EUROPEAN DELIRIUM ASSOCIATION ANNUAL MEETING

WINKEL VAN SINKEL
UTRECHT, THE NETHERLANDS

1 AND 2 NOVEMBER 2018

PROGRAM & ABSTRACTS

www.europeandeliriumassociation.com

Word of Welcome

Dear colleague,

It is a great pleasure to welcome you all to the 13th meeting of the European Delirium Association (EDA) in Utrecht, the Netherlands.

This is the third time that the Netherlands hosts the EDA. The Netherlands is also the country where the first EDA meeting was organized (Alkmaar 2006). Since then, the number of participants has grown and the field has matured significantly with important publications that raised awareness on the frequency and consequences of delirium. Major boosts for the global awareness of delirium were further the foundation of the American Delirium Society and the Australasian Delirium Association.

We are very pleased with the number and quality of the abstracts. We are grateful to many colleagues without whom it would not be possible to organize this meeting: above all the speakers, but also the session chairs and members of the scientific committee. Finally we would like to thank our sponsors for their generous contributions that made it possible to reduce fees for young scientists and clinicians.

We are sure that you will enjoy your stay in Utrecht. Utrecht is one of the main academic centres in Europe and host to Utrecht University, the largest university in the Netherlands, raised in 1636. The history of Utrecht is rich: in 1579 the Union of Utrecht was signed in which seven Dutch provinces decided to join forces against Spanish rule. The Union of Utrecht is regarded as the foundation of the Netherlands. History of Utrecht goes back to the construction of a Roman fortification, as will be explained during a guided walking tour of the city that takes you to Utrecht's must-see sights.

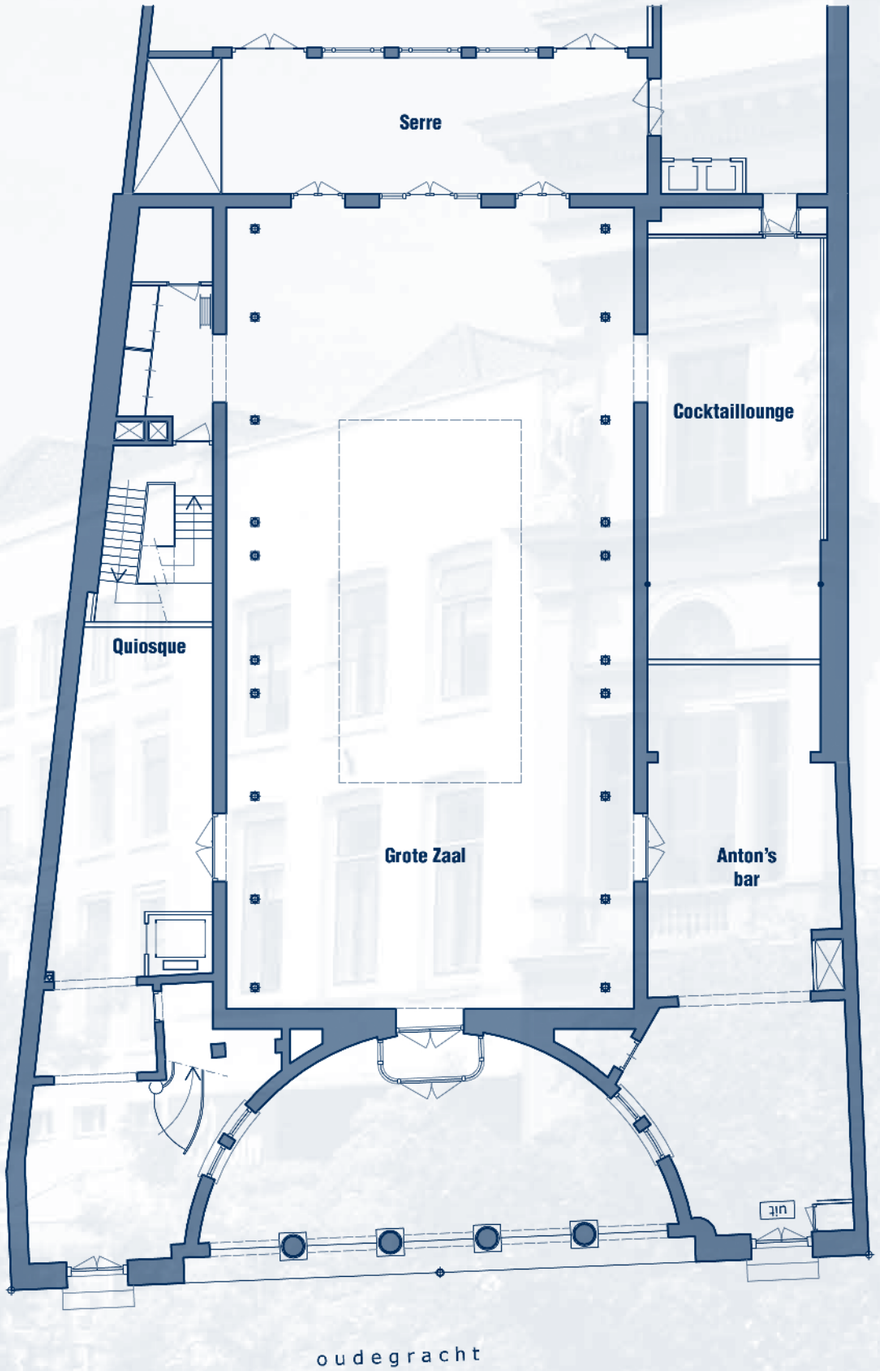
We hope that EDA2018 will inspire you to have fruitful discussions about all aspects of delirium.

Arjen Slooter and Mark van den Boogaard

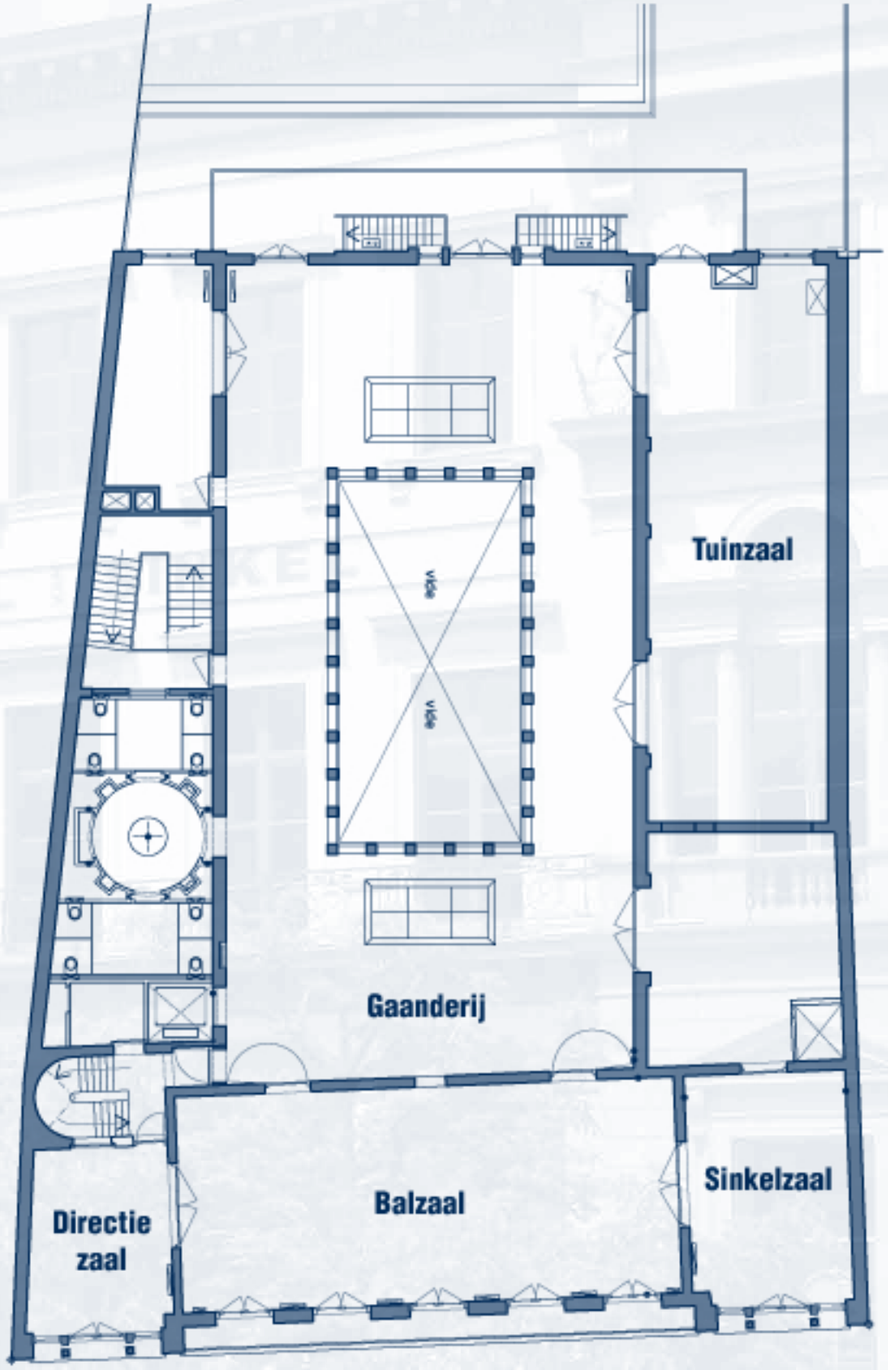
Organizing committee
Arjen Slooter, Utrecht Medical Center, Utrecht, The Netherlands
Mark van den Boogaard, Radboud University Medical Center, Nijmegen, The Netherlands

Scientific committee
Colm Cunningham, Trinity College Dublin, Dublin, Ireland
Leiv Otto Watne, Oslo University Hosptal, Ullevål, Norway
Alessandro Morandi, Ancelle Hospital, Cremona, Italy
Barbara Kamholz, University of California, San Francisco, United States
Wolfgang Hasemann, University Hospital Base, Basel, Switzerland
Sophia de Rooij, University Medical Center Groningen, The Netherlands
Alasdair MacLullich, University of Edinburgh, UK, Schotland
Stefan Kreisel, Evangelisches Klinikum Bethel, Akademisches Lehrkrankenhaus der Universität Münster, Münster, Germany
David Meagher, University of Limerick, Limerick, Ireland
Jouko Laurila, University of Helsinki, Finland

Winkel van Sinkel | Ground floor



Winkel van Sinkel | First floor



Thursday 1 November 2018

08.00-08.45 Registration

08.45-09.00 Grote Zaal **Opening**

09.00-10.00 Grote Zaal **Keynote lecture**
Chairs: Colm Cunningham and Tarek Sharshar
001 Michael Heneka: Sepsis and the brain

10.00-10.30 Gaanderij *Coffee break*

10.30-12.00 Grote Zaal **Delirium research: How to proceed (1)?**
Chairs: Stefan Kreisel and David Meagher
002 Leiv Otto Watne: Why is it so hard to find a biomarker of delirium?
003 Valerie Page: Development of core outcome sets for effectiveness trials
004 Daniel Davis: Using Epidemiology to answer questions in delirium

10.30-12.00 Balzaal **Symposium: 'Reality check' - The truth about delirium screening and diagnosis**
Chairs: Barbara Kamholz and Wolfgang Hasemann
005 Niamh O'Regan: Real-life delirium detection - mind the gap
006 Helen Bowden and Katrin Hoffmann: difficult cases in delirium – when the scales don't fit
007 Sophia de Rooij: How to organise optimal care for vulnerable patients with delirium in and outside the hospital?

12.00-13.30 Gaanderij *Lunch & poster session*

13.30-15.00 Grote Zaal **Delirium education and societal impact**
Chairs: Babar Khan and Birgitta Olofsson
008 Jose Maldonado: Legal implications of delirium
009 Alessandro Morandi: Postgraduate education on delirium across Europe
010 Koen Milisen: Quality improvement: how to change practice?

13.30-15.00 Balzaal **Delirium research: How to proceed (2)?**
Chair: Sophia de Rooij and Robert Sanders
011 Edwin van Dellen: Functional imaging
012 Robert Stevens: Biological subtypes of delirium: towards precision medicine
013 Robert Sanders: Integrating immunology and network science

15.00-15.30 Gaanderij *Coffee break*

15.30-17.00 Grote Zaal **Clinical delirium care**
Chairs: Jouko Laurila and Giuseppe Bellelli
014 Gideon Caplan: Persistent delirium
015 Willem van Gool: Delirium superimposed on dementia
016 Meera Agar: Delirium in palliative care

15.30-17.00 Balzaal **Symposium: Pathophysiology**
Chair: Thomas Jackson and Colm Cunningham
017 Tarek Sharshar: Amydala dysfunction in critical illness
018 Jan Pieter Konsman: Systemic inflammation increases water diffusion in the absence of blood-brain barrier breakdown
019 Elly Hol: Neuroinflammation and delirium: a role for astrocytes
020 Roos Vandenbroucke: An essential role for the blood-cerebrospinal fluid barrier in neuroinflammation
021 Colm Cunningham: Metabolic disturbance as a driver for delirium

17.15-18.00 Grote Zaal **Maeve Leonard award ceremony and general assembly**

18.00 **Social program**
18.00 City tour, start from registration area Winkel van Sinkel
20.00 Dinner at Humphrey's Restaurant, opposite Winkel van Sinkel

Friday 2 November 2018

08.00-09.00 Directiezaal EDA Board meeting

09.00-10.00 Grote Zaal **Keynote lecture**
Chairs: Robert Sanders and Claudia Spies
022 Wes Ely: Delirium in the ICU

10.00-10.30 Gaanderij *Coffee break*

10.30-12.30 Grote Zaal **ICU delirium**
Chairs: Karin Neufeld and Arjen Slooter
023 John Devlin: Reducing delirium through application of the 2018 SCCM PADIS guidelines
024 Claudia Spies: Intraoperative monitoring and postoperative delirium
025 Yoanna Skrobik: Pharmacological and non-pharmacological prevention of delirium
026 Tim Girard: Should delirium be treated with antipsychotics? Results of the MIND-USA Study

10.30-12.30 Balzaal **Oral presentations session 1**
Chair: Jouko Laurila
10.30-10.40 027 Barbara van Munster: The Effect of Treatment of Anemia with Blood Transfusion on Delirium
10.40-10.50 028 Manuela Pretto: The impact of a nurse-led delirium consultation service oncosts
10.50-11.00 029 Annmarie Hosie: A phase II cluster randomised controlled trial of a multi-component non-pharmacological intervention to prevent delirium for in-patients with advanced cancer
11.00-11.10 030 Elizabeth Sampson: Drug therapy for delirium in terminally ill adult patients
11.10-11.20 031 Christine Thomas: Patient safety, cost-effectiveness and quality of life: Reduction of delirium risk and post-operative cognitive dysfunction after elective surgery. (PAWEL Study)

