAM-ICU. Interview data were transcribed verbatim and systematic text condensation used to analyse data.

RESULTS: Twenty certified intensive care nurses were interviewed in 5 focus-groups. Four themes emerged from the analysis of data. 1/ "Violated integrity", When using the CAM-ICU, nurses felt that they violated the patient's integrity. This was embarrassing for the nurse, the patient, relatives and colleagues. 2/ "CAM-ICU not an indication for delirium", Nurses experienced that nurses and physicians did not initiate treatment for delirium on the grounds of a positive CAM-ICU result. 3/ "No faith in the CAM-ICU outcome", the CAM-ICU was difficult to use and nurses did not trust the results; consequently they simply chose not to use it. 4/ "Cultural differences", Due to differences in the intensive care patient case mix and differences between the culture of Denmark and USA, nurses felt that the CAM-ICU was not a valid screening tool for delirium in a Danish context.

CONCLUSIONS: Preliminary conclusion. The results suggest that in a Danish context nurses feel ethically challenged when using the CAM-ICU. They question the validity of the tool for identifying delirium within Danish ICUs, and a positive CAM-ICU does not serve as a grounds for initiating treatment for delirium.

37. Community-wide multiprofessional delirium education, prevention, and management initiative creates shared knowledge base, improves delirium care

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OBJECTIVES:

A community-wide delirium prevention and management initiative at a regional hospital system in Concord, NH, USA, aims to improve delirium recognition, reduce injurious falls, and improve care processes for the frail elderly.

METHODS:

In 2012 a multiprofessional Delirium Prevention Task Force identified priorities in delirium care. Subcommittees developed comprehensive nursing guidelines, changes to the hospital formulary, therapeutic arts materials, risk assessment decision support, an educational brochure, and an evidence-based "safe sleep protocol". A nurse-led pilot on 3 inpatient units tested these materials, conducting mandatory educational workshops for all nursing staff and training Delirium Resource Nurses. Education of hospital leadership, physicians, pharmacists, rehabilitation therapists, care coordinators, volunteers and community members accompanied the pilot.

RESULTS:

Results of pre- and post-pilot surveys showed increased nurse knowledge and confidence in recognizing delirium and caring for confused patients. Coding of delirium-related diagnoses increased by 29% in year 1. Injurious falls rates have improved. Project success resulted in broad rollout to all med-surg units. A consensus regarding delirium management is emerging, reflected in new order sets. Enthusiasm generated by the inpatient project prompted philanthropic donations which have funded delirium prevention workshops, Resource Nurse training, and therapeutic materials for local organizations serving the frail elderly. A Delirium Prevention Committee meets quarterly to review metrics and guide future work, reporting to hospital leadership. Delirium prevention has become an organizational quality assurance priority.

CONCLUSIONS:

Broad-based, multiprofessional community-wide efforts can contribute to improved recognition of delirium, facilitate improved care processes and contribute to reduction of injurious falls.

38. Prevalence of delirium in older hospitalised adults in Tanzania
The IDEA (Identification and Interventions for Dementia in Elderly Africans) study

STELLA-MARIA PADDICK (1) - WILLIAM K. GRAY (2) - CATHERINE DOTCHIN (2) - ALOYCE KISOLI (3) - GODFREY MBOWE (3) - JOHN KISIMA (4) - BINGILEKI LWEZUALA (5) - SARAH MKENDA (3) - DECLARE MUSHI (3) - ANDREW TEODORCZUK (1) - RICHARD WALKER (6)

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OBJECTIVES: In sub-Saharan Africa (SSA), little is currently known of the prevalence or causes of delirium. To date, only one study has reported prevalence in older adults in SSA, despite the known vulnerability of this group to delirium and the associated adverse outcomes. Validated screening tools for delirium in SSA are currently lacking. The IDEA cognitive screening tool was developed as a brief screen for use in low-resource settings and populations with low levels of formal education. We aimed to identify the prevalence of delirium in a cohort of consecutive inpatient admissions aged 65 and over. We also aimed to formally validate the IDEA study screening tool for delirium and dementia in this setting.

METHODS: The study took place in Mawenzi Regional Hospital, Northern Tanzania. 100 consecutive admissions to medical wards aged 65 and over were screened for cognitive impairment using the IDEA screening tool. All participants were subsequently assessed by a research doctor blinded to the outcome of the screening tool. This assessment included the Confusion Assessment Method (CAM) alongside cognitive assessment, neurological examination and informant history. Both DSM-IV and ICD-10 criteria were used for dementia and delirium diagnosis.

RESULTS: Three patients were excluded because they did not fully complete the assessment before discharge. Of the remaining 97 patients, 17 (17.53%) met criteria for delirium when assessed. Of these, 10 (10.31%) had a history suggestive of dementia with superimposed delirium. The IDEA screening tool demonstrated performance of AU-ROC 0.903 (95% CI 0.840-0.965) for identification of delirium and dementia combined.

