



NOVEMBER 16TH - 17TH 2017

12TH ANNUAL MEETING OF
THE EUROPEAN DELIRIUM ASSOCIATION

HOTEL BRISTOL, OSLO, NORWAY

Index

	Pagenumber
Welcome	3
Keynote speakers, presentation	4
EDA committees	5
Program	6 - 7
Detailed program of parallel sessions	8 - 13
Social program	14
General information	15
Submitted abstracts, oral presentations	16 - 53
Poster presentations	55 - 57
Upcoming events	68
Participants of the congress	69 - 72
Map	76 -77

Welcome to Oslo

We are delighted that our 12th Annual Meeting is held in Oslo, the capital of Norway. Lonely Planet recently selected Oslo as one of the ten best cities in the world to visit in 2018, so attendees to this meeting are ahead of schedule. During your stay we hope you will understand why Oslo deserves a place on this list!

The conference program covers the latest advances in clinical practice and delirium research, from diagnosis to management and clinical implementation. We are honored to present Professor Henrik Zetterberg and Professor Karin Neufeld as our worldwide known keynote speakers. They will provide the attendees with relevant information on the biomarkers for the vulnerable brain and on delirium management and prevention.

The European Delirium Association has formally collaborated with the American Delirium Society and the Australasian Delirium Society to increase the awareness of delirium via the “iDelirium”; a federation of three Delirium Societies that have combined forces to advance delirium science across international boundaries. During the meeting we will have the opportunity to acquire more information about the “iDelirium” initiative and on the World Delirium Day.

We are also pleased to announce that we will host a joined symposium with the European Union of Geriatric Medicine Society, which testifies the specific interest of both scientific societies to further increase the awareness and interest of delirium among geriatricians in Europe. There will also be the opportunity to learn more on NIDUS a collaborative, multidisciplinary network dedicated to improve scientific discovery in delirium research. Finally, there will be several oral and poster presentations which will further advance our knowledge on delirium.

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

On behalf of the Local Organizing Committee
Leiv Otto Watne and Maria Krogseth

On behalf of the European Delirium Association Board Members
Alessandro Morandi, EDA President

Keynote speakers



Karin Neufeld, MD, MPH

Associate Professor of Psychiatry and Behavioral Sciences. Clinical Director, Department of Psychiatry, Director of the Inpatient Psychiatry Consultation Service, Johns Hopkins Bayview Medical Center. USA.

Dr. Karin Neufeld is a graduate of the University of Manitoba, School of Medicine in Canada. After completing a residency and fellowship in the Department of Psychiatry & Behavioral Sciences at the Johns Hopkins University School of Medicine and a Masters of Public Health degree at the Johns Hopkins Bloomberg School of Public Health, she joined the medical school faculty where she is currently an Associate Professor. Dr. Neufeld has held a number of clinical and leadership positions in the department and is currently the Clinical Director of the Department of Psychiatry at the Johns Hopkins Bayview Medical Center and the Director of the General Hospital Inpatient Psychiatry Consultation Service. Her primary area of academic and clinical interest is in improving delirium prevention and treatment strategies within the acute inpatient setting, with particular focus on the critically ill and older aged postoperative populations.

She is the Chair of the Johns Hopkins Delirium Consortium, and Past President and ongoing Board Member of the American Delirium Society. Dr. Neufeld is a member of the Society for Critical Care Medicine and is serving as a delirium expert on the SCCM's guideline review group for the 2018 edition of the Pain, Agitation, and Delirium (PAD) Guidelines.



Henrik Zetterberg, MD, PhD

Professor of Neurochemistry at the University of Gothenburg, Sweden, and at University College London, UK. Head of the Department of Psychiatry and Neurochemistry at the Sahlgrenska Academy at the University of Gothenburg, Sweden.

Henrik Zetterberg is a Professor of Neurochemistry at the University of Gothenburg, Sweden, and University College London, UK, and a Clinical Chemist at the Sahlgrenska University Hospital in Gothenburg. He is Head of the Department of Psychiatry and Neurochemistry at the University of Gothenburg, and his main research focus and clinical interest is fluid biomarkers for CNS disorders.

Committees

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Anette Hylene Ranhoff



Program Thursday 16 November

08:00-08:45	Registration
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Plenary sessions - Bristol Hall

08:45-09:00	Opening – Alessandro Morandi, Leiv Otto Watne and Maria Krogseth
09:00-10:00	Keynote lecture by Karin Neufeld: Delirium Management and Prevention Chairs: Barbara Kamholz and Arjen Slooter
10:00-10:30	Coffee break
10:30-12:00	Chairs: Stefan Kreisel and Jouko Laurila World Delirium Day James Rudolph Differences in presentation and management of delirium in Low and Middle Income Countries Barbara Kamholz The economic impact of delirium Gideon Caplan
12:00-13:30	Lunch and poster session

Parallel sessions

	Haakon-salen	Maud-salen	Olav-salen
13:30-15:00	Invited symposium A*	Oral presentation A*	Oral presentation B*
	Implementation of delirium knowledge into clinical practice Chairs: David Meagher and Rakesh Arora	Symptoms, subtypes and quality improvement projects Chairs: Leslie Eide and Pratik Pandharipande	Diagnosis and management Chairs: Giuseppe Bellelli and Valerie Page
15:00-15:30	Coffee break		
15:30-17:00	Submitted symposium A*	Oral presentation C*	Submitted symposium B*
	Postoperative Translation: Using the Operative Model to Understand Delirium Chairs: Thomas Jackson and Anette Hølen Ranhoff	Prevention and treatment Chairs: Zöe Tiegens and Roanna Hall	Interventional trials in delirium: How To & How Not To Chairs: Bjørn Erik Neerland and Alasdair MacLullich
17:00-18:00	EDA board meeting and general assembly		
19:00-20:30	Reception at Oslo City Hall		
20:30	Conference dinner		

Program Friday 17 November

Plenary sessions - Bristol Hall

09:00-10:00	Keynote lecture by Henrik Zetterberg: Biomarkers for the Vulnerable Brain Chairs: Nenad Bogdanovic and Colm Cunningham
10:00-10:30	Coffee break
10:30-12:00	Chairs: Gideon Caplan and Noll Campbell Everything you always wanted to know about animal models but were afraid to ask? Colm Cunningham Recognition and treatment of pain in delirium Elisabeth Sampson Late breaking news: Prophylactic Haloperidol for Critically-III adults; the REDUCE Study Mark van den Boogaard The Oslo Study of Clonidine in Elderly Patients with Delirium; LUCID Bjørn Erik Neerland
12:00-12:05	Maeve Leonard Prize 2017, Alessandro Morandi introduces winner
12:05-13:30	Lunch and poster session

Parallel sessions

	Haakon-salen	Maud-salen	Olav-salen
13:30-15:00	Invited symposium B*	Joint EDA/EUGMS symposium*	Oral presentation D*
	Multiprofessional aspects of delirium in care homes and hospices Chairs: Meera Agar and Shirley Bush	An opportunity to improve delirium care Chairs: Antonio Cherubini	Risk factors, pathophysiology and novel diagnostic tools Chairs: Babar Khan and Daniel Davis
15:00-15:30	Coffee break		

Plenary sessions - Bristol Hall

15:30-16:00	Announcement EDA 2018. Awards. Closing of conference Alessandro Morandi and Arjen Slooter
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* A detailed program of parallel sessions is given on page 8 - 13

Detailed program of parallel sessions

Invited symposium A

Implementation of delirium knowledge into clinical practice

Chairs: David Meagher and Rakesh Arora

Simulation methods to teach doctors and nurses about delirium

Julie Mardon

How I do it: Practical issues not covered in guidelines

Arjen Slooter

Delirium Treatment Evidence, Current Practice and Future Developments

Alasdair MacLulich

Invited symposium B

Multiprofessional aspects of delirium in care homes and hospices

Chairs: Meera Agar and Shirley Bush

Occupational therapy in nursing home patients with delirium and dementia

Christian Pozzi

How to detect delirium superimposed on dementia?

Alessandro Morandi

Delirium in Palliative Care: An update on behalf of the SUNRISE group

Najma Siddiqi

Joint EDA/EUGMS symposium

An opportunity to improve delirium care

Chair: Antonio Cherubini

The 2015-2016 Italian delirium day. Should we think to a European delirium day in the world delirium era?

Giuseppe Bellelli

The bedside assessment of delirium: past, present, and future

David Meagher

Delirium evaluation across Europe

Anette Hylan Ranhoff

Detailed program of parallel sessions

Submitted symposium A Postoperative Translation: Using the Operative Model to Understand Delirium Chairs: Thomas Jackson and Anette Hylen Ranhoff
Using the health system to improve delirium James Rudolph
Biomarkers for delirium Pratik Pandharipande
Intraoperative factors in delirium Karin Neufeld
Minimizing the Impact of Delirium Rakesh Arora

Submitted symposium B Interventional trials in delirium: How To & How Not To Chairs: Bjørn Erik Neerland and Alasdair MacLulich
Key considerations designing and conducting a medication-focused delirium clinical trial John Devlin
Challenges undertaking interventional research outside academic centres Valerie Page
What are relevant outcomes in delirium trials? Karen Roksund Hov
Implementation of evidence into clinical practice Cathrine McKenzie

Detailed program of parallel sessions

Oral presentation A Symptoms, subtypes and quality improvement projects Chairs: Leslie Eide and Pratik Pandharipande
Perceptual disturbances in a population of older people in hospital: prevalence, content and association with delirium. Sarah Richardson
Motor subtypes and activity monitoring in delirium Sigurd Evensen
Clinical and biological features of delirium and their predictive effects on outcome; a prospective cohort study. Thomas Jackson
Diversity of opinions on delirium severity: an international survey of 344 delirium specialists Zoë Tieges
After delirium: Exploring how parents cope after their child experiences paediatric delirium in picu Rebecca Paterson
“In the heat of the moment..” Healthcare professionals and relatives reactions to octogenarian patients with delirium after aortic valve therapy: A qualitative content analysis study Irene Instenes
TIME to think about delirium – improving the detection and management of delirium on the acute medical unit Dr Elizabeth Sampson
Management of delirium in adults with cancer: Development of a new European Society of Medical Oncology (ESMO) Clinical Practice Guideline (CPG). Dr. Shirley H. Bush
Exploring the role of organizational factors to variations in incidence of delirium in icu patients Paul Rood

Detailed program of parallel sessions

Oral presentation B Diagnosis and management Chairs: Giuseppe Bellelli and Valerie Page
Delirium Prevalence Day: Evaluating the effect of multiple daily assessments on delirium detection rates on an orthopedic ward Sandra de Freitas
SQiD: How useful is a Single Question in helping clinicians detect Delirium in hospitalised cancer patients? Dr Megan B. Sands
The 4ATd scale: a new tool to assess delirium superimposed on moderate-severe dementia Eleonora Grossi
Validation of the Delirium Observation Screening Scale in long-term care facilities in Flanders Kelly Sabbe
Utility of the month of the year backwards test in detecting delirium: analysis of error patterns and overall performance in 148 older hospitalised patients Wolfgang Hasemann
RADAR: Rapid Detection Tool for Signs of Delirium (6th vital sign) Philippe Voyer
Delirium prediction in the intensive care unit: comparison of two delirium prediction models Annelies Wassenaar
Delirium management by specialists in palliative medicine: a survey of eligible members of the Association of Palliative Medicine (APM) of Great Britain and Ireland Peter G. Lawlor
Antipsychotic Prescribing Practices Amongst the Elderly Inpatients of an Irish General Hospital Clodagh Power

Detailed program of parallel sessions

Oral presentation C Prevention and treatment Chairs: Zöe Tiegés and Roanna Hall
Preventing Post-operative Delirium after Major Non-Cardiac Thoracic Surgery-A Randomized Controlled Trial Babar A. Khan
Pharmacological Management of Delirium (PMD) Trial Babar A. Khan
Pharmacologic De-Prescribing of Benzodiazepines and Anticholinergics to Reduce ICU Delirium: A Randomized Trial Noll Campbell
Does orthogeriatric care improve the diagnosis and management of delirium in older persons with hip fracture? Hilary Hayes
Assessment of Physiotherapy's Impact On Delirium in Respiratory Intensive Care Unit Berkan Basançelebi
Real world delirium prevention: The results of five years of standardized delirium prevention Stefan H. Kreisel, Michael Guhra
Family participation and delirium risk - interventions by nurses and family for hospitalized elderly Jolanda Peijster- de Waal
Development of a Multicomponent Delirium Prevention Sign for Orthopaedic Inpatients Christina Reppas-Rindlisbacher

Detailed program of parallel sessions

Oral presentation D

Risk factors, pathophysiology and novel diagnostic tools

Chairs: Babar Khan and Daniel Davis

Resting state fMRI reveals network disintegration during delirium

Simone van Montfort

Reduced neutrophil migratory accuracy is associated with delirium in older people with pneumonia

Thomas Jackson

CSF A β 42 Concentration Independently Predicts Postoperative Inattention In An Elderly Elective Arthroplasty Population

Emma Cunningham

The association between neurodegenerative and neurovascular brain changes and physical frailty in older individuals

Ilse Kant

The role of mini EEG in detecting delirium superimposed on dementia

Dr. Viona J.M. Wijnen

Role of epileptic activity in elderly delirium, a cEEG study

Sara Sambin

Anticholinergic burden and Delirium in an elderly acute medical population

Joana Rigor

Introduction to the Network for Investigation of Delirium: Unifying Scientists (NIDUS)

Pratik Pandharipande

Social program

Reception in Oslo City Hall

On Thursday the 16th of November at 7 PM, the Mayor of Oslo invites the participants of the congress to a reception at Oslo City Hall.

The City Hall is one of Oslo's most famous buildings, and is where the Nobel Peace Prize ceremony is held yearly. Refreshments will be served followed by a guided tour. The reception lasts for 90 minutes.

For security reasons, a letter of invitation is needed to be allowed entry. Personal letters are distributed in front of the City Hall from 18:50.

Address of the City Hall: Rådhusplassen 1, 0037 Oslo.

Conference dinner

At 8:30 PM, the participants who have signed up for the conference dinner, will be transported by bus to the restaurant Dattera til Hagen. Tapas is served in an informal setting, and we hope that old friends will meet and new friendships and collaborations will be started. As part of this program is outside, bring warm clothes. We recommend warm shoes, a warm coat/jacket, as well as scarf and gloves.

Address of Dattera til Hagen: Grønland 10, 0188 Oslo.



General Information

Certificate of attendance

Certificate of attendance will be sent by e-mail to all delegates after the congress.

Twitter

EDA 2017 is on twitter. Mark your tweets #EDAOslo2017.

WIFI

Free WIFI is available.

Name of the network: ThonWifi. Password: ThonGuest

Getting around in Oslo

From the airport to the city center, there is a very efficient airport express (20 minutes): http://www.flytoget.no/flytoget_eng/

All the public transport in Oslo is part of the same ticket and price system, operated by Ruter. Ruter's tickets are valid for buses, trams, subways, ferries (not the Bygdøy ferry) and local trains. The best way to buy tickets is to download the app "RuterBillett" as it is not always feasible and also more expensive to buy tickets directly from the drivers. You can also buy tickets at designated ticket machines, kiosks and service points. You can download the app "RuterReise" to find departure times.

