

# EDA 2013

## The 8th Annual Meeting of the European Delirium Association



**Improving the Quality of Care in Patients with Delirium**



**20<sup>th</sup> - 21<sup>st</sup> of September 2013  
Leuven - Belgium**

## KEYNOTE SPEAKERS

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### **Wesley Ely, MD, MPH**

Vanderbilt University Medical Center (USA)

Dr. E. Wesley Ely, MD, MPH is a subspecialist in Pulmonary and Critical Care Medicine with a focus in Geriatrics, who conducts patient-oriented, health services research as a Professor of Medicine at Vanderbilt University School of Medicine. He graduated Phi Beta Kappa and Summa Cum Laude from Tulane University and earned his medical degree from Tulane University School of Medicine and master's in public health degree from the Tulane School of

Public Health and Tropical Medicine in New Orleans, Louisiana. There he was elected to Alpha Omega Alpha (AOA) medical honors society. Dr. Ely's research has focused on improving the care and outcomes of critically ill patients with severe sepsis and respiratory failure, with special emphasis on the problems facing older patients in the ICU (e.g., weaning from mechanical ventilation, delirium in the ICU, neuropsychological and functional deficits post ICU care).

*Title: Delirium and Critical Illness-Associated Brain Injury*

*Time slot: Friday 20/9 , 11.30 - 12.30*



### **Donna Fick, PhD, GCNS-BC, FGSA, FAAN**

Pennsylvania State University (USA)

Donna Fick is a Distinguished Professor at The Pennsylvania State University School of Nursing, Co-Director of the Penn State Hartford Center for Geriatric Nursing Excellence, and Editor, Journal of Gerontological Nursing. Her area of research has focused on two major issues concerned with improving the care of older adults--- potentially inappropriate medications (PIMs) to avoid in

persons 65 and older and delirium superimposed on dementia (DSD).

*Title: Research and Practice Innovations in Delirium Superimposed on Dementia*

*Time slot: Saturday 21/9, 11.30 - 12.30*

# Welcome to the 8th Annual Meeting of the European Delirium Association

## Improving the Quality of Care in Patients with Delirium

20<sup>th</sup> - 21<sup>st</sup> September 2013, Leuven, Belgium

We are delighted that our 8th Annual Meeting is held in Leuven, a dynamic city in the heart of Europe. The program covers the full spectrum of the latest advances in delirium research and clinical practice, from basic science to clinical implementation.

Leuven (French: Louvain, German: Löwen) is located about 30 kilometers east of Brussels, the capital of Belgium and the capital of the European Union. It is the capital of the province of Vlaams Brabant in the Flemish Region of Belgium.

As one of Flanders' oldest and most historically significant cities, with a large palate of cafés, restaurants, cultural institutions and shopping neighborhoods, Leuven attracts residents, students, business and visitors from all over the world. Recreation and relaxation activities abound. Besides boasting Belgium's "longest bar" (the Old Market, where dozens of bars and cafés are crammed into a central square in Leuven), it's also the proud home city of Belgium's smallest bar, Onder den Toog in the Noormannenstraat. Plenty more hidden treasures await you in Leuven as well.

Leuven is also the worldwide headquarters of Anheuser-Busch InBev, the world's largest beer brewer. The company's imprint is noticeable all over town and the main brewery building is a familiar sight for those who travel to Leuven by train.

Today Leuven is a bona fide 'student city'. The majority of Leuven's inhabitants during the academic year are students. KU Leuven (University of Leuven) is the largest and oldest university of the Low Countries, the world's oldest Catholic university still in existence in the world, and one of Europe's premier research universities.

It's no surprise, then, that university spin-offs form an important engine of the local and regional economy. Leuven boasts many biotech and ICT companies, an extensive university hospital network and research center and a large number of private service providers in the medical and legal field.

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

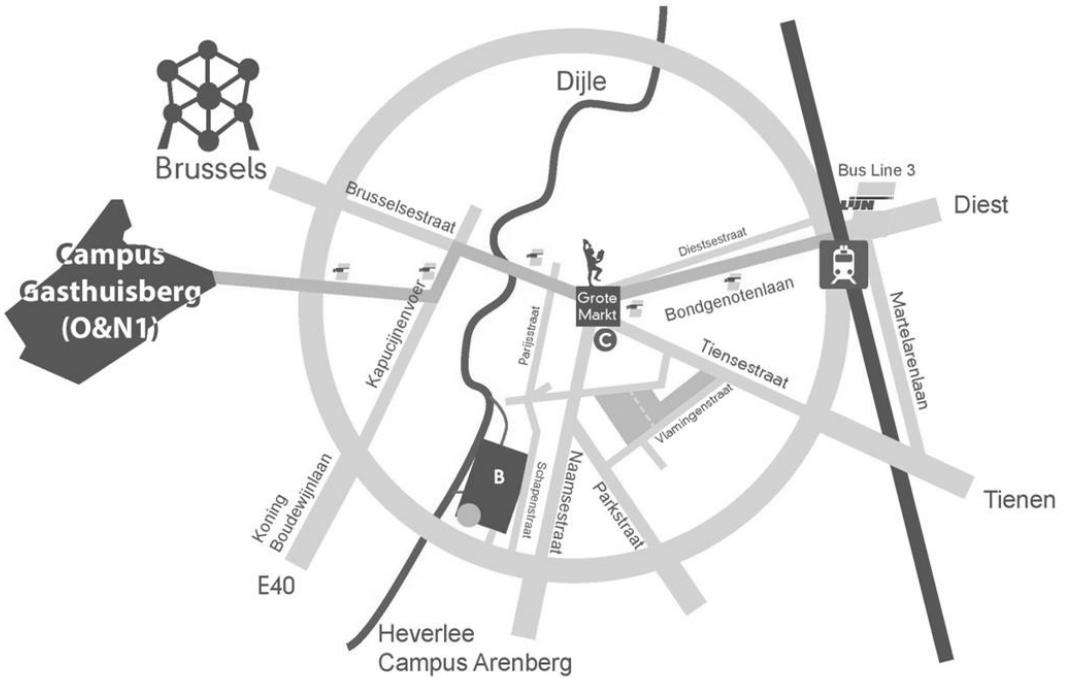
On behalf of the Local Organizing Committee  
Koen Milisen, President of EDA Leuven 2013

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



# 8th European Delirium Association Scientific Congress

20th-21st September 2013, Leuven, Belgium



● Faculty Club  
Conference dinner  
(Groot Begijnhof 14)

B



Groot Begijnhof

C



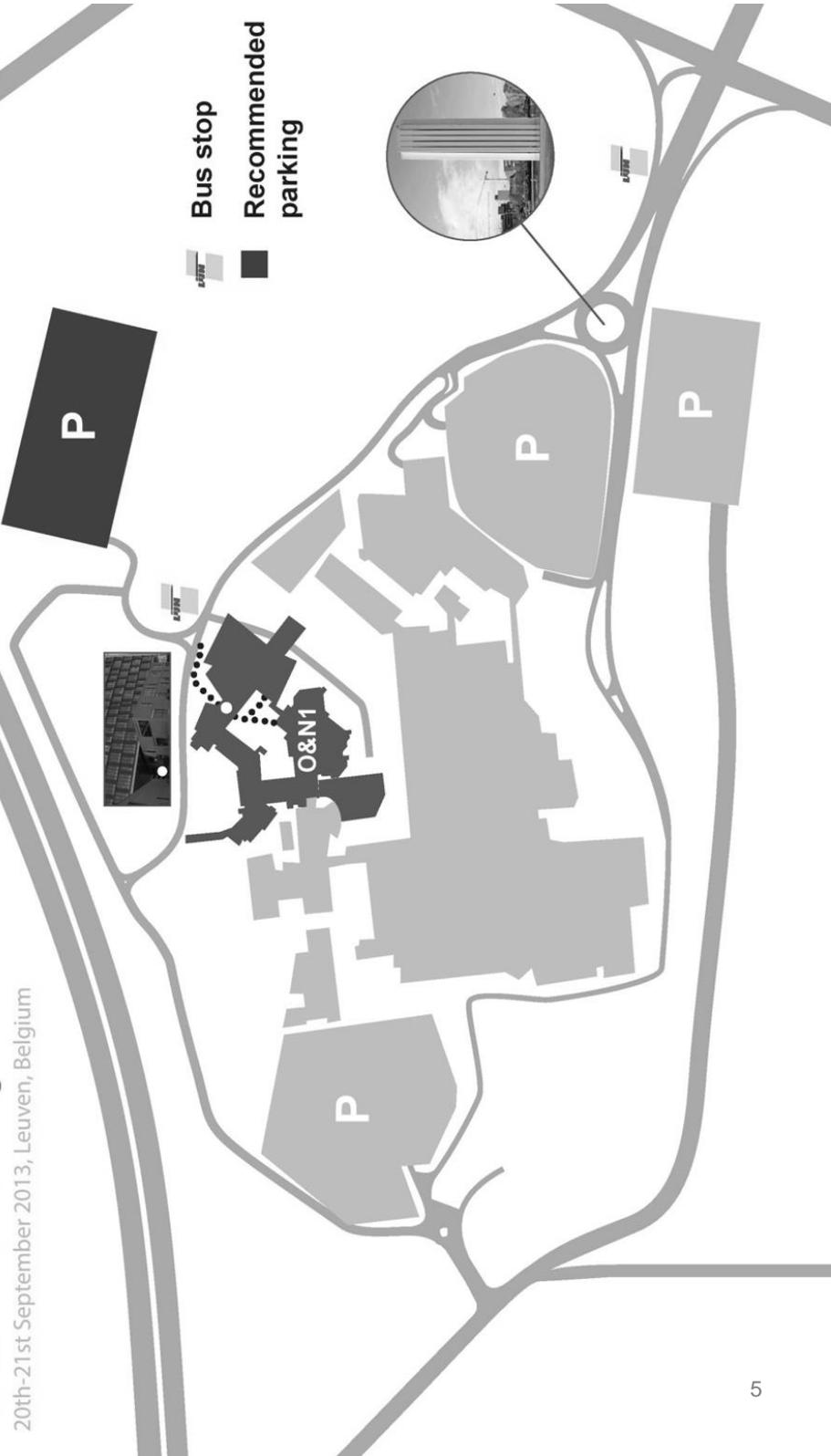
City Hall



Bus stop Line 3



**8th  
European  
Delirium  
Association  
Scientific Congress**  
20th-21st September 2013, Leuven, Belgium



# HOW TO GET TO THE VENUE ?

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The meeting takes place at

Onderwijs & Navorsing 1 (O&N1)  
Campus Gasthuisberg  
Herestraat 49  
3000 Leuven

How to reach the campus from your hotel:

## **By bus**

The easiest way to get from the train station or from the centre of Leuven to the venue is by bus. It is a 10 or 15 minute bus ride.

On the right side of the train station there are different bus stops. Take **bus 3** at platform 2. This bus will drive through the center (see maps on previous pages) to O&N1. Step out at the bus stop 'Campus Gasthuisberg'. This is the final stop. It is a 2 min walk to get from the bus stop to the venue, please follow the signs to EDA 2013.

Please note:

- Only bus number 3 drives to the venue. The other busses don't stop there.
- There are more bus stops than indicated on the map.
- The bus stop 'Gasthuisberg' is not the same as 'Campus Gasthuisberg'. The first one is to go to the main entrance of the hospital, the second one will bring you to the conference venue.
- On Friday there are 4 busses an hour, on Saturday there are 2 busses an hour. Please find the timetables on the next few pages

Other possibilities:

**By taxi**

**On foot**

**By car**

On Saturday September 20, there will be free parking at the campus for the EDA participants.