CONCLUSIONS: Delirium was common in this group of hospitalised older adults in Tanzania. Our prevalence estimate of delirium may be a conservative one, since patients were assessed only once during hospital admission. The IDEA screening tool appeared effective in identifying delirium in this group and further validation is suggested.

39. Prevention is better than cure - design and evaluation of interdisciplinary, volunteers-based, non-pharmacological delirium prevention in geriatric ward Wholesome Contact Project

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Hospital delirium is the most frequent complication of hospitalization in older people. Although it is treatable with antipsychotic drugs, the onset of delirium is the source of suffering for patients and their families, as well as barrier to medical staff for providing treatment. It is also connected with longer hospitalization, higher cost, risk for earlier death, health deterioration and institutionalization. Therefore „prevention is better than cure” strategy combined with screening for risk factors and early diagnosis seems to be the most efficient management of delirium.

The aim of the presentation is to introduce the audience into Wholesome Contact Project, first programme for prevention of hospital delirium in elders in Poland founded on geriatric ward in university hospital (Cracow) in 2012. Wholesome Contact Project is a multidimensional, interdisciplinary strategy for non-pharmacological delirium prevention directed to manageable risk factors (e.g. polypharmacy, malnutrition, dehydration, visual and auditory deprivation, immobilisation, sleep deprivation, lack of orientation in time and space, social deprivation and psychological stress).

The intervention is based on the work of volunteers - students of medicine, psychology and pharmacy - whose preexisting professional experience, knowledge and motivation for learning is an additional profit for a low-cost design of the programme. Another aims of the project are: to disseminate professional knowledge about delirium management, to develop social and communication skills in future medical personnel to improve doctor-patient relationship and to educate about professional burn-out and its prophylaxis in the context of geriatrics.

Quantitative evaluation of efficiency and cost-effectiveness of the programme as well as qualitative research on volunteers' experience and proper management of their work will be presented.

40. Delirium in an acute patient hospital in Italy: evaluation of nurses' knowledge and prevalence by 4AT.

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BACKGROUND: Delirium is a common and serious problem affecting hospitalized older people. Nurses play a key role in detecting delirium, which is often underestimated by the staff.

METHODS: We carried out an observational transversal study taking into account both prevalence of delirium and knowledge of the nurses in evaluating the phenomenon in 5 acute in-patients units, in the University Hospital of Padova. Prevalence of delirium was assessed in a single day using the 4AT in all elderly (≥ 65 yo) eligible patients. Nurses' knowledge about delirium was evaluated by using the questionnaire "Survey of knowledge of delirium" proposed by the Italian Psychogeriatric Association.

RESULTS: 102 patients were hospitalized in the 5 units. Male mean age was 73.4 (SD 14.4), female mean age was 71.7 (SD 17). 51% were women (n=52). 58 patients were eligible: 50% men (n=29), male mean age 77.9 (SD 6.6), female mean age 79.3 (SD 7.7).

26 patients (45%) out of 58, had "possible delirium +/-cognitive impairment"(4AT score ≥ 4): 12 were male patients and 14 were female patients, equally distributed between the Orthopedic-Trauma Unit and the Internal Medicine Unit.

68 nurses out of 143 completed the questionnaire (47%). 77% do not use any rating scale to diagnose delirium. 79% do not measure delirium intensity. 5.9% recognized all the 9 correct causes of delirium. As regards the approaches to delirium, 53% recognize correctly approach for hypokinetic delirium, whereas 43% that for the hyperkinetic one.

CONCLUSION: Delirium was found in 45% of the eligible patients (25.5% of the hospitalized patients).

4AT TEST, thanks to its simplicity, could be a good method to assess delirium, even though it is difficult finding information to complete item n. 4.

The study found that nurses do not regularly assess and measure delirium using rating scales. Nurses poorly know the multifactoriality of delirium causes and the approaches for treatment.

41. Delirium in older patient with hip fracture who are using psychotropic drugs**ANETTE HYLEN RANHOFF (1) - RAGNHILD BIRKELAND WAADE (2) - METTE IRENE MARTINSEN (3) - ESPEN MOLDEN (2)**

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OBJECTIVES:

Delirium is very common and associated with poor outcomes in older hip fracture patients. Psychotropic drugs are widely used, may be involved as a risk factor for injurious falls, but also to the risk of delirium.

Psychotropic drugs, and particularly benzodiazepines and z-hypnotics, are often found in blood analyses of older hip fracture patients when they are admitted to hospital. The association between these drugs and postoperative delirium has not been studied extensively.

The aim was to analyse concentrations of anxiolytics, hypnotics, antipsychotics and antidepressants in blood taken at admission of older people with hip fracture to get information about the use of these drugs at the time of fracture, and to explore the association with incidence of delirium postoperatively.