11.20-11.30		032	Alexandra Feast: Pain and delirium in people with dementia in the acute general hospital setting: Exploratory secondary analysis
11.30-11.40		033	Peiyan Ho: Structured Integrated Care Intervention prevents delirium in Singapore's Geriatric Hip Fracture Unit: A retrospective cohort study
11.40-11.50		034	Kelly Sabbe: The link between delirium knowledge and healthcare workers' strain of care in long-term care facilities (LTCFs)
11.50-12.00		035	Emma Cunningham: People With Postoperative Delirium Get Less Pain Relief
12.00-12.10		036	Juliane Spank: Strategies for complex multi-modal non-pharmacological delirium prevention and treatment (The PAWEL-Study Intervention)
12.10-12.20		037	Claudia Eckstein: Non-pharmacological delirium interventions and team interacting elements
12.20-12.30		058	Thomas Fischer: Pain assessment in patients with delirium. A scoping review
12.30-14.00	Gaanderij		*Lunch & poster session*
13.00-13.30	Balzaal		**Lunch session**
		039	Joseph Rasimas: New-old approaches to delirium: integrating detection, pharmacology, and therapy
14.00-15.30	Grote Zaal		**Oral presentations session 2**
			Chairs: Leiv Otto Watne and Mark van den Boogaard
14.00-14.10		040	Muhammad Umar Sajjad: CSF levels of interleukin-8 in delirium, dementia and cognitively healthy patients
14.10-14.20		041	Viona Wijnen: A bedside two-channel EEG to detect Delirium superimposed on Dementia
14.20-14.30		042	Simone van Montfort: DeltaScan for the assessment of delirium in the intensive care and ward: a multicenter stepped-wedge randomized trial
14.30-14.40		043	Zoë Tieges: Diagnostic accuracy of the DelApp smartphone test for assessing inattention in delirium in geriatric and intensive care settings
14.40-14.50		044	Hendrika Luijendijk: A short delirium caregiver questionnaire for triage of elderly outpatients with cognitive impairment; A development and test accuracy study
14.50-15.00		045	Ron Oliven: Integration of a Delirium Detection and Intervention Program in a tertiary urban hospital
15.00-15.10		046	Chloe Hood: Initial assessment for delirium in people with dementia admitted to hospital - can we do better?
15.10-15.20		047	T. Fischer: Clinicians' perspectives of assessing pain in patients with delirium
15.20-15.30		048	Timothy Wong: Feasibility of Implementation of a Cognitive Vital Sign on an Acute Care of the Elderly Unit
14.00-15.40	Balzaal		**Oral presentations session 3**
			Chairs: Valerie Page and Babar Khan
14.00-14.10		049	Babar Khan: Delirium Biomarkers in the ICU
14.10-14.20		050	Babar Khan: S-100β- a biomarker of delirium duration and delirium severity in the ICU
14.20-14.30		051	Nienke Peters van Ton: The effect of a delirium episode on the trajectory of cognition and structural changes to the brain during 9-year follow-up
14.30-14.40		052	Paul Rood: The effect of delirium and its subtypes on 90 day mortality in intensive care unit patients
14.40-14.50		053	Simone van Montfort: Predisposing risk factors for delirium and EEG network characteristics
14.50-15.00		054	Emma Vardy: Development and Validation of the Salford delirium prediction model using electronic medical records
15.00-15.10		055	Bjørn Erik Neerland: Prevalence of Delirium in Patients 75 Years or older admitted to ten Norwegian Hospitals
15.10-15.20		056	Matthew Duprey: Association between Sleep Quality and Delirium Occurrence in Critically Ill Adults
15.20-15.30		057	Ilse Kant: The association between physical frailty and MRI features of cerebral small vessel diseas
14.00-15.30	Directiezaal		Friedrich Borchers: **Kick-off meeting** International Observational Study on Perioperative Cognitive Trajectories (POCD Census International-PCI)
15.30-16.00	Gaanderij		*Coffee break*
16.00-17.30	Grote Zaal		**Long-term outcomes of delirium**
			Chairs: Barbara Kamholz and Wolfgang Hasemann
		059	Pratik Pandharipande: Cognitive decline
		060	Ramona Hopkins: Depression, anxiety and PTSD
		061	Mark van den Boogaard: ICU delirium and mortality
16.00-17.30	Balzaal		**How to improve outcome after delirium?**
			Chairs: Christine Thomas and Daniel Davis
		062	Zoë Tieges: Cognitive interventions for delirium: current progress and prospects for future work
		063	Alice Barra: Non-invasive brain stimulation to promote recovery in patients with disorders of consciousness
		064	Alasdair MacLullich: Can improved management of delirium lead to better outcomes
17.30-18.00	Grote Zaal		**Awards oral and poster presentations, closing and announcement of EDA 2019**

Friday 2 November 2018

Abstracts
Oral Presentations

001
Sepsis and the brain

Michael Heneka

In contrast to previous assumptions, the brain is not an immune-privileged organ. Acute inflammatory events, such as systemic inflammation, e.g. by bacterial sepsis as well as chronic inflammatory states affect the function and integrity of neurons and hence, at a system level, cognition and behaviour. Clinically, lasting consequences of inflammation include the risk to accelerate cognitive decline and to develop neurodegenerative disease such as Alzheimer's disease. Clinical and experimental findings from the molecular to the behavioural level will be reviewed in order to stimulate a vivid discussion how biomarker research and therapeutic interventions can be further advanced.

002
Why is it so hard to find a biomarker of delirium?

Leiv Otto Watne

To diagnose delirium can be difficult, and a biomarker would be of great help. Unfortunately, there is no such biomarker. Why is it so hard to find a biomarker of delirium? What can be done to increase the chances of finding one?

003
Development of core outcome sets for effectiveness trials

Valerie Page

Core outcome sets aim to standardise outcome reporting by identifying fundamental outcomes for trials of a specific interest area. Our aim is to develop international consensus on core outcome sets for trials of interventions to prevent and/or treat delirium.

Methodology includes a systematic review and interviews of patients and carers to determine outcomes important to them not previously reported, then a Delphi survey followed by a consensus meeting. A similar process is then be undertaken to decide the assessment tools that will be used to measure the key outcomes.

004
Using Epidemiology to answer questions in delirium

Daniel Davis

Despite the enormous clinical impact of delirium, many questions about its basic epidemiology remain unclear. Currently, we have little idea how delirium features may evolve in the context of longer-term trajectories of cognitive decline, particularly in generalised population samples.

This talk will review some of the issues necessary to consider when designing a delirium study. These include discussion of case ascertainment, standardised operationalisation of diagnostic criteria and definitions of delirium severity. Data from existing population studies will be reviewed and ongoing prospective studies will be mentioned.

005
Real-life delirium detection - mind the gap

Niamh O'Regan

Delirium is common, serious and under-detected. Multiple diagnostic and screening methods have been developed but little is known about how these diagnostic approaches work in clinical practice. In her presentation entitled 'Real-Life Delirium Detection- Mind The Gap', Dr. Niamh O'Regan will discuss the practical challenges faced and the knowledge translation gap that emerges when implementing delirium screening into clinical practice. She will also review the evidence pertaining to the real-life feasibility of delirium screening in the acute hospital (outside the intensive care setting).

006
Difficult cases in delirium – when the scales don't fit

Helen Bowden and Katrin Hoffmann

Standardised ascertainment of delirium is vital. Though existing instruments attempt a comprehensive, multidimensional description of delirium phenomenology, it may be that particular aspects of the patient experience of delirium are not fully captured.
We present some difficult cases from the ongoing Delirium and Population Health Informatics Cohort (DELPHIC) study. Using the Memorial Delirium Assessment Scale as an example, we identify challenges to classification of certain symptom clusters.

007
How to organise optimal care for vulnerable patients with delirium in and outside the hospital?
Sophia de Rooij

008
Legal implications of delirium
Jose Maldonado

009
Postgraduate education on delirium across Europe
Alessandro Morandi

010
Quality improvement: how to change practice?
Koen Milisen

The first part of this presentation will focus on the potential impact of e-learning on delirium knowledge of health professionals and its indirect effect on patient outcomes. To this end, the results of a recent trial will be discussed. In the second part of the presentation, factors will be discussed that can influence the behavior of health professionals in implementing preventive measures when taking care for older persons. To this end, we discuss preliminary results from a survey study on fall prevention in nursing homes, in which the Integrative Model of Behavioral Prediction (Fishbein 2008) was used.

011
Functional imaging

Edwin van Dellen

The multifactorial etiology of delirium makes it challenging to unravel the pathophysiological underpinnings of the syndrome. Network neuroscience studies the wiring of the brain and functional interactions between brain regions. This framework has revealed that many brain diseases, including schizophrenia and Alzheimer's disease, are characterized by disturbances of brain network organization and functioning. Recent evidence from functional neuroimaging and neurophysiology studies indicate that delirium could also be seen as a brain network disorder or disconnection syndrome. I will discuss how these findings, together with computational models of brain functioning, may help to gain insight in the pathophysiology of delirium.

012
Biological subtypes of delirium: towards precision medicine

Robert Stevens

Recent advances in data science have enabled a dramatic escalation in the ability to capture, aggregate and analyze large amounts of highly granular information on the health of individual subjects. These data encompass a range of unique patient characteristics including molecular and physiological signatures, resident microbial populations, imaging biomarkers, illness trajectories, environmental exposures, and treatment responses. We examine how the availability of these data, together with powerful new statistical and computational approaches, is radically changing current approaches to delirium, supplanting existing classifications with new taxonomies, and realigning treatments and health delivery to target disease-specific mechanisms and to match patient-specific needs.

013
Integrating immunology and network science

Robert Sanders

The mechanisms of “Cognitive Disintegration” of delirium are unclear. Sanders’ proposal for a model of the pathogenesis of delirium leans on cognitive theory, inflammatory biology and clinical risk factors. Importantly, it offers testable hypotheses about the neurophysiology of delirium. While unlikely to be complete, the Cognitive Disintegration Model is proposed as a starting point for delirium pathophysiology research. In this talk, he will describe how inflammation may modulate cognitive networks to induce the symptoms of delirium.

014
Persistent delirium

Gideon Caplan

The damage to the person with delirium is magnified by a longer duration, which raises the importance of investigating prolonged delirium. Although there is no reason to assume any different pathophysiology at work we, as clinicians, should take up the challenge with the armamentarium of the modern hospital.

We began by investigating the biochemistry of cerebrospinal fluid in prolonged delirium, revealing major disturbances in glucose metabolism which correlate with clinical measures of delirium and outcomes. Following this with FDG-PET studies, compared to other hospitalised older patients without delirium, has identified a specific phenotype which precisely explains the clinical features.

015
Delirium superimposed on dementia

Willem A. (Pim) van Gool

The diagnosis of delirium in patients with pre-existing cognitive impairment or clinically manifest dementia is difficult from a clinical point of view and its interpretation poses unique challenges. Diagnostic criteria will be discussed from a practical point of view. The potential for a contribution of bedside electroencephalography will be discussed, as well as new methods of clinical monitoring. The relation of delirium with progressive neurodegenerative disease will be explored, because better recognition of delirium superimposed on dementia will facilitate appropriate counseling and treatment, enabling alleviation of immediate suffering and possibly prevention of accelerated functional decline in dementia.

016
Delirium in palliative care

Meera Agar

017
Amydala dysfunction in critical illness

Tarek Sharshar

018
Systemic inflammation increases water diffusion in the absence of blood-brain barrier breakdown

Marion Griton[a,b,c],Ibtihel Dhaya[a,b,d], Renaud Nicolas[a,b], Gérard Raffard[e,f], Olivier Periot[a,b,g], Bassem Hiba[a,b], and Jan Pieter Konsman[a,b]

a INCIA, Institut de Neurosciences Cognitive et Intégrative d'Aquitaine, UMR 5287, Bordeaux, France; b Univ. Bordeaux, INCIA, UMR 5287, Bordeaux, France; c Service de Réanimation Anesthésie Neurochirurgicale, Centre Hospitalier Universitaire (CHU) de Bordeaux, Bordeaux, France; d Laboratoire de Neurophysiologie Fonctionnelle et Pathologies, UR/11ES09, Faculté des Sciences Mathématiques, Physiques et Naturelles, Université de Tunis El Manar, Tunis, Tunisie; e CNRS, Résonance Magnétique des Systèmes Biologiques, UMR 5536, Bordeaux, France; f Univ. Bordeaux, RMSB, UMR 5536, Bordeaux, France; g Service de Médecine Nucléaire, Centre Hospitalier Universitaire (CHU) de Bordeaux, Bordeaux, France

Cecal ligature and puncture-induced systemic inflammation increases water diffusion in white matter-rich regions in the absence of blood-brain barrier breakdown: relationships to changes in glial cell morphology.

Blood-brain barrier breakdown (BBB) has been proposed to underlie sepsis-associated encephalopathy (SAE). Cecal ligature and puncture (CLP) in rats induced deficits in the righting reflex and resulted in higher T2-weighted contrast intensities in the cortex, decreased blood perfusion distribution to the cortex and increased water diffusion anisotropy in the corpus callosum. CLP also reduced the number of fragments staining for microglia- and astrocytic-specific proteins but did not induce widespread perivascular IgG diffusion. In conclusion, experimental SAE can occur in the absence of BBB breakdown and is accompanied by changes in water diffusion and glia cell morphology in brain.

019
Neuroinflammation and delirium: a role for astrocytes

Elly Hol

Astrocytes and microglia are important regulators of neuronal communication and thus are vital for healthy brain functioning. Astrocytes have perisynaptic processes that form an intricate part of the synapse. They buffer extracellular potassium, recycle glutamate, and regulate the water balance. Moreover, astrocytes are actively involved in the modulating neuronal signalling, as they can release and respond to neurotransmitters. Microglia are the immune cells of the brain, and have recently been shown to play a crucial role in synapse maintenance. Activation of microglia induced by e.g. a systemic inflammation can trigger astrocytes to become neurotoxic and attack synapses. Thus, activation of glia could account for the cognitive dysfunction in patients with a delirium

020
An essential role for the blood-cerebrospinal fluid barrier in neuroinflammation

Roos Vandenbroucke

The blood-cerebrospinal fluid barrier (CSF) forms a unique interface between blood and brain. It consists of a single cell layer, the choroid plexus epithelium, situated at the interface of blood and CSF. This epithelium protects the brain from fluctuations in the blood, produces CSF and is responsible for the active removal of toxic molecules from the brain. Our research focusses on the role of the choroid plexus epithelium in different neuroinflammatory pathologies. In my talk, I will discuss the impact of acute inflammation on both the barrier and secretory activity of the choroid plexus epithelium and its impact on brain homeostasis.