## STATION → CENTRE → VENUE

Leuven Station	6:11	6:21	6:31	6:47	6:51	7:01	7:14	7:18	7:36	7:51	7:57	8:06	8:21	8:27	8:36
Leuven Rector De Somerplein	6:25	6:35	6:50	6:55	7:05	7:11	7:22	7:40	7:46	8:07	8:10	8:16	8:31	8:40	8:46
Leuven St-Jacobsplein	6:29	6:39	6:59	7:01	7:15	7:28	7:32	7:50	8:07	8:11	8:16	8:31	8:41	8:50	8:56
Leuven Gasthuisberg	6:31	6:41	7:01	7:03	7:17	7:34	7:52				8:13	8:22	8:43	8:52	
Leuven Gasthuisberg Campus	6:33	6:43													
Leuven Station	8:49	8:51	9:06	9:18	9:18	9:35	9:47	9:47	10:05	10:17	10:35	10:47	10:47	11:05	11:17
Leuven Rector De Somerplein	8:53	9:10	9:22	9:39	9:51	10:09	10:21	10:39	10:51	11:09	10:51	11:09	10:51	11:09	11:21
Leuven St-Jacobsplein	8:59	9:16	9:28	9:45	9:57	10:15	10:27	10:45	10:57	11:15	10:57	11:15	10:57	11:15	11:27
Leuven Gasthuisberg	9:03	9:19	9:31	9:48	10:00	10:18	10:30	10:48	11:00	11:18	11:00	11:18	11:00	11:18	11:30
Leuven Gasthuisberg Campus	9:05	9:21	9:33	9:50	10:02	10:20	10:32	10:50	11:02	11:20	11:02	11:20	11:02	11:20	11:32
Leuven Station	11:35	11:47	11:47	12:05	12:17	12:35	12:47	12:47	13:05	13:17	13:28	13:35	13:47	13:48	14:05
Leuven Rector De Somerplein	11:39	11:51	12:09	12:21	12:39	12:51	13:09	13:22	13:32	13:39	13:32	13:39	13:52	13:52	14:09
Leuven St-Jacobsplein	11:45	11:57	12:15	12:27	12:45	12:57	13:15	13:38	13:45	13:58	13:38	13:45	13:58	13:58	14:15
Leuven Gasthuisberg	11:48	12:00	12:18	12:30	12:48	13:00	13:18	13:41	13:41	14:01	13:41	13:48	14:01	14:01	14:18
Leuven Gasthuisberg Campus	11:50	12:02	12:20	12:32	12:50	13:02	13:20	13:43	13:43	14:03	13:43	13:50	14:03	14:03	14:20
-euven Station	14:21	14:35	14:47	14:51	15:05	15:17	15:35	15:51	15:52	16:05	16:22	16:22	16:35	16:50	16:52
Leuven Rector De Somerplein	14:25	14:39	14:55	15:09	15:21	15:39	15:56	16:09	16:26	16:39	16:26	16:39	16:52	16:56	17:02
Leuven St-Jacobsplein	14:31	14:45	15:01	15:15	15:27	15:45	16:02	16:15	16:32	16:45	16:32	16:45	16:58	17:02	17:08
Leuven Gasthuisberg	14:34	14:48	15:04	15:18	15:30	15:49	16:06	16:19	16:36	16:49	16:36	16:49	16:58	17:06	17:08
Leuven Gasthuisberg Campus	14:36	14:50	15:06	15:20	15:32	15:51	16:08	16:21	16:38	16:51	16:38	16:51	17:08	17:08	17:18
Leuven Station	17:05	17:19	17:22	17:35	17:49	17:52	18:05	18:15	18:20	18:33	18:44	18:46	19:03	19:17	19:20
Leuven Rector De Somerplein	17:09	17:26	17:32	17:45	18:02	18:14	18:29	18:42	18:56	19:12	18:56	19:12	19:29	19:29	19:29
Leuven St-Jacobsplein	17:15	17:32	17:45	18:06	18:18	18:33	18:46	18:59	19:16	19:33	18:59	19:16	19:33	19:33	19:33
Leuven Gasthuisberg	17:19	17:36	17:49	18:08	18:20	18:35	18:48	19:01	19:18	19:35	19:01	19:18	19:35	19:35	19:35
Leuven Gasthuisberg Campus	17:21	17:38	17:51												
Leuven Station	19:33	19:44	19:47	20:01	20:14	20:31	20:44	20:47	21:21	21:44	21:47	22:21	22:51	23:26	0:26
Leuven Rector De Somerplein	19:37	19:48	20:05	20:18	20:35	20:48	21:05	21:18	21:25	21:48	21:48	22:25	22:55	23:06	0:06
Leuven St-Jacobsplein	19:41	19:52	20:09	20:22	20:39	20:52	21:09	21:22	21:29	21:52	21:52	22:29	22:59	23:10	0:10
Leuven Gasthuisberg	19:43	19:54	20:11	20:24	20:41	20:54	21:07	21:20	21:31	21:54	21:54	22:31	23:01	23:12	0:12
Leuven Gasthuisberg Campus	19:45	19:56	20:13	20:26	20:43	20:56	21:09	21:22	21:33	21:56	21:56	22:33	23:03	23:14	0:14

## VENUE → CENTRE → STATION

Leuven Gasthuisberg Campus	8:10	8:25	8:40	8:55	9:10	9:25	9:40	9:55	10:10	10:25	10:40	10:55
Leuven Gasthuisberg	8:11	8:26	8:41	8:56	9:11	9:26	9:41	9:56	10:11	10:26	10:41	10:56
Leuven St-Jacobsplein	8:16	8:31	8:46	9:01	9:16	9:31	9:46	10:01	10:16	10:31	10:46	11:01
Leuven Rector De Somerplein	8:22	8:37	8:52	9:07	9:22	9:37	9:52	10:07	10:22	10:37	10:52	11:07
Leuven Station	8:26	8:41	8:56	9:11	9:26	9:41	9:56	10:11	10:26	10:41	10:56	11:11
Leuven Gasthuisberg Campus	11:10	11:25	11:40	11:55	12:10	12:25	12:40	12:55	13:10	13:25	13:44	13:55
Leuven Gasthuisberg	11:11	11:26	11:41	11:56	12:11	12:26	12:41	12:56	13:11	13:26	13:45	13:56
Leuven St-Jacobsplein	11:16	11:31	11:46	12:01	12:16	12:31	12:46	13:01	13:16	13:31	13:50	14:01
Leuven Rector De Somerplein	11:22	11:37	11:52	12:07	12:22	12:37	12:52	13:07	13:22	13:37	13:56	14:07
Leuven Station	11:26	11:41	11:56	12:11	12:26	12:41	12:56	13:11	13:26	13:41	14:00	14:11
Leuven Gasthuisberg Campus	14:10	14:25	14:40	14:55	15:10	15:25	15:40	15:55	16:10	16:25	16:40	16:55
Leuven Gasthuisberg	14:11	14:26	14:41	14:56	15:11	15:26	15:41	15:56	16:11	16:26	16:41	16:56
Leuven St-Jacobsplein	14:16	14:31	14:46	15:01	15:16	15:31	15:46	16:01	16:16	16:31	16:46	16:56
Leuven Rector De Somerplein	14:22	14:37	14:52	15:07	15:22	15:38	15:53	16:08	16:23	16:38	16:53	16:57
Leuven Station	14:26	14:41	14:56	15:11	15:26	15:42	15:57	16:00	16:12	16:30	16:42	16:57
Leuven Gasthuisberg Campus	16:55	17:10	17:25	17:40	17:55	18:10	18:25	18:40	18:55	19:10	19:25	19:30
Leuven Gasthuisberg	16:56	17:11	17:26	17:41	17:56	18:11	18:26	18:41	18:56	19:11	19:26	19:31
Leuven St-Jacobsplein	17:01	17:16	17:31	17:46	18:01	18:16	18:31	18:46	19:01	19:16	19:31	19:36
Leuven Rector De Somerplein	17:08	17:23	17:38	17:53	18:08	18:23	18:38	18:53	19:08	19:23	19:38	19:43
Leuven Station	17:00	17:12	17:27	17:42	17:57	18:00	18:27	18:30	18:42	18:57	19:12	19:27
Leuven Gasthuisberg Campus	19:25	19:40	19:55	20:10	20:25	20:55	21:55	22:25	22:55	23:34	23:08	23:34
Leuven Gasthuisberg	19:26	19:41	19:56	20:11	20:26	20:56	21:56	22:26	22:56	23:34	23:08	23:34
Leuven St-Jacobsplein	19:31	19:45	20:00	20:15	20:30	21:00	22:00	22:30	23:00	23:34	23:08	23:34
Leuven Rector De Somerplein	19:35	19:49	20:04	20:19	20:34	21:04	22:04	22:34	23:04	23:34	23:08	23:34
Leuven Station	19:39	19:53	20:08	20:23	20:38	21:08	22:08	22:38	23:08	23:34	23:08	23:34

# SATURDAY

## STATION → CENTRE → VENUE

Leuven Station	6:29	7:19	8:19	8:49	9:19	9:49	10:19	10:49	11:19	11:33	11:49	12:03	12:19	12:33	12:49
Leuven Rector De Somerplein	6:33	7:23	8:23	8:53	9:23	9:53	10:23	10:53	11:23	11:37	11:53	12:07	12:23	12:37	12:53
Leuven St-Jacobsplein	6:36	7:26	8:26	8:56	9:26	9:56	10:26	10:56	11:26	11:40	11:56	12:10	12:26	12:40	12:56
Leuven Gasthuisberg	6:40	7:30	8:30	9:00	9:30	10:00	10:30	11:00	11:30	11:44	12:00	12:14	12:30	12:44	13:00
Leuven Gasthuisberg Campus	6:43	7:33	8:33	9:03	9:33	10:03	10:33	11:03	11:33	11:47	12:03	12:17	12:33	12:47	13:03
Leuven Station	13:03	13:19	13:33	13:49	14:03	14:19	14:33	14:49	15:03	15:19	15:33	15:49	16:03	16:19	16:33
Leuven Rector De Somerplein	13:07	13:23	13:37	13:53	14:07	14:23	14:37	14:53	15:07	15:23	15:37	15:53	16:07	16:23	16:37
Leuven St-Jacobsplein	13:10	13:26	13:40	13:56	14:10	14:26	14:40	14:56	15:10	15:26	15:40	15:56	16:10	16:26	16:40
Leuven Gasthuisberg	13:14	13:30	13:44	14:00	14:14	14:30	14:44	15:00	15:14	15:30	15:44	16:00	16:14	16:30	16:44
Leuven Gasthuisberg Campus	13:17	13:33	13:47	14:03	14:17	14:33	14:47	15:03	15:17	15:33	15:47	16:03	16:17	16:33	16:47
Leuven Station	16:49	17:03	17:19	17:33	17:49	18:03	18:19	18:33	18:49	19:19	19:49	20:19	20:49	21:19	21:49
Leuven Rector De Somerplein	16:53	17:07	17:23	17:37	17:53	18:07	18:23	18:37	18:53	19:23	19:53	20:23	20:53	21:23	21:53
Leuven St-Jacobsplein	16:56	17:10	17:26	17:40	17:56	18:10	18:26	18:40	18:56	19:26	19:56	20:26	20:56	21:26	21:56
Leuven Gasthuisberg	17:00	17:14	17:30	17:44	18:00	18:14	18:30	18:44	19:00	19:30	20:00	20:30	21:00	21:30	22:00
Leuven Gasthuisberg Campus	17:03	17:17	17:33	17:47	18:03	18:17	18:33	18:47	19:03	19:33	20:03	20:33	21:03	21:33	22:03