METHODS:

Routine blood tests at admission of 250 patients 65+ years with hip fractures were taken, and some of the blood was stored. Informed consent for using the blood for analyses of drugs was obtained when the patients had recovered after surgery. Patients with severe dementia or a severe health condition were not included. Delirium was detected by using the CAM on each shift by the ward nurses.

RESULTS:

250 patients were included, 76% were female, mean age was 83 years (SD 7.9). We detected psychotropic drugs in blood samples from 53% of the patients; 44% had used benzodiazepines and z-hypnotics and 16% antidepressants. Delirium was detected postoperatively in 71 (28%). Psychotropic drugs were found in 41 (58%) of the patients with delirium vs 111 (65%) in those without delirium (ns), however benzodiazepines were more often found in the blood of patients with delirium (70% vs 46%).

CONCLUSIONS:

Psychotropic drugs were used by more than half of older hip fracture patients at time of fracture, not different between patients who had delirium or not. However, use of benzodiazepines were associated with delirium.

42. Is serum S100B a marker of blood-brain barrier leakage in delirium?**KAREN ROKSUND HOV (1) - TORGEIR BRUUN WYLLER (1) - NILS BOLSTAD (2) - LEIV OTTO WATNE (1)**

Geriatric Department, Oslo University Hospital, Oslo, Norway (1) - Department of Medical Biochemistry, Oslo University Hospital, Oslo, Norway (2)

OBJECTIVES:

Elevated serum levels of S100B have been found to be associated with delirium, also in hip-fracture patients. This calcium-binding protein is expressed primarily, but not specifically, by astrocytes, and previous studies have suggested significant expression in extra-cerebral tissue (e.g. bone fractures). Q-albumin (ratio of CSF-albumin and serum-albumin) is an established marker for blood-brain barrier (BBB) function and serum S100B has been suggested as a peripheral marker for BBB-leakage. The aim of this study was to explore if serum S100B is a marker for BBB-leakage in hip-fracture patients with and without delirium.

METHODS:

Hip-fracture patients (n=76, 75% women, mean age 83 years) were included at admission. Delirium was assessed daily using CAM. Serum was drawn pre-operatively and CSF at the onset of spinal anaesthesia. Albumin was analysed in serum and CSF, and the ratio (Q-albumin) was calculated using the formula $[\text{CSF albumin (mg/dl)} \times 1000] / [\text{serum albumin (mg/dl)}]$. S100B was analysed in stored preoperative sera from the same patients. Correlations were assessed with Spearman's rank correlation test (continuous variables) and Cohen's kappa (after dichotomization).

RESULTS:

There was no correlation between serum S100B and Q-albumin ratio (Spearman rho -0.004, p=0.97). N=19 had BBB-leakage (Q-albumin>9) and n=52 had elevated levels of serum S100B (S100B > 0.1), but there was no agreement between elevated S100B and BBB-leakage (kappa -0.044). Analysing subpopulations with (n=43) and without delirium and/or pre fracture chronic cognitive impairment did not change these results significantly.

CONCLUSIONS:

In our hip-fracture population, serum S100B did not correlate with Q-albumin. Our findings are not supportive of a theory of S100B as a marker of BBB-leakage.

43. Strategies to facilitate implementation of a multi-component delirium prevention intervention in U.K. NHS acute hospital wards

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OBJECTIVES: We are undertaking a cluster randomised controlled study in 16 wards in eight NHS acute hospitals to explore the potential effectiveness and cost-effectiveness of the Prevention of Delirium (POD) programme. Hospitals/wards were randomised to receive either POD or usual care. We required the eight wards (elderly care medicine and trauma/orthopaedic surgery) who received POD to complete implementation within a strict six month time period prior to the start of patient recruitment to the study. Implementation of new care systems on busy wards can be difficult and may fail. We therefore devised strategies to optimise the likelihood of wards successfully implementing POD.

METHODS: Prior to acceptance as a site, wards were screened for compliance with four readiness criteria identified during an earlier study testing the feasibility of POD: 1) availability of a named person to drive implementation forward (POD Lead); 2) commitment of senior nurse, ward manager and voluntary service manager; 3) adequate staffing levels; 4) availability of an experienced nurse to be seconded to act as POD Facilitator for 7.5 hours per week for 3-4 months. Support provided by the research team once implementation began included practical help e.g. preparing educational materials, weekly phone calls and monthly ward visits to discuss progress and give advice.

RESULTS: One ward implemented POD within four months and six wards fully implemented POD within six months. One ward achieved only partial implementation by the end of the six month period. However during the implementation period, as a result of a change in circumstances, this ward ceased to meet our initial readiness criteria.

CONCLUSIONS: Formal assessment against ward "readiness" criteria, and provision of support may facilitate the implementation of multi-component delirium prevention interventions.