021
Metabolic disturbance as a driver for delirium

Colm Cunningham

The pathophysiology of inflammation-induced delirium remains unclear. We have used mouse models to show that bacterial LPS drives acute and fluctuating cognitive dysfunction in animals with prior neurodegenerative disease and that this is dependent on peripheral actions of IL-1. In this presentation we will show that LPS produces marked hypoglycaemia that is evident in both blood and cerebrospinal fluid. Remarkably this does not disrupt cognitive function in normal animals. Mimicking this LPS-induced hypoglycaemia with insulin produced similar acute cognitive dysfunction and blocking glycolysis, using 2-deoxyglucose, blocked IL-1 synthesis but still produced robust sickness. Systemically administered glucose was sufficient to protect against LPS-induced cognitive dysfunction. Therefore LPS and IL-1 produce acutely altered brain function via significant disruption of brain glucose metabolism. The data provide support for the idea that neuronal metabolism may the final determinant of dysfunction.

022
Delirium in the ICU

Wes Ely

Dr. Ely will be presenting the latest findings from two major investigations of pharmacological and non-pharmacological approaches to delirium reduction in critically ill patients and putting those data into context for the audience given previous decades of research and clinical practice.

023
Reducing delirium through application of the 2018 SCCM PADIS guidelines

John Devlin

The 2018 SCCM Pain, Agitation/sedation, Delirium, Immobility, and Sleep disruption (PADIS) practice guideline for critically ill adults was recently published. This guideline, that makes 37 recommendations, 2 best practice statements and 32 ungraded statements, was developed by a multidisciplinary panel of international intensive care experts. The guideline, that included ICU patient input throughout, and includes two new sections, immobility and sleep, updates and expands the 2013 SCCM Pain, Agitation and Delirium (PAD) practice guideline. This presentation will briefly review the novel guideline methods and discuss some of the most important non-sleep recommendations for ICU clinicians to consider when optimizing patient comfort, reducing delirium and improving patient outcome.

024
Intraoperative monitoring and postoperative delirium

Claudia Spies and Charité´s Postoperative Delirium Team

Postoperative delirium is seen in ICU patients in up to 80% and is associated with adverse outcome including loss of independence and increased mortality. As convincing evidence for pharmacologic treatment is lacking, preventive measures before interventions and surgery are important. This is shown for preoperative risk assessment and intraoperative monitoring. This includes all known etiologies for postoperative delirium such as inflammation, toxicity, metabolic and hemodynamic imbalances. After surgery, either in the ICU as well as on the peripheral wards, non-pharmacologic treatment measures should be in the focus of the staff. In conclusion, a comprehensive interdisciplinary approach considering all aspects of perioperative and ICU patient safety is essential to improve overall outcome after postoperative delirium.

025
Pharmacological and non-pharmacological prevention of delirium

Yoanna Skrobik

026
Should delirium be treated with antipsychotics? Results of the MIND-USA Study

Tim Girard

Delirium during critical illness is often treated with antipsychotics despite very limited evidence of efficacy. During the MIND-USA Study, we randomized 566 delirious ICU patients with respiratory failure and/or shock in 16 United States medical centers to double-blind treatment haloperidol vs. ziprasidone vs. placebo and assessed participants for delirium for 14 days. The effects of these antipsychotics on the primary outcome, delirium/coma-free days, as well as numerous efficacy and safety outcomes will be described in this presentation.

027

The effect of treatment of anemia with blood transfusion on delirium

B.C. Van Munster, V. van der Zanden, S.J. Beishuizen, L.M. Swart, R.M. Scholtens,
A. de Jonghe, S.E.J.A. de Rooij
University Medical Center Groningen, Groningen, Netherlands

Introduction

Both anemia and blood transfusion could be precipitating factors for delirium; hence in postoperative patients with anemia at high risk for delirium, it is controversial whether transfusion is the best option.The aim of this study is to investigate the association of anemia and delirium and the role of blood transfusion in the prevention for delirium.

Methods

We conducted a substudy of a multicenter randomized controlled trial. 415 patients above 65 years admitted for hip fracture surgery were enrolled. Delirium was assessed using criteria of the DSM-IV, hemoglobin and transfusions were collected from the medical records.

Results

115 (32.5%) patients experienced delirium, 57.5% had a hemoglobin level ≤ 6.0 mmol/L, and 140 (33.7%) received a blood transfusion. Anemia (a hemoglobin level ≤ 6.0 mmol/L was associated with delirium (odds ratio (OR), 1.81; 95% confidence interval (CI), 1.15-2.86). Blood transfusion was a protective factor for delirium in patients with the lowest measured hemoglobin level ≤ 6.0 mmol/L (OR, 0.26; 95%CI, 0.10-0.70).

Conclusion

Low hemoglobin level is associated with delirium, and receiving a blood transfusion is associated with a lower delirium incidence. Investigating the effect of transfusion as part of the treatment of delirium in patients with anemia seems promising.

028

The impact of a nurse-led delirium consultation service on costs

M.P. Pretto, C.V. Voegelin, C.W. Weber, S.S. Schaerer, I.G. Gisler, W.H. Hasemann
University Hospital Basel, Surgery, Basel, Switzerland

Introduction

After the implementation of a nurse led delirium consultation service, delirium was less severe when consultation was provided in the first three days after delirium onset. Length of stay was lower in comparison to other delirious patients. We were interested in the effect on costs.

Methods

We calculated the effective costs, the cover ratios of costs and reimbursements and case-mix-indexes (CMI) for 135 delirious patients after orthopedic-traumatologic surgery. Cost-calculations were statistically controlled by CMI. Patients were divided into three pre-defined subgroups according to the main study: “early consultation” (< 3 days) (n=12) “late consultation” (> 3 days” (n=39) and control group (n=84) (no consultation). Consultation included a geriatric assessment resulting in recommendations for focused nursing and medical interventions.

Results

We found differences in cost-cover ratios between the subgroups of 100.4% for “early”- and 89.1% for “late” consultation versus 86.3% in control group The coverage of coasts in every single patient varied from +12’459 to -5’848 CHF. The mean deficit per patient was lowest in “early” consultation group (-1’866.-), higher in “late consultation” group (-4’784.-) and most in control group (-6’181.-).

Conclusion

The implementation of an additional nurse lead delirium consultation service resulted in a reduction of delirium associated costs.

029

A phase II cluster randomised controlled trial of a multi-component non-pharmacological intervention to prevent delirium for in-patients with advanced cancer

A.H. Hosie[1], J.P. Phillips[1], L.L. Lam[1], S.K. Kochovska[1], M.B. Brassil[1], B.N. Noble[1], S.K. Kurrle[2], A.C. Cumming[3], G.A.C. Caplan[4], R.C. Chye[5], B.L. Le[6], E.W.E. Ely[7], P.G.L. Lawlor[8], S.B. Bush[8], J.M. Davis[9], M.L. Lovell[10], L.B. Brown[1], B.F. Fazekas[1], S.L.C. Cheah[1], L.E. Edwards[1], M.A. Agar[1]

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Delirium is preventable for one-third of older inpatients through non-pharmacological strategies. If feasible and acceptable, these strategies similarly may reduce delirium incidence in inpatients with advanced cancer.

A phase II cluster randomised waitlist controlled trial of a multi-component delirium prevention intervention at four Australian palliative care units, incorporating six domains: sleep, vision and hearing, hydration, orientation, mobility, and family partnership. Stage 1 data were collected for 50 intervention and control unit patients aged ≥18 years with advanced cancer days 1-7 of admission, with 23 patients, family, staff and volunteers interviewed about their perspectives of the intervention. The intervention then was implemented at waitlist control units (Stage 2).

In Stage 1, 19 of 20 intervention unit patients (95%) had strategies documented within at least four domains. Highest adherence was for eating and drinking, and reorientation; the lowest was for family partnership. Qualitative data explained the varying adherence. The intervention caused no adverse events.

This study provides important insights into measurement and reporting of multicomponent intervention dosage; how interdisciplinary delivery of the strategies was influenced by role; and further opportunities to partner with family in delirium prevention. Results will inform a phase III trial of the intervention for inpatients with advanced cancer.

030

Drug therapy for delirium in terminally ill adult patients

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Introduction

Delirium is a complex neuropsychiatric syndrome common in palliative care, occurring in up to 88% of patients in the weeks preceding death. Our Cochrane review on drug therapy for delirium in 2012 (Candy et al. 2012) identified one trial. New trials have been conducted and an updated review is a Cochrane priority.

Aim

To evaluate the evidence from randomised controlled trials examining the effectiveness and safety of drug therapies to treat delirium in terminally ill adults.

Methods

We searched for RCTs comparing any drug treatment with any other treatment for delirium in terminally ill adults. Primary outcomes included delirium symptoms, agitation and adverse events.

Results

We retrieved 9,431 citations. Only four trials were included in the final review. All were vulnerable to bias, most commonly small samples and incomplete outcome data. There was no evidence that any of the drugs studied compared with placebo were effective in reducing delirium symptoms. Some drugs may be effective in reducing agitation. There was mixed evidence relating to adverse events.

Conclusion

The evidence on delirium symptoms, agitation and adverse events in terminally ill adults is lacking or of low quality. Further research comparing drug therapy to placebo (best supportive care), is essential.

031

Patient safety, cost-effectiveness and quality of life: Reduction of delirium risk and post-operative cognitive dysfunction after elective surgery (PAWEL Study)

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Background

The probability of delirium after surgery increases with patients' age, pre-existing cognitive impairment and comorbidities, but is also dependent on the quality of care. In the PAWEL study (German Clinical Trials Register DRKS00013311), we investigate whether a cross-sectoral and multi-modal intervention for preventing delirium can reduce delirium prevalence, postoperative cognitive decline (POCD) in 70+-patients undergoing elective surgery and whether the complex intervention is cost-effective.

Methods

From 11/2017 to 5/2020 the PAWEL-study is conducted at 5 tertiary medical centers in Germany's southwest (2 or 3 surgical departments each) recruiting more than 1500 patients undergoing elective surgery (cardio-thoracic, vessels, proximal big joints, spine, genitourinary, gastrointestinal, general surgery procedures). Measurements are performed at 6 consecutive points: pre-admission, pre- and postoperative (daily delirium screening up to day 7), with POCD evaluations at 2, 6 and 12 months after surgery. A stepped-wedge design with cluster randomization of the 5 centers is employed.

Discussion

Key aims of the trial are the improvement of patient safety and quality of life, reduction of the long-term risk of conversion to dementia and -from an economic perspective - benefits and decreased costs for hospitals, patients and health and care insurances. Study progress, challenges and hazard minimizations are presented.

032

Pain and delirium in people with dementia in the acute general hospital setting: Exploratory secondary analysis

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Pain and delirium are common in people with dementia admitted to hospitals. Pain is implicated as a cause of delirium but this association has not been investigated in this setting.

230 participants from two UK hospitals aged ≥ 70 years were assessed for dementia severity, delirium (Confusion Assessment Method), and pain (Pain Assessment in Advanced Dementia) scale. Regressions explored the relationship between pain and delirium. Analyses adjusted for potential confounders (age, dementia severity, challenging behaviour, and Charlson co-morbidity scores).

Pain at rest developed in 49%, and pain during activity for 26% of participants. 42% remained delirious for at least two assessments, and 15% developed incident delirium. Of the 35% of participants who were delirious and unable to self-report pain, 33% of these participants experienced pain at rest, and 56 experienced pain during activity. The odds of being delirious were 3.26 times higher in participants experiencing pain at rest (95% CI 1.03 to 10.25, p = 0.044). An association between pain at rest and delirium was found; pain may be a risk factor for delirium. Pain and delirium persisted and developed during an inpatient stay, therefore regular pain and delirium assessments are required to manage pain and delirium effectively.

033

Structured Integrated Care Intervention prevents delirium in Singapore's Geriatric Hip Fracture Unit: A retrospective cohort study

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Introduction

Delirium is common in hip fracture patients. Recent study established that 48% of hip fracture patients aged 65 and above had perioperative delirium. This could unravel a cascade of adverse outcomes which has significant implications for healthcare utilisation and cost. A structured integrated care intervention was developed with reference to National Institute for Health and Care Excellence (NICE) guidelines in hope to reduce incidence of delirium in elderly hip fracture patients in Singapore.

Method

A retrospective cohort study from 2015-2017 was performed in Khoo Teck Puat Hospital, Singapore where patients aged 60 and above with hip fracture who underwent surgery were recruited. Incidence of delirium and other postoperative outcomes were measured.

Results

Of a total of 831 patients with median age of 79 years, delirium was observed in 11.1% under the structured integrated care intervention. This is significantly lower as compared to previous studies. Lower incidence of delirium is shown to decrease medical complications, better functional recovery and reduced hospitalisation stay.

Conclusion

Structured integrated care intervention prevents delirium in this vulnerable population in Singapore. It offers a standardized pathway with available resources and has shown to improve clinical outcome, increase quality of care and reduce healthcare cost.

034

The link between delirium knowledge and healthcare workers' strain of care in long-term care facilities (LTCFs)

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Background

Previous research shows that caring for residents with delirium causes strain of care due to a lack of knowledge and skills. Current research looks at the relationship between delirium knowledge and healthcare workers' strain of care in LTCFs before and after blended learning.

Method

In this intervention study the Delirium Knowledge Questionnaire (DKQ) and the Strain of Care for Delirium Index (SCDI) are used to investigate the link. The intervention was blended learning, consisting of e-learning and in-service training. Subgroup analyses were performed for healthcare workers completing only the e-learning, the in-service training and the blended learning.

Results

From 312 healthcare workers from 19 LTCFs, pre-test SCDI was completed by 289 and DKQ by 284 of them. Post-test, SCDI was completed by 80 and DKQ by 74 of them. Only nurse assistants had a decrease in care strain (before: -r=0.011, p=0.916, after: r=-0.584, p=0.011). For them, 46.6% of the decrease in strain of care was clarified by the increase in knowledge after blended learning and the amount of years they work in a LTCF.

Conclusion

Knowledge after blended learning had only a significant influence on the perceived care strain for nurse assistants, which makes it the best approach.

035
People With Postoperative Delirium Get Less Pain Relief

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Postoperative delirium is common and has been associated with opioids. The hypothesis that postoperative opioid dose would be associated with delirium incidence following elective arthroplasty was tested in this observational cohort study.