For links to information about the apps and more information on transportation in Oslo, please check out: <https://www.visitoslo.com/en/transport/in-oslo/>

Taxi: The companies Norgestaxi and Oslo Taxi both offer fixed prices to/from Oslo Airport. Taxis can be found at designated taxi stops around the city (e.g. across the street and to the left leaving the conference dinner), booked with help from hotels/restaurants or by downloading the app "Taxifix".

And finally, please do not hesitate to ask anyone in the Norwegian local organizing committee for any help or advice during your stay.



Submitted abstracts
Oral presentations

**Symptoms, subtypes and
quality improvement project**

Thursday 16th of November

13:30-15:00

Perceptual disturbances in a population of older people in hospital: prevalence, content and association with delirium

Dr Sarah Joanna Richardson¹, Dr Daniel H J Davis², Dr Blossom Stephan³, Professor Louise Robinson³, Professor Carol Brayne⁴, Linda Barnes⁴, Professor Stuart Parker³, Dr Louise M Allan¹.

1 Institute of Neuroscience, Newcastle University

2 MRC Unit for Lifelong Health and Ageing, University College London

3 Institute for Ageing, Newcastle University

4 Institute of Public Health, University of Cambridge

Background: Delirium affects one in five hospital inpatients and is associated with considerable patient and carer distress. Perceptual disturbances, including hallucinations, illusions and misperceptions, are a key feature of delirium but little is known about their prevalence, content or associated distress.

Methods: During a 12-month period, participants from the Cognitive Function and Ageing Study II-Newcastle, a population-based cohort aged 65 years and over, were approached on admission to hospital and invited to take part in the DECIDE (Delirium and Cognitive Impact in Dementia) study. Consenting participants, and those recruited via a consultee, were screened for delirium on admission to hospital and monitored for delirium during their inpatient stay. As part of these assessments, participants were asked about the presence of perceptual disturbances along with feelings of distress.

Results: Between January and December 2016, 205 participants were recruited (70-99 years) to the DECIDE study. Perceptual disturbances were reported by 65 participants (31.7%) at some point during their inpatient stays. 40 (61.5%) of these participants fulfilled DSM-5 criteria for delirium at the time of the assessment when they reported the perceptual disturbances and 30 (46.2%) reported feeling distressed at this time. Of the 25 participants who reported perceptual disturbances but did not fulfil DSM-5 criteria for delirium, 9 had experienced their disturbances at night and had resolved by the daytime, 1 had Dementia with Lewy Bodies and 3 reported experiences they had at home prior to admission. The perceptual disturbances were varied but included seeing animals, faces, people and dolls.

Conclusions: Perceptual disturbances are common in a population of older people in hospital. These are frequently distressing and strongly associated with the presence of delirium. It is vital to regularly ask patients about these symptoms along with any related distress.

Motor subtypes and activity monitoring in delirium

Sigurd Evensen, MD¹, Kristin Taraldsen, physiotherapist, phd¹,
Ingvild Saltvedt, dr.med, professor¹, Olav Sletvold, dr. med, professor em¹,
Torgeir Bruun Wyller, dr.med, professor².

1 Department of Neuromedicine and Movement Science (INB), NTNU, Faculty of Medicine and Health Sciences, Trondheim, Norway

2 Department of Geriatric Medicine, Postboks 4956, Nydalen, 0424 Oslo, Norway

Background: Three motor subtypes of delirium have been described - hypoactive, hyperactive and mixed. Previous studies indicate that the hypoactive subtype occur more frequently and has worse prognosis than the others. Only one study has measured activity in patients with delirium. The aim of this study is to characterize movements and activity across delirium subtypes using the validated Delirium Motor Subtype Scale (DMSS) for subtyping and two activity monitors, ActivPAL and ActiGraph, to monitor activity objectively.

Methods: We included 315 patients above 75 years acutely admitted to a medical geriatric ward. To diagnose delirium we used the DSM V criteria. To identify the motor subtypes we used the DMSS. The patients wore the ActivPAL on the right thigh and the ActiGraph on the right wrist. Only participants wearing both activity monitors for one complete day with DSM V delirium were included in the analyses. For each delirium subtype we analyze time in upright position (ActivPAL), number of transitions per day (ActivPAL), number of counts per day (ActiGraph), speed of movements (ActiGraph) and number of counts (ActiGraph) when the patient according to the ActivPAL is not moving.

Results: 103 patients developed delirium. 66 of these completed 24 hour activity monitoring on a day with delirium. 21 had hypoactive delirium, 16 had hyperactive delirium, 19 had a mixed delirium and 10 were classified as “no subtype.”
We will present further results at the conference.

Conclusions: Our study will provide a deeper insight into motor subtypes of delirium through analyses of several aspects of movements and activity. The strengths of the study are the strict use of diagnostic criteria for delirium as well as for the motor subtypes and the use of two activity monitors to objectively measure movements and activity. The major weakness is the small number of patients in each group.

Clinical and biological features of delirium and their predictive effects on outcome; a prospective cohort study

TA Jackson¹, L McCluskey¹, D Davis², AMJ Maclullich³, JR Gladman⁴, B Sheehan⁵, JM Lord¹.

1 Institute of Inflammation and Ageing, University of Birmingham, UK

2 MRC Unit for Lifelong Hlth & Ageing, University College London, UK

3 Edinburgh Delirium Research Group, University of Edinburgh, UK

4 Faculty of Medicine & Health Sciences, University of Nottingham, UK

5 Department of Psychological Medicine, John Radcliffe Hospital, Oxford, UK

Background: Delirium is a common, acute neuropsychiatric disorder associated with increased mortality. However, delirium is currently poorly understood, in part due to heterogeneous precipitants and outcomes. A greater understanding of the underlying precipitants and their effect on outcome may shed light on underlying mechanisms.

We aimed to:

1. Describe differences between patients with delirium in those with and those without frailty, dementia, infection, and motor subtypes.
2. Describe baseline and delirium factors predicting survival at 4, 12 and 24 months?

Methods: 125 older people with DSM-IV delirium on admission had detailed clinical and biological assessment of clinical phenotype; frailty (standardised frailty index), dementia (IQCODE >3.82), precipitant (infection, CRP >60), and clinical motor subtype. Follow-up was at 4, 12 and 24 months. Data were analysed for differences between underlying phenotypes, and using multivariable Cox regression to investigate their effects on risk of dying.

Results: There were key clinical differences between those with and without; dementia, frailty, infection, and motor subtype. Mortality was 24% at 4 months, 37% at 12 months and 61% at 24 months. Adjusting for confounders, the following predicted risk of death; delirium duration >3 days at 4 months (HR 4.64 [1.94-11.69]), 12 months (HR 2.21 [1.35-3.62]), and 24 months (HR 1.86 [1.06-3.25]); hypoactive motor symptoms and reduced arousal at 4 months (hypoactive symptoms HR 3.18 [1.13-8.93]) and 12 months (OSLA scale increase HR 1.09 [1.02-1.18]); underlying infection at 4 months (HR 2.11 [1.21-3.65]) and 12 months (HR 1.68 [1.14-2.46]); and frailty at 12 months (standardised frailty index 1.39 [1.03-1.88]). Dementia did not predict mortality.

Conclusion: Distinct clinical phenotypes exist among older people with delirium. Adverse outcomes after delirium are associated with an infective, prolonged, and reduced consciousness phenotype. To stratify delirium by underlying precipitant, clinical features, and duration, may improve our current understanding of the underlying mechanisms and aid clinical decision making.

Diversity of opinions on delirium severity: an international survey of 344 delirium specialists

Tieges, Z.^{1,2}, Watne, L.O.^{3,4}, Bing-Jonsson, P.C.^{3,5}, Stiohairs, A.¹, MacLulich, A.M.^{1,2}.

1 Edinburgh Delirium Research Group, Geriatric Medicine, University of Edinburgh, Edinburgh, UK

2 Centre for Cognitive Ageing and Cognitive Epidemiology, University of Edinburgh, Edinburgh, UK

3 Oslo Delirium Research Group, Department of Geriatric Medicine, Oslo University Hospital, Oslo, Norway

4 Institute of Basic Medical Sciences, University of Oslo, Oslo, Norway
5 Faculty of Health and Social Sciences, University College of Southeast Norway, Norway

Background: Severity grading has potential use in delirium research, as predictor of outcomes, and for monitoring delirium course. However, there is uncertainty regarding its definition, measurement and applicability. An international survey of delirium specialists was undertaken to evaluate current opinions on delirium severity.

Methods: An online survey was distributed among members of three international delirium associations and other interested parties. The survey covered severity markers, prognostic symptoms, delirium with and without dementia, and assessment tools. Consensus was defined as $\geq 75\%$ agreement.

Results: Three hundred forty-four eligible respondents completed the survey (completion rate 74%). Respondents were from the UK (32%), US (23%), Australia (18%) and 24 other countries. Most were doctors (59%) and nurses (30%) working in geriatrics (38%), ICUs (23%) and assessment units (22%). Experts agreed that poor outcomes (84%), symptom intensity (81%), patient safety (79%), delirium duration (77%) and distress (77%) were important markers of severity. The number of symptoms was not considered important (51%). Respondents identified multiple symptoms that could predict poor prognosis, but there was consensus only on "altered arousal" (83%). Symptoms thought to be present in severe delirium included inattention (94%), disorientation (88%) and sleep disturbance (87%). About half of respondents (47%) stated that delirium symptom profiles differ between those with and without dementia. Severity assessment tools were considered useful in research (18%), clinical practice (22%) or both (33%), but 46% of respondents had never used one. The Confusion Assessment Method-Severity scale and the Delirium Rating Scale Revised-98 were most commonly used.

Conclusion: This survey demonstrates diverse opinions on delirium severity among specialists. The view that the number of symptoms does not indicate severity contrasts with current practice. Further, current tools mostly do not include level of arousal. This study challenges current conceptualisations of the multi-dimensional construct of delirium severity, and highlights the need for development of weighted scoring tools.

After delirium: Exploring how parents cope after their child experiences paediatric delirium in picu

Paterson, Rebecca^{1,2,3}, Kenardy, J^{1,3,4}, De Young, A^{3,5}, Dow, B^{3,4}, Long, D^{3,6}.

- 1 School of Psychology, University of Queensland,
- 2 Paediatric Critical Care Research Group,
- 3 Children's Health Research Centre, University of Queensland,
- 4 RECOVER Injury Research Group,
- 5 Centre for Children's Burns and Trauma Research,
- 6 Lady Cilento Children's Hospital, Brisbane Australia

Background: Paediatric delirium is often anecdotally described as distressing for parents to witness, however, there is a large gap in the literature exploring the impact of delirium on parents and their experience of their child's critical illness. This study aims to describe the impact of delirium on parents of PICU survivors.

Methods: A prospective observational study of children admitted to a 36-bed Australian PICU was conducted. Delirium was assessed using the Cornell Assessment for Pediatric Delirium (CAP-D; score ≥ 9 indicated 'delirium positive') or by psychological review. Parents completed a well-being and adjustment questionnaire including the Post-traumatic stress Diagnostic Scale (PDS), the Parent Experience of Child Illness Scale (PECI) and the Depression, Anxiety and Stress Scale (Short-Form; DASS-21), approximately two weeks after their child's discharge from PICU.

Results: A total of 42 eligible patients (64.3% delirium incidence) were consented to the study. At approximately two weeks post-PICU, parents reported greater guilt and worry ($p = .004$), unresolved anger and sorrow ($p = .050$), and long-term uncertainty ($p = .011$) if their child experienced delirium compared to parents of children that did not. Additionally, parents of children who were delirious trended towards greater depression ($p = .059$) and anxiety ($p = .060$), but not stress, symptoms. There were no differences in acute traumatic stress symptoms between the two groups.

Conclusions: Delirium is a common complication of critical illness in children and yet its impact on parent well-being is largely unknown. This study highlights that parents' emotional functioning and adjustment to caring for their child after discharge from PICU is worse when their child experiences delirium. Further research exploring parent coping, especially the long-term impact of acute distress on both parent and child, is still required. Future research should also look to answer how we assuage parent distress when their child experiences delirium.

“In the heat of the moment..” Healthcare professionals and relatives reactions to octogenarian patients with delirium after aortic valve therapy: A qualitative content analysis study

Irene Instenes MSc¹, Anette H Ranhoff MD, PhD⁴, Hege A Amofah MSc¹,
Leslie S.P Eide PhD³, Bengt Fridlund PhD^{1,2}, Tone M Norekvål PhD^{1,4}
On behalf of the CARDELIR Investigators

1 Department of Heart Disease, Haukeland University Hospital, Bergen, Norway.

2 School of Health and Welfare, Jönköping University, Jönköping, Sweden.

3 Institute of Nursing, Faculty of Health and Social Science, Western Norway University of Applied Sciences, Bergen, Norway.

4 Department of Clinical Science, University of Bergen, Bergen, Norway

Background: Postoperative delirium (PD) is a serious complication, affecting nearly half of octogenarian patients after aortic valve therapy. Symptoms like impaired cognition and reduced awareness accompanied with hallucinations are frequently seen, often with health-care professionals and relatives present. Healthcare professionals and relatives’ reactions and how they influence on the patients in a longitudinal perspective are scarcely studied.

Methods: A qualitative interview study of 10 patients (5 women) was conducted 6 to 12 months after the aortic valve therapy resulted in a delirious state. PD was assessed for 5 postoperative days using the Confusion Assessment Method. Follow-up interviews were conducted after four years (n=5, 1 woman). The patients were 81–88 years old at the first interview. Interviews were analysed by qualitative content analysis.

Results: An overarching theme emerged: “The nature of healthcare professionals and relatives responses made a considerable impact on the postoperatively delirium experience and in a longitudinal perspective”. Three sub-themes described the patient’s experiences: “Lack of comfort and support increased the patient’s vulnerability”, “A condescending approach imbalanced the healthcare professional/patient relationship”, “Unthoughtful comments made lasting impressions”. Having healthcare professionals and relatives close by made the patients feel secure and calm. Insufficient safeguarding on the other hand, increased patients’ emotional distress and placed them in a vulnerable position. Condescending and disrespectful behaviour influenced patients’ self-respect, decreased the confidence of the healthcare professionals and increased the feeling of helplessness. Follow-up interviews confirmed the patients’ clear memory of healthcare professionals and relatives’ reactions. Still, family members struggled to accept the delirium incident.

Conclusion: Inconsiderate behaviour from healthcare professionals and relatives can be remembered for a long period of time by octogenarians after PD, and worsen an already incomprehensible situation. Supportive care, focused on maintaining the patients’ dignity and integrity is therefore vital in the postoperative phase.

TIME to think about delirium – improving the detection and management of delirium on the acute medical unit

Dr Yehudit Bauernfreund (foundation trainee)¹, Dr Matt Butler (foundation trainee)¹, Dr Sumathi Ragavan (care of the elderly consultant)¹, Dr Elizabeth Sampson (liaison psychiatry consultant)¹.

¹ North Middlesex University Hospital (United Kingdom)

Background: Delirium occurs in 18-35% patients in the acute hospital setting, however is often neither detected nor managed appropriately. It increases morbidity and mortality rates, and is a frightening experience for patients. We used quality improvement tools and a multi-component intervention to promote detection and improve management of delirium on the acute medical unit.