44. 'My littleChild, I don't recognize him, anymore. Where is my littleChild?'
In Memory of Giampaolo Magnani
Born on 5th March 2009 died on 17th October 2010

LUISELLA PROFESSOR MAGNANI (1)

University of Insubria of Varese, Paediatric Clinic of Varese, Varese, Italy (1)

Background

Preverbal children may live delirium because of the 'underlying disease and its treatment' (Jan Schieveld, 2008). And Erwin Ista (2012) wrote that 'the real incidence of delirium in these patients may be much higher than now observed in daily practice'. Indeed this incidence is very high in Preverbal children undergoing chemotherapy, cortisone therapies, and sedation therapies for painful procedures and surgical interventions. And every child responds in his individuality, subjectivity and unicity, showing severe and frightful changes in his personality.

Methods

Creating 'synaesthetic atmospheres' (Gernot Böhme, 2001), using words, signs and gestures, tailored just for that child, millisecondly, creating a new inscape, a new time, a new space for that child, 'providing visual and hearing aids, reorienting patient repetitively (Wesley Ely, Heidi Smith, 2007), wondering what the preverbal child thinks of, how he thinks, how his thought is, how the level of his consciousness is, where and what he looks at, how he looks at, what his eyes see, how his eyes see, what he feels, what atmosphere surrounds him, how he lives that surrounding atmosphere, how he perceives and how the level of his sensations, perceptions and emotions is.

Results

The higher is the preverbal child's attentional capacity to participate to these synaesthetic atmospheres, the less is the cognitive capacity to listen to distress, disorganization, disorientation, agitation, fear and pain. The more answers the caregiver gives to those questions, written in the 'Methods' section, the more he enters the preverbal child's Inscape.

Conclusions

If our behavior creates the purest, highest, sweetest atmospheres, the preverbal child feels understood everywhen, everywhere, anyhow, despite anything and against anything. His mind is reorganized, reordered, reoriented.

45. Education program to screen and manage delirium within NHS Ayrshire & Arran, Scotland**CLAIRE COPELAND (1)**

NHS Ayrshire and Arran, University Hospital of Crosshouse, Kilmarnock, United Kingdom (1)

OBJECTIVES: Design and deliver an innovative educational program to support all staff during the implementation of the Delirium Pathway for older people in NHS Ayrshire&Arran.

METHODS: The scale of the project was a challenge. NHS A&A employ ~6,500 healthcare professionals in secondary care alone.

Recognising the importance of education to delivering this new pathway I drew together a collaborative, multidisciplinary team, in addition to myself:

- Consultant Liaison Psychiatrist, Consultant Nurse in Dementia
- Senior Charge Nurses from the Care of the Elderly wards.
- Occupational Therapist.
- Physiotherapist
- Trainee Healthcare Improvement Scotland Improvement Advisor.

To ensure consistency between trainers the course content and objectives were agreed. In conjunction with traditional methods of teaching i.e. lecture style, new innovative methods using social media were also tried. The most successful of these was the NHS A&A delirium Facebook page. We have 157 members. It is a closed group and no patient identifiable material is allowed. There is active engagement from all staff about all aspects of delirium but also dementia. Posts include short video clips about delirium. These were also posted on Vine, Wordo, Twitter and Google+. The Facebook page also contained links to research articles and local online training. It was also a way of advertising teaching sessions across Ayrshire to a bigger audience. I can 'see' who has looked at the posts like a virtual attendance sheet.

RESULTS: A local audit carried out since the introduction of the delirium pathway, supported by a robust training and education program has shown encouraging results. There is an increased documentation of delirium in medical notes 42% to 61%, medico legal paperwork (Adults With Incapacity) has improved. An indirect assessment shows that there are an additional 140 referrals to our local Elderly Mental Health team suggesting increased awareness of delirium.

CONCLUSIONS: New innovative ways of delivering education and training has seen an increase in compliance and staff engagement with the delirium pathway.

46. Behavioural Predictors of Incident Delirium**NIAMH A O'REGAN (1) - DIMITRIOS ADAMIS (2) - JAMES FITZGERALD (3) - D W MOLLOY (1) - DAVID MEAGHER (4) - SUZANNE TIMMONS (1)**

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INTRODUCTION: Delirium is common and leads to poor outcomes. Evidence suggests that it is preceded by a prodrome. Identifying prodromal features may promote prompt detection and intervention. We aimed to determine the prodromal behavioural features of medical inpatients who develop incident delirium.

METHODS: Medical inpatients of ≥ 70 years were assessed for delirium using the Delirium Rating Scale-Revised '98 (DRS-R98) within 36 hours of admission. Consenting non-delirious subjects were then assessed daily for delirium development. Evidence of potential prodromal features was sought by interview with relevant nursing staff using a novel prodromal checklist, based on 34 features suggested from the existing literature. The generalised estimating equation (GEE) was used to identify prodromal predictors of delirium in those who subsequently developed delirium from those who never developed delirium during the study period.