Participants aged 65 years or older, without a diagnosis of dementia, admitted for primary elective arthroplasty under spinal anaesthesia were recruited. Participants were assessed for delirium on postoperative days 1,2 and 3 using the Confusion Assessment Method supplemented by notes review. Postoperative opioid drugs and doses were recorded and daily total morphine equivalent (MEq) doses calculated. Postoperative pain scores were not collected. Postoperative opioid doses between delirium and no delirium groups were compared using non-parametric tests.

Of the 315 participants completing the study, postoperative drug data was available for n=178 (with a similar delirium incidence: 26/178 vs 44/315, p=0.95). Daily total MEq doses (median, interquartile range) for delirium and no delirium groups respectively were: Day 0 5.5(3.0,10.6) and 5.5(0,7.6) p=0.273; Day 1 13.2(8.0,34.1) 15.6(8.0, 22.2) p=0.691; Day 2 4.5(3.0, 9.8) 10.6(6.0, 17.2) p=0.006; Day 3 3.0(0, 6.0) 5.0(0, 10.3) p=0.356.

Day 2 morphine equivalent doses were significantly lower in delirium compared to no delirium groups. This suggests delirium symptoms may prompt a reduction in analgesic doses.

036
Strategies for complex multi-modal non-pharmacological delirium prevention and treatment (The PAWEL-Study Intervention)

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Postoperative delirium is associated with higher morbidity and mortality, prolonged post-operative cognitive dysfunction (POCD), development of dementia and rising health care costs. In 11/2017 a cross-sectorial, longitudinal 5-centre-study (PAWEL) started to assess delirium risk and reduction with stepped-wedge design in 1500 patients undergoing elective surgery. Trial results should form the basis of future standards for preventing delirium and POCD on surgical wards. These aims should be reached by the implementation of a multi-sector, individualized and multi-professional delirium and POCD prevention program. One part is the multi-modal intervention which includes peri- and postoperative non-pharmacological interventions, all-personnel-training in 3 levels and care management modified according to best practice models (e.g.HELP,CHOPS). Psychogeriatric Nurse Specialists assess individual delirium risk, perform daily rounds for delirium assessment and medication supervision and prescribe individualized activities. These are executed daily by trained aids or gap-year-volunteers and defined in six modules: 1) reorientation 2) cognitive activation 3) mobilization 4) meal companionship 5) chaperoned diagnostics and operation room attendance 6) non-pharmacological sleep promotion and anxiety reduction via acupressure.
Intervention modules and their implementation as well as educational program realization are presented in the framework of PAWEL's aims for ensuring patient safety, life quality and cost-effective POCD and dementia risk reduction.

037
Non-pharmacological delirium interventions and team interacting elements

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The vulnerable group of elderlies in the acute-care setting, especially those with cognitive decline, are especially exposed to develop a delirium. Therefore, this scoping review aimed to answer which non-pharmacological interventions are available for elderlies and also to identify what kind of team interacting elements are currently used to support the delivery of these interventions.

A systematically database search was conducted according to predefined inclusion criteria. Two independent reviewers screened 3.809 records, assessed 77 full-text articles for eligibility, and included 24 studies into a 3-step analysis. Analysis I: program development, piloting and evaluation; analysis II: comparison of all identified interventions with guideline recommendations, analysis III: critical appraisal of team interacting elements used. Only a few intervention programs are available for elderly patients in the acute-care, and still fewer interventions for elderly inpatients with cognitive impairment. The identified programs include on average 11 delirium components. Only a few programs link currently components systematically to team interacting elements, e.g. for strategic planning, performing and evaluating of interventions, to improve interprofessional exchange, or to optimize workflow processes.

Future research is needed to gain better understanding which components are suitable for elderly patients in acute-care and how these may be provided by a team.

039
New-old approaches to delirium: integrating detection, pharmacology, and therapy

Joseph Rasimas

Beginning with some basic neurotransmitter-based hypotheses about delirium, I will focus on the central role of cholinergic function. The topic will be elucidated by insights we have from work on the anticholinergic burden of certain medications on brain function, and the role of physostigmine as an antidote to this specific problem. Then I will integrate a discussion about pathophysiologic mechanisms involving inflammation and measurable cholinergic indices with attention to detection. I will end with some suggestions about the therapeutic potential of physostigmine beyond merely increasing acetylcholine availability in the CNS, and reflecting what biological indices may be tracked as the syndrome is treated.

040
CSF levels of interleukin-8 in delirium, dementia and cognitively healthy patients

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Delirium is a very common condition in elderly patients admitted to the hospitals. There is very little known about the underlying mechanisms involved in the pathogenesis of delirium.
We conducted a prospective cohort study at Oslo University hospital, Norway where we analyzed cerebrospinal fluid (CSF) levels of Tumor Necrosis Factor alpha (TNF-□), Interleukin-1beta (IL-1□) and Interleukin-8 (IL-8) from hip-fracture patients (n = 134), cognitively healthy controls (n = 125) and stable dementia patients (n = 73).
Our analysis illustrated significantly higher ($p < 0.05$) preoperative CSF levels of IL-8 in hip-fracture patients that developed delirium as compared to patients without delirium after surgery. We also identified that hip-fracture patients had significantly higher ($p < 0.001$) preoperative CSF levels of IL-8 when compared to cognitively healthy controls and patients with stable dementia. Furthermore, dementia stratification highlighted that higher IL-8 levels were restricted to dementia free hip-fracture patients that developed delirium. Interestingly, depression stratification also revealed higher IL-8 levels in delirium with existing depression despite most of the patients in this group had dementia.
This study concludes that IL-8 levels are associated with delirium in hip-fracture patients and underlying dementia or depression may influence IL-8 levels in geriatric patients.

041
A bedside two-channel EEG to detect Delirium superimposed on Dementia

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The diagnosis of delirium superimposed on dementia (DSD) is challenging. Early and reliably diagnosing DSD is important, and an objective, simple method for delirium detection has the potential to enable interventions for early treatment of delirium. In this proof of concept study, a new method based on a bedside EEG using only four electrodes and just 3 minutes of registration was investigated to assess its feasibility and its potential to identify differences in EEG characteristics depending on delirium status in patients with cognitive impairment or clinically manifest dementia.
EEG recordings were conducted shortly after admission, repeatedly thereafter with a maximum of three recordings during admission, and one at discharge. Clinical observation screening and camera registrations were performed during sessions.
Results show that 62 EEG recordings in 20 patients were well tolerated and preliminary analyses indicate significant differences in DSD, based on comparisons within patients and at group level. An increase in relative delta and theta1 power and a decrease in relative theta2, and alpha1 power were found right prefrontal and right temporal, suggesting high sensitivity and specificity for DSD detection.
Preliminary results suggest that an 'easy to perform' bedside EEG is well tolerated and could serve to diagnose DSD.

042

DeltaScan for the assessment of delirium in the intensive care and ward: a multicenter stepped-wedge randomized trial

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Early detection of delirium would allow for early treatment and improved patient outcomes, but delirium is often not recognized. As current screening tools are subjective, a more objective diagnostic tool for early delirium detection is desired. Recently, the DeltaScan, a CE-certified device to detect delirium using a one-minute, one-channel EEG recording, was found to have diagnostic properties that outperform currently used screening tools. In two prospective multicenter stepped-wedge randomized trials within at least 4 ICU departments (trial 1) and at least 6 non-ICU departments (trial 2), the detection rate of delirium and duration of admission will be compared between a setting in which delirium will be measured with the DeltaScan (index period) and a setting in which delirium will be assessed with currently used delirium screening tools (reference period). We hypothesize that EEG-based delirium monitoring will increase the delirium detection rate and reduce duration of hospital admission.

043

Diagnostic accuracy of the DelApp smartphone test for assessing inattention in delirium in geriatric and intensive care settings

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Aims

To determine the diagnostic performance of the smartphone Delirium Application (DelApp) combined arousal and attention test for delirium in hospital inpatients.

Methods

Consecutively-approached, unselected patients were recruited from geriatrics and acute orthopaedic wards (Study 1; aged ≥65) and from Intensive Care Units (ICU; Study 2; aged ≥18). Algorithm-based reference standard assessment incorporating neuropsychological testing based on DSM-5 was performed. Separate blinded assessors administered the DelApp (total score 0-10, 10=good performance). Pre-determined cut-points from prior case-control studies were evaluated.

Results

Study 1: 382 older inpatients were recruited, mean age 82.3y (range 65-99), delirium: n=58 (15.2%); dementia/no delirium: n=60 (15.7%).Area under the curve (AUC) was 0.83 (95% Confidence Interval (CI): 0.77-0.89). At a cut-point of ≤8, sensitivity for delirium was 75.4% (95% CI: 64.9-85.9) and specificity 83.6% (95% CI: 78.7-88.5). Specificity for delirium versus dementia was 84.5% (95% CI: 75.2-93.8; cut-point ≤6). Study 2: 165 ICU patients were recruited, mean age 61.0y (range 24-89); delirium: n=39 (23.4%). The AUC was 0.90 (95% CI: 0.85-0.97). Sensitivity for delirium was 81.6% (95% CI: 69.3-93.9) and specificity 85.6% (95% CI: 79.3-91.9; cut-point ≤6).

Conclusion

The DelApp provides a brief, objective test with acceptable diagnostic accuracy for detecting delirium in unselected inpatient populations.

044

A short delirium caregiver questionnaire for triage of elderly outpatients with cognitive impairment; A development and test accuracy study

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Delirium is often missed in memory clinics. Caregivers can give valuable information to improve identification rates. Our aim was to develop a short and sensitive delirium caregiver questionnaire (DCQ) for triage by telephone, and investigate its test accuracy.

The 17-item pilot and 7-item final DCQ were administered to 112 respectively 211 caregivers of patients that were referred for dementia screening in our clinic for geriatric psychiatry. In both study phases, the patients received a structured diagnostic work-up for delirium. The primary outcome was test accuracy, and the secondary time to first visit.

The final DCQ consisted of the following items: emergency visit required, sleeping disorder, fluctuating course, hallucinations, suspicious thoughts, previous delirium, and recent discharge from hospital. With the DCQ, 66 of 211 patients were screen-positive for possible delirium. Sensitivity was 76% (95% CI: 60%-88%) and specificity 79% (73%-85%). A post-hoc analysis showed that an enhanced 3-item DCQ had sensitivity of 89% (74%-96%) and specificity of 76% (69%-82%).Mean time to first visit dropped from 47 to 9 days in patients with delirium.

Triage with the DCQ in patients referred for cognitive screening leads to earlier assessment and high delirium detection rates. The DCQ is easy-to-use and requires little training.

045

Integration of a Delirium Detection and Intervention Program in a tertiary urban hospital

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Although delirium is present in 10 to 15% of older adults arriving to the emergency department (ER), this condition is frequently not recognized, evaluated, and managed appropriately, in Israel maybe more so.

The 4AT, that examines alertness, cognition, and acute change in mental status, was integrated into the computerized medical records of all patients 70 years and older arriving to the ER. Patients' medical files who were "4AT-positive" (scores ≥2) are automatically forwarded to the Geriatric Unit, where either a Geriatrician or a Geriatrics Nurse decide what intervention should be undertaken, on a HELP based interventions (Geriatric consult, physiotherapy, deconditioning prevention and reorientation by medical and nursing students, Social worker), along with a post-discharge follow-up.

Of the 2413 4AT tests performed since the program was initiated on November 2017, 729 (30.2%) were 4AT-positive. 412 of 4AT-positive patients hospitalized (76.4%) had HELP based interventions during hospitalization, and all were followed up after discharge. On the internal medicine patients, 482 patients were positive for delirium on admission (25%). There was an increase in the number of geriatric consults as well.

Integration of a Delirium Detection and Integration program based on the 4-AT test on admission is a feasible and viable option.

046
Initial assessment for delirium in people with dementia admitted to hospital - can we do better?

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In 2017 the National Audit of Dementia (care in general hospitals) reported that an initial assessment (or screen) for delirium/possible delirium was undertaken in only 45% of a national sample of 10047 hospital patients with dementia. However, the definition of what constituted a delirium assessment varied considerably within and between hospitals. A targeted "spotlight" delirium audit in 2018 examined patient notes to determine what initial assessments were carried out.

117/ 199 eligible acute hospitals in England and Wales participated and provided data from 20 casenotes of randomly selected people with dementia admitted as an emergency, and therefore at high risk of delirium. The data collection tool asked about the initial screen/ assessment and whether delirium had been recorded during the admission episode.

2228 casenotes were audited. Auditors reported that 51% had an "initial assessment" carried out. Further questions regarding specific commonly used assessments and pre-recorded delirium raised the percentage of patients who had been screened for evidence of delirium to 68%. 27% had no initial delirium assessment nor any cognitive test undertaken.

This audit shows a sizeable proportion of vulnerable people who are not being appropriately assessed for delirium. Hospitals must implement clear procedures to improve delirium assessment.

047
Clinicians' perspectives of assessing pain in patients with delirium

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Faced with a lack of validated strategies for pain assessment in patients with delirium, clinicians use individual decision pathways. Understanding clinician perspectives is essential to inform development of effective pain assessment during delirium. Therefore, the aim of this study was to examine how clinicians assess pain in patients with delirium.

Semi-structured qualitative interviews and focus groups with 19 nurses and nine physicians from Australian hospital, palliative care and aged cares settings were conducted, recorded and analysed using qualitative content analysis.

Participants mainly looked for facial expressions, body movements, changes in vital signs and loud and noisy behaviour to identify pain. To interpret these signs, participants relied on background knowledge about the patient and his or her usual behaviour. Many participants considered the identification of pain in patients with hypoactive delirium more challenging than in those with hyperactive delirium. The fluctuating nature of delirium meant that constant adaptation of the pain assessment approach was necessary.

A wide variety of pain assessment approaches was reported and included aspects neglected in the literature, e.g. pain localisation, and more detail of other aspects, e.g. physical assessment. These data will contribute to the development of pain assessment tools and strategies for patients with delirium.

048
Feasibility of Implementation of a Cognitive Vital Sign on an Acute Care of the Elderly Unit

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Although many delirium screening tools exist, little is known about real-world feasibility. We aimed to investigate the feasibility of daily screening on an Acute Care of the Elderly Unit.

We developed a delirium screening tool based on RADAR (Recognising Acute Delirium As part of your Routine) and MOTYB (Months of the Year Backwards). We trained nursing staff, implemented the tool for use daily during vital signs, and monitored refusal rates, assessment duration, and staff adherence. Participants and caregivers were also surveyed on their opinion of the screening.