Methods: We reviewed whether a delirium screening tool (4AT) had been completed for all patients aged over 65 admitted to the acute medical unit over one week (n=93). If delirium was detected, we assessed whether investigation and management was adequate as per British Geriatric Society guidance. After baseline data collection we delivered multiple sessions of delirium education for doctors and nursing staff, including training on use of the 4AT tool and the TIME ("Triggers, Investigate, Manage, Engage") management bundle. We introduced delirium TIME checklists, an online delirium blood test order set, and created a bedside orientation tool. We collected data following the interventions (n=107) and identified areas for further improvement.

Results: Use of the 4AT screening tool improved from 39.7% to 60.7%. The proportion of patients with a diagnosed delirium increased from 11.8% to 14.9%. Adequate assessment for the causes and exacerbating factors of delirium improved from 72.7% to 93.7% of cases. Use of orientation signage improved from 0% to 37.5%.

Conclusions: This multi-component intervention has improved awareness, screening and management of delirium on the acute medical unit. It highlights the ability of targeted education sessions to improve diagnosis and management of delirium. Our study demonstrates that thorough investigation and management can be improved through staff access to practical tools, and gives further evidence for the clinical effectiveness of the TIME bundle. Further improvement and maintenance of these changes should continue through regular training sessions and the implementation of nursing champions for delirium.

Management of delirium in adults with cancer: Development of a new European Society of Medical Oncology (ESMO) Clinical Practice Guideline (CPG)

Dr. Shirley H. Bush¹, Dr. Peter G. Lawlor¹, Dr. Alessandro Morandi², Dr. Karen Ryan³, Mr. Salmaan Kanji, Associate Scientist⁴, Dr. Najma Siddiqui⁵, Dr. Maurizio Lucchesi⁶, Dr. Carlos Centeno⁷, Dr. Daniel H.J. Davis⁸, Dr. Marie Laurent⁹, Dr. Eva Barallat¹⁰, Ms. Nadine Schofield¹¹, Ms. Monisha Kabir¹², Dr. Carla I. Ripamonti¹³.

(1) Department of Medicine, University of Ottawa, Ottawa, Canada. (2) Department of Rehabilitation and Aged Care of the Fondazione Camplani, Ancelle Hospital, Cremona, Italy. (3) UCD School of Medicine, Mater Misericordiae University Hospital and St Francis Hospice, Dublin, Ireland. (4) The Ottawa Hospital Research Institute, Ottawa, Canada. (5) Department of Health Sciences, University of York, York, UK. (6) Thoracic Cancer Center – Pulmonology Unit, University Hospital of Pisa, Pisa, Italy. (7) Faculty of Medicine, Clinica Universidad de Navarra, Navarra, Spain. (8) MRC Unit for Lifelong Health and Ageing, University College London, London, UK. (9) Hôpital Albert Chenevier, Créteil, France. (10) IRB Lleida Biomedical Research Institute of Lleida, University of Lleida, Lleida, Spain. (11) Founding Director, Let's Respect: Delirium, Dementia and Depression, UK. (12) Bruyère Research Institute, Ottawa, Canada. (13) Supportive Care in Cancer Unit, Fondazione IRCCS, Istituto Nazionale dei Tumori, Milan, Italy.

Background: Delirium is the most common neuropsychiatric complication of cancer, with a variable reported prevalence of 10-43%, increasing to 88% at the end of life. In April 2017, an international interdisciplinary team of experts was established to develop an evidence-based ESMO CPG on delirium.

Methods: The invited CPG development team was composed of palliative care physicians, oncologists, geriatricians, a psychiatrist, a pharmacist, and specialist nurses. Team members were assigned 1-2 sections. Targeted systematic literature searches were conducted for each section in core databases for the period 2000-May 2017. Target population: adults ≥ 18 years with cancer and a formal diagnosis of delirium in hospital, inpatient palliative care/hospice or community setting. Exclusions: delirium due to alcohol withdrawal, postoperative delirium, intensive/critical care settings, case reports, case series, conference abstracts and reviews. In the pharmacological management section, studies with $< 50\%$ cancer patients were also excluded. Included full text articles were evaluated by the respective team member/s. Formal recommendations were derived and assigned an ESMO level of evidence and grade.

Results: The CPG encompasses the incidence and impact of delirium, risk factors, work-up and reversal, screening, diagnosis, as well as non-pharmacological and pharmacological management. Support and education of the patient, family and healthcare team is highlighted. Practical delirium algorithms and management tables were included to assist the clinician. Major findings included the lack of evidence for delirium management across the illness trajectory of the cancer patient, and insufficient evidence to support the routine use of delirium screening tools. High quality research on non-pharmacological strategies and prospective placebo-controlled pharmacology trials for delirium prevention and treatment in cancer patients were also lacking.

Conclusions: This comprehensive CPG will guide oncologists in the management of delirium in their patients, and also provide recommendations for future research that is urgently needed in this patient population.

Exploring the role of organizational factors to variations in incidence of delirium in ICU patients

Paul Rood¹, G. Huisman-de Waal², H. Vermeulen², L. Schoonhoven³, P. Pickkers¹, M. van den Boogaard¹.

¹Radboud University Medical Center, Intensive Care, Nijmegen, Netherlands,

²Radboud University Medical Center, Radboud Institute for Health Sciences, Nijmegen, Netherlands,

³University of Southampton, Faculty of Health Sciences, Southampton, United Kingdom.

Background: Delirium occurs frequently in ICU patients and is associated with numerous deleterious outcome. Early recognition of delirium is essential for treatment and improvement of ICU outcomes. Several studies on ICU delirium incidence have been published which reported a large variety on delirium incidence. Unknown is to what extend this variety exist and also it is unknown for what reason, other than patient characteristics, this wide variety can be explained. Therefore we systematically reviewed the variety of reported ICU delirium incidences, and the role of organizational factors to delirium incidence in adult ICU's.

Methods: A systematic review was undertaken following the Cochrane methodology searching for 'Critical Care', 'Delirium' and 'Incidence' and synonyms. Medline, Embase, Cinahl and Cochrane Library databases were searched. Solely prospective cohort studies which primary observed delirium incidence were included. All available organizational factors were extracted from the included studies and analyzed using meta-regression analysis.

Results: A total of 9,357 studies were found, of which nineteen studies met the inclusion criteria. All included studies reported at least ICU delirium incidence. The overall good quality prospective cohort studies published between 2005 and 2016, and originated from 17 countries. A total of 11,965 ICU patients were included, which originated from medical, surgical and mixed populations. In total five different delirium assessment methods were used. Incidence rates varied from 4-55%. The median ICU delirium incidence is 26% [IQR 21-41]. Location, hospital type and admission type, screening frequency and executive screener did not significantly influence the variance found. Variations in research methodology might have influenced the incidence found.

Conclusions: The reported ICU delirium incidence varies largely. This variety cannot be explained by the organizational factors which we could extract. It may be more plausible that differences in patients characteristics and treatment differences are responsible for this variety in reported ICU delirium incidences.

Diagnosis and management

Thursday 16th of November

13:30-15:00

Delirium Prevalence Day: Evaluating the effect of multiple daily assessments on delirium detection rates on an orthopedic ward

Sandra de Freitas MBBS, Eric Wong MD, Justin Lee MD MSc,
Christina Reppas-Rindlisbacher MD, Christopher Gabor MSc,
Alexandra Curkovic RN MN, Christopher Patterson MD.

St Peter's Hospital, Ontario, Canada

Background: Delirium is an acute state of confusion that commonly occurs in older inpatients. It is characterized by fluctuations in attention or arousal and can lead to functional decline, cognitive impairment and institutionalization. Orthopedic patients are at particularly high risk of delirium, with quoted rates of 20% to 50% in those with hip fracture. The Confusion Assessment Method (CAM) is a validated tool that accurately identifies delirium and has been further adapted into an operationalized version (3D-CAM), yielding a sensitivity and specificity of 95% and 94%. Using this tool, our aim was to establish the point prevalence of delirium on an orthopedic ward by administering multiple 3D-CAM assessments in a single day to determine whether 3D-CAM scores change with the expected fluctuation of delirium. We hypothesized that multiple 3D-CAM assessments would increase delirium detection.

Methods: Multiple teams with specialized training in geriatrics assessed patients 65 years and older admitted to an orthopedic ward in Hamilton, Ontario, Canada. In this pilot quality improvement study, up to four 3D-CAM assessments were performed on participants to determine rates of delirium. Initial delirium rates were compared to cumulative rates to determine if detection increased with multiple assessments.

Results: Twenty percent of patients (5/25) were found to be delirious. Of these cases, only 12% (3/25) were detected during the initial morning assessment. Of the identified delirious patients, one patient converted from CAM-positive to CAM-negative and two patients converted from CAM-negative to CAM-positive.

Conclusion: The point prevalence of delirium was 20%, which is consistent with the range of previously published delirium rates in an orthopedic inpatient population. We demonstrated an increased detection of delirium with repeated testing throughout the day. CAM detection may change as delirium symptoms fluctuate and the use of multiple daily CAM assessments in hospitalized patients may be beneficial.

SQid: How useful is a Single Question in helping clinicians detect Delirium in hospitalised cancer patients?

Megan B Sands^{1,2}, Swapnil Sharma^{1,2}, Sanja Lucic³, Lindsay Carpenter^{1,2}, Jessica T Lee⁴, Megan E Congdon¹, Angus Buchanan², Meera Agar⁵, Janette L Vardy^{4,6}.

1 The Prince of Wales Hospital, Sydney, NSW, Australia

2 University of New South Wales, Prince of Wales Clinical School

3 Centre for Big Data Research in Health, University of New South Wales, Sydney, NSW Australia.

4 Concord Cancer Centre, Concord Repatriation General Hospital, Sydney, NSW, Australia

5 University of Technology, Sydney, NSW, Australia

6 Sydney Medical School, University of Sydney, Sydney, NSW, Australia.

Background: Oncology patients, carers and staff suffer serious ill-effects of co-morbid delirium. Screening is not, however routine in many cancer inpatient care settings. We tested a Single Question in Delirium (SQid) in hospitalised, cancer patients.

Methods: Patients admitted to the oncology wards of two comprehensive cancer centres, in Sydney, Australia, were prospectively screened. Overnight admissions for chemotherapy or radiotherapy only, were excluded. The SQid “Do you feel that [patient’s name] has been more confused lately?” posed to the, relative, carer or friend, was tested against interview by consultant psychiatrist (CPI), using DMS criteria.

The primary endpoint was negative predictive value (NPV) of the SQid versus CPI; secondary endpoints included NPV of SQid versus Confusion Assessment Method (CAM), sensitivity and specificity.

Results: 120 patients were recruited between May 2012 and July 2015. Mean age(years) was 66.5 (range 22-89), female sex was 43%, cancer types were: lung 21%; breast 12%, and prostate: 10%. Cerebral metastases were present in 9%; 73% had stage 4 cancer. The primary endpoint of NPV of SQid was 72.2 (95%CI 58.36 - 83.54); NPV of CAM was 71.2 (95%CI 57.92 - 82.24). The secondary endpoint, NPV of SQid vs CAM, was 97.6 (95%CI 91.57 - 99.71). In this non consecutive study sample, delirium was diagnosed on gold standard in 35% (4/71 hyperactive, 17/71 hypoactive, 6/71 mixed) while the SQid indicated a delirium prevalence of 23.1% v 9.2% on CAM. Of the 16 patients with hypoactive delirium the CAM identified 1 versus 6 on SQid.

Conclusion: The SQid performed well against both comparators. Use of the SQid required minimal extra training and was feasible in busy inpatient oncology settings. This single question in delirium screening has potential to set a new standard of care.

The 4ATd scale: a new tool to assess delirium superimposed on moderate-severe dementia

Eleonora Grossi PsyD¹, Elena Lucchi PsyD^{1,2}, Bianca Faraci MD¹, Enrico Mossello MD³, Antonio Cherubini MD⁴, Simona Gentile MD^{1,2}, Christian Pozzi OT¹, Alasdair Mac Lulich MD⁵, Heidi Smith MD⁶, Pratik Pandharipande MD⁶, Marco Trabucchi MD², Giuseppe Bellelli MD^{2,7}, Alessandro Morandi MD^{1,2}.

1 Department of Rehabilitation, Fondazione Camplani Casa di Cura “Ancelle della Carità”, Cremona, Italy;

2 Geriatric Research Group, Brescia, Italy;

3 University of Florence, Carreggi University Hospital, Italy;

4 IRCCS INRCA Ancona, Italy;

5 University of Edinburgh, Scotland;

6 Vanderbilt University, Nashville, USA;

7 Geriatric Clinic, University of Milan-Bicocca.

Background: Delirium superimposed on dementia (DSD) is common and associated with adverse outcomes but to date there is no specific tool to test it. Preliminary data suggest that tests used to assess delirium in preschoolers may also be useful in patients with advanced dementia. The aim of this multicenter study is to create a new scale (4ATd) from the 4AT for the diagnosis of DSD including specific items used to assess children’s attention and disorganized-brain.

Materials and methods: A total of 150 patients admitted to acute hospital wards and rehabilitation settings with moderate-severe dementia will be included (except coma, aphasia, lack or refusal to informed consent). Delirium (DSM-5, RADAR), the severity of dementia (Global Deterioration Scale, GDS), and the level of consciousness/agitation (m-RASS) will be assessed by a geriatrician during the first two days of hospitalization. Two psychologists/geriatricians, blinded to the DSM-5 delirium assessment, will test the patients with the 4ATd as assessor and observer, using specific instruments for detecting attention in children by observing eye contact, tracking, interaction and recognition of illustrated and mirror-cards. The 4ATd score ranges from 0 to 12.

Results: A total of 50 patients were included; of these 43 were admitted to rehabilitation settings and 7 patients admitted to acute hospitals (66% female, age 84.78±6.38, years of education 6.76 ±3.01). The most prevalent type of dementia was vascular dementia (32%), followed by Alzheimer (20%), Lewy Body Dementia (4%), Parkinson dementia (14%), not specified (30%). DSD was detected with the DMS-5 in 18% of the patients. Preliminary data show a high 4ATd score in patients with DSD (9.11±2.37 first assessor, 9.11±2.52 observer).

Conclusions: These preliminary data show a high score of the 4ATd scale in DSD patients compared to the DSM-5 assessment. However, further analyses are required since to date most of the patients included had moderate dementia and were enrolled in rehabilitation settings.

Validation of the Delirium Observation Screening Scale in long-term care facilities in Flanders

Dr. Sabbe, K., Prof. dr. Van Rompaey, B., Prof. dr. van der Mast, R.C.

Dendermonde

Background: Delirium is an important clinical problem among Long Term Care Facility (LTCF) residents. Currently, there is no validated specific screening tool for delirium available for this population. The aim of this study was to validate the Delirium Observation Screening Scale (DOSS) in a population of LTCFs residents, using the Confusion Assessment Method as golden standard.

Methods: A multisite, cross-sectional study was conducted in six LTCFs in the province of Antwerp, Belgium. Residents of age 65 years and older were included. The Montreal Cognitive Assessment (MoCA) score was used to assess the level of cognitive Impairment. Baseline data including the MoCA, CAM and DOSS were obtained at the same time by a trained research personnel and supplemented with nurse interviews and chart review. The researchers were trained using the e-learning tool www.deliriummodule.be.