## VENUE → CENTRE → STATION

Leuven Gasthuisberg Campus	7:12	8:22	8:52	9:22	9:52	10:22	10:52	11:22	11:37	11:52	12:07	12:22	12:37	12:52	
Leuven Gasthuisberg	7:14	8:24	8:54	9:24	9:54	10:24	10:54	11:24	11:39	11:54	12:09	12:24	12:39	12:54	
Leuven St-Jacobsplein	7:18	8:28	8:58	9:28	9:58	10:28	10:58	11:28	11:43	11:58	12:13	12:28	12:43	12:58	
Leuven Rector De Somerplein	7:21	8:01	8:31	9:01	9:31	10:01	10:31	11:01	11:31	11:46	12:01	12:16	12:31	12:46	
Leuven Station	7:25	8:05	8:35	9:05	9:35	10:05	10:35	11:05	11:35	11:50	12:05	12:20	12:35	12:50	
Leuven Gasthuisberg Campus	13:07	13:22	13:37	13:52	14:07	14:22	14:37	14:52	15:07	15:22	15:37	15:52	16:07	16:22	16:37
Leuven Gasthuisberg	13:09	13:24	13:39	13:54	14:09	14:24	14:39	14:54	15:09	15:24	15:39	15:54	16:09	16:24	16:39
Leuven St-Jacobsplein	13:13	13:28	13:43	13:58	14:13	14:28	14:43	14:58	15:13	15:28	15:43	15:58	16:13	16:28	16:43
Leuven Rector De Somerplein	13:16	13:31	13:46	14:01	14:16	14:31	14:46	15:01	15:16	15:31	15:46	16:01	16:16	16:31	16:46
Leuven Station	13:20	13:35	13:50	14:05	14:20	14:35	14:50	15:05	15:20	15:35	15:50	16:05	16:20	16:35	16:50
Leuven Gasthuisberg Campus	16:52	17:07	17:22	17:37	17:52	18:07	18:22	18:52	19:22	19:52	20:22	20:52	21:22	21:52	22:16
Leuven Gasthuisberg	16:54	17:09	17:24	17:39	17:54	18:09	18:24	18:54	19:24	19:54	20:24	20:54	21:24	21:54	22:18
Leuven St-Jacobsplein	16:58	17:13	17:28	17:43	17:58	18:13	18:28	18:58	19:28	19:58	20:28	20:58	21:28	21:58	22:22
Leuven Rector De Somerplein	17:01	17:16	17:31	17:46	18:01	18:16	18:31	19:01	19:31	20:01	20:31	21:01	21:31	22:01	22:25
Leuven Station	17:05	17:20	17:35	17:50	18:05	18:20	18:35	19:05	19:35	20:05	20:35	21:05	21:35	22:05	22:29

# TIMETABLE

Program		
8th Annual Meeting of the European Delirium Association		
Thursday, September 19, 2013		
19.00-20.30	EDA board meeting	Heilige Geest College
20.30-22.30	Dinner keynote speakers, invited speakers, local organizing committee and EDA board members	Heilige Geest College
<b>Friday, September 20, 2013</b>		
07.30-08.30	Registration and poster set-up	Entrance hall O&NI
08.30-08.45	Opening by Koen Milisen (BE) and Alastair MacLulich (UK)	GA 3
08.45-10.15	Invited lectures - Chairs: Meera Agar, Alessandro Morandi	GA 3
	<b>Colin Cunningham (IE): Delirium Pathophysiology: do we have any idea of what is going on?</b>	GA 3
	<b>Jan Schieveld (NL): Pediatric Delirium at the PICU, Clinical Approach, &amp; New Developments</b>	GA 3
	<b>Arjen Slioter (NL): Effects of intensive care unit environment on the course of delirium</b>	GA 3
10.15-10.45	Coffee break	Entrance hall O&NI
10.45-11.30	<b>Headline results - Chairs: Geert Meyfroidt, Etienne Joosten</b>	GA 3
	<b>Headline results 1: Tim Girard (US): Subtypes of Delirium during Critical Illness as Predictors of Long-Term Cognitive Impairment</b>	GA 3
	<b>Headline results 2: Valerie Page (UK): Haloperidol Effectiveness in ICU delirium - the HOPE-ICU trial</b>	GA 3
11.30-12.30	<b>Keynote lecture by Wesley Ely (US): Delirium and Critical Illness-Associated Brain Injury</b> Chairs: Valerie Page, Sophia De Rooij	GA 3
12.30-14.00	Lunch and poster session (poster session with jury from 13.00 until 14.00)	Entrance hall O&NI
14.00-15.30	<b>Parallel sessions - oral presentations</b>	
	<b>Oral presentations: session 1 - Chairs: Colin Cunningham, Stefan Kreisel</b>	GA 1
	<b>G. Caplan (AU): Insights to the pathophysiology of delirium through secretogranin family</b>	GA 1
	<b>D. Veldhuijzen (NL): Intraoperative dexmedetomidine and delirium after cardiac surgery: a randomized clinical trial</b>	GA 1
	<b>E. Wesselink (NL): Intraoperative hypotension and delirium after cardiac surgery</b>	GA 1
	<b>M. Boks (NL): Elevated postoperative IL-6 levels in delirious elderly patients</b>	GA 1
	<b>R. Hall (UK): CSF levels of neopterin are elevated in delirium after hip fracture</b>	GA 1
	<b>V. Page (UK): Plasma beta-amyloid ratio and risk of delirium in critically ill patients: an a priori analysis of the HOPE-ICU randomized controlled trial</b>	GA 1
	<b>Oral presentations: session 2 - Chairs: Lauria Jouko, Bart Van Rompaey</b>	GA 3
	<b>H. Verloo (CH): Nursing strategies to detect and prevent delirium among home dwelling older adults after recent hospitalization: a RCT pilot study</b>	GA 3
	<b>L. Van de Steeg (NL): The effect of an e-learning course for nurses on provided delirium care: results of a stepped wedge cluster randomized trial</b>	GA 3
	<b>H. Rhodius-Meester (NL): Development and Validation of the Informant Assessment of Geriatric Delirium Scale (I-AGeD). Recognition of delirium in geriatric patients</b>	GA 3
	<b>M. Van den Boogaard (NL): Stress experienced in caring for patients with delirium in a university orthopedic International validation of the delirium prediction model for ICU patients (PRE-DELIRIC): a multicenter observational study</b>	GA 3
	<b>M. Leventhal (CH): Stress experienced in caring for patients with delirium in a university orthopedic and trauma surgery center</b>	GA 3
	<b>A. Morandi (IT): Delirium Superimposed on dementia and functional outcome in elderly patients admitted to a rehabilitation setting</b>	GA 3
15.30-16.00	Coffee break	Entrance hall O&NI

16.00-17.30	<b>Parallel sessions – workshops and symposia</b> Workshop 1: Andy Teodorczuk (UK), Elke Detroyer (BE), Emma Reynish (UK), Koen Milisen (BE), <i>Models of Delirium Education for Healthcare Workers</i> Workshop 2: Etienne Joosten (BE), Marc Sabbe (BE), Geert Meyfroidt (BE), and Mathieu Vandenbulcke (BE); <i>Dilemmas in pharmacological treatment of delirium</i> Symposium 1: Karin Neufeld (US), James Rudolph (US), Frederick Sieber (US), Rakesh Ahora (CA); <i>The Epidemiology, Outcomes, and Prevention of Post-operative Delirium among the Elderly</i> Symposium 2: Dika Luijendijk (NL), Agnes Blom (NL), Daisy Quispel (NL), Anne Stroomer-van Wijk (NL); <i>Delirium in elderly patients at home: Easily missed and underresearched</i>	HP 4 HP 8 GA 1 GA 3 GA 3
17.30-17.40	Instructions night-out	City Hall
18:45-20:00	Guided tour to Faculty Club (Meeting point: City Hall - Grote Markt 9)	Faculty Club
20.00-23.00	Night-out: Conference dinner	
<b>Saturday, September 21, 2013</b>		
07.30-08.30	Registration and poster set-up	Entrance hall O&NI
08.30-08.40	Introduction by Koen Milisen (BE) and Alasdair MacLullich (UK)	GA 3
08.40-08.45	Newsletter Annals of Delirium by Valerie Page (UK)	GA 3
08.45-10.15	Invited lectures - Chairs: Stefan Kreisel, Bugitta Olofsson Meera Agar (AU): <i>Prevention and treatment of delirium in palliative care setting</i> Jude Partridge (UK): <i>Delirium recall, delirium-related distress and its relevance to older surgical patients</i> Joris Vandenbergh (BE): <i>Understanding side-effects and risks of antipsychotic medication</i>	GA 3 GA 3 GA 3
10.15-10.45	Coffee break	Entrance hall O&NI
10.45-11.30	Headline results - Chairs: Alessandro Morandi, Valerie Page Headline results 3: Elke Detroyer (BE): <i>The Effects of an Interactive E-learning Tool for Delirium on Nursing and Patient Outcomes: a Controlled Trial</i>	GA 3
	Headline results 4: Daniel Davis (UK): <i>Delirium and Terminal Cognitive Decline in Relation to Dementia Neuropathology: results in 992 autopsies from three population-based cohort studies</i>	GA 3
11.30-12.30	Keynote lecture by Donna Fick (US): <i>Research and Practice Innovations in Delirium Superimposed on Dementia</i> Chairs: Mathieu Vandenbulcke, Christine Thomas Lunch and poster session (informal)	GA 3
12.30-14.00		
14.00-15.30	<b>Parallel sessions – workshop, symposium and oral presentations</b> Symposium 3: Mei Sian Chong (SG), Laura Tay (SG), Jasmine Kang (SG), Mark Chan (SG): <i>Experience of a Specialised Delirium Management Unit in an acute geriatric care setting: The Geriatric Monitoring Unit (GMU)</i> Workshop 3: Alasdair MacLullich (UK) and David Meagher (IE): <i>Implications of the new DSM-5 criteria for delirium research and clinical practice</i> Oral presentations: session 3 - Chairs: Nele Van Den Noortgate, Wolfgang Hasemann F. Driessens (BE): <i>Experiences of family members of geriatric patients with a delirium: a qualitative study</i> E. Ista (NL): <i>The Sophia Observation withdrawal symptoms-pediatric delirium scale (SOS-PD) as a screening tool</i> O. Todd (DE): <i>Poor Sleep – an early sign of incipient Delirium, or a risk factor in itself? A Clinical Observational Study</i> G. Bellelli (IT): <i>Anesthesia and post-operative delirium in elderly patients undergoing hip fracture surgery</i> S. Kreisel (DE): <i>Screening for delirium in patients with acute ischemic stroke: Pitfalls and how to overcome them</i> B. Khan (US): <i>Relationship between African American Race and Delirium in the Intensive Care Unit</i>	GA 1 HP 4 GA 3 GA 3 GA 3 GA 3 GA 3 GA 3
15.30-16.00	Coffee break	Entrance hall O&NI
16.00-16.10	Announcement EDA 2014 by Alessandro Morandi (IT)	GA 3
16.10-16.30	Awards, closing and farewell	GA 3

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EDA 2013

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# Friday



# Delirium Pathophysiology: do we have any idea of what is going on?

Colm Cunningham<sup>1</sup>, Carol Murray<sup>1</sup>, Donal Skelly<sup>1</sup>, Robert Field<sup>1</sup>,  
Eadaoin Griffin<sup>1</sup>, Daniel Davis<sup>2</sup>, Alasdair MacLulich<sup>3</sup>

<sup>1</sup>*Trinity College Dublin, DUBLIN, Ireland*

<sup>2</sup>*University of Cambridge, CAMBRIDGE, United Kingdom*

<sup>3</sup>*University of Edinburgh, EDINBURGH, United Kingdom*

**Background:** The pathophysiology of delirium is not well understood and remains very significantly understudied. Lack of animal models has contributed to this, but translation of existing data from basic research has also been slow to develop. To progress in our understanding of delirium etiology it is necessary that the field formulates new hypotheses or adopts those arising from animal research and tests these hypotheses directly in clinical cohorts.