Of 111 participants, median age was 84 years (IQR 9.5), 53.2% were women, and 469 of a possible 508 assessments were conducted. Seventy-one (64%) had all assessments completed correctly. Thirteen refused MOTYB at least once, five of whom screened positive using RADAR. A further 27 patients had at least one assessment missed, 16 of whom had screened positive previously. The median screening duration was 70 seconds (IQR 44.5). The majority of patients (n=54) and caregivers (n=48) rated the screening favourably.

Despite training, this short, simple screening test was difficult to implement daily, however was well-received by patients and caregivers. Next steps include interviews with nurses to help understand their perceptions of the tool.

049
Delirium Biomarkers in the ICU

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Introduction
Delirium in the ICU is prevalent with both delirium duration and severity associated with adverse outcomes. We hypothesized that peripheral biomarkers representing systemic inflammation will be independently associated with delirium duration and delirium severity in critically ill patients.

Methods
Patients aged ≥ 18 years who screen positive for delirium based on the CAM-ICU and have a blood draw upon enrollment were included. Outcome measures were delirium/coma free days and delirium severity. The biomarkers included Interleukin (IL)-6, 8, 10, and tumor necrosis factor (TNF)-alpha.

Results
321 critically ill patients (median age: 60 years; 56% females; 49% African-American; median APACHE-II: 21) with delirium constituted the study cohort. After adjusting for relevant covariates, markers of inflammation IL-6, 8, 10, and TNF-alpha were negatively associated with delirium/coma free days by one week post-enrollment ($p<0.001$) and by 30 days post-enrollment (IL-6, 8, 10 $p<0.001$, TNF-alpha, $p=0.003$). Higher IL-6, 8, 10, and TNF-alpha were positively associated with higher mean delirium severity by one week (IL-6: $p<0.001$, IL-8: $p<0.001$, IL-10: $p=0.001$, TNF-alpha: $p=0.011$). IL-6, 8, and 10 levels were also associated with higher delirium severity by discharge (IL-6: $p=0.014$, IL-8: $p=0.038$, IL-10: $p=0.008$).

Conclusion
Inflammatory biomarkers are associated with longer delirium duration and higher delirium severity.

050
S-100β- a biomarker of delirium duration and delirium severity in the ICU

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Introduction

Delirium in the ICU is prevalent with both delirium duration and severity associated with adverse outcomes. We hypothesized that S-100β representing astrocyte and glial activation will be independently associated with delirium duration and delirium severity in critically ill patients.

Methods

Patients aged ≥ 18 years who screen positive for delirium based on the CAM-ICU and have a blood draw upon enrollment were included. Outcome measures were delirium/coma free days and delirium severity. S-100β was selected as a marker of astrocyte and glial activation.

Results

321 critically ill patients (median age: 60 years; 56% females; 49% African-American; median APACHE-II: 21) with delirium constituted the study cohort. After adjusting for relevant covariates, S-100β levels were negatively associated with delirium/coma free days by one week post-enrollment ($p<0.001$) and by 30 days post-enrollment ($p<0.001$). S-100β levels were also associated with higher mean delirium severity by one week ($p=0.011$) and by hospital discharge ($p=0.017$).

Conclusion

S-100 β levels as a biomarker of astrocyte and glial activation are associated with longer delirium duration and higher delirium severity among critically ill patients.

051
The effect of a delirium episode on the trajectory of cognition and structural changes to the brain during 9-year follow-up

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Delirium is strongly associated with cognitive decline. However, the neuroanatomy underlying delirium remains unclear, as well as whether delirium is an expression of underlying pathology or a cause of brain damage itself. We examined the effects of a delirium episode on temporal dynamics of changes in the brain on MRI and cognitive performance in the Radboud University Nijmegen Diffusion Tensor and Magnetic resonance Cohort (RUN DMC). 503 community-dwelling elderly without dementia at baseline were studied from 2006-2015. Data on delirium episodes during follow-up were available from 317 participants. 23 non-demented participants developed an episode of delirium. These participants were significantly older (mean age: 72 vs 64 years) and had a higher mortality than controls (35% vs 3%), both $p<0.001$. Participants deteriorated more over 9 years on the cognitive domain of concept shifting after a delirium episode (mean z-score: -1.15 vs. -0.19, $p=0.014$, corrected for demographic differences). Structurally no changes in imaging parameters occurred after a delirium. At baseline however, we found more white matter hyperintensities in participants who would later develop delirium during follow-up. This study firstly confirms that delirium patients are premorbidly more vulnerable, both cognitively and structurally, and secondly discovered a deterioration in concept shifting after a delirium.

052
The effect of delirium and its subtypes on 90 day mortality in intensive care unit patients

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Introduction
Many ICU patients suffer from delirium which is associated with deleterious effects on outcome. We aimed to determine the effect of delirium subtypes on 90day-mortality in a large cohort of ICU patients.

Methods
ICU patients admitted to a university hospital between 2015-2017 were included in this retrospective cohort study. Delirium status, including subtypes was determined using CAM-ICU and RASS-scores. Cox-regression analysis was used to determine associations of delirium subtypes with 90day-mortality. Patients' severity of illness (APACHE-IV) score, ventilator days, ICU length of stay and delirium subtype served as covariates.

Results
7,362 ICU patients were included of which in 6,323 (86%) patients sufficient delirium assessments were completed. A total of 1,600 (25%) patients were tested delirious. The mixed subtype occurred the most frequent (36%). Compared to non delirious patients, the unadjusted odds ratio (OR) for delirium with 90day-mortality was 2.84 (95%CI 2.32-3.49). When adjusting for covariates, delirium occurrence (OR 0.87[95%CI 0.54-1.41]) neither its rapidly reversible (OR 0.93[95%CI 0.62-1.39]), hypoactive (OR 1.28[95%CI 0.91-1.80]) and hyperactive (OR 1.36[95%CI 0.70-2.67]) subtypes were associated with 90day-mortality. The mixed subtype was significantly associated with increased 90day-mortality (OR 1.53[95%CI 1.12-2.08]).

Conclusion
When adjusting for covariates, only the mixed subtype delirium is associated with increased 90day-mortality.

053
Predisposing risk factors for delirium and EEG network characteristics

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Introduction
As adequate cognitive functioning requires interaction or functional connectivity between remote brain regions, it can be hypothesized that delirium is a disconnection syndrome, caused by breakdown of functional brain networks. It is unknown if network abnormalities are already present in patients at risk for delirium. To explore this hypothesis further, we studied the effects of predisposing risk factors for delirium on EEG network characteristics.

Methods
Elderly patients (N=206) underwent resting-state EEG measurements and were assessed for risk factors for delirium, i.e. age, alcohol misuse, cognitive impairment, depression, functional impairment, history of stroke and severity of illness. Linear regression analyses were used to evaluate the relation between the risk factors (individually and combined) and EEG (1) signal slowness, (2) connectivity and (3) network integration.

Results
After correction for multiple testing, none of the other risk factors or the combination of risk factors had a significant influence on EEG signal slowness, connectivity or network integration.

Conclusion
While delirium is related to several EEG alterations, predisposing risk factors for developing delirium are not. This may imply that predisposing risk factors mediate vulnerability for delirium via different pathways.

054

Development and Validation of the Salford delirium prediction model using electronic medical records

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Introduction

Delirium is common in hospital settings, particularly in older people. There is an incentive to actively prevent delirium due to the adverse outcomes associated with its incidence. A prediction model could be used for early identification of at risk patients. This would assist clinicians to focus efforts in prevention. This study aimed to develop a delirium prediction model with high clinical utility, using electronic medical records.

Methods

A retrospective cohort of inpatients admitted to Salford Royal NHS Foundation Trust hospital was used. The data used was collected from admissions between June 2013 and July 2018. We used data found in the electronic medical records to determine features for the model. Machine learning methodologies were utilized to develop the predictive model. Clinical utility was determined using the F1 and Kappa score.

Results

The developed model had an AUROC of 0.96. Additionally, F1 score was 0.95 and Kappa score was 0.91.

Conclusion

Machine learning methodologies were useful in developing a reliable prediction model for delirium. Increasing the quality of data that is collected would assist in improving the performance of the model. This model would be useful in settings with informatics infrastructure to support clinical decisions.

055

Prevalence of Delirium in Patients 75 Years or older admitted to ten Norwegian Hospitals

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Introduction

Delirium is common in acutely admitted older patients, but the prevalence of delirium in the Emergency Departments of Norwegian Hospitals has not been investigated previously.

Methods

On World Delirium Awareness Day March 14th 2018, all patients aged ≥75 years admitted to the Emergency Departments of ten Norwegian Hospitals were screened for delirium with 4AT by geriatricians. Delirium Motor Subtype was assessed using the Delirium Motor Subtype Scale. Age, sex and hospital department affiliation were registered. Informed written consents were obtained from the patients or close relatives.

Results

In total, 140 patients aged ≥75 years (mean age 85.5 years, 54% women) were admitted during the study period, and 118 (84%) of these were included. Delirium was diagnosed in 16 (14%) of the patients. In addition, 40 patients (34%) had signs of cognitive impairment. Hypoactive (50%) was the most common delirium motor subtype, while 6% had hyperactive and 13% had mixed motor subtype.

Conclusions

Cognitive impairment was prevalent in the Emergency Departments of all hospitals in the study. The prevalence of delirium was 14% and hypoactive delirium was the most common motor subtype. Screening with 4AT in the Emergency Department was feasible. Was also presented as poster at EUGMS 2018.

056

Association between Sleep Quality and Delirium Occurrence in Critically Ill Adults

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Introduction

How delirium and sleep quality are linked remains unclear. A recent RCT reported nocturnal dexmedetomidine (DEX) significantly reduced incident ICU delirium; Leeds Sleep Evaluation Questionnaire (LSEQ) scores were similar between DEX (n=50) and placebo (n=50) groups (Skrobik Y AJRCCM 2018).We evaluated the association between daily delirium occurrence and LSEQ score.

Methods

At 7am, delirium was evaluated with the ICDSC (when RASS≥-3) and sleep quality with the LSEQ (when RASS≥-1). This secondary analysis included all patient-nights (DEX+Placebo) when LSEQ and delirium were documented. Logistic regression controlling for age, baseline APACHE-II score and DEX/placebo allocation was used to measure the association between delirium occurrence and LSEQ score.

Results

The 100 patients spent 1,115 nights in the ICU; coma, delirium, and no delirium were present on 130 (11.7%), 114 (10.2%) and 871 (78.1%) nights, respectively. LSEQ data were available for 439/985 (44.8%) of delirium/no delirium nights. Delirium occurred on 41/439 (9.3%) of these nights. LSEQ scores were similar [5.1±1.1(delirium) vs. 5.4±1.1(no-delirium), p=0.94], and were not associated with delirium occurrence after controlling for age, severity of illness, and DEX (vs. placebo) treatment (OR 0.97, 95% CI 0.72-1.31).

Conclusions

ICU patient sleep quality perception is not associated with delirium occurrence in critically ill adults.

057

The association between physical frailty and MRI features of cerebral small vessel disease

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Introduction

Physical frailty is a common syndrome in older individuals that is associated with poor cognitive outcome. The underlying brain correlates of physical frailty remain unclear. We have therefore assessed the association between physical frailty and magnetic resonance imaging (MRI) features of cerebral small vessel disease (SVD).

Methods

We included 170 non-demented participants who were classified as frail (n=29), pre-frail (n=83) and non-frail (n=55) according to the Fried frailty phenotype. The association of physical frailty and MRI features of SVD (white matter hyperintensity (WMH) volume and shape features, lacunar infarcts and cerebral perfusion) was investigated by linear regression analysis corrected for age, sex and intracranial volume.

Results

Frail and pre-frail participants showed a higher WMH volume (frail: β(95% CI)=0.69(0.08-1.31), p=0.03; pre-frail: β(95% CI)=0.43(0.04-0.82), p=0.03) compared to non-frail participants. Pre-frail participants showed a more complex shape of periventricular and confluent WMH compared to non-frail participants (frail: concavity index: β(95% CI)=0.05(0.00-0.11), p=0.06); pre-frail: concavity index: β(95% CI)=0.04(0.03-0.08), p=0.03; fractal dimensions: β (95% CI)=0.07(0.00-0.15), p=0.05). No between group differences were found in shape features of deep WMH, cerebral perfusion or presence of lacunar infarcts.

Conclusion

Increased WMH volume and a more complex WMH shape seem to be structural correlates of the physical frailty phenotype.

058
Pain assessment in patients with delirium. A scoping review

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Pain and delirium are highly prevalent in the same patient groups, and characteristics of delirium can compromise pain assessment. The aim of this review was therefore to examine pain assessment approaches and instruments for adult patients with delirium.

A scoping review was conducted of all publications that reported on pain assessment in adult patients with delirium. No time or language limits were imposed. Publications were systematically assessed for inclusion, followed by standardised data extraction and narrative synthesis.

Seventy-five publications of 1402 screened were included. No evidence was found for the measurement properties of self-report or behavioural pain assessment instruments, with the exception of limited evidence for the validity of the Critical Care Pain Observation Tool (CPOT) and Behavioural Pain Scale for Non-Intubated patients (BPS-NI) in the intensive care setting. Proxy ratings of pain and comprehensive pain assessment hierarchies were recommended, although not supported by evidence.

Current evidence is insufficient to guide clinical practice in pain assessment in patients with delirium. The influences of specific features of delirium on pain experience and assessment are not well understood. Future research will need to address the validity of existing pain assessment instruments and apply theoretical and conceptual understandings of pain and delirium.

059
Cognitive decline

Pratik Pandharipande

Survival after hospitalization and critical illness has improved, yet many patients struggle with new or worsening of cognitive, functional and neuropsychiatric impairments that prevent them from returning to their pre-illness quality of life including hobbies and employment. Delirium, a manifestation of acute brain dysfunction during hospitalization, may be an independent risk factor of these impairments which impact survivorship. This presentation will elaborate on the spectrum of cognitive impairment after critical illness and focus on targeting delirium as a potentially modifiable risk factor.

060
Depression, anxiety and PTSD
Ramona Hopkins

061
ICU delirium and mortality
Mark van den Boogaard

In general, delirium can be devastating for the patient. Many studies showing an deleterious effect of delirium on short-term as well as on the long-term. These effects on outcome includes also the association of delirium with mortality. ICU delirium increases the odds to die, as well as every day spent with delirium increases the risk to die. Is delirium really killing or should it be seen more as an epiphenomenon? In this presentation this association will be discussed.