Results: For 338 residents, baseline delirium assessments were completed at a random moment. Reliability was determined using the Cronbach's α for the CAM (0.87) and DOS Scale (0.72). The interrater reliability was calculated using Cohen's (K) kappa (0.78). To validate the DOSS, the sensitivity and specificity of the DOSS relative to the CAM were determined through ROC analysis. The area under the curve was 0,96. The sensitivity was 97.1% and the specificity was 95.1% for a cut-off value of 3 for the DOSS by the Youden's index. The positive predictive value was 68.8%. The negative predictive value was 99.7%.

Conclusions: This study showed that the DOSS is a reliable and valid instrument to screen for delirium in LTCF residents. At the commonly used cut-off score of 3 on the DOSS, a sensitivity of 97.1% and a specificity of 95.1% was determined. The positive predictive value of the DOSS was 68.8%. The negative predictive value of the DOSS was 99.7%.

Utility of the month of the year backwards test in detecting delirium: analysis of error patterns and overall performance in 148 older hospitalised patients

Wolfgang Hasemann¹, Nikki Duncan^{2,3}, Caoimhe Clarke^{2,3}, Eva Nouzova^{2,4}, Lisa Marie Rutter^{2,4}, Catriona Keerie⁵, Valentina Assi⁵, Christopher Weir⁵, Jonathan Evans⁶, Tim Walsh⁷, Elizabeth Wilson⁸, Tara Quasim⁹, Duncan Middleton¹⁰, Alexander Weir¹⁰, Jennifer Barnett¹¹, David Stott³, Alasdair MacLullich^{2,4}, Zoë Tieges^{2,4}.

1 University Hospital Basel, Switzerland

2 Edinburgh Delirium Research Group, University of Edinburgh, UK;

3 Institute of Cardiovascular and Medical Sciences, University of Glasgow, UK;

4 Centre for Cognitive Ageing and Cognitive Epidemiology, University of Edinburgh, UK;

5 Edinburgh Clinical Trials Unit, Usher Institute of Population Health Sciences and Informatics, University of Edinburgh, UK;

6 Institute of Health and Wellbeing, University of Glasgow, UK;

7 Dept of Critical Care Medicine and Centre for Inflammation Research, University of Edinburgh, UK;

8 Dept of Critical Care Medicine and Anaesthesia, Royal Infirmary of Edinburgh, UK;

9 Dept of Anaesthesia, University of Glasgow, UK;

10 Medical Devices Unit, Dept of Clinical Physics and Bioengineering, University of Glasgow, UK;

11 Cambridge Cognition, UK.

Background: There is limited data on Months of the Year Backwards (MOTYB) performance and scoring in hospitalised patients with and without cognitive impairment. We examined the performance in MOTYB in older hospitalised patients, and also the different types of response patterns.

Methods: A subsample from a case-control study in older hospitalised patients investigating a novel tool for assessing delirium was analysed to assess MOTYB performance. 149 hospitalised patients (50 with DSM-5 delirium, 46 with dementia, and 53 without cognitive impairment) with median age 85 years (Q1 = 80.0; Q3 = 88.0; range 67-98) were recruited in two hospital sites in Scotland, UK. Decision tree analyses were conducted to identify and describe key features of response patterns.

Results: Patients with delirium were more often unable to engage meaningfully with MOTYB than patients with dementia, $\chi^2(1) = 14.31$, $p < 0.001$. The MOTYB was sensitive to dementia 0.80 (95% CI: 0.66-0.91) and delirium 0.96 (95% CI: 0.86-1.00), with a specificity of 0.77 (95% CI: 0.64; 0.88) for delirium for correctly reciting back to July. Additionally, it discriminated delirium from dementia with a sensitivity of 0.96 (95% CI: 0.86; 1.00) and a specificity of only 0.20 (95% CI: 0.09; 0.34). Reciting the months back to July had a negative predictive value of 0.95 (95% CI: 0.84-0.99) for delirium and 0.82 (95% CI: 0.69-0.91) for dementia. The decision analysis indicated that a typical error pattern for cognitively unimpaired patients was not being able to correctly recite the months back to July due to repetitions or self-corrections, whereas no self-corrections and less repetitions were observed in patients with delirium.

Conclusion: In this case-control study, the MOTYB test was sensitive to both delirium and dementia, but not specific to either. Reciting backwards correctly to July showed good performance in excluding delirium and moderate performance in excluding dementia.

RADAR: Rapid Detection Tool for Signs of Delirium (6th vital sign)

Philippe Voyer,

Université Laval, Québec, Canada.

Background: Detecting delirium is a challenge for healthcare providers. Given RADAR's quick seven-second administration time and ease of use, we tested its validity and reliability as a brief screening tool to measure the 6th vital sign.

Methods: RADAR was tested in three different settings: a university-affiliated emergency department (n=57), a nursing home (n=45) and a residential care (n=31). Depending on the setting, research assistants (RA), aide-nurses or licensed practical nurses administered RADAR four times a day (8 am-12 noon-4 pm-8 pm) and other RAs administered a cognitive test at baseline and the Confusion Assessment Method (CAM) twice daily to determine the presence of delirium symptoms. A 6th vital sign was positive when a patient had both inattention and altered level of consciousness.

Results show that RADAR's sensitivity and specificity for a positive 6th vital sign varied from 67% to 100% and 67% to 89% respectively. Among all participants with a positive RADAR, 89% to 100% of them had at least one symptom of delirium. Inter rater reliability for the three settings showed a kappa varying from 0.46 to 1.

Conclusion: Results of this study support the use of RADAR as a rapid and reliable screening tool for the 6th vital sign.

Delirium prediction in the intensive care unit: comparison of two delirium prediction models

Annelies Wassenaar

Department of Intensive Care Medicine, Radboud university medical centre, Nijmegen, the Netherlands.

Background: Delirium occurs frequently in Intensive Care Unit (ICU) patients and is associated with poor outcome. Accurate prediction of ICU delirium may help clinicians reduce it. Yet it remains unclear which delirium prediction model should be used: the PRE-DELIRIC model (predicts delirium within 24 hours after ICU admission) or the E-PRE-DELIRIC model (predicts delirium at ICU admission). We therefore compared the predictive performance and clinical feasibility of the PRE-DELIRIC and E-PRE-DELIRIC models.

Methods: This multinational prospective cohort study evaluated consecutive adults admitted ≥ 6 hours to eleven ICUs from seven countries over a 3-month period and who were able to be reliably assessed for delirium. Delirium was evaluated by trained bedside nurses using either the Confusion Assessment Method-ICU or the Intensive Care Delirium Screening Checklist. The predictive performance of both models was measured using the Area under the Receiver Operating Characteristic curve (AUROC) and compared using the Hanley & McNeil method. Calibration was assessed graphically. Clinical feasibility and convenience was evaluated using a physician survey.

Results: Among 2802 patients, 2178 (78%) were included. The AUROC of the PRE-DELIRIC [0.74 (95%CI 0.71-0.76)] was significantly higher than the E-PRE-DELIRIC model [0.68 (95%CI 0.66-0.71)] [Z-score of -2.73 ($p < 0.01$)]. Both models were well calibrated. While the ICU physicians ($N = 68$) rated the PRE-DELIRIC model to take more time and effort to collect data ($p < 0.05$) and to be a greater burden for the physician to collect data ($p < 0.01$), they stated that the predictors of the E-PRE-DELIRIC model were more available ($p < 0.05$) and that they were more likely to use it in daily clinical practice ($p < 0.05$).

Conclusions: While both the PRE-DELIRIC and E-PRE-DELIRIC ICU delirium prediction models perform well statistically, the predictive accuracy of the PRE-DELIRIC model is greater. However, the E-PRE-DELIRIC model is preferred by ICU physicians.

Delirium management by specialists in palliative medicine: a survey of eligible members of the Association of Palliative Medicine (APM) of Great Britain and Ireland

Monisha Kabir¹, Jason Boland², Juliet Spiller³, Meera Agar⁴, Miriam Johnson², Shirley H. Bush^{1,5}, Peter G. Lawlor^{1,5,6},

1 Bruyère Research Institute, Ottawa, Ontario

2 Wolfson Palliative Care Research Centre, Hull York Medical School, University of Hull, Hull,

3 Marie Curie Hospice, Edinburgh, Scotland,

4 University of Technology Sydney, Sydney, Australia,

5 Division of Palliative Care, Department of Medicine, University of Ottawa,

6 Ottawa Hospital Research Institute Bruyère Continuing Care, Ottawa, Ontario.

Background: Delirium is highly prevalent in palliative care settings and causes management challenges and distress for patients, families and healthcare practitioners. A recent clinical trial showed no benefit over placebo and worse outcomes with antipsychotic use for those with mild-moderate delirium. We surveyed UK and Irish palliative medicine (PM) specialists regarding their assessment and management of delirium and their priorities for specific research domains.

Methods: An online 20-question anonymous survey was developed and piloted, and the final version emailed to all APM members. Analysis was restricted to those in current practice (N=859) who identified themselves as PM specialists. Skip logic facilitated answers to specific practice setting-related questions.

Results: Of 859 eligible specialists from a variety of inpatient institutional and community settings, 335 (39%) completed the survey. Of these, 70%, 15% and 15% were consultants, associate specialists and specialist trainee registrars in PM, respectively. Overall, 85% had >5 years of experience in PM. Most, 184/314 (59%) never use a tool to screen for delirium at inpatient admission. The majority, 248/273 (91%) would prescribe an antipsychotic to a delirious patient with distressing hallucinations. Most respondents would use non-pharmacological interventions to manage delirium either alone before prescribing an antipsychotic (106/275; 39%) or along with an antipsychotic (160/275; 58%). Respondents (n=270/335; 81%) rated the importance (0, not at all and 4, extremely important, as anchors) of domains for future research; the three highest weighted average scores were for research on preventive strategies (2.91/4), prediction of delirium reversibility (2.96/4), and the pharmacological and non-pharmacological management of delirium (3.19/4).

Conclusion: Of almost 40% of PM specialist respondents, most do not formally screen for delirium at inpatient admission; and most would use an antipsychotic to treat distressing hallucinations. Further rigorously designed studies are urgently needed in view of management variability, emerging evidence and perceived priorities for research.

Antipsychotic Prescribing Practices Amongst the Elderly Inpatients of an Irish General Hospital

Dr. C. Power¹, Dr. B. McCarthy², Prof. BA Lawlor¹, Dr. E. Greene²,

1 Memory Clinic, Ground Floor MISA Building, St. James's Hospital, Dublin, Ireland,

2 Jonathan Swift Clinic, St. James's Hospital, Dublin, Ireland,

Background:Antipsychotic medications are used in the management of delirium and behavioural and psychological symptoms of dementia (BPSD) in the elderly. Their use is largely unlicensed and associated with significant risks, particularly in dementia. We wished to examine antipsychotic prescribing practices in St. James's Hospital with a view to creating a local guideline to promote best prescribing practice.

Methods: On 23rd February 2016 all inpatients aged over 65 who were prescribed antipsychotic medications were identified. Demographic and medical data were collected from medical notes, the electronic patient record and medication kardexes.

Results: Complete data for 53 of 59 patients prescribed an antipsychotic were obtained. 62% male. Mean age 80 (range 65-99 years). 39/53 (74%) had a documented cognitive impairment or dementia. 31/53 (58%) were newly prescribed an antipsychotic following admission. 5/53 (9%) had their admission antipsychotic altered. Over half of the antipsychotics were prescribed for delirium (53%), followed by BPSD (25%), other (14%), psychosis (6%) and mood disorder (3%). Haloperidol (56%), quetiapine (19%) and risperidone (8%) were prescribed most frequently. Non-pharmacological interventions were documented in 50%. Antipsychotic was discussed with patients and/or next of kin (NOK) in 24%. Adverse effects were noted in 6/36 (17%) with equal incidence of falls, EPSEs and ECG changes.

Conclusion: Positive and negative aspects of current antipsychotic prescribing practices are highlighted. Antipsychotics were prescribed for a small number of patients for appropriate indications. However, there was poor consideration of non-pharmacological interventions and a lack of consultation with the patient/NOK as is recommended. This may reflect, in part, inadequate medical documentation. A guideline should specifically address these areas of concern to enhance safe prescribing and promote best practice.

Prevention and Treatment

Thursday 16th of November

15:30-17:00

Pharmacological Management of Delirium (PMD) Trial

Babar A. Khan MD, MS^{1,2,3,4}, Anthony J. Perkins MS⁴,
Noll L. Campbell, PharmD, MS^{1,2,3,4,5,6}, Sujuan Gao, PhD¹,
Malaz A. Boustani, MD, MPH^{1,2,3,4,5},

1 Indiana University School of Medicine, Indianapolis, IN;

2 Indiana University Center for Aging Research, Indianapolis, IN;

3 Regenstrief Institute, Inc., Indianapolis, IN;

4 Indiana University Center for Health Innovation and Implementation Science; Indiana Clinical and Translational Sciences Institute, Indianapolis, IN;

5 Sandra Eskenazi Center for Brain Care Innovation at Eskenazi Health, Indianapolis, IN;

6 Department of Pharmacy Practice, Purdue University College of Pharmacy, West Lafayette, IN.

Background: Up to 80% of patients cared for in the intensive care units (ICU) suffer from delirium. We used the pathophysiological neurotransmitter imbalance model for delirium to design a bundle of pharmacological treatment to reduce delirium duration and severity.

Methods: We randomized 351 critically ill patients with delirium (mean age 59.3 year, SD 16.9; 52% female, and 42% African Americans) to receive a bundle for pharmacological management of delirium (PMD) or usual care. The PMD bundle targeted the reduction of anticholinergic medications and benzodiazepines throughout the hospitalization, and prescribed a low-dose haloperidol for up to seven days. The primary outcomes of the trial were delirium duration and severity at discharge; and secondary outcomes were ICU, in-hospital, and 30-day mortality.

Results: At hospital discharge and in comparison to patients randomized into the usual care group, patients randomized to receive the PMD bundle had more delirium/coma free days [mean 7.4 days (SD: 7.1) versus 8.4 days (SD: 7.3), P value: 0.017]; greater reduction in delirium severity [mean change in the Confusion Assessment Method for the ICU-7 (CAM-ICU-7) score of 3.2 (SD: 3.3) versus 2.5 (SD: 3.2), P value: 0.033]; and a lower risk for death [Proportional Hazard Ratio of 0.56 (95% Confidence Interval: 0.32 – 0.98), P value: 0.042]. There were no differences between the two groups in the rates of drug-related adverse events or delirium-related hospital complications.

Conclusion: Implementing the PMD Bundle in the ICU may reduce delirium duration, severity and overall mortality.

Preventing Post-operative Delirium after Major Non-Cardiac Thoracic Surgery-A Randomized Controlled Trial

Babar A. Khan MD, MS^{1,2,3,4}, Anthony J. Perkins MS⁴, Noll L. Campbell, PharmD^{2,3,4,5,6}, Sujuan Gao, PhD¹, Malaz A. Boustani, MD, MPH^{1,2,3,4}, Kenneth Kesler MD¹.

1 Indiana University School of Medicine, Indianapolis, IN

2 Indiana University Center for Aging Research, Indianapolis, IN

3 Regenstrief Institute, Inc., Indianapolis, IN

4 Indiana University Center for Health Innovation and Implementation Science; Indiana Clinical and Translational Sciences Institute, Indianapolis, IN

5 Eskenazi Health, Indianapolis, IN

6 Department of Pharmacy Practice, Purdue University College of Pharmacy, West Lafayette, IN.

Background: Post-operative delirium is common in patients undergoing major thoracic surgery such as esophagectomy, and predisposes to longer ICU and hospital length of stay.