**Methods:** Our group has developed relevant animal models to study mechanisms of systemic inflammation-induced acute CNS dysfunction on a background of existing neurodegenerative states with good face validity for delirium susceptibility. These models have made explicit predictions for clinical delirium and we have begun to test these hypotheses in collaboration with clinical colleagues.

**Results:** These works have proposed and proved that microglia are primed by prior degenerative pathology. Despite this hypothesis gaining traction in the field, no delirium researcher has directly tested this hypothesis in humans. We have shown that prior hypocholinergia and systemic inflammation combine to induce acute cognitive dysfunction but serum anticholinergic activity and acetylcholinesterase inhibition in ICU have dominated clinical investigations of the cholinergic hypothesis. We have also shown that decreased synaptic density and increased axonal pathology are associated with predisposition to delirium and we propose strategies to make clear associations between prior pathological patterns and delirium predisposition. Finally, we have identified 3 inflammatory pathways that directly contribute to acute CNS dysfunction in animal models and we propose that epidemiological studies and even clinical trials with existing approved drugs could clarify whether these pathways are causative in clinical delirium.

**Conclusion:** The aim of this lecture is to synthesise our current views on delirium pathophysiology and to set these against the current state of knowledge of clinical delirium with a view to stimulating discussion and provoking further clinical study.

## INVITED LECTURE

# Pediatric Delirium at the PICU, Clinical Approach & New Developments

Jan Schieveld

*Maastricht University Medical Centre+, MAASTRICHT, Nederland*

'The brain is not an organ, but a set of organ-systems' (C.Thomas Gualtieri, 2002). And it is so huge, that there is room enough for pediatric: -neurologists, -intensivists, -surgeons, -anesthesiologists, -nurses and other therapists as well and then there is still room enough for even neuropsychiatrists. Due to (critical) illness the brain frequently responds with 'five reaction types': fever, sickness behavior, pediatric delirium (PD), catatonia and epilepsy. These all can lead to acute emotional & behavioral disturbances- and or even refractory agitation (RA) - in an already critically ill child at the PICU and should be considered as a serious complication ('Delirium is acute brain failure' Lipowski, 1987). The pediatric neuropsychiatrist should play a role in the interdisciplinary team in trying to solve his/her part of the problem of the differential diagnosis and by giving treatment advice. So the goals of this talk are to present you with information regarding 1) three of these reaction types: sickness behavior, PD and catatonia in relation to 2) TBI (Traumatic Brain Injury) in the broadest sense of the word, 3) a flowchart regarding PD and RA and their relations in the whole context of acute emotional & behavioral disturbance at the PICU, and 4) some new developments regarding 4.1) the DSM- 5 and 4.2) anti NMDA receptor encephalitis.

## INVITED LECTURE

# Effects of Intensive care unit environment on the course of delirium

Arien Slooter

*University Medical Centre Utrecht, UTRECHT, Nederland*

Delirium is a frequent condition in Intensive Care Unit (ICU) patients with limited options for prevention and therapy. Whereas, non-pharmacological strategies can prevent delirium in non-ICU patients, there are very few studies on the effects of these measures in ICU patients. Still, the ICU environment with continuous light and noise, around the clock personnel and lack of orientation points is assumed to play a role in the development of delirium. The ICU of our institution recently moved to a new location, providing a unique opportunity to study the effects of a changed ICU environment on the course of delirium.

We compared the occurrence of delirium between a conventional ICU with wards, and a single-room ICU. In the new setting, all patients have separate rooms designed to reduce noise and improve exposure to daylight. Other factors did not differ between the two study periods. Delirium was assessed daily with the Confusion Assessment Method for the ICU (CAM-ICU) by research physicians combined with evaluation of medical and nursing charts.

We found that a change in ICU environment can decrease the number of delirium days during ICU admission (mean -0.4 days, 95% Confidence Interval: -0.7 to -0.1,  $p=0.005$ ). The incidence of delirium during ICU stay was however similar in the ICU with wards (51%) and in the single-room ICU (45%,  $p=0.53$ ).

Reducing the duration of delirium is of pivotal importance to ICU patients as each additional day with delirium in the ICU has been found to increase the risk of death with 10%. Our findings broaden the evidence for the effectiveness of non-pharmacological measures in the treatment of delirium. As the ICU environment appears to influence the course of delirium, non-pharmacological anti-delirium measures deserve more attention in Intensive Care Medicine.

## HEADLINE RESULT

# Subtypes of Delirium during Critical Illness as Predictors of Long-Term Cognitive Impairment

Timothy Girard<sup>1</sup>, Pratik Pandharipande<sup>1</sup>, James Jackson<sup>1</sup>, Alessandro Morandi<sup>2</sup>, Jennifer Thompson<sup>1</sup>, Ayumi Shintani<sup>1</sup>, Gordon Bernard<sup>1</sup>, Robert Dittus<sup>1</sup>, Wes Ely<sup>1</sup>

<sup>1</sup>*Vanderbilt University School of Medicine, NASHVILLE, United States of America*

<sup>2</sup>*Geriatric Research Group, BRESCIA, Italy*

**Background:** Numerous risk factors, including sepsis, hypoxia, sedative exposure, and others, contribute to delirium during critical illness. It is unknown whether adverse long-term cognitive outcomes associated with delirium are predicted by specific risk factor-defined subtypes or by all subtypes of delirium.

**Methods:** In a prospective cohort study, we examined adult medical/surgical ICU patients with respiratory failure and/or shock daily for delirium using the Confusion Assessment Method-ICU and determined subtypes of delirium (not mutually exclusive) by identifying concomitant presence of severe sepsis, hypoxemia, metabolic (renal or hepatic) dysfunction, and sedative exposure on a daily basis. Three and twelve months after hospital discharge, we evaluated cognitive outcomes using the Repeatable Battery Assessment of Neuropsychological Status (RBANS). We used multiple linear regression to separately analyze associations between the duration of each subtype of delirium and RBANS global cognition scores at 3- and 12-month follow-up, adjusting for potential confounders.

**Results:** Of 821 patients enrolled, 252 died prior to 3-month follow-up and another 59 died prior to 12-month follow-up. Of survivors, 467 were assessed at 3- and/or 12-month follow-up; during their ICU stay, the survivors had septic delirium for a median [interquartile range] of 0 [0-3] days, hypoxic delirium for 1 [0-3] day, metabolic delirium for 0 [0-1] days, and sedative-associated delirium for 1 [0-3] day. Longer durations of septic ( $p<0.001$ ), hypoxic ( $p<0.01$ ), and sedative-associated delirium ( $p<0.01$ ) predicted cognitive impairment at 3 months, whereas metabolic delirium did not ( $p=0.51$ ). Similarly, longer durations of septic ( $p=0.03$ ) and sedative-associated delirium ( $p=0.04$ ) predicted cognitive impairment at 12 months, whereas hypoxic ( $p=0.09$ ) and metabolic delirium ( $p=0.94$ ) did not.

**Conclusion:** Whether diagnosed in the setting of sepsis, hypoxia, or sedation, duration of delirium independently predicts long-term cognitive impairment after critical illness. Future studies are needed to determine if mechanisms of cognitive impairment differ in various subtypes of delirium.

## HEADLINE RESULT

# HalOPERidol Effectiveness in ICU delirium - the HOPE-ICU trial

Valerie Page<sup>1</sup>, E Wesley Ely<sup>2</sup>, Simon Gates<sup>3</sup>, Xiao Bei Zhao<sup>1</sup>, Timothy Alce<sup>1</sup>, Ayumi Shintani<sup>2</sup>, Gavin Perkins<sup>3</sup>, Daniel McAuley<sup>4</sup>

<sup>1</sup>*Watford General Hospital, WATFORD, United Kingdom*

<sup>2</sup>*Vanderbilt University Medical Center, NASHVILLE, United States of America*

<sup>3</sup>*University of Warwick, COVENTRY, United Kingdom*

<sup>4</sup>*Queens University, BELFAST, United Kingdom*

**Background:** Delirium is frequently diagnosed in critically ill patients and associated with poor clinical outcomes. Haloperidol is the most commonly recommended and used drug for delirium with limited evidence. The aim of this study was to establish if early treatment with haloperidol would improve number of days alive without delirium or coma in critically ill patients.

**Methods:** A double-blind, allocation concealed, placebo-controlled randomised trial in a general adult intensive care unit (ICU) in the UK in critically ill patients requiring mechanical ventilation was undertaken. Patients were randomised (1:1) to receive haloperidol 2,5mgs or 0,9% saline placebo intravenously every 8 hours. Study drug was discontinued on ICU discharge, once delirium-free and coma-free for 2 consecutive days, or following a maximum of 14 days treatment. Delirium was assessed using the Confusion Assessment Method-ICU. The primary outcome was number of days alive, without delirium, and without coma to day 14.

**Findings:** One hundred and forty two patients were randomised, 141 included in the final analysis (71 haloperidol, 70 placebo). Patients in the haloperidol group spent a similar number of days alive without delirium and without coma as patients in the placebo group (median 5 [IQR 0-10] vs median 6 [IQR 0-11] days;  $p= 0,53$ ). No differences were found in secondary clinical outcomes. No patient had a serious adverse event related to study drug.

**Interpretation:** This study found that early treatment with haloperidol does not modify the prevalence or duration of delirium and coma in critically ill patients. These results do not support the hypothesis that haloperidol is effective in the management of delirium in high risk critically ill patients.

**Funding and registration:** The trial is registered on the International Standard Randomised Controlled Trial Registry (ISRCTN83567338) and funded by the National Institute for Health Research (NIHR).

## KEYNOTE LECTURE

# Delirium and Critical Illness-Associated Brain Injury

E Wesley Ely

*Vanderbilt University Medical Center, NASHVILLE, United States of America*

Critical illness-associated brain injury is an often-disabling form of cognitive impairment affecting survivors of critical illness. We hypothesized that in-hospital delirium duration and sedative medications are risk factors for critical illness-associated brain injury. In a recently completed prospective cohort study, we enrolled adult medical/surgical ICU patients with respiratory failure or shock, measured delirium and sedative exposure in the hospital, and assessed global cognition and executive function outcomes 3 and 12 months post-discharge using the Repeatable Battery for Assessment of Neuropsychological Status (RBANS) and Trail Making Test-B. Associations of delirium duration and sedative doses with outcomes were assessed using linear regression, adjusting for potential confounders.