062
Cognitive interventions for delirium: current progress and prospects for future work

Zoë Tieges

Cognitive and behavioural interventions for delirium are under-studied but have enormous potential for improving delirium outcomes, both in hospitalised patients and following discharge. In this talk I will give an overview of key studies in delirium and more broadly in distressed and cognitively impaired patients, ranging from simple reorientation and reassurance to formal cognitive stimulation protocols. I will discuss key principles of cognitive rehabilitation strategies in general, and give examples of its application in related conditions, such as traumatic brain injury. Potential avenues for future work will be discussed.

063
Non-invasive brain stimulation to promote recovery in patients with disorders of consciousness

Alice Barra

Neuromodulation techniques have been studied for years, aiming to modulate brain activity in order to treat several neurological diseases. The field of (non)-invasive brain stimulation offers a valuable alternative to promote the recovery of severely brain injured patients with disorders of consciousness, a population that lacks effective treatment options, especially at the chronic stage. We will describe brain stimulation techniques such as deep brain stimulation (DBS) and transcranial direct current stimulation (tDCS), as therapeutic options for patients with DOC. Both techniques have shown to induce some behavioral improvement in these patients, however, larger controlled studies have to be conducted in order to understand better the neuromodulatory effects underlying this clinical benefit.

Keywords: transcranial direct stimulation, coma, disorders of consciousness, traumatic brain injury

064
Can improved management of delirium lead to better outcomes?
Alasdair MacLullich

Delirium is linked with multiple poor outcomes. These include short-term medical complications such as falls, dehydration, malnourishment and pneumonia, and longer-term outcomes such as the association with new institutionalisation, worse long-term cognition, post-traumatic stress symptoms, and mortality.
Treatment of established delirium is complex, involving assessment and treatment of acute precipitants, avoidance of complications, and management of distress and agitation.

In this talk the possibility of improving the outcomes of delirium through optimised delirium care will be described. The available evidence will be reviewed and directions for future research discussed.

Abstracts
Poster Presentations

P01
The value of biochemical screens in delirium

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Introduction
The British Geriatric Society guidelines recommend biochemical investigations including calcium and thyroid function, for all those presenting with delirium based on 'grade D' level of recommendation . They recommend further B12 and folate serum measurements based on clinical judgement.

Aim
To ascertain how many cases of delirium were due to a biochemical abnormality or whether another cause for delirium was more clinically likely.

Method
We reviewed patients 65 and over admitted between 31st March 2015 and 31st March 2016 at North Middlesex University Hospital and coded with delirium on discharge. Those with 3 or 4 of: serum B12, calcium, folate and thyroid functions requested within 7 days of this care episode were included.

Results
786 coded with delirium. 313 delirium admissions were included into our analysis. 105 patients had one or more abnormal result and 208 patients' results were normal. Those with abnormal results, only 4 had evidence this was the cause of their delirium determined by a senior clinician.

Discussion
Although it is considered standard practice to perform biochemical confusion screens there is little evidence in the literature to support this approach. A third of our patient cohort had abnormal delirium bloods, yet we found minimal clinical implications.

P03
The feasibility of an occupational therapy intervention in people with delirium and dementia in nursing home settings

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Introduction
The aim of the current study is to assess the applicability and feasibility of an Occupational Therapy(OT) intervention in people with delirium and dementia.

Methods
The study included a convenient sample of 22 people with a diagnosis of moderate dementia and delirium living in nursing home. Delirium was diagnosed with the DSM-5 criteria. The OT intervention was carried out for three weeks or until delirium resolution. The OT treatment involved two sessions of 30 minutes each, 5 times a week. The OT used the COPM to assess the impact of the intervention on the caregivers and on the patients.

Results
The mean age was 86.45±6.46 years . Delirium resolved in 50% of the people(N=11) after 48 hours,in 18% (N=4) after 72 hours, and in 14%(N=3) after 96 hours. OT was feasible and one session was carried out in 95% of the patients on the first day, in 100% on the second and following days. The mean duration of the session was 14±7 minutes.

Conclusion
OT intervention is feasible in people with delirium and dementia in nursing homes. Future studies are required to test the efficacy of an OT intervention as a non-pharmacological treatment of delirium in this population.

P04

Reducing delirium in patients with acute brain injury? A two-phase intervention study

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Introduction

Delirium is under-investigated in the neuro-critically ill, although its harmful effects are well documented in patients admitted to medical and surgical intensive care units. We hypothesized that time with delirium could be reduced in adults with acute brain injury by a delirium-prevention bundle.

Methods

We conducted a prospective nonrandomized, controlled intervention study in an academic neuro-ICU. A five-month baseline phase with standard care was followed by an intervention phase. Patients were assessed for delirium by the Intensive Care Delirium Screening Checklist. Primary outcome was days free of coma and delirium; secondary outcomes were length of ICU stay and one-year mortality.

Results

We included 44 patients in the baseline group and 50 patients in the intervention group. There was no difference between groups in days free of coma and delirium(median, 1 vs. 2 days, P=0.06), length of ICU stay (median, 15.0 vs. 15.5 days, P= 0.72) or one-year mortality (n, 11 (25%) vs 6 (12%), P=0.09).

Conclusions

In this study of neurocritically ill adults, a delirium-prevention bundle changed neither the duration of delirium nor mortality, although a modest trend toward an improved outcome may warrant further study.

P05

Effect of nursing interventions towards preventing postoperative delirium of elderly patients with orthopedical surgery

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Introduction

Postoperative delirium (POD) is a well-known complication among elderly surgical patients. This study is conducted to determine the effects of planned nursing interventions towards perioperative risk factors of POD on prevention of POD in elderly patients.

Method

A total of 120 patients were enrolled in this nonrandomized clinical trial - 60 in experimental group and 60 in control group, who underwent surgery either for hip fracture, coxarthrosis or gonarthrosis in Kocaeli University Research and Practice Hospital's Orthopedic Clinic. NEECHAM confusion scale was used to diagnose delirium. Nurses were trained about POD, nursing interventions and approaches for the experimental group before the start of the trials. Control group was treated with routine clinical practice whereas experiment group received interventions based on risk factors of POD. Patients were evaluated for delirium, interventions were planned and practiced regularly once a day by the researcher.

Results

Incidence of POD in control and experiment group was found 36.70% and 6.70% respectively, and this difference was statistically significant. Relative efficacy was 5.4, attributed efficacy was 30, and efficacy protection ratio was 81.74.

Conclusion

Nursing interventions for delirium risk factors in elderly patients who were surgically operated were found effective in reducing frequency, severity and duration of POD.

P06
The role of Constant Personal Observation (CPO) in the management of delirium

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Constant personal observation (CPO) or "specialing" a widely used non-pharmacological intervention in the management of delirium. To date the evidence on the impact of CPO on delirium outcomes yields mixed results.

Objective
To evaluate the utility of constant personal observation (CPO) in the management of delirium.

Method
A retrospective study including 191 (N) patients aged 65 and older admitted to acute non-geriatric wards in a tertiary hospital over 4 months. Inclusion criteria were documented diagnosis of delirium anytime during admission. Exclusion criteria were age less than 65 and palliative care patient.

Results
There were 59 (N) patients in CPO group and 132 (N) in non-CPO. The mean age in CPO group was 82.8+/-6.1 and non-CPO was 83.8+/-7.5. The percentage of female was 42 % in CPO and 64 % non-CPO. Antipscyhotic requirement is significantly higher in CPO than non-CPO ($p<0.05$). There were no statistically significant difference in patient outcomes between 2 cohorts.

Conclusion
Our study showed that "specialling" is not associated with improved outcomes in patients with delirium. CPO was associated with higher antipsychotic prescription and longer delirium duration. We attributed these results to the higher safety risk due to behavioural symptoms as well as the delirium severity and duration.

P07
Amino acids and fatty acids relevant to delirium and unconscious state

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Introduction
The aim of this study was to systematically review on studies that examined relationships between delirious or unconscious state and amino acids (AA) or fatty acids (FA).

Methods
We conducted a systematic literature search for human studies examining the expression of AA and FA in adult patients with delirious or unconscious state compared to those without the state until August 2018 using PubMed. The following search terms were set: ((delirium) OR (loss of consciousness)) AND ((amino acid) OR (fatty acid)). In addition, cross-reference as well as hand searches were performed.

Results
An initial search yielded 899 articles and lastly18 studies were found to be relevant. Twelve studies examined AA or FA concentration of blood, four studies for cerebrospinal fluid, three studies for magnetic resonance spectroscopy, and one study for postmortem brain. All the studies indicated that alteration of FA (such as short-chain FA and unsaturated FA) as well as amino acids (such as tryptophan, tyrosine and so on) were relevant to delirious and/or unconscious state.

Conclusion
This review demonstrated that there are some commonalities on neurochemical mechanism between delirium and unconscious state in FA and AA.

P08

Prevalence and management of delirium in adult ICU patients in the Netherlands: an observational multicenter study

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Introduction

Delirium affects many ICU patients. Although several studies determined ICU-delirium prevalence and management these were predominantly performed in non-Dutch countries and/or university hospitals. Study aim was to determine delirium prevalence and management in Dutch ICUs of various organizational levels and to determine predisposing and precipitating risk factors for delirium.

Methods

A multicenter observational study was performed determining the point-prevalence (on World Delirium Awareness Day, March 14th 2018) and the 7-day period-prevalence, ICU-delirium management and risk factors.

Results

26 of 84 (31%) Dutch ICUs (organizational levels 1-3) participated and included 383 patients. ICU-delirium point-prevalence was 23%, and period-prevalence was 42%. Period-prevalence was the lowest in level 1 ICUs (level 1: 13%, level 2: 44%, level 3: 45%; p<0.001). ICU-delirium assessment compliance was 88%, and haloperidol was the most frequently used drug for delirium, 71% of level 1 ICUs had a delirium protocol, and in level 2 and 3 this was 100%-92%, respectively. Hypertension (predisposing risk factor) and APACHE score, infection, mechanical ventilation (precipitating risk factors) were significantly more present in delirium patients than in non-delirium patients.

Conclusion

Delirium prevalence rates in Dutch were substantial and varied between the ICU levels. Delirium management appears less organized on level 1 ICUs.

P09

Utility of the 4AT assessment of delirium in acute care: a multi-centre blinded independent rater diagnostic test accuracy study

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Introduction

The 4AT is a short delirium assessment tool designed for routine clinical use: www.the4AT.com. Primary objective: diagnostic accuracy of the 4AT in acute patients. Secondary objectives included comparative performance of Confusion Assessment Method (CAM) and to determine if 4AT scores predict outcomes.

Methods

This was a prospective, randomized, double-blind multi-site study of 785 patients aged >=70 in the Emergency Department within 12 hours, or acute wards within 96 hours of attendance. Each patient underwent (1) DSM-IV reference standard delirium assessment informed by the Delirium Rating Scale-Revised-98, and (2) assessment with either 4AT or CAM (randomised).

Results

Mean age was 81.4 (SD 6.4) years, 45% male, 9% known dementia diagnosis. 96 (11.7%) had reference standard delirium. The 4AT had an area under the receiver operating characteristic curve of 0.90. The 4AT had specificity of 95% (95% CI 92-97%) and sensitivity of 76% (95% CI 61-87%). The CAM had specificity of 100% (95% CI 98-100%) and sensitivity of 40% (95% CI 26-57%). Patients with positive 4AT had longer lengths of stay than negative 4AT, and higher mortality.

Conclusions

The 4AT is a rapid delirium assessment instrument which has good overall diagnostic accuracy for delirium in acutely unwell older patients.

P10

The development of blended learning about delirium for healthcare workers in long-term care facilities (LTCFs)

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Background

A core element of multicomponent delirium strategies to improve delirium care is education of healthcare workers. The aim of this study is to describe the development of blended learning for healthcare workers in LTCFs and to evaluate the impact on healthcare workers.

Method

The traject was developed by the research team, using a phased approach. Content development was based on literature review. The prototype of the tool was pilot-tested by 4 research nurses. Based on their feedback the tool was improved before testing its use with healthcare workers. The e-learning was offered to all who wanted to participate. Four in-service trainings by the research nurses were given. The participants completed the Delirium Knowledge Questionnaire (DKQ) and Strain of Care for Delirium Index (SCDI) before and after each intervention.

Results

There were 312 participants from 19 LTCFs in the pre-test. The post-test was completed by 87 participants, of which 37.9% nurse assistants, 33.3% nurses, 2.6% masters and 26.2 others. Of the participants, 88.5% was female, with a mean age of 43 (SD 11.7). Only 67.9% knew what delirium was before the intervention.

Conclusion

Delirium education for healthcare workers in long-term care facilities should contain multicomponent strategies like blended learning.

Poster Presentations

P11

The influence of blended learning on the knowledge about delirium of healthcare workers in long-term care facilities (LTCFs)

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Background

Previous studies have shown that e-learning tools improved healthcare workers' delirium knowledge, but the effect of the tool was directly linked to its level of completion. The aim of this study is to determine the effect of blended learning on healthcare workers' knowledge about delirium.

Method

A pre-posttest study with a convenience sample was conducted. The intervention was blended learning. The Delirium Knowledge Questionnaire (DKQ) was used. Subgroup analyses were performed for those completing only the e-learning, in-service training and blended learning.

Results

From 19 LTCFs, 289 participants completed the DKQ pre-test, 79 post-test. Pre-test, the degree had a significant influence ($p=0.008$). There was a significant improvement of the score after intervention (before: mean 26.0, SD 3.6, after: mean 29.0, SD 3.1, $p<0.001$). Knowledge increased the most for nurse assistants (23.6 to 28.2, $p<0.001$), level 5 nurses (25.7 to 30.6, $p=0.042$) and bachelors (27.0 to 29.4, $p<0.001$). The e-learning tool had the lowest impact ($p=0.043$), the in-service training and blended learning the highest ($p<0.001$).

Conclusion

Blended learning has the highest influence on the knowledge of delirium, measured with the DKQ. Nurse assistants had the most benefit of this intervention They play a crucial role in delirium care in LTCFs.

P12

The strain healthcare workers experience in caring for patients with delirium in long-term care facilities (LTCFs)

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Background

Previous studies showed that e-learning tools had no influence on the level of experienced care strain for healthcare workers in caring for residents with delirium. The aim of this study is to determine the effect of blended learning on healthcare workers' strain of care for delirium.

Method

In this pre-post study, a convenience was included. The intervention consisted of blended learning, including e-learning and in-service training. The Strain of Care for Delirium Index (SCDI) was used. Subgroup analyses were performed for healthcare workers completing only the e-learning, the in-service training and the blended learning.