Methods: We conducted a randomized double-blind placebo-controlled trial with a 1:1 allocation between low-dose haloperidol and placebo for four days.

The primary outcome was delirium incidence. Secondary outcomes included delirium duration, delirium severity, and ICU and hospital length of stay.

Results: Among 135 participants, no significant differences were observed between groups in incident delirium (22.1% haloperidol versus 28.4% placebo; $p=0.433$), delirium duration [1.4 (0.7) days versus 1.6 (1.1) days; $p=0.715$], delirium severity, ICU length of stay [2.6 (2.2) days versus 2.9 (2.5) days; $p=0.292$], or hospital length of stay [9.6 (3.2) versus 10.5 (4.4); $p=0.405$]. In the esophagectomy subgroup ($n=84$), incident delirium was lower in the haloperidol group but did not reach statistical significance (23.8% haloperidol versus 40.5% placebo; $p=0.160$). There were no differences in delirium duration [1.5 (0.8) days versus 1.7 (1.1) days; $p=0.705$], delirium severity, and hospital length of stay [11.1 (2.6) days versus 12.5 (4.1) days; $p=0.255$]. The ICU length of stay was significantly lower in the intervention group [2.9 (2.1) days versus 3.9 (2.4) days; $p=0.026$].

Conclusions: Low dose haloperidol intervention post-operatively did not reduce delirium among thoracic surgery patients. Haloperidol however reduced delirium incidence and significantly reduced ICU length of stay among esophagectomy patients.

Pharmacologic De-Prescribing of Benzodiazepines and Anticholinergics to Reduce ICU Delirium: A Randomized Trial

Noll L. Campbell, PharmD, MS¹⁻⁴, Anthony Perkins, MS⁴, Babar Khan, MD, MS²⁻⁵, Sujuan Gao, PhD^{2,5}, Malaz A. Boustani, MD, MPH²⁻⁵.

1 Purdue University, Indianapolis, IN, USA

2 Indiana University Center for Aging Research, Indianapolis, IN, USA

3 Eskenazi Health, Indianapolis, IN, USA

4 Indiana University Center for Health Innovation and Implementation Science

5 Indiana University School of Medicine, Indianapolis, IN, USA.

Background: Benzodiazepines and anticholinergic medications are routinely administered in the intensive care unit (ICU) and are recognized as deliriogenic risk factors. We hypothesized that de-prescribing these medications in ICU patients with delirium would reduce delirium duration, delirium severity and mortality.

Methods: We conducted a randomized trial in 200 critically ill adults to test the impact of a combined pharmacist and computerized decision support de-prescribing intervention targeting anticholinergics and benzodiazepines. All participants had delirium according to the Richmond Agitation Severity Scale and the Confusion Assessment Method for the ICU (CAM-ICU). Participants had a contraindication to haloperidol (seizure disorder or prolonged QT interval). The primary outcomes were delirium duration and severity measured by the CAM-ICU and the CAM-ICU-7, respectively; secondary outcomes were ICU, in-hospital, and 30-day mortality.

Results: Participants had a mean age of 61.8 (SD 14.3) years, 59% were female, and 52% were African American with no statistically significant differences between groups in baseline characteristics. No differences between groups were identified in the number exposed to anticholinergics ($p=0.219$) or benzodiazepines ($p=0.566$) or the median total dose (median total anticholinergic score: 4.3 (IQR: 8.8) in intervention vs. 6.1 (IQR: 16.6) in usual care, $p=0.282$; median total benzodiazepine dose in lorazepam equivalents: 38.3mg (IQR: 98.6mg) in intervention vs. 37.7mg (IQR: 115.9mg) in usual care, $p=0.501$). Neither mean delirium/coma-free days (adjusted $p=0.087$) nor mean change in delirium severity scores (adjusted $p=0.314$) were different between groups. No differences in ICU, hospital, and 30-day mortality were identified (adjusted $p>0.3$) for each outcome.

Conclusion: This study reveals little impact on medication exposure and delirium outcomes from a combined de-prescribing intervention when added to state-of-the-art clinical services of a tertiary care center. Recent results from a parallel study suggest haloperidol, a missing component in this intervention, is an important pharmacologic intervention to reduce delirium symptoms in the ICU.

Does orthogeriatric care improve the diagnosis and management of delirium in older persons with hip fracture?

Hilary Hayes¹, Erica Epstein¹, Suzanne McNeill¹, Roshan Gunathilake¹.

¹ John Hunter Hospital, Newcastle.

Background: Delirium is a common and potentially preventable complication in patients with hip fracture. Our aim was to determine if orthogeriatric co-management improves detection and management of delirium in older persons hospitalised with hip fracture.

Methods: We extracted prospectively collected demographics and clinical characteristics data from the hip fracture registry for 393 patients who received Orthogeriatric Care in 2015. For the “Usual Care” control group, we extracted identical data by retrospective chart review of 100 consecutive patients from 2013. Medical records of both an Orthogeriatric Care subgroup (n=100) and the control group were examined for documented delirium diagnosis and use of chemical and physical restraints. We used the CHART-DEL tool to establish delirium prevalence and assessed delirium diagnostic performance by calculating the sensitivity and specificity of delirium diagnosis for each group.

Results: 47% of patients who received Orthogeriatric Care and 30% of patients who received Usual Care were found to have delirium using the CHART-DEL tool. Delirium diagnostic performance of the Orthogeriatric Care model was superior to the Usual Care model with better sensitivity (85% vs. 27%, 95% CI 38 to 75%, $p<0.05$), and comparable specificity (87% vs. 100%, 95% CI -24 to -6%, $p>0.05$). The odds of receiving physical restraint in Usual Care were four times higher than Orthogeriatric Care (50% vs. 19%, OR 4.22, 95% CI 1.52 to 11.71, $p=0.004$). There was no significant difference in antipsychotic use between Usual and Orthogeriatric Care cohorts (37% vs. 45%, OR 0.71, 95% CI 0.28 to 1.83, $p=0.48$).

Conclusions: Orthogeriatric co-management improved delirium detection and reduced use of physical restraints among delirious patients with hip fracture.

Assessment of Physiotherapy's Impact On Delirium in Respiratory Intensive Care Unit

S. Ufuk Yurdalan, PT, PhD, Prof.; Berkan Basançeplebi, PT; Begüm Ünlü, PT; Nur Yeşilkurt, PT; Suzan Altinkeser, PT; Murat Öztürk, PT; Nalan Adigüzel, MD, Assoc. Prof.; İpek Özmen, MD.

Marmara University, Faculty of Health Sciences, Physiotherapy and Rehabilitation Department, Istanbul, Turkey,
Süreyyapaşa Pulmonary Diseases And Thoracic Surgery Education And Research Hospital, Pulmonary Rehabilitation Department, Istanbul, Turkey,
Süreyyapaşa Pulmonary Diseases And Thoracic Surgery Education And Research Hospital, Respiratory Intensive Care Unit, Istanbul, Turkey.

Background: Early mobilization and range of motion exercises in intensive care unit (ICU) can reduce length of hospitalization, incidence and duration of delirium and duration of mechanical ventilation. There are limited randomised controlled trials which evaluate mobilization and range of motion exercises on delirium. This study was conducted to assess the effect of the physiotherapy program on the delirium in the respiratory intensive care unit.

Methods: Patients who were admitted to Respiratory ICU and who were diagnosed with delirium according to Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) were included in this study. Thirty-five patients (average age $67,05 \pm 11,48$) were randomized into 2 physiotherapy programs (in-bed and out-of-bed mobilization groups). Demographic information of the patients was recorded. Delirium Rating Scale-Revised-98 (DRS-R-98), The Tampa Scale of Kinesiophobia (TSK) and Fagerstrom Test for Nicotine Dependence (FTND) were used. Patients were evaluated just before and immediately after physiotherapy program.

Results: Types of cases according to physiotherapy program 19 patients were mobilized out of bed, and 16 patients were in bed mobilization program. No statistically significant difference was found in the baseline DRS-R-98 and TSK scores between groups ($p>0,05$), but it was found in the final scores ($p<0,05$). Out-of-bed mobilization group's DRS-R-98 and TSK scores was significantly reduced at the end. However in-bed mobilization group's DRS-R-98 and TSK scores was significantly increased.

Conclusions: Our findings showed that delirium and kinesiophobia decreased in out-of-bed mobilization group. In ICU, mobilization programs should be used which progress to out-of-bed approaches and ambulation from in-bed mobilization in possible earliest period. It also should supported with physiotherapy in frequent intervals. These programs should be routinized within delirium cases because of its biopsychosocial recovery.

Real world delirium prevention: The results of five years of standardized delirium prevention

Stefan H. Kreisel, Michael Guhra.

Klinik für Psychiatrie und Psychotherapie, Evangelischen Krankenhaus Bielefeld.

Background: Multicomponent delirium prevention has proven to be effective in randomized trials, although effect size is quite variable across studies - possibly related to the specifics of the cohorts under investigation. Generalizability to routine care settings that include heterogeneous patient populations has yet to be proven. Moreover, it remains unclear which specific elements of a given intervention protocol drives preventive effects.

Methods: This is a naturalistic observational study reporting data from a multicomponent delirium prevention program, covering a five year period. The program is implemented on general medical, neurological and trauma/orthopaedics wards at a large teaching hospital. It includes standardized strategies to reorient patients, activate them mentally and physically, to support rehydration and provide non-pharmacological sleep promotion. Patients are included if they are delirium free on admission, 70 years or older and are identified as high risk of developing delirium via a protocol. They are "treated" for a median of 7 days. Delirium assessment is performed on a daily basis.

Results: Overall data is available from over 2500 patients. 6.2% of these patients developed delirium albeit receiving multicomponent delirium prevention. We will discuss the temporal dynamics of nonetheless developing delirium in this setting, present which risk factors are associated with incident delirium and how the individual components of the prevention protocol may predict effective prevention.

Conclusions: It is important to test the effects of multicomponent delirium prevention programs outside the very controlled environment of randomized trials, present potentially effective strategies, but also pitfalls to guide the implementation of prevention programs.

Family participation and delirium risk - interventions by nurses and family for hospitalized elderly

Jolanda Peijster-de Waal MSc,

Rendiermos 8 3994 LC Houten, The Netherlands

Background: The Dutch patient safety program aimed to achieve preventable adverse events for hospitalized patients. All patients of 70+ shall be screened for delirium risk. When a high risk is ascertained, preventive interventions shall be applied. It's proven that early use of interventions are effective. Research at the University Medical Center Utrecht (UMCU) shows that non-pharmacological interventions delivered by nurses to patients aged 70 year and older with high delirium risk are not sufficiently applied. There are 2 focus areas where interventions are hardly used, namely family care and geriatric consultation.

Aim: Designing an effective intervention family participation resulting in improvement of all non- pharmacological interventions for patients aged 70+ with an increased risk on delirium by admission at UMCU.

Research question: How can it be realized that non-pharmacological interventions regarding patients aged 70 year and older with an increased risk of delirium will be used more often by nurses and family?

Methods: Literature study, benchmarking, expert consultation, interviews with family of patients.

Results:

- Family participation is feasible and aimed at improving use of all non-pharmacological interventions
- To make it successful, there must be attention for the following themes: communication, partnership, involvement, education.
- In hospitals no protocols or guidelines on family participation with respect to prevention of delirium are available.

Conclusion: Family participation is an important factor in improving the use of interventions on patients with an increased risk of delirium. The protocol family participation offers nurses tools to deploy family care in a smart and effective way. The family folder provides the necessary information and directly encourages active participation at delirium prevention. This also helps to discuss the topic with the family members. The geriatric consultation provides knowledge transfer, support and sample behavior towards nurses. This fits well with the role of the geriatric nurse specialist.

Development of a Multicomponent Delirium Prevention Sign for Orthopaedic Inpatients

Christina Reppas-Rindlisbacher MD, Eric Wong MD, Christopher S Gabor MSc, Sandra De Freitas MD, Christopher Patterson MD FRCP(C)

Hamilton Health Sciences, Juravinski Hospital, Ontario, Canada.

Background: Delirium is an acute state of confusion that occurs commonly in hospitalized inpatients. The hip fracture population is at particularly high risk with a delirium prevalence of up to 50%. Multifactorial interventions have been shown to be effective in preventing onset of delirium in at-risk patients. Our aim was to design an evidence-based multicomponent delirium prevention sign to place above beds in an orthopaedic inpatient unit.

Methods: We designed the delirium prevention sign using evidence from a systematic review of in-hospital delirium prevention strategies as well as guidance from a multidisciplinary expert panel of physicians, geriatric clinical nurse specialists, and physical/occupational therapists. We searched PubMed, Embase, PsychINFO, Cochrane, and CINAHL (January 1999 to January 2016) for studies on delirium interventions in hospitalized patients. Studies were included if multicomponent interventions were described and delirium incidence was measured post intervention. The expert panel met on 4 occasions to determine key interventions to include on the sign.

Results: Our systematic review identified 15 studies that evaluated the efficacy of multicomponent interventions for delirium prevention. Six of these studies found a reduction in incident delirium after implementation of the Hospital Elder life Program (HELP) compared with usual care. Using HELP interventions to inform discussion, the multidisciplinary panel identified seven key areas to address using the sign (hearing/visual impairment, fluid intake, sleep-wake reversal, frequent orientation, mobility, and offering a warm beverage at bedtime).

Conclusion: A delirium prevention sign was designed to include multicomponent interventions modelled after HELP strategies. The sign will be placed above the beds of older patients admitted to an orthopaedic unit to help staff use evidenced-based delirium prevention strategies at the bedside. Evaluation of the sign through assessment of nursing satisfaction and measurement of delirium incidence pre/post sign is currently underway.

**Risk factors, Pathophysiology
and
Novel Diagnostic Tools**

Friday 17th of November

13:30-15:00

Resting state fMRI reveals network disintegration during delirium

van Montfort, S.J.T., van Dellen, E., van den Bosch A.M.R., Otte, W.M., Schutte, J.L., Choi, S.H., Chung, T.S., Kyeong, S., Slooter, A.J.C., Kim, J.J.

The Hague, The Netherlands.

Background: Delirium is characterized by cognitive deficits and altered levels of awareness and attention, i.e. processes that require interactions between remote brain regions. However, it is unknown how delirium influences the global organization of the functional neural network as measured with functional magnetic resonance imaging (fMRI). The aim of this study is to compare network organization of patients during and after an episode of delirium to those of healthy control subjects.

Methods: Patients of the Gangnam Severance Hospital at Yonsei University in Seoul were studied during and after an episode of delirium and compared to healthy controls. Resting state fMRI scans were analyzed from 9 delirious patients, 7 post-delirium patients and 13 controls. Functional connectivity between atlas-based anatomical regions (i.e. the nodes) was calculated based on the AAL atlas, and the backbone of the functional networks was analyzed using the minimum spanning tree (MST). The MST consists of the strongest connections between all nodes without forming loops. Therefore, network organization can be compared between groups without any bias due to different average connectivity strengths.

Results: The delirium group showed a lower leaf fraction ($p = 0.01$) and a longer diameter ($p = 0.01$) than the control group, suggesting respectively less network integration and less network efficiency during a delirium. No differences in network organization were found between the delirium and the post delirium group, or between the post delirium group and the comparison group.