Of 821 patients enrolled, 6% had baseline cognitive impairment and 74% developed delirium. At 3 months, 40% of patients had global cognition scores 1.5 standard deviations (SD) below population means (similar to patients with moderate traumatic brain injury [TBI]), and 26% scored 2 SD below (similar to patients with Alzheimer's disease [AD]). Deficits occurred in both older and younger patients and persisted to 12 months, with 34% and 24% having scores similar to TBI and AD patients, respectively. Longer delirium duration was independently associated with worse global cognition at 3 ( $P<0.01$ ) and 12 months ( $P=0.04$ ) and worse executive function at 3 and 12 months (both  $P<0.01$ ). Higher benzodiazepine doses were associated with worse executive function at 3 months ( $P=0.04$ ).

In conclusion, medical and surgical ICU patients are at great risk for critical illness-associated brain injury. Duration of delirium is a modifiable risk factor.

# Insights to the pathophysiology of delirium through the secretogranin family

Gideon Caplan<sup>1</sup>, Jian Tai<sup>2</sup>, Anne Poljak<sup>2</sup>, Mark Hill<sup>2</sup>

<sup>1</sup>*Prince of Wales Hospital, SYDNEY, Australia*

<sup>2</sup>*University of New South Wales, SYDNEY, Australia*

**Background:** Delirium is a syndrome that commonly affects older patients and is associated with subsequent permanent functional and cognitive decline. Previous studies suggested a link with a variety of altered neurotransmitter levels. Therefore we have studied the mechanism of neurotransmission, focussing on a group of proteins known as secretogranins, which are found in synaptic vesicles and released into CSF during neurotransmission, to investigate whether the mechanism of neurotransmission is affected. We examined whether the level of secretogranins are altered in patients with delirium compared with dementia.

**Methods:** Cohort study comparing delirium with Alzheimer's disease, using proteomics using iTRAQ and Western blotting targeting members of the secretogranin family: chromogranin A; and secretogranin 3, in cerebrospinal fluid and serum.

**Results:** Proteomics found that the family of secretogranins were dysregulated in delirium. Western blotting of patient CSF confirmed decreased chromogranin A in all patients with delirium and secretogranin 3 in two-thirds of patients with delirium compared with dementia.

**Conclusion:** This is the first evidence of a role of secretogranins in delirium. Decreased levels of chromogranin A and secretogranin 3 in delirium suggests a general impairment of neurotransmission may be involved, perhaps as a result of neuronal damage or death, rather than changes to a specific neurotransmitter pathway.

# Intraoperative dexamethasone and delirium after cardiac surgery: a randomized clinical trial

Dieuwke Veldhuijzen<sup>1</sup>, Arjen Slooter<sup>2</sup>, Anne-Mette Sauer<sup>1</sup>, Maarten Van Eijk<sup>1</sup>, John Devlin<sup>3</sup>, Diederik Van Dijk<sup>1</sup>

<sup>1</sup>University Medical Center Utrecht, UTRECHT, Nederland

<sup>2</sup>UMC Utrecht, UTRECHT, Netherlands

<sup>3</sup>Northeastern University, BOSTON, United States of America

**Background:** Delirium is common after cardiac surgery and is related in part to the systemic inflammatory response triggered by surgery and the use of cardiopulmonary bypass. The objective of this study was to investigate whether intraoperative, high-dose dexamethasone influences the incidence of postoperative delirium.

**Methods:** This single-center, prospective study was nested within the DExamethasone for Cardiac Surgery (DECS) trial that randomized patients 18 years or older, undergoing cardiac surgery with cardiopulmonary bypass, to receive, in a double-blind fashion, either dexamethasone 1 mg/kg or placebo at the induction of anesthesia. Over the first 4 postoperative days, we compared the incidence of delirium between these two groups. Delirium was assessed by twice-daily Confusion Assessment Method (CAM)-ICU screening in the ICU, or after ICU discharge by the CAM accompanied by chart review. Also, restraint use, and administered haloperidol, sedatives, and opioids were monitored.

**Results:** In total 768 of the 4494 enrolled patients in the large multicenter DECS study were included in this study, in which complete delirium data was available for 737 (96%) patients. The incidence of delirium was similar between the dexamethasone and placebo groups: 14.2% versus 14.9%, respectively; odds ratio 0.95, 95% confidence interval 0.63-1.43. Among patients who developed delirium, the median (interquartile range) duration of delirium was similar between the dexamethasone and placebo groups: 2 (1-2) days versus 2 (1-3) days, respectively;  $p=0.45$ . Restraint use and the administration of haloperidol, sedatives, and opioids were also similar between the two groups.

**Conclusions:** The intraoperative administration of dexamethasone, an agent with potent anti-inflammatory effects, influences neither the incidence nor duration of delirium in the first 4 days after cardiac surgery.

# Intraoperative hypotension and delirium after cardiac surgery

Esther Wesselink, Teus Kappen, Diederik Van Dijk, Wilton Van Klei, Arjen Slooter

*UMC Utrecht, UTRECHT, Netherlands*

**Background:** Delirium is a frequent complication after cardiac surgery. Although the pathophysiology of postoperative delirium is not fully understood, inadequate cerebral perfusion due to intraoperative hypotension (IOH) is one of the proposed mechanisms [1]. The aim of this study was to investigate the association between IOH and delirium after cardiac surgery.

**Methods:** This observational cohort study was nested within the DECS-trial [2]. Adults who participated in this study and who underwent cardiac surgery in the UMC Utrecht (n=736) were followed by research personnel during the first four postoperative days for occurrence of delirium. The CAM(-ICU) and inspection of medical records were used to obtain outcome data. Two absolute and two relative predefined thresholds for IOH [3] were chosen and the area under the curve was calculated. The outcome was occurrence of delirium. Multivariable logistic regression analysis of complete cases (n=646; 88%) was used to investigate the association between IOH and occurrence of postoperative delirium. The results were adjusted for age, sex, mean number of IOH episodes, duration of surgery, duration of cardiopulmonary bypass, history of hypertension, history of stroke.

**Results:** The baseline average of the Mean Arterial Pressure (MAP) was 95 (SD 17) and 88 patients (14%) developed delirium. Independent of IOH definitions, there was no significant effect of IOH on delirium in crude (OR 1.00; 95%: CI 1.00-1.00) and adjusted (OR 1.00; 95%: CI 1.00-1.00) logistic regression analyses.

**Discussion:** This study showed that IOH was not associated with occurrence of delirium after cardiac surgery. However, as cardiac surgery and anesthesia were performed according to highly standardized procedures in a particular subgroup of patients, the contrast between patients could be too small to detect an effect of IOH.

## Elevated postoperative IL-6 levels in delirious elderly patients

Marije Boks, THG Bongaerts, IB Hovens, AR Absalom, GH De Bock, GJ Izaks, BL Van Leeuwen

*University Medical Center Groningen, GRONINGEN, Nederland*

**Background:** Delirium is a common postoperative complication in elderly patients. The etiology of this phenomenon is still unclear. Since previous research indicates that an inflammatory process might attribute to the onset of delirium, we hypothesized that patients with a high level of interleukin-6 (IL-6) immediately after surgery, would have a larger risk for delirium.

**Methods:** Forty-six patients, aged 65 years and older, underwent elective surgery for a solid malignant tumour. Immediately after skin closing, a blood sample was obtained. In this sample, the IL-6 concentration was determined using ELISA. Symptoms of delirium were scored 3 times per 24 hours during the first postoperative week. In case of symptoms, a psychiatrist or geriatrician was consulted and the delirium diagnosed according to DSM-IV criteria. The IL-6 levels of the delirious patients were compared with those of the patients without delirium using the Mann-Whitney U Test.

**Results:** Ten patients (22%) developed a postoperative delirium (POD). Preoperative IL-6 levels in this group were similar to the preoperative IL-6 levels in the group without POD: median (75<sup>th</sup> percentile), 00.00 (0.34) and 00.00 (1.05) pg/ml, respectively ( $p=0.429$ ). Postoperative IL-6 levels were significantly higher in the group with POD: median (25<sup>th</sup>-75<sup>th</sup> percentile) 461.25 (250.32-528.90) pg/ml versus 12.58 (11.58-78.27) pg/ml in the group without POD ( $p=0.003$ ).

**Conclusion:** Patients who developed postoperative delirium had higher levels of interleukin-6 immediately after surgery than patients who did not develop postoperative delirium. This supports the hypothesis that postoperative inflammatory response is associated with an increased risk for postoperative delirium. Since this study was performed within a small population, further research on this topic and other inflammatory markers is required.

# CSF levels of neopterin are elevated in delirium after hip fracture

Roanna Hall<sup>1</sup>, Leiv Otto Watne<sup>2</sup>, Vibeke Juliebø<sup>2</sup>, Torgeir Bruun Wyller<sup>2</sup>, Alasdair MacLulich<sup>1</sup>, Durk Fekkes<sup>3</sup>

<sup>1</sup>*University of Edinburgh, EDINBURGH, United Kingdom*

<sup>2</sup>*University of Oslo, OSLO, Norway*

<sup>3</sup>*Erasmus Medical Center, ROTTERDAM, Netherlands*

**Background:** Delirium pathophysiology is poorly understood, but an exaggerated central inflammatory response to peripheral insults and oxidative stress is potentially involved. Neopterin, a marker of cellular immune activation and oxidative stress, has recently been shown to be elevated in serum in delirium after cardiac surgery. We hypothesised that cerebrospinal fluid (CSF) and serum neopterin would be elevated in delirium after hip fracture.

**Methods:** Patients with acute hip fracture were recruited at two sites, The Royal Infirmary of Edinburgh and Oslo University Hospital. Delirium assessments were performed according to the Confusion Assessment Method pre-operatively and post-operatively over two weeks. CSF was collected at the onset of spinal anaesthesia, with a contemporaneous serum sample. Neopterin was measured using high performance liquid chromatography after acid oxidation. Group comparisons were with Mann-Whitney U.

**Results:** One hundred and thirty-nine patients were included (N=54 from Edinburgh, N=85 from Oslo), 46% with delirium, 36 men. Median age was 85 years (79-89) in those with delirium and 82 years (70-88) in those without ( $p=0.02$ ). CSF and serum neopterin correlated positively (Spearman's Rho 0.652,  $p<0.01$ ). CSF neopterin was higher in the delirium group (median 29.6nmol/ml (22.3-40.4) vs. 24.7nmol/ml (19.4-30.6),  $p<0.01$ ). Serum neopterin was also higher in the delirium group (median 37.0nmol/ml (26.2-51.1) vs. 27.1nmol/ml (22.6-40.7),  $p<0.01$ ). Neopterin levels were not different between those who did or did not use NSAIDs or Aspirin. Serum but not CSF neopterin levels were significantly higher in those with active cancer or infection; exclusion of these patients did not alter results.

**Conclusions:** This study is the first to demonstrate elevated neopterin levels in CSF in delirium, and confirms the earlier finding of elevated serum neopterin in delirium. This suggests a role for a cellular immune response in delirium; activated microglia may be a source of intrathecal neopterin.