Results

A total of 312 healthcare workers from 19 LTCFs participated. The mean score on the SCDI was higher after the blended learning (0.16, SD 0.43, p=0.015) and the e-learning (0.12, SD 0.49, p=0.019). There was no significant difference in the mean score for the participants who followed only the in-service training (0.12, SD 0.44, p=0.07). Hyperactive behavior caused the highest care strain. Before the intervention, age and degree had the highest influence.

Conclusion

The experienced care strain after blended learning and e-learning was significantly higher. In-service training had no influence. This needs further investigation. To decrease delirium care strain, blended learning is advised.

P13

Differences in severity and symptoms between postoperative and subsyndromal delirium

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Introduction

Subsyndromal delirium (SSD) frequently precedes postoperative delirium (PD). Therefore, early detection of SSD may prevent delirium. This prospective cohort study examined the differences in severity and symptoms between SSD and PD.

Methods

Patients who underwent gastrointestinal surgery were evaluated daily for 3 days after surgery. Delirium symptoms and severity were evaluated using the Intensive Care Delirium Screening Checklist, and the Japanese version of the NEECHAM Acute Confusion Scale (J-NCS). Delirium symptoms were checked using the assessment scale including 9 factors and 51 symptoms.

Results

A total of 42 patients (mean age 74.3±6.8) were diagnosed with PD (n=9), SSD (n=9), or no delirium (n=24). There were no significant differences in J-NCS scores between SSD and PD on postoperative day 1. However, the scores on postoperative day 2 and 3 were significantly higher in SSD than in PD. The delirium symptoms on postoperative day 2 were significantly lower in SSD than in PD, although the differences between the groups did not appear on postoperative day 1.

Conclusion

The results suggest that early detection of SSD symptoms and nursing interventions on postoperative day 1 may be effective for recovery from SSD.

P14

Delirium - prevalence and intervention strategies on neurological intensive care and stroke unit at the University of Saarland

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During a period of 6 months, data of 417 patients of the neurological intensive care unit and stroke unit was collected. In the first step, analyzing a collective of 209 patients, the main goal was to determine how many of them developed delirium. Which factors such as age and length of the hospital stays favor a delirium? The data was collected by choosing different types of instruments. The Confusion Assessment Method for Intensive Care Unit (CAM-ICU) and the Richmond Agitation Scale Score (RASS) were used to identify delirium. Additionally selected data from the patient chart was noted. This information was collected three times a day; between 8 and 10 am, 5 and 7 pm and 11 pm and 1 am. In the second part some intervention strategies are added, tested in 208 patients, to see if there is a difference in the delirium occurrence. Strategies like maintaining the day-night-rhythm, aroma therapy with soothing oils and daily psychoeducation. In the first part 31,67% of the patients were tested positive for delirium at least one time during their stay. The results of the intervention showed that 30,32% of the patients were positive tested for a delirium.

P15

Dementia and delirium in the hospital. need for adaptation and creation of specific care units

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Introduction

People with dementia are hospitalized and present delirium and its consequences more frequently. The aim of this study is to confirm this tendency in order to establish the need for adaptation of care.

Methods

Prospective study 1-February/31-july2018. Patients admitted in the Geriatric Department. Demographic data (age, sex, length stay, location previous/discharge, exitus), medical (diagnostic, dementia/GDS, delirium income/during/discharge). Descriptive/statistical analysis (SPSS).

Results

911 patients. Age 87, 9. Female56%. Length-stay 6,88. Previous location: nursing-home 19.8%; discharge: nursing-home16.9%; intermediate-care-unit13, 3%,. Exitus13%. Diagnosis: infection43, 5%. Dementia 50.4%, GDS1-2-3:41.2%; 4-5:14.9%; 6-7:33.8%. Delirium income57, 4%; during38,5%; discharge25%.

Statistically significant associations: Dementia: previous location and discharged to nursing-home or intermediate-care-unit; mortality increases with dementia degree. Delirium during stay to higher length stay. Delirium income/during/discharge: major GDS, exitus, discharge to intermediate-care-unit and nursing-home.

Conclusions

1) Half of subjects have dementia, and over 1/3 in moderate/severe degree. They were discharged frequently to nursing-home and intermediate-care-units. Severity of dementia was associated with delirium and death.
2) Half had delirium at admission. Delirium was related to greater length stay, institutionalization, discharge to intermediate-care-unit and exitus.
We consider the creation of specific units of hospitalization is justified for people with dementia in order to reduce the incidence of delirium and its negative consequences.

P16

Severe, persistent and fatal delirium in psychogeriatric patients admitted to a psychiatric hospital

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Background/Aims

Although delirium is generally regarded as a transient syndrome, persistence of delirium in patients with cognitive impairment even with fatal outcome has been reported as well. This study aims to describe the clinical features, medical comorbidity and neuropathological correlates of this type of delirium.

Methods

Inclusion criteria for this case-series were: (1) severe persistent delirium until death, (2) history with cognitive impairment, (3) consent for brain autopsy. Medical records were examined in combination with collected clinical data and neuropathological findings.

Result

In 15 patients episodes with delirium lasted for 4.2 months on average. No distinct medical causes of persistent delirium could be identified. Pathological diagnoses included Alzheimer's disease, Lewy body dementia and single cases of Creutzfeldt-Jakob's disease and progressive supranuclear palsy.

Conclusion

Severe, persistent and fatal delirium in patients with cognitive impairment can occur relatively early in the disease trajectory and it is associated with diverse neuropathology.

P17

Inch by inch, little by little - enhancing delirium care in a general hospital

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Middlemore Hospital is a 700 bed general hospital serving the ethnically diverse and deprived population of South Auckland. Over the past 10 years, the hospital has seen a series of initiatives (based on the Confusion Assessment Method (CAM)) designed to enhance the prevention, detection and management of delirium.

The four key delirium initiatives are reviewed and analysed. Two current initiatives are described. The state of delirium care at Middlemore Hospital is assessed. Options for future initiatives are discussed.

The CAM was successfully introduced to the Orthogeriatric service; evolved into a delirium pathway in the Geriatric Rehabilitation service; evaluated and then extended to the whole hospital. Casual bureau "watches" were replaced by trained, employed "carers" in general medical wards. An audit of delirium care in Middlemore Hospital is planned for October 2018 and there are plans for a collaborative revision of the Delirium Guideline involving all the hospital's "delirium stakeholders".

Multiple initiatives have been introduced to enhance delirium care at Middlemore Hospital with varying degrees of success and sustainability. The task is unfinished, and the challenge will be to apply the lessons learned, so that little by little, inch by inch, delirium care will be continuously enhanced.

P18
Anticholinergic drug burden and delirium: a systematic review

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Introduction
The aim of this review was to assess the association between anticholinergic drug burden (ADB) and delirium.

Methods
A systematic literature search was performed in Medline, Embase, PsycINFO, Web of Science, CINAHL, Cochrane library and Google Scholar. Studies evaluating the association between ADB (measured as a total score), and delirium or delirium severity, published in English, were eligible for inclusion.

Results
Ten studies, including 21152 persons, were included. Nine studies investigated delirium. ADB was measured with the Anticholinergic Risk Scale (ARS, n = 5), the Anticholinergic Cognitive Burden scale (n = 3), the list of Chew (n = 1), and the Anticholinergic Drug Scale (ADS, n = 4). A high ADB, measured with the ARS, was associated with delirium (5/5). No associations were found using the other scales. Two studies investigated the possible association between ADB (ADS n = 2, Summers Drug Risk Number n = 1) and delirium severity. One study found an association between a high ADB, measured with the ADS, and an increase in delirium severity.

Conclusion
ADB assessed with the ARS is associated with delirium. When assessed with other scales, ADB was not associated with delirium.

P19
Admission avoidance in delirium - Prototype project March 2018

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Introduction
A 4 week trial in March 2018 of a senior trainee level Psychiatrist (project lead) working directly within the Triage and Rapid Elderly Assessment Team (TREAT – Geriatrician led A&E based admission avoidance team) at the Royal Free Hospital on a daily basis, in a model of embedded care between mental and physical health care. Project aim to improve patient care and impact of TREAT team via increased identification of complex patients with delirium suitable for admission avoidance (treatment at home) via use of community care pathway with heightened support from Rapid Response Team (community therapists and nurses) and mental health older adults home treatment team where necessary.

Methods
A 'prototype' project; a design methodology that is: 'relevant, rapid, rough, revolutionary, relationally effective, right and replicable' (Scharma & Kaufer 2013).

Results
3 complex frail elderly patients with delirium avoided admission over course of project. Cost saving from admission avoidance is calculated to be £9753 over 4 weeks. 90% of respondents to post-trial surveys reporting a positive impact from the trial.

Conclusion
By integration of care between community, secondary care and mental health services we can achieve better outcomes at lower cost out of hospital in delirium care

P20

An audit on the management of delirium in an acute medical ward in an urban hospital in Sri Lanka

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The elderly population of Sri Lanka is expanding, with 21% of the population expected to be 60 years or over by 2025 and therefore diseases of ageing are on the increase. Despite this, there are no published data on the prevalence, aetiology and management of delirium in Sri Lanka, nor national guidelines. This audit aimed to investigate the management of delirium in an urban hospital in Sri Lanka.

Patients on the general medical wards between 08/05/2018-18/05/2018 were included. Demographics, reason for admission, use of delirium diagnostic tools and management plans were collected. Management was compared with NICE guidance CG103.

Of 693 patients, 15 (2%) were clinically diagnosed with delirium. There were a variety of precipitating aetiologies: respiratory (n=3) or urinary tract infections (n=2), electrolyte disturbance (n=3), meningitis (n=2), constipation (n=1), urinary retention (n=1), sepsis (n=1), gastroenteritis (n=1) and unknown (n=1). No patients received a risk-factor assessment, cognition screen or formalised delirium assessment. Management included addressing infection (n=9), hypoxia (n=2), dehydration (n=6) and electrolyte disturbance (n=3).

There is room for improvement in delirium recognition and management in Sri Lanka, when compared to the UK. Although delirium may be due to different aetiologies, re-education and introduction of delirium guidelines could improve this.

P21

Anticholinergic burden is not associated with full-syndromal or subsyndromal delirium or post-delirium mortality in hospitalised older adults: prospective cohort study

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Background

We aimed to clarify the relationship between anticholinergic burden and delirium symptom severity and whether anticholinergic medications influence the delirium-mortality association.

Methods

Exploratory analysis of prospective cohort (aged ≥70 years) with unplanned hospital admission. Participants were classified with full-syndromal delirium (FSD), sub-syndromal delirium (SSD) or no delirium. Anticholinergic burden score calculated (Anticholinergic Cognitive Burden Scale-ACBS). Deaths were notified from linked mortality statistics. Multivariate logistic regressions estimated associations between anticholinergic burden, delirium symptom severity and mortality, adjusting for clinically relevant covariates.

Results

577 eligible participants were included (median age: 83 years). Median ACBS score was 1. FSD was diagnosed in 13%, SSD 17% and 70% had no delirium. There was no association between ACBS score and delirium type. Patients with FSD were twice as likely to die within two years than patients with SSD/no delirium, after adjusting for ACBS score, age, gender, residence type, dementia, dementia severity, pressure sores, comorbidities and severity of illness. ACBS score did not influence the delirium-mortality association.

Conclusions

Higher anticholinergic burden is not associated with SSD or FSD. Delirium was strongly associated with mortality but anticholinergic burden did not influence this relationship. Further research should consider additional covariates to inform tailored symptom management.

P22
In-hospital delirium after mild acute ischemic stroke

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Introduction
In-hospital development of delirium is a serious complication in acute ischemic stroke (AIS). The precise incidence is not known, and delirium may be under-recognized, especially in patients with mild strokes.

Methods
We did a prospective study of delirium incidence in adults admitted to our acute stroke unit with onset of AIS within the last 72 hours. Inclusion criteria were absence of delirium before inclusion and the ability to give an informed consent. Patients were screened daily for delirium using the Confusion Assessment Method (CAM). Stroke severity and length of stay (LOS) were compared in patients who developed delirium during hospitalization and patients who did not. The stroke cohort was compared to an overall stroke registry population (Danish Stroke Registry).

Results
Sixty-three patients were included. The delirium incidence was 18%. The included patients had milder strokes and shorter LOS compared to the stroke registry population.

Conclusion
Delirium may also occur at a high frequency in patients with mild strokes who are often discharged to their own private home after only a few days of hospitalization. Systematic delirium screening is warranted in this patient group.

P23
Vulnerable elders-13 score predicts delirium severity in acute trauma

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Older trauma patients are at great risk for delirium. We tested whether a short functional status survey can predict incidence and severity of delirium during acute trauma care.
We interviewed 195 older (age 65+) trauma patients admitted to an academic Level 1 trauma center from 09/2012-09/2016 using the Vulnerable Elders-13 Survey (VES-13), which includes age and pre-injury functional status. We reviewed medical records to collect incidence and severity of delirium.
The VES-13 score was used to predict delirium and the increasing probability of severity of delirium using multivariable logistic and ordinal logistic regression controlling for Injury Severity Score (ISS), gender, and comorbidity.
Mean age was 78.1, and 67.7% had severe injury (ISS>9). Seventy-three patients (37%) had delirium; of these, half (n=37, 50.7%) were severe. Every 1-point increment in the VES-13 increased the odds of delirium by 20% [95% CI 8-32%]. Furthermore, VES-13 predicted severity. Among severely-injured men, those with VES-13 of 0 were much less likely to develop severe delirium than score of 10 (21 vs. 62%).
The VES-13 can identify which older trauma patients could potentially benefit from delirium prevention efforts as well enhanced management of complex delirium cases to prevent prolonged hospitalization.

P24

Validity and reliability of the Brazilian Portuguese version of the Pediatric Confusion Assessment Method for the Intensive Care Units

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Introduction

Delirium is prevalent among critically ill children and is associated with increased length of hospital stay, mortality, and health-care costs. However there are no reliable and validated tools to diagnose delirium in Brazilian Pediatric Intensive Care Units (PICU).The purpose of this study was to determine the validity and reliability of the Brazilian Portuguese version of the Pediatric Confusion Assessment Method for the Intensive Care Unit (pCAM-ICU) for use in Brazilian PICU settings.

Methods

We studied children and adolescents aged 5 up to 18 years, submitted or not to mechanical ventilation, in seven terciary PICU Rio de Janeiro and one in São Paulo, Brazil.

A convenience sample of patients were assessed in variable days of the week and periods of the day according to the availability of the investigators. To assess interobserver reliability, two researchers previously trained to use the tool applied it in the same patient concomitantly and gave their diagnostic impression independently. Then, pediatric psychiatrists or pediatric neurologists assessed the patients within thirty minutes, using the Diagnostic and Statistical Manual Fifth Edition (DSM-5), considered the gold standard. To assess criterion validity, results from p-CAM-ICU and DMS-5 evaluations were compared.