Conclusion: By using fMRI with the bias-limiting MST method, our study revealed a disintegrated, less efficient resting state network during an episode of delirium. These findings provide further evidence that the clinical syndrome of delirium reflects a transient disintegration of functional interactions between remote brain areas.

Reduced neutrophil migratory accuracy is associated with delirium in older people with pneumonia

T A Jackson^{1,2}, F Grudzinska¹, C Welch¹, J M Patel^{1,2}, D Parekh^{1,2}, G M Walton¹, J M Lord¹, D R Thickett^{1,2}, E Sapey^{1,2}.

1 Institute of Inflammation and Ageing, University of Birmingham, UK
2 Queen Elizabeth Hospital, Birmingham, UK

Background: Delirium is a common acute neuropsychiatric condition affecting mainly older people in hospital. Despite its associations with adverse outcomes and patient distress we currently have no interventions to ameliorate these. This is in part due to our poor understanding of the underlying cellular mechanism. Neutrophil migratory accuracy and neutrophil extracellular trap (NET) formation are impaired with age, are an expression of immunosenescence, and is amenable to pharmacological correction (1). We aimed to investigate if age related immune senescence, as expressed by reduced neutrophil function was associated with delirium.

Methods: Patients over 60 years and pneumonia were recruited on admission to an ongoing trial of HMG-CoA reductase inhibitors. Neutrophils were isolated from whole blood and migratory accuracy assessed by video microscopy in an Insall Chamber. NET release was measured on isolated cells using fluorometry. Delirium was defined by validated chart review methods.

Results: 51 patients (78 yrs \pm 17, 39% female), of which 12/51 (23.5%) had delirium. Median SOFA score was 1 (IQR3) and 90-day mortality was 18%. Neutrophils displayed delirium related decline in migratory accuracy to endogenous chemoattractant (IL-8) chemotaxis (pneumonia alone 2.38 μ m/min(0.91); pneumonia and delirium 1.70 μ m/min(0.49, $p=0.028$). The association remained after adjusting age and sepsis (SOFA score) in a logistic regression model (Exp (β)=0.137, $p=0.01$). There was no difference in NET release and delirium.

Conclusion: These data are the first to show a reduction in neutrophil migratory accuracy in delirium irrespective of underlying pneumonia and sepsis. These results suggest there is immune cellular dysfunction, typical of immunosenescence, in older patients with delirium. As such ongoing research should focus on biological cellular mechanisms of delirium amenable to intervention.

(1) Sapey E, Greenwood H, Walton G, et al. Phosphoinositide 3-kinase inhibition restores neutrophil accuracy in the elderly: toward targeted treatments for immunosenescence. *Blood*. 2014;123(2):239-48.

CSF A β 42 Concentration Independently Predicts Postoperative Inattention In An Elderly Elective Arthroplasty Population

Dr EL Cunningham¹, Dr B McGuinness¹, Prof D Beverland², Prof DF McAuley¹, Dr S O'Brien², Dr T Mawhinney², Mr J Toombs³, Prof H Zetterberg^{3,4,5,6,7,8}, Dr JM Schott^{8,9}, Dr M Lunn⁸, Prof AP Passmore¹.

1 Queen's University Belfast, Belfast, United Kingdom,

2 Belfast Trust, Belfast, United Kingdom,

3 UCL Institute of Neurology, London, United Kingdom,

4 Institute of Neuroscience and Physiology, The Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden,

5 Clinical Neurochemistry Laboratory, Sahlgrenska University Hospital, M \ddot{a} lndal, Sweden,

6 Institute of Neuroscience and Physiology, Department of Psychiatry and Neurochemistry, The Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden,

7 University of Gothenburg, Gothenburg, Sweden,

8 University College London, London, United Kingdom,

9 Dementia Research Centre, Institute of Neurology, University College London, London, United Kingdom.

Background: Recent work has demonstrated an independent association between cerebrospinal fluid amyloid β 42 (CSF A β 42) and postoperative delirium. Subsyndromal delirium has also been associated with negative outcomes. This study tested the hypothesis that CSF A β 42 would independently predict the risk of new postoperative inattention, a cardinal feature of delirium, in the absence of delirium.

Methods: Participants aged 65 years or older, admitted pending primary elective arthroplasty, were recruited to this observational cohort study. Baseline demographic and medical data was collected. Cognitive tests, including the Mini Mental State Examination (MMSE), were undertaken preoperatively. Participants were assessed for delirium on postoperative days 1,2 and 3 using the Confusion Assessment Method supplemented by notes review. Participants were asked to spell WORLD backwards preoperatively and on each post-operative day. Any new error compared to preoperative score constituted inattention for these analyses. CSF was sampled at the time of spinal anaesthesia. Univariate analyses and binary logistic regression were undertaken.

Results: Of the 315 participants completing the study CSF was available for analyses for n=282. Of these n=40 had developed postoperative delirium and n=242 were therefore included in these analyses with 64/242 participants demonstrating new postoperative inattention. On univariate analyses years in education (p=0.04), estimated IQ (p<0.001), activities of daily living score (p=0.022), preoperative MMSE score (p=0.048), time to complete Colour Trails 2 (p=0.008), type of surgery (p=0.039) and CSF A β 42 (p=0.036) were significantly different between inattention and no inattention groups. Only estimated IQ (p<0.001) and CSF A β 42 (p=0.013) remained significant on multivariate analysis.

Conclusions: This study demonstrates an independent association between CSF A β 42 and new postoperative inattention in an elective surgical population. Further work is required to understand how A β 42 pathology contributes to inattention and to elucidate the prognostic significance of new postoperative inattention.

The association between neurodegenerative and neurovascular brain changes and physical frailty in older individuals

Ilse M.J. Kant, Jeroen de Bresser, Ellen Aarts, Yarit Wiggerts, Ilona Bader, Simone J.T. van Montfort, Georg Winterer, Claudia Spies, Arjen J.C. Slooter, Jeroen Hendrikse

On behalf of the BioCog Consortium, clinicaltrials.gov identifier: NCT02265263, ethical approval number EA2/092/14 (Berlin), 14-469 (Utrecht)

Background: Physical frailty develops with increasing age and is a chronic state of vulnerability that is associated with disability and cognitive decline. Few studies have assessed the underlying structural brain abnormalities of physical frailty (Chen et al., 2015; Del Brutto et al., 2016). We therefore examined the association of brain volumes (white matter, grey matter and white matter hyperintensity volume) and physical frailty.

Methods: A total of 150 non-demented participants (mean age 72.3 ± 4.8 years) were included after ethical approval in UMC Utrecht and Charité Universitätsmedizin Berlin. Participants were classified as non-frail (N=61), pre-frail (N=67) or frail (N=22) by an adapted version of the Fried frailty phenotype. Brain volumes were automatically segmented on 3D T1 and 3D FLAIR images by using the lesion prediction algorithm, a lesion filling algorithm and CAT12. Participants with large cortical infarcts were excluded because of inaccurate segmentations. The association between brain volumes and frailty was examined by ANCOVA analyses, corrected for age, gender and intracranial volume.

Results: Grey matter volume ($F(2,144)=3.7$, $p<0.05$, partial $\eta^2=0.04$) and white matter hyperintensity volume ($F(2,144)=3.1$, $p<0.05$, partial $\eta^2=0.04$) were significantly different between groups even after correction for age, gender and ICV. Planned contrasts showed a significantly lower grey matter volume in the frail group (548 ± 45 ml) compared to the pre-frail group (568 ± 51 ml; $p<0.01$), but not compared to the non-frail group (566 ± 54 ml; $p=0.08$). Furthermore, planned contrasts showed a significantly higher WMH volume (12.2 ± 25.0 ml) in the frail group compared to the pre-frail group (4.2 ± 5.3 ml; $p<0.05$) and compared to the non-frail group (2.9 ± 3.1 ml; $p<0.05$). Total brain volume ($F(2,144)=2.1$, $p=0.13$) and total white matter volume ($F(2,144)=0.81$, $p=0.45$) showed no between group differences.

Conclusion: Participants with physical frailty showed more brain abnormalities compared to pre-frail and non-frail participants. These brain abnormalities could be the underlying structural correlates of the physical frailty phenotype.

The research leading to these results has received the funding from the European Community's FP7 under grant agreement n. 602461

The role of mini EEG in detecting delirium superimposed on dementia

dr. Viona J.M. Wijnen, Ph.D¹, drs. Judith I. Hanemaaijer, MD^{1,2}, Prof.dr. Arjen J.C. Slooter, Ph.D, MD^{1,3}, Prof. dr. Willem. A. van Gool, Ph.D, MD ⁴.

1 Psychogeriatric Observation Unit, Institution for Mental Health Care 'Dijk en Duin', Parnassia Groep, Castricum, the Netherlands

2 Department of General Practice & Elderly Care Medicine, Amsterdam Public Health, VU University Medical Center Amsterdam the Netherlands

3 Department of Neurology, Academic Medical Center, University of Amsterdam, The Netherlands

4 Department of Intensive Care Medicine and Brain Center Rudolf Magnus, University Medical Center Utrecht, The Netherlands

Background. The diagnosis of delirium superimposed on pre-existing cognitive impairment or dementia, 'delirium superimposed on dementia' (DSD), is challenging because signs of delirium may be interpreted as symptoms of pre-existing cognitive dysfunction. As a consequence, patients with DSD tend to be misdiagnosed and thus mistreated. In addition, delirium is related to a poor prognosis such as increased cognitive deterioration and increased risk of mortality. Therefore, ancillary diagnostic (bio)markers could be very useful. Literature, dating back 60 to 70 years, strongly suggests already that electroencephalography (EEG) can distinguish between delirium and non-delirium. Also later studies confirmed these findings. Recent studies suggest that delirium can be detected reliably using only a limited number of EEG electrodes for a short period of time (< 10 minutes). These findings encouraged us to study the role of such a mini EEG in the differential diagnosis of DSD in patients admitted to of a psychogeriatric observation unit of a mental hospital.

Methods. In a prospective cohort study we are investigating the test characteristics of mini EEG registrations. Secondary objectives are to investigate whether the mini EEG delirium monitor can be used to characterize the severity of delirium, and to evaluate feelings of discomfort associated with mini EEG registrations.

A five minutes eyes open and a five minutes eyes closed EEG recording with four electrodes will be conducted shortly after admission (T1), repeatedly thereafter with a maximum of three recordings during admission, and at discharge. EEG results will be compared to the reference standard, based on registrations with a camera, together with clinical observational scales and patients' medical files and DSM-V criteria.

In this presentation the first results of this longitudinal study will be presented.

Role of epileptic activity in elderly delirium, a cEEG study

Sara Sambin, MD¹, PhD, Gilles Naeije, MD¹.

¹ Neurology department, CUB Hôpital Erasme, Université libre de Bruxelles (ULB), Brussels, Belgium.

Background: Delirium in the elderly is a clinical acute syndrome associated with important morbidity and mortality. To date, there is no clear understanding of the link between phenomenology, etiology and pathophysiology, hence limiting treatment and prevention strategies (Gupta et al., 2008; Inouye et al., 2013; Neufeld & Thomas, 2013; Shafi et al., 2017). Epilepsy and delirium share clinical symptoms and predisposing conditions suggesting that epileptiform anomalies (EA) might play a role in delirium. However, EA are seldom sought in elderly delirium. We aimed in this work at studying the link between EA and delirium by performing continuous EEG monitoring in acute elderly delirium

Methods: Subjects above 65 years were prospectively included and cEEG was performed. EA were characterized into sporadic and periodic (Hirsch et al., 2013) and non-convulsive epileptic status (NCSE) was defined according to published criteria (Beniczky et al., 2013). Clinical, biological, and imaging characteristics and length of hospitalization were recorded. AEDs were administered according to the clinical context.

Results: Forty-seven patients over 65 years were included. NCSE was detected in 10% of the patients and epileptiform anomalies in 38%. Twenty-two % of patients have exclusively sporadic discharges, 33% only periodic and 44% of patient associated sporadic and periodic discharges. Sixty-five % of the seventeen patients treated with AED show clinical improvement. Thirty-two % of patients could return to their homes and the same amount were transferred to rehabilitation or institutions centers, while 21% died.

Conclusions: NCSE occurs in 10% and EA in 38% of acute delirium in the elderly when cEEG is performed highlighting the possible role of EA in the pathophysiology of elderly delirium and the necessity of cEEG in that context. Further study are needed to assess the potential benefice of AED in the treatment of delirium.

Anticholinergic burden and Delirium in an elderly acute medical population

Joana Rigor, MD¹, Paula Marques Ferreira, MD¹, Inês Rueff Rato, MD¹, Catarina Ribeiro, MD², Diogo Teixeira, MD³, Pedro Mesquita, MD¹, Ana Mafalda Silva, MD¹, Sofia Pereira, MD¹, Ingride Costa, MD¹, Paula Ferreira, MD¹, Manuela Sequeira, MD¹, Matilde Monteiro-Soares, PhD⁴, Daniela Martins-Mendes, MD, PhD^{1,5,6}.

1 Centro Hospitalar Vila Nova de Gaia/Espinho – Internal Medicine Department;

2 Centro Hospitalar Vila Nova de Gaia/Espinho – Nephrology Department;

3 Centro Hospitalar Vila Nova de Gaia/Espinho – Dermatology Department;

4 Faculty of Medicine of the University of Porto - MEDCIDS/ CINTESIS;

5 Faculty of Medicine of the University of Porto - Biochemistry Department;

6 i3S - Instituto de Investigação e Inovação em Saúde of the University of Porto

Matilde Monteiro-Soares' work was supported by NanoSTIMA project

Background: The presence of Delirium can be detected by the application of various tools, being the Short Confusion Assessment Method (Short-CAM) widely used. The Anticholinergic Cognitive Burden (ACB) Scale is one of the most validated and common scales to determine anticholinergic drug burden. With this study, we aim to determine the prevalence of Delirium in the elderly (age ≥ 65 years) acute medical population and to analyze its association with patient characteristics and ACB.

Methods: Elderly patients hospitalized in an Internal Medicine ward (n=198), between August 1st and December 31st 2016, were included and tested for Delirium using the Short-CAM, and their drug use (before and during admission) was evaluated through the ACB scale. Association between independent variables and Delirium presence was evaluated through univariate and multivariate analysis, using logistic regression methods.

Results: In the included sample, 53.5% were male with a mean age of 79.9 (± 7.5) years. Delirium was diagnosed in 28.3%. Known or suspected dementia presented a crude odds ratio (OR) of 3.6 [95% confidence interval (CI) 1.8-7.2], and ACB score of 1.3 (95% CI 1.1-1.5). No association was found with gender, age, number of ambulatory drugs or number of ambulatory drugs with anticholinergic effect. When adjusted for age, gender, dementia and number of ambulatory drugs, ACB score remained associated with Delirium (OR 1.2, 95% CI 1.0-1.5). Patients who developed Delirium had a higher number of hospitalization days (median 13 vs. 8; p=0.01), drugs administered (median 18 vs. 15; p=0.02) and intra-hospital ACB score (mean 3.9 vs. 3.1; p=0.034).

Conclusion: The ACB score was associated with the presence of Delirium independently from other tested population characteristics, including dementia. Patients with Delirium had a bigger drug and hospital burden, which may represent both risks and consequences of this disease.