# Plasma beta-amyloid ratio and risk of delirium in critically ill patients: an a priori analysis of the Hope-ICU randomized controlled trial

Timothy Alce<sup>1</sup>, Daniel Davis, MB BCh<sup>2</sup>, Xiao Zhao, BSc<sup>1</sup>, Daniel F. McAuley MB ChB, PhD<sup>3</sup>, Valerie Page, MB BCh<sup>1</sup>

<sup>1</sup>West Hertfordshire Hospitals NHS Trust, WATFORD, United Kingdom

<sup>2</sup>University of Cambridge, CAMBRIDGE, United Kingdom

<sup>3</sup>Queen's University of Belfast, BELFAST, United Kingdom

**Background:** Beta amyloid protein accumulates in the brains of individuals with Alzheimer disease (AD) and is detectable in plasma. Cognitive impairment predisposes to delirium, and lower plasma beta-amyloid (Ab) 42/40 is associated with higher risk of cognitive decline among elderly persons without dementia. One study of a subgroup of 54 critically ill patients without systemic inflammation demonstrated low plasma Ab42:Ab40 ratio is independently associated with delirium.

The aim of this exploratory study was to assess the potential of plasma Ab42:Ab40 ratio as a biomarker for duration of delirium in critically ill patients.

**Methods:** Hope-ICU was a double-blind, allocation concealed, placebo-controlled randomised trial at a UK general adult intensive care unit in 142 critically ill patients requiring mechanical ventilation. Patients were randomised (1:1) to receive haloperidol 2,5mgs or 0,9% saline placebo intravenously every 8 hours. Exclusions included documented moderate or severe dementia. The Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE), a surrogate assessment of premorbid cognitive function, was collected. Blood was drawn within 72 hours of randomisation for plasma beta-amyloid Ab42 and Ab40. Delirium was assessed using the Confusion Assessment Method-ICU.

**Results:** Data was available from 76 consecutive patients of whom 37 patients received haloperidol and 38 placebo. The distribution of the Ab42:Ab40 ratio was skewed with no difference between patients who received haloperidol or placebo (median (IQR) 0.32 (0.22-0.49) vs 0.26 (0.36-0.62) respectively). Regression analysis on the Ab42:Ab40 ratio and risk of delirium showed patients in the highest third of Ab42:Ab40 ratio compared to those in the lowest had approximately 6% more days free of delirium or coma, although this was not statistically significant.

**Conclusion:** There was no association between the plasma  $\beta$ -amyloid 42/40 ratio and the number of days in delirium or coma in mechanically ventilated patients. Long term follow up cognitive data is awaited.

# Nursing strategies to detect and prevent delirium among home dwelling older adults after recent hospitalization: a RCT pilot study

Henk Verloo

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Switzerland*

**Background:** A third of hospitalized older adults developing a delirium are discharged home prior to complete resolution of their delirium symptoms. Delirium can also appear shortly after hospital discharge. Perhaps the most effective strategy in controlling delirium at home is to implement an early detection and prevention strategy.

**Method:** Using a RCT pilot study design, 103 patients aged 65 and older were recruited between February and November 2012 and randomized into an experimental (EG =51) and a control group (CG =52). Besides the usual home care, nursing interventions tailored to detect/prevent delirium were given to the EG at 48 hours, 72 hours, 7 days, 14 days and 21 days after discharge. Socio-demographic characteristics, BMI, drug prescription, comorbidities, delirium symptoms, cognitive impairment and functional status were assessed at  $T_1$  (study entry) and  $T_2$  (1 month). Delirium symptoms, cognitive impairment and functional status were measured with CAM, MMSE and ADL/IADL. Descriptive and bivariate methods were used to analyse the data.

**Results:** No statistical difference was found between EG and CG on any variable at  $T_1$ . At  $T_2$ , no statistical differences were found between the groups for symptoms of delirium ( $p= 0.085$ ), cognitive impairment ( $p= 0.151$ ) and functional status ( $p= 0.235$ ). However, the results showed a beneficial improvement in delirium symptoms, cognitive functioning, and functional status at  $T_2$  in the EG.

**Conclusion:** Nursing interventions to detect/prevent delirium at home are feasible and acceptable. Nursing interventions to prevent delirium appear to be effective but a large-scale RCT study should confirm this.

# The effect of an e-learning course for nurses on provided delirium care: results of a stepped wedge cluster randomized trial

Lotte Van de Steeg, Maaïke Langelaan, Roelie IJkema, Cordula Wagner

*NIVEL, UTRECHT, Netherlands*

**Background:** Delirium occurs frequently in older hospitalised patients and is associated with several adverse outcomes. Early recognition of patients at risk for delirium could give healthcare professionals the opportunity to proactively identify and minimise risk factors. Efforts are being made in the Netherlands to improve early recognition of at risk older patients by nursing staff.

**Methods:** This stepped wedge cluster randomized trial has assessed the effects of a complementary delirium e-learning course on the implementation of a quality improvement initiative. This initiative aims to enhance the recognition and management of delirium in older patients by introducing delirium risk screening, among other things. The primary outcome used to determine the effectiveness of e-learning was the percentage of older patients screened for delirium risk. Delirium risk screening is routinely recorded by nursing staff in patient records. This data was gathered in 18 hospitals during 11 months, through monthly reviews of patient records of patients aged 70 or over.

**Results:** Of the 3,273 included patient records, 1,862 were reviewed during the control phase of the stepped wedge trial and 1,411 during the intervention phase. A total of 1,125 nurses included in the study received an invitation for the e-learning course.

In this trial the e-learning course on delirium did have a significant positive effect on the nursing staff's delirium risk screening rate. The effect of e-learning on the delirium screening rate was larger in internal medicine departments than in surgical departments participating in the study.

**Conclusion:** This study demonstrated that an e-learning course on delirium aimed at nurses from internal medicine and surgical departments of Dutch hospitals increased screening of older patients for delirium risks, indicating an improvement in the recognition of at risk patients. This shows that e-learning can be a valuable instrument for hospitals when implementing delirium care improvements.

# Development and Validation of the Informant Assessment of Geriatric Delirium Scale (I-AGeD). Recognition of delirium in geriatric patients

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**Objectives:** Delirium is common in older patients admitted to hospital. Information obtained from patient's relatives or caregivers may contribute to improved detection. Our aim was to develop a caregiver based questionnaire, the Informant Assessment of Geriatric Delirium (I-AGeD), to assist in better recognition of delirium in elderly patients.

**Methods:** A cross-sectional observational study using a scale construction patient cohort and two validation cohorts was conducted at geriatric departments of two teaching hospitals in the Netherlands. Delirium status, based on DSM-IV criteria, was assessed directly on admission by a geriatric resident and research coordinator and evaluated within the first 48 hours of admission. Questionnaire item sampling was based on discussions with an expert panel. Caregivers filled out a 37-item questionnaire of which 10 items were selected reflecting delirium symptoms, based on their discriminatory abilities, internal consistency and interitem correlations.

**Results:** A total of 88 patients with complete study protocols in the construction cohort were included. Average age was 86.4 (SD 8.5), and 31/88 patients had delirium on admission. Internal consistency of the 10-item I-AGeD was high (Cronbach's alpha=.85). At a cut-off score of >4 sensitivity was 77.4% and specificity 63.2%. In patients without dementia, sensitivity was 100% and specificity 65.2%. Validation occurred by means of 2 validation cohorts, one consisted of 59 patients and the other of 33 patients. Sensitivity and specificity in these samples ranged from 70.0-88.9% and 66.7%-100%.

**Conclusion:** The newly constructed caregiver based I-AGeD questionnaire is a valid screening instrument for delirium on admission to hospital in geriatric patients.

# Stress experienced in caring for patients with delirium in a university orthopedic International validation of the delirium prediction model for ICU patients (PREDELIRIC); a multicenter observational study

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**Introduction:** Delirium is a serious and frequent disorder in intensive care unit (ICU) patients. The aim of this study was to internationally validate and re-calibrate the existing PREdiction of DELIRium ICu (PREDELIRIC) model to predict delirium in ICU patients.

**Methods:** A prospective multicenter cohort study was performed in 8 ICU's in 6 countries (*table 1*). The 10 predictors (age, APACHE-II, urgent and admission category, infection, coma, sedation, morphine use, urea level, metabolic acidosis) were collected within 24 hours after ICU admission. CAM-ICU was used to identify ICU delirium.

**Results:** 2,852 adult ICU patients were screened and 1,824 (64%) were included. Main exclusion reasons were length of stay <1day (19.1%) and sustained coma (4.1%). Mean  $\pm$  CAM-ICU compliance was  $82 \pm 16\%$  and interrater reliability  $0.87 \pm 0.17$ . Overall delirium incidence was 19.9% (range 27.2%). Despite significant differences between centres on all ten predictors, the overall area under the receiver operating characteristic curve (AUROC) of the 8 centers was 0.77 (95%CI: 0.74-0.79). The linear predictor and intercept of the prediction rule were adjusted and resulted in good re-calibration of the PREDELIRIC model.

**Conclusions:** We validated and re-calibrated the PREDELIRIC-model internationally. Despite differences in the incidence of predictors between the centers in the different countries the discriminative power and calibration of the PREDELIRIC-model remained good, indicating that the PREDELIRIC model can now be used in other countries as well.

# Stress experienced in caring for patients with delirium in a university orthopedic and trauma surgery center

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**Background:** The serious consequences of delirium have been identified over the recent years and this has served as a motivation for establishing delirium prevention and management programs. An important aspect of caring for these frail patients is the effect that patients with delirium have on the healthcare staff. The Strain of Care for Delirium Index (SCDI) has been developed to measure stress experienced in caring for patients with delirium. No such information is available in a Swiss acute care setting.

**Aims:** To establish a baseline measurement for the degree of stress experienced in working with patients with delirium and to compare the results between professional groups.

**Methods:** Design: Cross-Sectional Study. Sample / Setting: Each staff member of the University Clinic for Orthopedic and Trauma Surgery in Switzerland was asked to complete the SCDI at the launch of a quality care improvement project in February 2010. The SCDI was analyzed using descriptive statistics. T-tests were used to analyze differences between the professional groups.

**Results:** 128 questionnaires were distributed and 112 were returned (87.5%). In general, nurses report the greatest amount of stress working with patients showing signs and symptoms of delirium, followed by nursing assistants and social workers, then physical therapists, with physicians reporting the least amount of stress. A significant difference ( $p < 0.05$ ) was found between the total scores for the nurses and the physicians. Analyzing the 4 domains separately, physical therapists and nurses have significantly more stress working with patients showing hypoactive behavior than did physicians; no significant differences were seen between professional groups for the other domains.

**Conclusion:** Different healthcare professionals experience varying levels of stress caring for patients with delirium. This information may be useful in designing staff education programs to increase compliance with delirium screening and early implementation of treatment.

# Delirium Superimposed on dementia and functional outcome in elderly patients admitted to a rehabilitation setting

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**Background:** The prevalence of delirium superimposed on dementia (DSD) ranges from 22% to 89%. Little is known on the effect of DSD on clinical outcomes in rehabilitation settings. Here we evaluate the association between DSD and functional outcomes in elderly patients admitted to a rehabilitation hospital.

**Methods:** This was a retrospective cohort study of 1,833 patients aged >65 years admitted to the Department of Rehabilitation and Age Care of the Ancelle Hospital (Cremona, Italy) between January 2002 and December 2006. Dementia was defined using the DSM-III-R criteria. Delirium was assessed at admission with the Confusion Assessment Method. The primary outcome was the walking dependence at discharge (Barthel Index deambulation subitem score of <15). A multivariate logistic regression model was used to analyse the association between DSD and walking dependence after adjusting for three cognitive subgroups [no delirium no dementia (reference group), dementia, delirium no dementia], age, walking dependence before admission, length of stay (LOS), C-reactive protein, Charlson Comorbidity Index.