RESULTS: Of 555 patients approached, the studied sample was 191, mean age 80 years (+/- 5.85), 52.9% male. Incident delirium was diagnosed in 61 patients (10.9% of 555 approached; 31.9% of those studied), most frequently on day two (n=30). The first eight days of assessments were included in the analysis (n=1162) and delirium was defined by a DRS-R98 total score of ≥ 18 . The most parsimonious GEE model showed that prior dementia, increased comorbidities and low Barthel Index were associated with delirium. Additionally, the prodromal features most significantly associated with delirium were 'distractability' (p=0.013), 'increased confusion or foggy' (p=0.004) and 'combativeness / resistance to care' (p=0.02), with 'restlessness' trending towards significance (p=0.051).

CONCLUSIONS: Patients who are destined to develop delirium in the first eight days of admission display more prodromal features than those who do not, specifically distractability, increased confusion and resistance to care. Identifying such features in non-delirious medical inpatients, together with the already known risk factors of dementia, functional disability and multiple illness, may facilitate targeted early intervention strategies.

47. Development of Prodromal Features of Delirium in Older Medical Inpatients**NIAMH A O'REGAN (1) - DIMITRIOS ADAMIS (2) - JAMES FITZGERALD (3) - D W MOLLOY (1) - DAVID MEAGHER (4) - SUZANNE TIMMONS (1)**

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INTRODUCTION: There is growing evidence to suggest that delirium is preceded by a prodromal period, which has yet to be defined. Characterisation of this prodrome may facilitate prompt detection and intervention. We aimed to describe the developing pattern of prodromal behavioural features in medical inpatients with impending delirium.

METHODS: Medical inpatients of ≥ 70 years were assessed for delirium within 36 hours of admission using the Delirium Rating Scale-Revised '98 (DRS-R98). Consenting subjects without prevalent delirium were then assessed daily for delirium development. Evidence of prodromal features was sought from relevant nursing staff using a novel prodromal checklist, based on 34 features proposed from the existing literature. A Cox Proportional Hazards model was used to analyse the development of prodromal features in the cohort as some of the patients develop delirium during the hospitalisation. A delirium event was defined by a DRS-R98 total score of ≥ 18 . Controls remained non-delirious over ≥ 4 consecutive assessments.

RESULTS: Of 555 approached, 191 entered the study (mean age 80 years \pm 5.85, 52.9% male), and of 1162 assessments, 61 patients had 100 delirium events. Using a Cox Proportional Hazards model, and controlling for dementia and functional ability, we found that 'irritability' (HR 1.7, 95%CI 1.0-2.8, $p=0.027$), 'distractibility' (HR 1.9, 95%CI 1.1-3.2, $p=0.018$), 'increased confusion / fogginess' (HR 2.3, 95%CI 1.4-3.7, $p=0.001$), 'needing prompting to do usual tasks' (HR 1.9, 95%CI 1.1-3.1, $p=0.021$), 'tiredness in the morning' (HR 1.8, 95%CI 1.1-2.8, $p=0.015$), 'drowsiness during the day' (HR 1.7, 95%CI 1.1-2.7, $p=0.014$) and 'restlessness' (HR 1.7, 95%CI 1.1-2.8, $p=0.023$) were indicative of imminent delirium.

CONCLUSIONS: Development of behavioural features, specifically irritability; distractibility; increased confusion; requiring prompting for usual tasks; morning tiredness; and daytime drowsiness were significantly associated with progression to delirium in older medical inpatients. Recognising these features as delirium precursors may aid efforts to improve early detection.

48. Delirium superimposed on dementia is common, and is associated with worse physical status and longer hospital stay than uncomplicated dementia**AOIFE BARRETT (1) - EDMUND MANNING (1) - EILEEN O'HERLIHY (1) - KATHLEEN O'SULLIVAN (2) - NOEL WOODS (3) - JOHN LINEHAN (4) - SUZANNE CAHILL (5) - DAVID MEAGHER (6) - SUZANNE TIMMONS (1)**

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OBJECTIVES: Delirium superimposed on dementia is common. We compared the characteristics and outcome of older people with dementia, with/without delirium, in a multi-hospital study.

METHODS: The Cork Dementia Study recruited 606 people over 70 years of age admitted to six regionally-clustered Irish hospitals. Assessments included dementia and delirium testing within 36 hours of admission (Mini Mental State Examination, MMSE; Informant Questionnaire on Cognitive Decline in the Elderly, IQCODE; Clinical Dementia Rating Scale, CDR; Delirium Rating Scale Revised-98, DRS-R98; Confusion Assessment Method, CAM; expert panel consensus). Baseline parameters included co-morbidities (Cumulative Illness Rating, CIRS-G), functional and nutritional status (Barthel Index, BI; Mini-Nutritional Assessment, MNA); with longitudinal in-hospital follow-up until death/discharge.