Poster presentations

Poster presentations

First author	Title of poster presentation
Henk Verloo	Integrating Family Caregivers' Involvement in Care Measures to Prevent Delirium in Older Persons Hospitalised for Orthopaedic Surgery
Ilana Levy	Acupuncture efficacy for the treatment of delirium in older patients hospitalized in internal medicine departments: a pilot trial
Clodagh Power	The Detection, Diagnosis and Impact of Delirium and Cognitive Impairment Amongst Over 65s in an Irish Tertiary-Referral Hospital
Martina Power	Comorbidity of delirium in patients referred to Psychiatry for the Elderly over a three month period
Gaetano Aloisi	Drug prescription and delirium in older persons. Results from the Italian Delirium Day 2016
Hadi Qureshi	Nefopam in Delirium
Barbara Senesi	Usefulness of the Multidimensional Prognostic Index (MPI) for identification and management of hospitalized older patients with delirium
Camilla Prete	Caregivers' Stress Of Hospitalized Geriatric Patients With Delirium
Massimo Veneziano	Psychological counselling in depressive symptoms after delirium in elderly patients
Annelies Wassenaar	Development and validation of an abbreviated questionnaire to easily measure cognitive failure in Intensive Care Unit survivors: a multicenter study

Poster presentations

First author	Title of poster presentation
Kelly Sabbe	The prevalence of delirium in Flemish long-term care facilities as assessed with the Delirium Observation Screening Scale
Eveline van Velthuisen	Effects of a medication revision on delirium in older hospitalised patients: a comparative retrospective cohort study
Esteban Sepulveda	Delirium risk factors and diagnosis in a nursing home
Anne Meierkord	Risk factors for postoperative delirium after cardiac surgery
Leslie SP Eide	Indwelling urinary catheters and delirium in octogenarian patients following aortic valve replacement
Anette Høyen Ranhoff	Delirium screening with 4AT in two general hospitals in Norway
Lisa Smit	Efficacy of haloperidol to decrease the burden of Delirium In adult Critically ill patiEnts (EuRIDICE): a prospective randomised multi-center double-blind placebo-controlled clinical trial
Nina Smulter	A clinical database without systematic assessment fails to identify postoperative delirium in older patients undergoing cardiac surgery
Karol Wierzbą	Delirium in elderly general medicine patients – prevalence and risk factors

Poster presentations

First author	Title of poster presentation
Karen Roksund Hov	Cerebrospinal fluid levels of YKL-40 in delirium
Karen Roksund Hov	The use of clonidine in elderly patients with delirium; pharmacokinetics and hemodynamic responses
Ane Victoria Idland	Serum Neurofilament light (NFL) and delirium in hip fracture patients
Kristi Henjum	CSF sTREM2 in delirium
Gunilla Martinsson	Care transitions and delirium in nursing home residents

Financial support

The congress is supported by
the Research Council of Norway



Industry partners of the congress

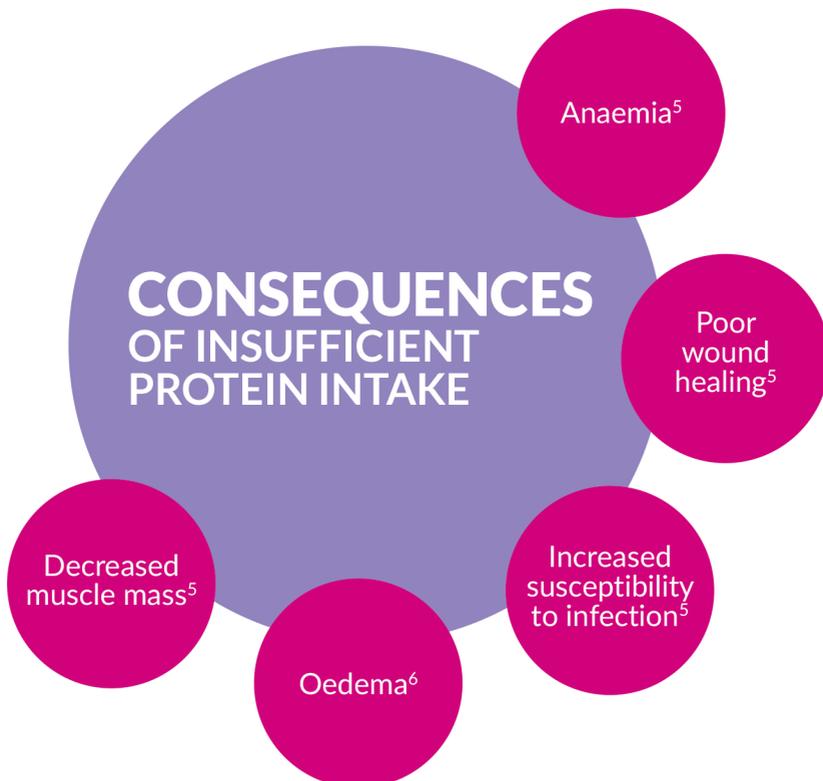




**IMPORTANCE OF HIGH
PROTEIN MEDICAL NUTRITION
FOR FRAIL, ELDERLY PATIENTS**

OLDER PATIENTS STRUGGLE TO CONSUME SUFFICIENT PROTEIN DURING ILLNESS^{1,2}

- 20% of adults aged >65 years do not meet the reference nutrient intake (RNI) for protein³
- Inadequate protein intake is more likely to occur in patients with disease-related malnutrition due to poor appetite resulting from the effects of their disease⁴
- Protein requirements can increase by up to 50% depending on the patient's clinical condition⁴
- A protein intake above normal may be desirable in patients with disease-related malnutrition⁴



HIGH PROTEIN MEDICAL NUTRITION PROVIDES SIGNIFICANT BENEFITS*

30%
REDUCTION

Significant reduction in hospital readmissions within 6 months ($p < 0.04$)⁴

31%
REDUCTION

Significant reduction in complications[†] in hospital setting ($p < 0.005$)

34%
REDUCTION

Significant reduction in complications[†] in community setting ($p < 0.017$)



Significant improvement in **handgrip strength** ($p < 0.014$)⁴

Significant improvements in **nutritional intake and weight** ($p < 0.001$) with little reduction in normal food intake⁴



Significant increase in **patient independence** at discharge and 6 months ($p < 0.05$)⁷

Increase in median **ADL score** at discharge and 6 months⁴



*When compared to control (dietary advice)

[†]Such as infections, poor wound healing and leg and pressure ulcers, in hospital and community settings⁴

HIGH PROTEIN ORAL NUTRITIONAL SUPPLEMENTS*†



FORTIMEL Compact Protein

ENERGY	PROTEIN	VOLUME
300kcal	18g	125ml

FORTISIP 2kcal

ENERGY	PROTEIN	VOLUME
400kcal	20g	200ml



*Product availability is dependent on the country, check your local Nutricia website.

†These products are also known as Fortimel, Fortisip or Nutridrink depending on the country.

REFERENCES:

1. Deutz NEP *et al.* Protein intake and exercise for optimal muscle function with aging: Recommendations from the ESPEN Expert Group. *Clin Nutr* 2014;33:929–936
2. Bauer J *et al.* Evidence-Based Recommendations for Optimal Dietary Protein Intake in Older People: A Position Paper From the PROT-AGE Study Group. *JAMDA* 2013;14:542–559
3. Finch S *et al.* National Diet and Nutrition Survey: People Aged 65 Years and Over, Vol 1. London: The Stationary Office, 1998.
4. Cawood AL *et al.* Systematic review and meta analysis of the effects of high protein oral nutritional supplements. *Ageing Res Rev* 2012;11:278–296.
5. Gandy J. Manual of dietetic practice. 5th edition Wiley Blackwell Publishing and The British Dietetics Association, 2014
6. Wingate P, Wingate R., *Medical Encyclopedia* (4th ed.) London, 1997, Penguin Books
7. Volkert D *et al.* Nutritional support and functional status in undernourished geriatric patients during hospitalization and 6-month follow-up. *Ageing Clin Exp Res* 1996;8:386–395.

These products are food for special medical purposes for the dietary management of disease-related malnutrition and must be used under medical supervision.





NUTRISON ADVANCED PROTISON



NUTRISON ADVANCED PROTISON: THE STANDARD HIGH PROTEIN FORMULA

The standard high protein formula in line with ICU guidelines: Protison contains the ideal levels of protein and energy according to ICU guidelines¹⁻³

>En% coming from protein

Nutrison Advanced Protison:



This product is food for special medical purposes for the dietary management of disease-related malnutrition and must be used under medical supervision.

REFERENCES:

1. Lochs H, Allison SP, Meier R et al. Introductory to the ESPEN Guidelines on Enteral Nutrition: Terminology, Definitions and General Topics. Clin Nutr. 2006 Apr;25(2):180-6. Epub 2006 May 11.
2. Kreymann KG, Berger MM, Deutz NE et al. ESPEN Guidelines on Enteral Nutrition: Intensive care. Clin Nutr. 2006 Apr;25(2):210-23. Epub 2006 May 11.
3. McClave SA, Martindale RG, Vanek VW et al. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient. JPEN J Parenter Enteral Nutr. 2009 May-Jun;33(3):277-316.

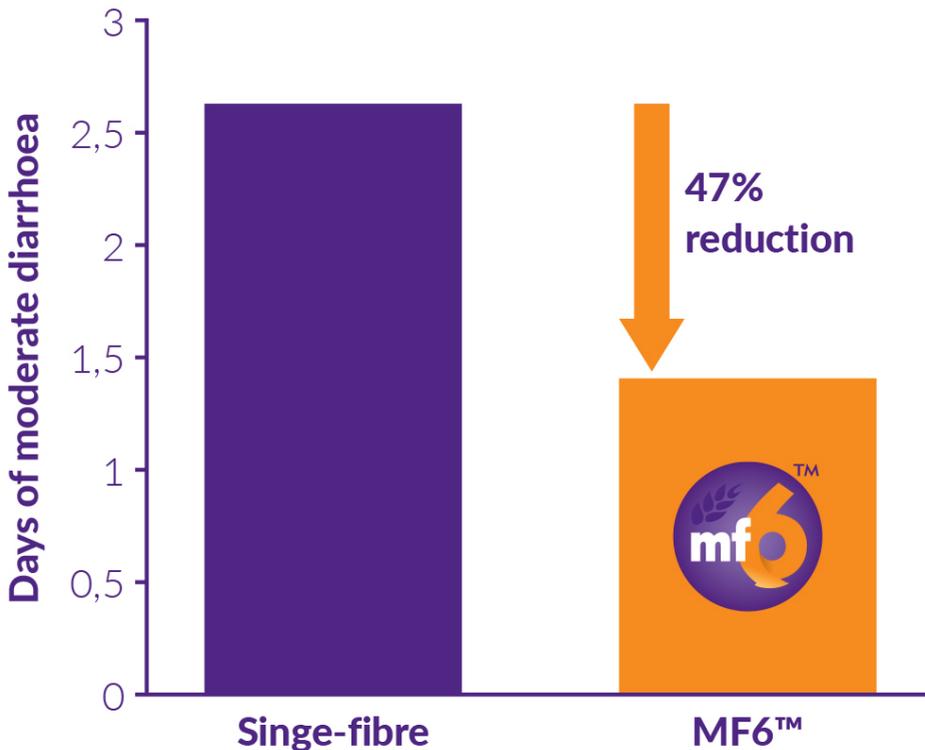
* In Nutricia portfolio 1.1.2013



THE MF6™ MULTI FIBRE MIX IN NUTRISON ADVANCED PROTISON REDUCE DIARRHOEA BY UP TO 47% ^{1,2}

The MF6™ Multi Fibre mix in Nutrison Advanced Protison is proven to reduce diarrhoea by up to 47% ^{1,2}

Reduced incidence of diarrhoea with MF6™ Multi Fibre feed²



REFERENCES:

1. Elia M et al. Systematic review and meta-analysis: the clinical and physiological effects of fibre-containing enteral formulae. *Aliment Pharmacol Ther* 2008;27:120-45.
2. Wierdsma NJ et al. Comparison of two tube feeding formulas enriched with guar gum or mixed dietary fibres. *Ned Tijdschr Dietisten* 2001;56:243-7.

OPTIMAL NUTRITIONAL THERAPY FOR BETTER CLINICAL OUTCOMES

Optimal nutritional therapy in critically ill patients
= PROTEIN + energy ¹

**50%
DECREASE**

OPTIMAL PROTEIN and
energy provision
is associated with a
50% decrease
in 28-day mortality ¹

References:

1. Weijjs PJ, Stapel SN, de Groot SD et al. Optimal protein and energy nutrition decreases mortality in mechanically ventilated, critically ill patients: a prospective observational cohort study. JPEN J Parenter Enteral Nutr. 2012 Jan;36(1):60-8. Epub 2011 Dec 13.



Building well-being

Orion is a globally operating Finnish pharmaceuticals company – a builder of well-being already since 1917. Orion develops, manufactures and markets human and veterinary pharmaceuticals, active pharmaceutical ingredients and diagnostic tests. It is continuously developing new drugs and treatment methods.

Orion Pharma's critical care product portfolio includes two own proprietary molecules, the alpha2-agonist dexmedetomidine (dexdor®) for light sedation of patients in intensive care units and levosimendan (Simdax®) for acutely decompensated heart failure.

Orion's customers are mainly healthcare service providers and professionals such as specialist and general practitioners, veterinarians, pharmacies, hospitals, healthcare centres, clinics and laboratories. Consumers with pets are another important customer group.

Orion's main market is Finland, where it is the clear market leader. Orion's products are marketed in over a hundred countries, and the Group's own human pharmaceuticals sales organisation covers almost all key European markets. In other markets Orion's products are sold by several collaboration partners. All of Orion's manufacturing plants and most of its R&D operations are in Finland. Orion's headquarters are in Espoo, Finland.