**Results:** The mean ( $\pm$  SD) age was 76 $\pm$ 11. The most common admission diagnosis was orthopaedic (39%) and mean LOS was 23 $\pm$ 9. The prevalence of DSD was 5.3%, while the prevalence of delirium no dementia, and dementia no delirium were 3.4% and 18.9%, respectively. After adjusting for covariates, DSD increased the risk of walking dependence at discharge by almost 4 times (odds ratio [OR], 3.61; 95% Confidence Interval: 1.89-6.85;  $p=0.000$ ). The effect of dementia alone (OR, 2.24; 95% CI: 1.62-3.09;  $p=0.000$ ), and delirium (OR, 2.08; 95% CI: 1.08-4.01;  $p=0.029$ ) was smaller.

**Conclusion:** DSD is a strong marker of functional dependence in elderly patients admitted to a rehabilitation setting, indicating that it should be routinely detected. DSD should be included in prognostic models for health care planning. Future investigation is needed to test intervention protocols to improve functional outcomes in patients with DSD.

## WORKSHOP 1

# Models of Delirium Education for Healthcare Workers

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Since the early 1990s the field of delirium education has expanded. In part the growing interest relates to the fact that delirium is a preventable illness, and yet it is widely under recognised in the clinical setting and is rarely afforded the same status as other common illnesses. Unfortunately, despite strong experimental evidence demonstrating benefit of effectiveness of educational interventions, there has been minimal impact on detection rates in the real world settings. Recently, there has been a change in direction in delirium education research, and new conceptual models of delirium education have been developed from novel methods of educational research. Further more innovative teaching methods such as e-learning and interprofessional education have been developed.

With this in mind, in this workshop we will describe and discuss different models and practices of delirium education. An overview of the state of the science of delirium education will be presented. A recently published Call for Action will be outlined. This work stemmed from expert consensus developed at previous EDA Congress workshops (Amsterdam, 2010 & Umea 2011). The call advocates for a broader and more strategic approach for delirium education focussed and aligned at individual, team and organisational level.

Furthermore, an e-learning tool which has high applicability to training staff in delirium care will be described in detail. We will especially focus on the construction and applicability of the tool in clinical practice. Given the increasing interest in training and education arguably the time is right to develop more robust approaches to researching innovative educational approaches. As such the workshop will conclude by evaluating the feasibility and desirability of a pan European research proposal. It is anticipated that the workshop will lay the foundations for a multicentre trial which will take education and delirium to a new and exciting direction.

## WORKSHOP 2

# Dilemma's in pharmacological treatment of delirium

Etienne Joosten, Marc Sabbe, Geert Meyfroidt, Mathieu Vandenbulcke

*University Hospitals Leuven, LEUVEN, Belgium*

The diagnosis, management and pharmacological treatment of delirium can sometimes be particularly challenging. In such complicated cases, the pharmacological treatment decisions are mainly empirically-derived rather than evidence-based and consequently, management varies across different centers. Examples include the use and choice of antipsychotics in patients with prolongation of QT-interval, the need for pharmacological intervention in hypoactive delirium, treatment of patients that are difficult to assess (eg intubation), rare underlying disorders etc. During this highly interactive and multidisciplinary workshop, we will select and present clinical cases associated with specific diagnostic questions and therapeutic dilemma's. For each case, a series of questions related to clinical decisions will be submitted to the participants using a forced-choice voting design. The audience will receive immediate feedback on the decisions made and emerging controversies will be used to build and animate the discussion. Each dilemma will be followed by a brief review of existing literature on the topic. However, the main purpose of our workshop is to assure that specific clinical situations qualify as dilemma's across centers and to share clinical expertise among attendants.

## SYMPOSIUM 1

# The Epidemiology, Outcomes, and Prevention of Post-operative Delirium among the Elderly

, Karin Neufeld<sup>1</sup>, James Rudolph<sup>2</sup>, Frederick Sieber<sup>1</sup>, Rakesh Ahora<sup>3</sup>

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Postoperative delirium (POD) among the elderly is a common problem that is associated with significant morbidity and increased mortality and loss of quality of life. This symposium will bring together work outlining the epidemiology and risk factors associated with the development of delirium throughout the post-operative course, the outcomes associated with delirium and will suggest one approach to reducing the incidence of delirium among elderly patients.

A number of research designs will be cited in this symposium including prospective cohort studies, which will provide the evidence for understanding the pre- and intra-operative risk factors associated with the development of POD and its associated outcomes. These studies will include a number of different clinical populations of varying surgical type, from several academic medical centers. A randomized double blind controlled trial will be cited in understanding how the depth of sedation during anesthesia, might contribute to the development of post-operative delirium.

The aims of this symposium are to: 1) increase understanding of the natural history of the development of POD in elderly patients, both early and late in the hospital course; 2) to demonstrate why it is important to prevent POD, given the cognitive, functional, and resource utilization associated outcomes, and 3) to review specific anesthetic practices that may decrease its incidence. This symposium also demonstrates the benefits of multi-specialty clinical research in developing best practices that are required to prevent, detect and treat delirium in modern health care settings.

# Delirium in elderly patients at home: Easily missed and underresearched

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For a long time, epidemiological studies have suggested that the prevalence of delirium in community-dwelling elderly persons is as low as 1%. However, recent studies have reported a prevalence of 8% to 16%. In our first study, we review published epidemiological studies to assess what could explain the wide variation.

Delirium in patients living at home may be easily missed. Due to the fluctuating course, with more severe symptoms at night, the physician may see a relatively lucid patient during the day. Moreover, subtle inattention is difficult to spot, and patients may already be having cognitive deficits due to pre-existent dementia. Symptoms and severity of delirium have not been studied before in patients at home. In our second, case-control study, we use the Delirium Rating Scale-98R to compare 45 delirious patients living at home to 46 patients with dementia only.

It is important to diagnose delirium timely. Caregivers are often the first to notice that patients are showing unusual behaviour. To increase the number of recognized delirium in ambulatory patients, we have developed a Delirium Caregiver Questionnaire, which can be administered by phone. We set up a third, blinded validation study in 225 patients to test the diagnostic quality of the questionnaire.

Outcomes of delirium are known to be poor in inpatients, but little is known about risk factors and course in outpatients. We have started a fourth, prospective study among 450 patients referred for dementia screening. They are assessed at baseline with a standardized intake protocol including demographics, medical history, MMSE, Delirium Rating Scale-98R, functional abilities of daily living, blood tests and physical examination. Three months later, the patients diagnosed with delirium at baseline (n=72) will be re-examined. With our studies, we aim to develop knowledge about symptoms, risk factors and course of delirium in patients at home.



EDA 2013

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# Saturday



## INVITED LECTURE

# Prevention and treatment of delirium in palliative care setting

Meera Agar

*Flinders University, SYDNEY, NSW, Australia*

Delirium is a prevalent syndrome in people with advanced life limiting illnesses, and is associated with significant distress for patients and their caregivers. There are specific challenges for clinicians caring for patients with life-limiting illness: such as understanding the benefits of delirium screening, the detection and appropriate management of precipitants, and avoiding the pitfall of assuming 'delirium' is part of the dying process for people with advanced disease.

This presentation will provide a critical review of the current literature on delirium screening and prevention in palliative settings, including the challenges of delirium detection in the last days to hours of life. The treatment issues will cover delirium aetiology and potential for reversibility, and summarise the specific evidence for pharmacological and non-pharmacological approaches in these patients. The clinical issue of managing severe pain in the palliative patient with delirium will be discussed, including issues of analgesics with psychoactive side effects, and the challenges of pain assessment.

# Delirium recall, delirium-related distress and its relevance to older surgical patients

Jude Partridge

*Guy's and St Thomas' NHS Foundation Trust, LONDON, United Kingdom*

Delirium is a common postoperative complication the risk factors for which are well described. Literature supports the use of multicomponent interventions to successfully reduce the incidence of the syndrome in patients undergoing unplanned surgical procedures. This is important as delirium has an independent impact on postoperative mortality, morbidity and institutionalisation.

Less is understood about patient's experiences and recollections of delirium and any longer term psychological morbidity attributed to the syndrome.

The literature examining the delirium experience is generally qualitative involving small numbers of patients across various populations. This qualitative evidence base has led to a few quantitative studies describing the delirium experience.

In this session we will cover;

- [1] what is specific about delirium in the surgical patient?
- [2] the recall of delirium and what factors affect this recall?
- [2] what patients recall of delirium?
- [3] the psychological and psychiatric morbidity attributed to the experience of delirium (distress and psychiatric sequelae)
- [4] the potential role of information provision in reducing the distress related to delirium
- [5] early pilot data examining the measurement of delirium distress in postoperative patients

# Understanding side-effects and risks of antipsychotic medication

Joris Vandenberghe

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**Background:** Although the evidence is rather scarce and of limited quality, classical and novel antipsychotics are considered first line pharmacological treatment for multifactorial delirium. Haloperidol is often stated as the antipsychotic of choice. However, initiating a drug requires an individualized cost-benefit assessment taking into account efficacy, side-effects and risks.

**Methods:** Literature review.

**Results:** Short and long term risks of antipsychotics are abundant and qualitatively and quantitatively differ between different antipsychotics. As delirium treatment is generally limited to days or weeks, the main focus is on side-effects and risks associated with *short term* use of antipsychotics. Anticholinergic effects and induction of hypotension can worsen delirium. Akathisia can induce agitation and considerable distress. Cognitive and emotional side-effects are frequent. Fall risk is associated with motor side effects (parkinsonism), hypotension, drowsiness and sedation. The latter can also contribute to hypoventilation, dysphagia and delirium associated reversed circadian rhythm. Another motor side effect, acute dystonia, causes intense pain and distress. QT-interval prolongation increases the risk for arrhythmias and sudden cardiac death, especially in patients with other risk factors, as is often the case in delirium. Gastrointestinal side-effects are frequent, especially obstipation with rarely development of paralytic ileus. Antipsychotics can induce SIADH (syndrome of inappropriate secretion of anti-diuretic hormone), especially in the elderly. Furthermore, antipsychotics can lower the epileptic threshold. The risks of drug-drug interactions are discussed. Allergic reactions, hepatotoxicity, hematological dyscrasias and malignant neuroleptic syndrome are rare complications. Risks that are rather associated with *long term* use (weight gain, metabolic side effects, diabetes, tardive dyskinesia, consequences of sustained hyperprolactinemia, stroke, mortality) are briefly discussed.

**Conclusion:** Potential side-effects and risks should guide the decision to start an antipsychotic in patients with multifactorial delirium, the choice of the antipsychotic and its dosing. These risks and side-effects justify reluctance in using antipsychotics in the prevention of delirium.

## HEADLINE RESULT

# The Effects of an Interactive E-learning Tool for Delirium on Nursing and Patient Outcomes: a Controlled Trial

Detroyer Elke<sup>1,2</sup>, Depaifve Yves<sup>1</sup>, Kate Irving<sup>3</sup>, Joosten Etienne<sup>4</sup>,  
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<sup>4</sup>Department of Geriatric Medicine, University Hospitals Leuven, Leuven, Belgium

**BACKGROUND:** Despite the evidence that multicomponent interventions improve clinicians' knowledge of delirium and patient outcomes, no research testing e-learning in this area was found. This study aimed to evaluate the effect of a delirium e-learning tool for nurses on geriatric nurses' knowledge and on delirium in hospitalized geriatric patients.