RESULTS: In total, 597 older patients had determinable delirium and dementia status and 115 (19.3%) had delirium. In total, 149 had dementia (25%; 56% mild): 63 (42.3%) had dementia-without-delirium (Dem) and 83 (10.6% overall) had dementia-with-delirium (DemDel). Only 29 (6.5%) had delirium-without-dementia (Del). Delirium thus occurred predominantly in dementia (75%), but crucially, only 36% with dementia had a known diagnosis pre-study. Compared to Dem, patients with DemDel had higher co-morbidity ($p<0.001$); dependency ($p<0.001$); and malnutrition ($p=0.001$). Dementia type was similar, but severity higher in DemDel (median CDR: 10 versus 6.5, $p<0.001$). Median length of stay (LOS) was highest for Del>DemDel>Dem (8 versus 7 versus 5 days). Delirium, but not dementia, independently influenced LOS ($p=0.01$), as did co-morbidity, functional dependency and age. In-hospital mortality was highest for DemDel>Del>Dem (14% versus 10.7% versus 1.6%, $p<0.01$). The combined adverse outcome of in-hospital mortality or institutionalisation was independently influenced by stroke, infection and functional dependency, but not dementia or delirium.

CONCLUSIONS: Delirium superimposed on dementia occurs in patients with more severe dementia and poorer physical status. Delirium, but not dementia, independently influences hospital length of stay and hence hospital costs.

49. Predictors and long-term outcomes of delirium in an older person on admission to hospital: a multi-hospital study

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OBJECTIVES: Delirium is common in older people in hospitals. In a large, multi-hospital, prospective study, we examined the features associated with delirium on admission to hospital, and the predictors of long-term outcome.

METHODS: The Cork Dementia Study assessed people over 70 years of age admitted to six regionally-clustered Irish hospitals (14 admission days per hospital), within 36 hours of admission, for: dementia and delirium (Mini Mental State Examination, MMSE; Informant Questionnaire on Cognitive Decline in the Elderly, IQCODE; Clinical Dementia Rating Scale, CDR; Delirium Rating Scale Revised-98, DRS-R98; Confusion Assessment Method, CAM; expert panel discussion); medical co-morbidities (CIRS-G); functional and nutritional status (Barthel index, BI; Mini-Nutritional Assessment, MNA); with detailed follow-up at six and twelve months.

RESULTS: During recruitment, 676 older people were admitted; 53 declined participation, 7 were moribund, 10 were discharged before screening; thus 606 patients were included (90%). Of these, 597 had dementia and delirium status determinable, and 115 (19.3%) had delirium (DRS-R98 total score ≥ 18 , or CAM-positivity where DRS-R98 impossible (n= 25: advanced dementia, reduced consciousness; severe speech disturbance)). Most delirium (75%) occurred in patients with dementia, but only 36% with dementia had a known diagnosis pre-study. Delirium on admission was independently associated with dementia, pneumonia and functional dependence ($p < 0.02$). Delirium severity (DRS-R98 total score) was independently associated with dementia, increasing age, pneumonia, stroke, co-morbidity, functional dependence, and malnutrition ($p < 0.02$). Delirium was independently associated with a composite poor outcome of death or new admission to residential care by twelve-month follow-up ($p = 0.01$), along with male sex, age, cancer and functional dependence. Dementia did not independently influence this composite outcome.

CONCLUSIONS: Delirium in older people is common on admission to hospital, predominantly in patients with dementia (often unknown), and more severe in those with poor physical status. Delirium, but not dementia, is independently associated with poor long-term outcome.

50. Psychometric evaluation of the DMSS-4 in a cohort of elderly orthopaedic post-operative patients with delirium.

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OBJECTIVES:

Delirium is a common neuropsychiatric syndrome with considerable heterogeneity in clinical profile. Rapid reliable identification of clinical subtypes can allow for more targeted clinical and research efforts.

METHODS:

We explored the concordance in attribution of motor subtypes between the DMSS-4 and the original longer DMSS and subtypes defined longitudinally using the Delirium Symptom Interview (DSI) method.

RESULTS:

We included 118 elderly patients developing DSM-IV delirium after hip-surgery [mean age 87.0 ± 6.5 years; range 65 - 102; 66% females; 28 (23.7%) had no previous history of cognitive impairment]. Concordance was high for both the DMSS-4 and original DMSS ($k = 0.8$), and for the DMSS-4 and DSI methods ($k = 0.82$). The DMSS-4 also demonstrated high internal consistency (McDonald's $\omega = 0.78$).

CONCLUSIONS:

The DMSS-4 provides an ultra-rapid means of identifying motor-defined clinical subtypes of delirium and is a reliable alternative to the more detailed original DMSS and DSI methods of subtype attribution. The DMSS-4 can be readily applied to further studies of causation, treatment and outcome in delirium.

51. Measuring delirium in care homes: experience from the UK**JENNIFER HARRISON (1) - NAJMA SIDDIQI (2) - ANNE HEAVEN (3)**

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BACKGROUND: The occurrence of delirium in long-term care residents is thought to be high, with a clustering of risk factors e.g. dementia, older age, and multimorbidity. However, there is wide variation in reported rates (1 to 58%), which may be the result of a diversity of approaches to case ascertainment, inconsistencies in statistical measures of frequency, and differing criteria for eligibility for long-term care in different parts of the world. No studies to date have reported data for delirium occurrence from UK care homes for older people.