Upcoming events

EDA 2018 ANNOUNCEMENT

The 2018 EDA meeting will take place in
Utrecht, The Netherlands
Thursday 1st and Friday 2nd of November



14th EUGMS
International Congress of the European Union Geriatric Medicine Society
Advancing Geriatric Medicine
in a Modern World

Berlin, Germany - October 10/12, 2018

Participants of the congress

Lastname	Firstname	Title
Adamis	Dimitrios	Psychiatrist
Agar	Meera	Palliative Care Physician and Academic
Ahmed	Marc	Doctor
Aldwikat	Rami Kamel	registered nurse
Allvin	Helen	Sponsor
Al-Rawi	Yasir	Consultant Geriatrician
Andersen	Sølvi	Student
Ansteensen	Therese	Sykepleier
Ansteensen	Line	Nurse
Arora	Rakesh	Surgeon/Intensivist
Bannink	Marjolein	Psychiatrist
Bannon	Leona	Doctoral Fellow
Basancelebi	Berkan	Physiotherapist
Bauernfreund	Yehudit	Foundation Doctor
Belgum	Iselin	Nurse
Beliveau	Genevieve	général practitioner
Bellelli	Giuseppe	Professor in Geriatrics
Berg MD	Mary	physician
Bialasz	Sylwester	Sykepleier
Bigler	Sabine	Advanced practice nurse
Bing-Jonsson	Pia Cecilie	Vice dean
Birkeland	Astrid	Nurse, orthopedicks
Bjerkelund	Toril Sollie	Sykepleier
Bogdanovic	Nenad	Professor , Head of Neurogeriatric Clinic
Bogert	Lysander	Geriatrician
Bowden	Helen	Research Practitioner
Breuer	Roman	Nurse/Nurse Educator
Burgers-Mulder	Esther	Nurse Practitioner
Bush	Shirley	Physician
Butler	Matt	Foundation Doctor

Lastname	Firstname	Title
Bodal	Ida	Psychiatrist
Campbell	Noll	Academic Research
Caplan	Gideon	Geriatrician
Castberg	Ingrid	MD, PhD
Castro	Roberta	Physician
Cesuanu	Atena luciana irinel	Consultant in geriatrics
Chan	Agnes	Psychiatrist
Charles Lwanga	Sekitoleko	Student
Corneliussen	Nina	Sykepleier/Registered Nurse
Csepán-Magyar	Reka	Geriatrician
Cunningham	Emma	Academic Clinical Lecturer
Cunningham	Colm	Research Scientist
Dakhil	Shams	Student
Dal-Pont	Alexandra	Ward physician
Dauphin	Linda	General Practicer
Davis	Daniel	Geriatrician
Delgado Førland	Rebecca	Nurse
Devlin	John	Critical Care Pharmacist
Dietrich	Katharina	researcher
Duong	Oanh	Oslo
Eckl	Jannik	Student
Eckstein	Claudia	doctoral student (nursing scientist)
Eide	Leslie SP	Associate professor
Evensen	Sigurd	MD phd-candidate
Evensen	May- Britt	Nurse, Geriatrics
Featherstone	Imogen	Occupational Therapist
Flottorp	Trine	Nurse Practitioner
Forfang	Elisabeth	Doctor
Fosby	Reidun	Anesthesiologist
Fosnæs	Grith Overgaard	Master student

Participants of the congress

Foss	Catherine H.	Consultant
Fossdal	Øystein	physician
Fossoy	Jeanette	Critical Care Nurse, master student University of Stavanger
Freitas	Sandra de	internal medicine resident
Frengen	Anna B.	Laboratory manager
Freyer	Sonja	nurse
Garcia	Geraldine V.	Geriatric nurse
Garmark	Anne	
Gil	Efrat	physician
Gleditsch	Dyveke	Consultant
Glomsrod	Maren	Lis lege
Greene	Elaine	Psychiatrist
Grindal	Linda	Nurse
Gross	Renate	Fachärztin für Psychiatrie und Psychotherapie
Grossi	Eleonora	PSYCHOLOGIST
Guhra	Michael	Psychiatrist
Hagenfeldt	Ingela	Productmanager
Hall	Roanna	Specialist Registrar, Geriatric Medicine
Hammer	Torunn	
Haraldsen	Jeanette Helen	Sykehjemslege
Harper	John	Physician
Hasemann	Wolfgang	Clinical nurse specialist
Hayes	Hilary	Advanced Trainee Geriatric Medicine
Heimdahl	Ragnhild	physician
Hendrix	Yvonne	geriatrician
Henjum	Kristi	PhD student
Hilgeman	Ilse-Sigrid	Geriatrician
Hoffmann	Katrin	Research Practitioner
Hoffmann-Weltn	yvonne	Geriatrician, Internal Medicine

Hov	Karen	MD, PhD-student,
Huneide	Elisabeth	Trainee in geriatric medicine
Høen	Sofie	
Håvik	Kristin Bolme	Nurse
Idland	Ane-Victoria	Medical Doctor
Instenes	Irene	RN, Nurse specialist in Geriatrics
Jackson	Thomas	Clinician Scientist in Geriatric Medicine
Jacobs	Bart	Psychiatrist
Jerpseth	Thea	Medical doctor
Johansson	Ingger	Professor
Johnsen	Nina	Nurse
Jonker	Judith	Geriatrician
Kamerman	Floortje	geriatrician
Kamholz	Barbara	Geriatric Psychiatrist
Kant	Ilse	PhD student
Khan	Babar	Physician
Knapkog	Anne-Brita	consultant
Kohl	Claudia	psychiatrist
Kok	MK	Geriatrician
Kotfis	Katarzyna	Anaesthesiologist
Kreisel	Stefan	Medical doctor
Krogseth	Maria	MD, PhD
Laurila	Jouko	Consultant
Lawlor	Peter	Physician
Lee	Sook Ting	Doctor
Levy	Ilana	Internal Medicine Resident
Lui	Chok Lin	Geriatrician
Luijendijk	Hendrika	Senior researcher
Lundberg	Tor Oscar	Sykepleier

Participants of the congress

Maagaard	Truls	Medical doctor
MacLulich	Alasdair	Professor of Geriatric Medicine
Maini	Sameer	Overlege geriatri
mardon	julie	doctor
Martinsson	Gunilla	postdoc
Marttila	Minna	registered nurse
Maviri	Amiri Abdul	kampala
McKenzie	Catherine	Pharmacist
Meagher	David	Psychiatrist
Meierkord	Anne	Medical student
Mellingsæter	Marte	MD, Geriatric department
Midsæther	Ann-Grete	Geriatrician
Mjørud	Marit	researcher
Morandi	Alessandro	Geriatric consultant
Mosling	Trude	Nurse
Myrstad	Marius	Consultant/researcher
Mørch	Marianne Metz	Consultant
Naalsund	Paal	MD-Geriatrician
Neerland	Bjørn Erik	MD, PhD-student,
Nester	Marit	Critical Care Nurse, master student University in Stavanger
Neufeld	Karin	Physician
Norbaek	Jens	Consultant
Næss	Amita	Sykepleier
Nåvik	Marit	Leader/ occupational therapist
Olausse	Carine	Sponsor
Oliven	Roni	Geriatrics specialist
Olofsson	Birgitta	Reg Nurse, associate professor
Olsen	Espen Andre	Nurse
Olsen	Karethe V.	heart section

Oostveen	Rosina	psychiatrist
O'Regan	Niamh	Geriatrician
Ott	Martin	Geriatrician
Oudewortel	Letty	elderly care physician
Page	Valerie	Consultant Anaesthesia and Critical Care
Pandharipande	Pratik	Intensivist
Paterson	Rebecca	PhD Student
Pearson	Paul	Consultant Geriatrician
Pedersen	Hanne	Consultant
Pedersen Kjærsmo	Anette	Sykepleier
Peijster	Jolanda	
Pettersen	Tine Karlsrud	
Pollmann	Christian	Orthopedic surgeon
Power	Martina	Nurse
Power	Clodagh	Psychiatry Research Registrar
Pozzi	Christian	Occupation Therapist
Ranhoff	Anette Huyen	Professor
Rasmussen	Dag	geriatrician, Nursing home doctor
Reissig	Christian	Consultant
Reiten	Tine	Physician
Reppas	Christina	Resident - Internal Medicine PGY2
Richardson	Sarah	PhD Clinical Research Fellow
Rigor	Joana	Internal Medicine Resident
Rood	Paul	PhD student
Rose	Louise	Nursing professor
Rudolph	James	Physician
Rosvik	Janne	sykepleier, forsker
Sabbe	Kelly	PhD student
Sagen	Ulrike	Senior psychiatrist

Participants of the congress

Sajjad	Muhammad Umar	Postdoc
Sambin	Sara	neurology
Sampson	Elizabeth	Clinical academic
Sands	Megan B	Physician
Sandvig	Heidi	physician
Scane	Andrew	Geriatrician
Schjønneberg	Eline Elshaug	
Schøller	Marianne	Nurse
Scott	John	Geriatrician
Sexe	Ingrid	Medical doctor/lege i spesialisering
Siddiqi	Najma	Clinical Senior Lecturer in Psychiatry
Skare	Ragnhild	Geriatric Nurse
Slettingdalen	Ellen	Sykepleier
Slooter	Arjen	University Medical Center Utrecht, Department of Intensive Care Medicine
Smit	Lisa	PhD Student / Medical Doctor
Smulter	Nina	PhD-student
Storli	Bettina	Oslo
Suryawan	Andreas	Geriatrician
Sætran	Malin	Oslo
Søgnen	Eva Herlø sund	lege
Tieges	Zoë	Research fellow
Torbergsen	Anne C.	Sponsor
Tsevis	Theofanis	Consultant
Unneby	Anna	PhD-student
Upton	Ciaran	Doctor
Utkilen	Therese	Nurse
van den Boogaard	Mark	Senior researcher

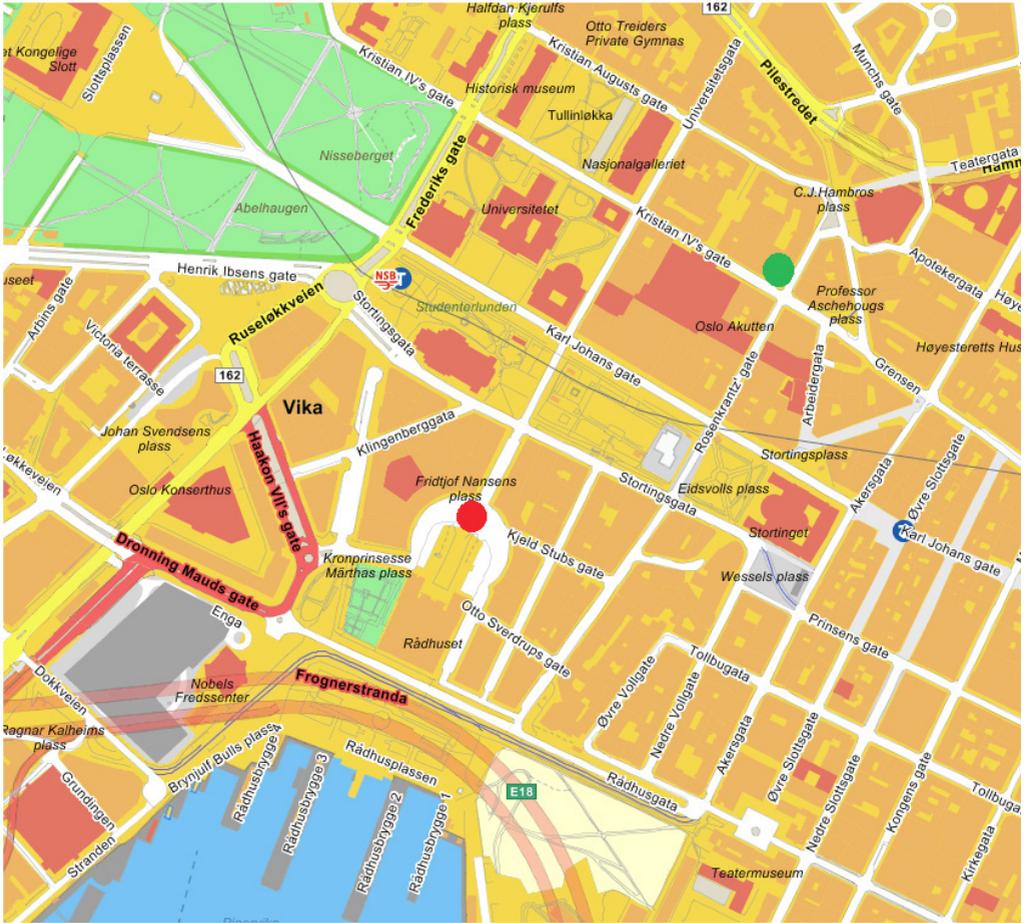
van Montfort	Simone	PhD student
van Velthuisen	Eveline	PhD student
Vestby	Eva Marie	Spesialsykepleier neurologi
Vie	Michelle	Nurse
Voyer	Philippe	Professor
Wand	Anne	psychiatrist
Wang-Hansen	Marte Sofie	Doctor/Phd student
Wassenaar	Annelies	PhD student
Watne	Leiv Otto	MD, PhD
Wierzba	Karol	Doctorial student
Wiig	Ingrid	Consulting doctor
Wijnen	Viona	Psychologist, Senior Researcher
Willems	Annemarie	Engineer
Wyller	Torgeir Bruun	Professor
Young	Lesley	Geriatrician
Zetterberg	Henrik	MD, PhD, Professor

Notes

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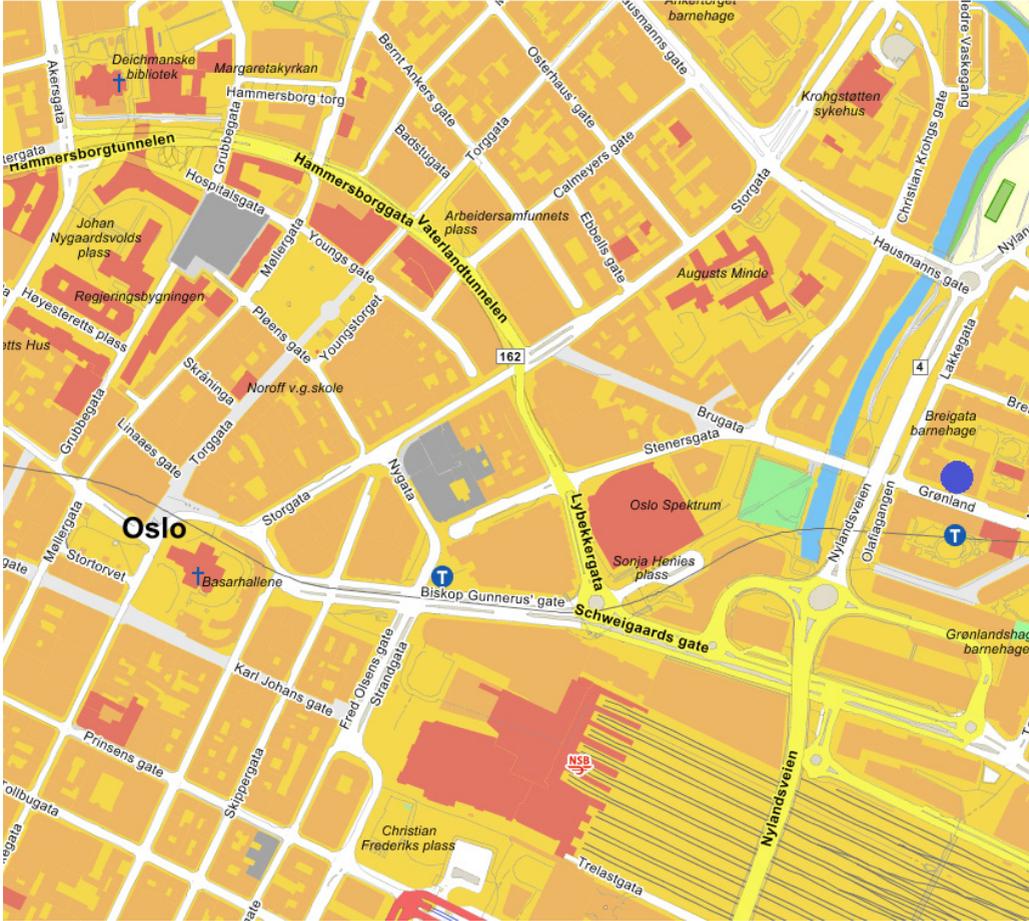
Notes

Map



-  Dattera til Hagen
-  Oslo City Hall
-  Hotel Bristol

Map



**We are Nutricia and
we believe in the
power of nutrition to
make a positive and
proven difference to
health**



NUTRICIA
Advanced Medical Nutrition