Results

They will be present in the conference.

P25

Delirium screening by nurses and non-pharmacological delirium treatment in an acute geriatric ward - a quality improvement project

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Delirium is common in acutely ill old and frail individuals, but often remains unrecognized. 4AT is a rapid screening tool that assesses the most common delirium symptoms. A 4AT-score ≥4 indicates delirium.

This project was carried out in an acute geriatric ward in a local Norwegian hospital. With the aim to improve the alertness of delirium and non-pharmacological treatment among nurses, patients aged ≥65 admitted between April 1st and May 31st 2018 were screened by nurses with 4AT after a short training period. Medical records were reviewed retrospectively for delirium diagnoses, symptoms and non-pharmacological treatments.

In total, 59 patients (median age 87 years, 46% men) were admitted during the 8-week study period. 4AT was performed ≥once in 52 (88%) patients, of whom 15 (29%) had a 4AT-score ≥4 indicating delirium. Delirium diagnoses or symptoms were documented by nurses in the medical records in 12 out of 15 patients and non-pharmacological treatment was documented in seven patients.

Delirium screening by nurses with 4AT was feasible in this acute geriatric ward and indicated delirium in one out of four patients. Delirium diagnoses and symptoms were documented in most patients, but documentation of non-pharmacological treatment was lacking in the majority of the patients.

P26
A protocol for an observational experimental study

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Background
Delirium is an acute, severe neuropsychiatric syndrome The causes of delirium are multi-faceted; therefore it can be impossible to predict outcomes pre-surgery.

Objectives
This study's aims are to characterise the neuropsychological and neurophysiological profiles of healthy, elective surgery patients ≥70 years old before and after surgery, and at long-term follow-up. We will specifically test the mismatch negativity (MMN) and P50 paradigms, which are reliable indicators for exploring preattentive processing. The decrease in the MMN amplitude has been replicated in schizophrenia and associated with poor cognitive functioning. The P50 indexes sensory gating, and cortical inhibition, which are altered in neuropsychiatric disorders.

Hypotheses
In older people who develop delirium, and/or postoperative cognitive decline, compared to those who don't, there will be exaggerated neurocognitive decline measured by EEG and neuropsychological testing.

Method
Detailed neuropsychological testing and EEG experiments will be conducted pre-operatively and at 3 month follow-up. A focussed re-assessment will also take place In the 4 days post-operatively.

Statistics
We will calculate a logistic regression using the pre-operative results to predict the outcome of Delirium or Non-delirium. T-tests will show if the pre-operative and follow-up results significantly differ; plus, a 3x2 mixed model ANOVA of the time points and patient group interaction.

P27
Delirium categorisation by multimodal machine learning

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Introduction
Managing delirium can be difficult, variable, time-consuming, and dependent on the clinical setting, especially when co-presenting with dementia. High-dimensional models constructed by applying machine learning to large-scale clinical data may substantially enhance diagnosis and prognosis without the need for new clinical or investigational measures.

Methods
Between March 2015 and January 2017, consecutive patients admitted under the acute geriatric service at University College London hospital were categorized by a consultant geriatrician under delirium, dementia, delirium superimposed on dementia, or cognitively intact. The primary diagnosis and length-of-stay were recorded together with routine blood tests, microbiology, and CT head imaging within the first 48 hours of admission. A subset of 1036 unique episodes was identified where complete data was available. This multimodal data was transformed to enable extraction and comparison across individuals of clinical, biochemical, haematological, microbiological, grey matter, and white matter anatomical features. High-dimensional models based on either decision tree algorithms or kernel machines were constructed and cross-validated for feature subsets of incremental complexity.

Results
Membership of the target categories was individually predictable, with accuracy significantly increasing with addition of greater numbers of clinical or investigational features.

Conclusions
High-dimensional models created by applying machine learning to routine multimodal data may assist the management of delirium.

P28

Assessments of cognitive function and delirium - Lack of clinical routines

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Introduction

Cognitive impairment and delirium are often unidentified in hospitalized patients. Despite the fact that 40 % of all cases of delirium might be prevented, national guidelines are missing in Sweden. Study aim was to examine the routines about assessing cognitive function and delirium in a university hospital and a county hospital in Sweden.

Methods

A web based questionnaire was developed and distributed to 58 managers. The questionnaire addressed routines for identifying cognitive impairment and delirium in clinical practice, for instance which assessment tools, and which terms were used.

Results

The response rate was 43 % (25/58) equally distributed for nurses and physicians managers (43 and 44 %). Study findings showed that structured assessment of cognitive function and delirium were missing. Twelve managers (48 %) had established routines for assessment of cognitive function and seven (28 %) for assessment of delirium. It was unclear how the assessments were performed. Most common was free descriptions based on varying questions. Assessment tools and the term delirium were rarely used.

Conclusion

Established routines of assessing cognitive function and delirium are missing. Validated rapid clinical assessment tools for cognitive function and delirium are needed as well as consensus to use the term “delirium”.

P29

Agents intervening against delirium in the Intensive Care Unit (AID-ICU): Study protocol for a randomised controlled trial

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Background

No evidence-based treatment exists for delirium. Haloperidol is still the most frequently used agent to treat ICU-acquired delirium, but there is no firm evidence of efficacy and safety of this intervention.

Objective

To assess benefits and harms of haloperidol in adult, critically ill patients with delirium in the ICU.

Design

An investigator-initiated, pragmatic, international, multicentre, blinded, randomised controlled trial.

Inclusion criteria

Adult patients acutely admitted to the ICU with diagnosed delirium with a validated screening tool.

Exclusion criteria

contraindications to haloperidol, habitual treatment with antipsychotic medication, alcohol induced delirium (delirium tremens), permanently incompetent, delirium assessment non-applicable, withdrawal from active therapy, pregnancy or consent not obtainable.

Intervention

Experimental intervention with 2.5 mg haloperidol intravenously three times daily. Control intervention is matching placebo (saline). Further, 5 additional doses of trial medication (haloperidol/placebo) may be administered to a maximum daily dose of 20mg haloperidol/placbo. Escape protocol includes propofol, midazolam or dexmedetomidine.

Primary outcome

Days alive out of the hospital within 90 days after randomisation.

Trial size

A total of 2 x 500 patients are required to show an 8% improvement or worsening of the mean days alive out of the hospital, assuming a 90-day baseline mortality of 27% (a=0.05, two-sided and b=0.1).

P30
Can Single-bed rooms prevent delirium in geriatric patients?

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Introduction
Few studies have investigated private rooms and prevention of delirium. In March 2017 our Geriatric Department was moved from old hospital buildings with multiple-bed rooms (old ward) to a new hospital with single-bed rooms (new ward), with no changes regarding uptake area, staff and admission criteria. Aim of the study was to investigate risk of delirium among patients in single-bed rooms compared to multiple-bed rooms.

Methods
An observational prospective study included 1014 admitted patients (aged ≥75 years) between September 15, 2016 and March 19, 2017 to the old ward and March 20 to December 19, 2017 to the new ward. Included were neurological, orthopedic and medical patients admitted to geriatric wards. Exclusion criteria were terminal illness, somnolence and inability to communicate in Danish. Delirium was assessed by nurses every morning and evening using the Confusion Assessment Method (CAM).

Results
At admission 105 patients had delirium, with no significant difference between the old and new ward. After 12 days, the cumulated incidence of delirium was 16% in the new ward compared to 24% in the old ward ($p<0.02$, Cox-regression).

Conclusion
We found evidence that the risk of delirium is reduced in single-bed rooms compared to multiple-bed rooms in geriatric departments.

P31
Study proposal: International Observational Study on Perioperative Cognitive Trajectories (PCI)

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Introduction
A comprehensive geriatric assessment (CGA) of patients scheduled for elective surgery is essential to reduce adverse outcomes and to improve long-term postoperative quality of life. CGA should encompass a cognitive screening. Goal of the International Observational Study on Perioperative Cognitive Trajectories (PCI, www.clinicaltrials.com NCT03540433) is to analyze the feasibility of a routine cognitive screening in the preoperative anesthesia clinic, which will be used to aid risk stratification, and prospectively evaluate cognitive trajectories.

Methods
Multicenter international observational study in five centers, each including 100 patients ≥ 70 years. Following cognitive screening with https://mini-cog.com/ and animal naming test (routine screening), 500 patients will be evaluated using an iPad-based neuropsychological test battery, enabling subsequent POCD diagnosis. Additionally, psychosocial covariables and other baseline parameters will be evaluated, and 100 participants will be included as a matched non-surgical control group.
Primary outcomes include feasibility parameters of routine testing, predictive validity for POCD up to 12 months after surgery, as well as intraoperative neuromonitoring and delirium management standards. Secondary outcomes include mortality, quality of life, and level of dependency.

Rationale
We will define a core data set of relevant cognitive screening parameters to be implemented into clinical routine.

P32
Relationship between components of the delirium syndrome and outcomes in hospitalised adults: a systematic review

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Systematic review of how domains of the delirium syndrome each predict outcomes in hospitalised patients with delirium.

MEDLINE, EMBASE, PsycINFO, CINAHL, clinicaltrials.gov and the Cochrane Central Register of Controlled Trials were searched from inception to May 2018. Inclusion criteria were: hospitalised adults; use of a validated delirium screening or rating system; association between components of delirium (including arousal/inattention) and the primary outcome mortality. Screening and data extraction were conducted independently by two reviewers. Risk of bias was assessed using the Risk of Bias Assessment tool for Non-randomized Studies.

From 6,802 screened citations we included 5 studies (total 4,448 patients, 731 with delirium). Impaired arousal was assessed in four studies with three studies (n=288) finding an association between impaired arousal and higher mortality (at 4, 6, 12 months); inattention was assessed in three studies with one study (n=72) finding that impaired attention was associated with higher in-hospital mortality. A meta-analysis was not possible due to clinical heterogeneity, and studies varied widely in their risk of bias and quality assessments.

Available studies indicate associations between delirium components and mortality. More high-quality studies are required to estimate the risk of impairments in delirium domain including arousal and attention on mortality.

P33
Can Neopterin be used to diagnose or predict delirium or does it simply suggest susceptibility? A review

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Introduction

Neopterin is expressed in myeloid cells including microglia. It is synthesised during periods of oxidative stress in both plasma and cerebrospinal fluid (CSF). As such, it has a potential role as a biomarker for delirium diagnosis and/or prognosis. However, whether neopterin levels are dynamic with respect to delirium and if this reflects underlying pathophysiology is unclear.

Methods

We searched for observational studies in AMED, CINAHL, EMBASE, EMCARE, MEDLINE, PsycINFO, Scopus, Web of Science and the Cochrane Library were searched (August 2018). Eligible studies required validated delirium ascertainment. We excluded case series. Quality was assessed using the Newcastle-Ottawa Scale.

Results

1767 articles were identified with five studies eventually included (n=229 with delirium and n=281 controls) in medical, surgical and ICU settings. Most studies found higher neopterin (plasma and CSF) to be associated with delirium cross-sectionally, or with incipient delirium. No studies reported delirium prognosis in context of raised neopterin. Study quality was generally poor. Heterogeneity across the studies precluded meta analysis.

Conclusions

There is low quality evidence that neopterin is associated with delirium. Further research should consider temporal profiles of neopterin levels in relation to evolving acute illness with/without delirium, underlying dementia status and eventual clinical outcomes.

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The role of tryptophan metabolism in the development of delirium symptoms

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The psychotic symptoms of delirium (hallucinations and paranoid delusions) are the most distressing to patients. The main aim of this study is to demonstrate that plasma/urine concentrations of tryptophan and its putative hallucinogenic metabolites are positively associated with the severity of delirium symptoms.
Samples and clinical data will be collected from 100 delirium cases and for comparison 100 non-cases following heart surgery. Samples will be analysed using High performance liquid chromatography with Mass spectrometry. Clinical measures include the delirium rating scale DRS-98 and the altered states of consciousness hallucinogenic questionnaire (ASC).
Examination of raw ASC data from the first 27 patients suggested 3 distinct groups: high total ASC score with visual and auditory alterations, a medium total ASC score with visual alterations only, a low total ASC score and no visual or auditory alteration. Linear regression demonstrated that raw ACS scores differed significantly between the 3 groups (p=2.07x10-8). The medium group profile is similar to the profile of healthy volunteers given a dose of 0.6mg/Kg ketamine (dissociative hallucinogen, N-methyl-D-aspartate (NMDA) receptor antagonist).
These findings suggest that one of biochemical pathways underlying delirium may be involve the NMDA receptor. If valid, this finding has potential as a therapeutic stratification strategy.

P35

Evaluation of the implementation of the new delirium guideline in Dutch Hospitals and Nursing Homes.

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Evaluation of the implementation of the delirium guideline in Dutch Hospitals and Nursing Homes.

Introduction

Implementation of good care and treatment can prevent development of a delirium or might reduce the severity or duration. The aim of this study was to describe the extent to which the Dutch delirium guideline has been incorporated in protocols of hospitals and nursing homes in the Netherlands.

Methods

Dutch hospital protocols were collected for two periods: before and 15 months after publication of the guideline and nursing home protocols two years after publication. Protocols were compared with respect to basic delirium care (screening, diagnostic approach, therapy and follow-up care) and organisation of care.

Results

Of the 80 Dutch hospitals approached, we were able to include 71% protocols in this study. 16 hospitals had adapted their protocols to the new guideline.
68 nursing homes from different organisations were included. 32% of the nursing homes used a deliriumprotocol. 48% of the responding specialised doctors knew about the national guideline delirium,

Conclusion

All hospitals had a delirium protocol and over a quarter of the protocols were based on the most recent national guideline. A third of the approached organisations in nursing homes developed a local delirium protocol.

Notes

Notes

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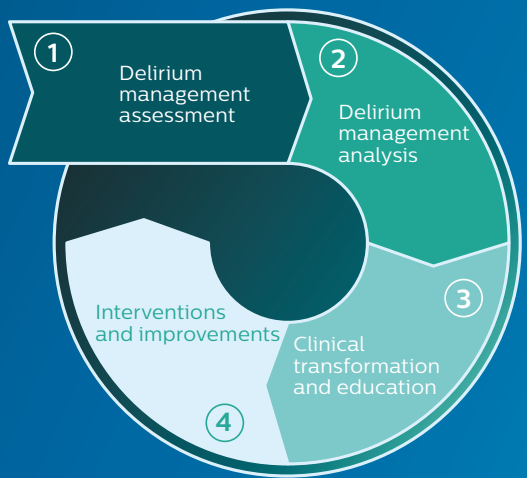

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