METHODS: This report presents data on delirium occurrence collected as part of a pilot cluster RCT of a delirium prevention intervention conducted in 14 care homes for older people in Bradford Metropolitan District, UK. Consenting residents, and those with proxy agreement were assessed at baseline using the 6-item Cognitive Impairment Test and short Confusion Assessment Method (CAM). Delirium was assessed again on alternate days over a one-month period using the CAM as part of the outcomes assessment in both intervention and control homes. A structured review of case notes for the same period was also undertaken to identify potential cases, with all information reviewed by a psychiatrist to determine cases of delirium.

RESULTS: At baseline, there were three CAM positive cases in 215 residents giving a point prevalence of 1.4%. Using only data from outcomes assessments for the 94 residents in the control arm, there were 6 CAM identified cases, which increased to 9 using information from case notes review. Repeated face-to-face assessments with the CAM by researchers were challenging for reasons related to resident ill health and frailty, limited access to care homes, and variable reliability of information from care home staff.

CONCLUSIONS: 9.6 % of residents experienced an episode of delirium over a one-month period. The need for active participation in assessments may under-estimate the presence of delirium in this frail older population. Instruments that can be routinely completed for all residents by care home staff through observation may be more useful for delirium case ascertainment in care homes research.

52. The Neurophysiology of Attention: Aspects Relevant to Delirium**BARBARA KAMHOLZ (1)**

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Abstract

There are many components to the process of paying attention. It is an ongoing activity and can't be appropriately conceived as a fixed, easily measured state. Strictly speaking, "inattention" can be conceptualized as the inability to respond in an appropriate manner to environmental activity, as opposed to the lack of engagement with, or isolation from, environmental inputs. At any given time, a network of cortical structures and subcortical nuclei are involved in assessing the relative salience of new input in order to direct appropriate motor responses. The "default network", most often described as composed of a mesial frontoparietal network (posterior parietal cingulate, the ventromedial PFC, and the medial temporal lobes) receives initial sensory signals. With the assistance of the insula and anterior cingulate cortex to assess novelty and salience, the network then transmits this information to the "external awareness network." This latter involves mostly lateral frontoparietal areas. These areas, in conjunction with the superior colliculus and its projections to the centromedian and parafascicular nuclei, are involved with more specific analysis of stimulus features as relevant in a given moment. The result is the selection of events to which other aspects of attention must be paid, including orienting to the event and directing output to the striatum, which in turn directs behavior. The specific process of paying attention to environmental stimuli largely involves an alternation between these two networks, with their complex inputs representing memory, affect, assessment of motor state (proprioception), and others. The saliency of the new stimulus (which has to be evaluated in the context of the current state of perception, motor activity, and preoccupation) drives the process. At all phases, the stimulus must have correct representation in the CNS, and the systems assessing salience must be intact and coordinated if appropriate responses are to be made. The goal of this presentation is to illuminate some of the neurophysiological aspects of the process of attending to stimuli and measuring saliency of inputs, from which a better understanding can develop of the neural dysfunction reflected in behavior during episodes of delirium. A brief discussion of neurotransmitter functions relevant to the process of paying attention will be provided.

53. Delirium and Acute Stroke: The occurrence of delirium and its association with long term outcomes for patients post stroke

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Introduction

Delirium is an acute generalised impairment of brain function and a common complication of illness in older people. However it is commonly overlooked or misdiagnosed in clinical practice. Previous studies have found that delirium is linked to longer hospital stays, an increased need for institutionalisation and risk of future complications. Delirium onset may be associated with an acute stroke, although few studies have investigated this association. The aims of this study were to identify delirium incidence in stroke, compare long-term patient outcomes and identify confounding variables that may affect delirium onset.

Methods

Based on the findings from the systematic review, a UK based prospective cohort study was designed to recruit stroke patients with and without delirium. Assessments of physical function, mood, risk of dementia and cognitive impairment were administered within 72 hours of admission. These assessments were repeated six months post stroke as well monitoring outcomes such as mortality, length of stay and discharge destination.

Results

A total of 298 patients, with a delirium incidence of 32.9%, were recruited from the stroke units at the Leeds Teaching Hospitals Trust. Patients with delirium were associated with longer hospital stays, higher mortality rates and an increased need for institutionalisation. There was a positive association with a number of predisposing factors. Delirium patients also had lower assessment scores at six months for physical function and dementia risk.

Conclusion

The results of this study show that delirium has a significant effect on outcomes for stroke patients. Increased emphasis and awareness of delirium on the stroke units could help to increase detection rates of delirium. Suggestions for the implementation of better education programmes and screening protocols may aid delirium management.

54. A PLS Path Model for the relationships between Dementia, Delirium and Depression

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OBJECTIVES:

The aim of the application is to study the relationships between Dementia, Delirium and Depression in an elderly population.

METHODS:

Since Dementia, Delirium and Depression can be considered as latent variables, i.e. variables which are not directly observable, PLS Path Modeling (Partial Least Squares approach to Structural Equation Modeling) was applied. A PLS path model is described by two models: (1) a measurement model relating the manifest variables to their own latent variables and (2) a structural model relating some endogenous latent variables to other latent variables.

RESULTS:

The data reveal a considerable effect of Dementia on Delirium (path coefficient = 0.52) and a moderate effect of Depression on Delirium (path coefficient = 0.17). Analogously, the effect of Dementia on Depression is very low (path coefficient = 0.04) and statistically not significant.

CONCLUSIONS:

The application shows the ability of PLS Path Modeling to study the relationships between Dementia, Delirium and Depression.

55. A novel software application for the detection and monitoring of inattention in delirium: protocol for formal validation studies

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BACKGROUND: Inattention is the core feature of delirium and yet objective methods for assessing attentional deficits in delirium remain sparse. We previously developed a new smartphone test for the objective measurement of inattention in delirium (DelApp). Proof-of-principle single-rater studies using the DelApp in >200 hospital patients have demonstrated excellent performance. We now aim to further develop and optimise the DelApp and perform formal validation studies in unselected patients using independent raters.

METHODS: The programme of work consists of three phases. Project A (6mo) deals with further software development and clinical staff interviews to assess usability. Project B (9mo) will involve case-control studies in hospitalised patients in general wards (delirium, dementia, control groups, aged >64) and ICU (delirium, control, aged >17; N=60 per group) to assess diagnostic accuracy and inform optimal cut-points. The performance of the DelApp against reference standard diagnosis will be independently assessed by pairs of trained raters in hospitals in Glasgow and Edinburgh. Project C (15mo) will involve formal STARD-compliant validation studies to evaluate the diagnostic performance of the DelApp in unselected patients in general wards (N=500) and ICU (N=200). Sixty patients (general wards) will undergo repeat assessments to explore the performance of the DelApp in tracking change in cognitive function.

Additional tests include conventional attention tests (e.g. digit span), the Short Orientation Memory Concentration test, the Delirium Rating Scale-Revised-98, the Confusion Assessment Method (CAM) in general wards; and the CAM-ICU, the Intensive Care Delirium Screening Checklist and the Richmond Agitation-Sedation Scale in the ICU. Statistical analyses will include ROC analyses; Youden's index and likelihood ratio's to inform cut-points; positive and negative predictive values and Spearman correlations; Kappa statistic (inter-rater reliability); and normal linear models to explore the relationship between patients' scores on all measures with demographic information and outcome measures, including length of stay and mortality.

56. Results of an Italian survey about knowledge of delirium for young geriatric healthcare professionals.

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Background: Although delirium occurs frequently in older patients, the diagnosis is often underestimated and delayed. The Italian Association of Psychogeriatrics (AIP) has created in 2012 a new section named "AIP giovani" to improve the knowledge of young health care providers on geriatric syndrome and promote research. This section of the AIP has conducted a survey of a sample of doctors, nurses and psychologists about their knowledge of delirium and its management in clinical practice.

Methods: A web-mail survey was sent to 120 email contacts from AIP database from 1st November 2013 to 30th April 2014. The sample consisted of healthcare professionals (doctors, nurses and psychologists) 35 years old and younger working with geriatric patients in Italy. The survey included 25 questions about delirium knowledge and management.

Results: A total of 81/120 responses were collected (90% doctors; 4% nurses; 6% psychologists). According to the survey responses delirium is correctly defined by 70% of responders and it is generally diagnosed through the Confusion Assessment Method (CAM) and the Diagnostic and Statistical Manual of Mental Disorders-5. DSM 5 is used by 53% of sample. Nurses are more likely to not recognize delirium, in particular the hypokinetic form. Doctors report delirium systematically in 47% of the clinical records and in 68% of the discharge letter. Physical restraints are reported to be used to treat hyperkinetic delirium by 32% of responders, while pharmacological restraint and treatment of secondary causes are the main approach for most of the responders (66%). Typical and atypical antipsychotics are the preferred drugs to treat psychomotor agitation and intramuscular haloperidol is the preferred initial therapy. Trazodone is indicated by 70% of the responders to treat hyperactive delirium, while 37% of the responders use antipsychotics or trazodone in hypokinetic forms. There is no agreement for the duration of therapy. Electrocardiogram is always prescribed by 73% of sample to monitor QT interval. Delirium training is lacking for 67% of people in undergraduate education and for 4% in postgraduate courses.

Conclusion: This survey describes the knowledge of delirium among young geriatric healthcare professionals within the Italian Association of Psychogeriatrics. Higher education and training are needed to improve the management of this widespread geriatric syndrome.



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