**METHODS:** A longitudinal before-after study (sequential design) was conducted on one geriatric unit (GU) of a university hospital, including a sample of GU nurses (n=17) and geriatric patients who were consecutively enrolled in a 4-month before (control cohort (CC); n=81) and a 4-month after study (intervention cohort (IC); n=79). Implementation of the e-learning tool occurred between the two periods of patient enrollment (3-months). The tool is organized into 11 sub modules of 10 minutes each, providing information about recognition and management of delirium in combination with tests for self-assessment. Nurses completed a questionnaire to assess their knowledge about delirium before and after the intervention. All patients were evaluated for occurrence and duration of delirium (Confusion Assessment Method), severity of delirium (Delirium Index) and cognitive functioning (12-item Mini-Mental State Examination) by independent raters.

**RESULTS:** No significantly improvement in nurses' knowledge of delirium was found (mean score before education: 29.3±2.6/35 versus after education: 29.9±3.2/35; p=0.43). Although there was no significant effect on occurrence (CC 25.9% versus IC 21.5%; p=0.51) and duration of delirium (mean number of days: CC 4.9±4.8 versus IC 4.2±4.8; p=0.38), non-significant trends towards a lower severity of delirium (IC versus CC: difference estimate (DE) -1.55; P=0.08) and a higher cognitive functioning (IC versus CC: DE 1.37; P=0.09) was noted for delirious IC patients after linear mixed model analysis.

**CONCLUSION:** Although these results show no effect of e-learning on nurses' knowledge, and on occurrence and duration of delirium, some clinically important improvements in delirium severity and cognitive functioning were found. Further research with a larger sample size is needed.

## HEADLINE RESULT

# Delirium and Terminal Cognitive Decline in Relation to Dementia Neuropathology: results in 992 autopsies from three population-based cohort studies

Daniel Davis<sup>1</sup>, Graciela Muniz Terrera<sup>2</sup>, Hannah Keage<sup>3</sup>, Blossom Stephan<sup>2</sup>, Jane Fleming<sup>1</sup>, Fiona Matthews<sup>1</sup>, Colm Cunningham<sup>4</sup>, Wesley Ely<sup>5</sup>, Alasdair MacLulich<sup>6</sup>, Carol Brayne<sup>1</sup>

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**Background:** Terminal decline describes a period of cognitive decline before death, typically over the last 3 to 8 years. Delirium is common in this population. We hypothesised that delirium would be associated with accelerated terminal cognitive decline, and also that this faster decline would act independently of terminal cognitive decline associated with dementia neuropathology.

**Methods:** Participants were drawn from three population-based cohorts: Cognitive Function and Ageing Study; Cambridge City over-75s Cohort; Vantaa 85+. Delirium diagnosis, based on DSM-III-R or CAMDEX, was retrospectively determined through multiple sources. In brain autopsies (n=992), Braak stage, neocortical amyloid plaques, large infarcts and Lewy-bodies were assessed using a standardized protocol. The effect of delirium on change in MMSE in the six years before death was modeled using random-effects linear regression. All models were adjusted by age at death, sex, and education, and interactions between delirium and pathology burden were assessed.

**Results:** Mean MMSE at the start of the six-year analysis period was 25 points. Individuals with delirium had worse initial scores (-4.4 points,  $p < 0.01$ ), but also demonstrated faster decline in MMSE (-2.1 vs. -0.9 points/year,  $p < 0.01$ ). There was an interaction between delirium and pathology ( $p = 0.01$ ), such that the greatest decline was evident in those with both delirium and dementia pathology. However, delirium was also associated with cognitive decline even with relatively little classical dementia pathology.

**Conclusions:** This is the first demonstration of the impact of delirium on terminal cognitive decline in the general population, and the first to relate this to neuropathology. History of delirium is strongly associated with rate of cognitive decline in the last years prior to death, even where there was relatively little classical dementia pathology. Accordingly, where delirium is a determinant of terminal decline, the substrates of this decline are contributory to, but distinct from, conventional dementia pathology.

## KEYNOTE LECTURE

# Research and Practice Innovations in Delirium Superimposed on Dementia

Donna Fick

*Penn State, BOALSBURG, United States of America*

This is an exciting and innovative time to be conducting delirium research. We now have better tools available for bedside assessment, improved understanding of biological measurements and wider use of the electronic health record for the communication of delirium assessment, prevention and management. We also have much work to do--to better understand the pathophysiology, causes, prevention and recovery phase of delirium and detection and prevention of delirium superimposed on dementia (DSD). There are several implementation and system areas where we can improve care such as ensuring patient and family centered care, overcoming organizational barriers to delirium care, improving community management of delirium and working together as teams to prevent delirium in acute and long term care. This keynote will share preliminary results from two five year National Institute of Health ongoing randomized clinical trials on delirium in persons with dementia with over 500 participants enrolled, discuss innovations and challenges in the field of delirium, and invite the participants to share their vision for the future of delirium care.

## SYMPOSIUM 3

# Experience of a Specialised Delirium Management Unit in an acute geriatric care setting: The Geriatric Monitoring Unit (GMU)

Mei Sian Chong, Laura Tay, Jasmine Kang, Mark Chan

*Tan Tock Seng Hospital, SINGAPORE, Singapore*

The main objective of this symposium is to share with the learned audience our conceptualization, implementation and preliminary outcomes of a specialized delirium management unit which is grounded in geriatric principles while incorporating best evidence-based practices in the developed Asian city-state of Singapore.

The GMU is a specialised 5-bedded unit in the acute geriatric care setting developed for the care of delirious older patients. It is modeled after the Delirium Room, with adoption of core interventions from the Hospital Elder Life Program and use of evening bright light therapy to consolidate circadian rhythms and improve sleep in older inpatients.

We demonstrated satisfactory management of acutely delirious patients in a restraint-free environment whilst achieving the following important clinical outcomes: i) A non-significant trend of lower antipsychotic usage; ii) good family/ caregiver satisfaction and most importantly, iii) functional improvements (compared to pre-GMU and control groups) with resultant decreased complications of immobility.

Additionally, we will highlight related works from the GMU including its effect on sleep parameters and demonstration of functional improvement in hospitalized older adults independent of dementia diagnosis. Exploratory work on residual subsyndromal delirium (disease trajectory and its effect on adverse outcomes of mortality and institutionalization) will be further discussed.

The GMU model can be transposed across locations and disciplines of any acute care setting where delirious patients will be sited. It is thus a highly relevant system of care for nations faced with a greying population and a deluge of frail elderly hospital admissions.

## WORKSHOP 3

# Implications of the new DSM-5 criteria for delirium research and clinical practice

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This workshop will address diagnostic criteria for delirium, including the recently published DSM-5 criteria. The implications for delirium detection for clinical and research settings will be considered, including a comparison with previous systems. The workshop will engage participants in exploring optimal approaches to delirium assessment and how this can be applied to establishing a DSM-5 diagnosis. Video examples will be used to supplement group discussion. A diagnostic algorithm prototype will be described and key avenues for further research activity explored.

# Experiences of family members of geriatric patients with a delirium: a qualitative study

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**Background:** Delirium is common in older patients. Little is known about the lived experience of close relatives of geriatric patients in general hospitals who are confronted with a delirium. Insight into the needs and experiences of family members is a necessary step in providing appropriate care for them. This study aims to provide this insight and to describe what relatives expect from caregivers.

**Methods:** This qualitative study is based on the principles of grounded theory. In-depth interviews are held with family members of non-terminal geriatric patients with delirium. Sampling is based on situational diversity and will evolve to sampling based on the results of data-analysis. The interviews are transcribed and coded and constant comparison is used to analyse the data. Data-collection and -analyses take place in a cyclic process. Till now 9 interviews are held and analyzed.

**Preliminary results:** For most relatives the sudden and unexpected occurrence of the delirium means the beginning of a very distressing period. The changed behavior of the patient, the functional decline and in particular the use of physical restraint are shocking. A major concern of family members is if their loved one will become 'normal' again. Relatives are hoping for the best but the fluctuating character of the delirium challenges this hope. They need accurate information about the cause, the nature and the prognosis of the delirium to keep the hope alive. When the delirium persists, hope is lost and concerns about the future are arising. Family put themselves aside during the delirium. They want to be there for their relative. The family needs reassurance that they can leave the patient in the caregivers' good hands.

**Conclusion:** Caregivers often underestimate the impact of delirium on family members of patients. Meeting the need for information and support should be more central in the nurses' approach of relatives.

# The Sophia Observation withdrawal symptoms-pediatric delirium scale (SOS-PD) as a screening tool

Erwin Ista, Harma Te Beest, Dick Tibboel, Monique Van Dijk

*Erasmus MC - Sophia Children's Hospital, ROTTERDAM, Netherlands*

**Objectives:** Considering that symptoms of pediatric delirium (PD) and withdrawal syndrome may overlap in critically ill children, we modified our validated Sophia Observation withdrawal Symptoms - scale to assess both. In this study we will evaluate the applicability of the SOS-PD Scale in critically ill children.

**Methods:** We retrospectively evaluated data collected from January 2012 until December 2012. The delirium items of the SOS-PD scored in the 48-hrs period from 24 hrs before to 24 hrs after diagnosing PD were retrieved from the nursing records. The SOS-PD scale comprises two subscales, i.e. 'withdrawal' and PD with 15 and 16 symptoms, respectively. They have 10 symptoms in common. An expert panel defined the cut-off score for PD subscale as a total (15) score of = 4 or a positive score on 'hallucination'.

**Results:** Twenty-three children were diagnosed with delirium, confirmed by a psychiatrist. Their median age was 11 years (range 15 months to 17 years); 12/23 (53%) were male. PD-subscale scores per patient ranged from 1 to 8 points, with a median of 5. Based on the cut-off score, the SOS-PD scale identified 91% (21/23) of those as delirious and 13 of 21 of those patients scored positive on 'hallucination'. Frequencies of the PD symptoms ranged from 4% for grimacing up to 74% for agitation.

**Conclusions:** This study suggests that the SOS-PD scale is suitable for early screening of delirium in critically ill children. A prospective study is needed for further psychometric evaluation

# Poor Sleep - an early sign of incipient Delirium, or a risk factor in itself? A Clinical Observational Study

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**Background:** Sleep and delirium share multiple risk factors. Altered sleep architecture or deficit may themselves cause delirium, or rather represent early markers for established delirium. Recent studies suggest that altered sleep causes brain injury. Sleep disturbance was recently correlated with cognitive decline at 10 year follow-up, in 3 large population studies. Disrupted sleep amongst elders, mediated by structural brain change has also been associated with long-term cognitive decline. Ascertaining the direction of causality between sleep and delirium is crucial: to better understand delirium pathophysiology; to identify at-risk sub-groups; and to direct future efforts in seeking evidence-based prevention.

**Methods:** We aim to recruit 120 patients, older than 65 years, who are admitted for elective knee and hip replacement operations. Wrist-actigraphy objectively measures sleep efficiency and total sleep time 1 night pre-operatively, and 5 nights post-operatively. Pre-operatively we measure baseline subjective sleep quality at home (Pittsburgh Sleep Quality Inventory - PSQI), cognitive function (Mini-Mental State Examination), mood (Geriatric Depression Score), chronotype (Morning-Eveningness Questionnaire) and daytime sleepiness (Epworth Sleepiness Score). Confusion Assessment Measure (CAM) scores are performed daily on each of the first 5 post-operative days, and positive scores trigger referral for clinical geriatric assessment. Known predisposing factors for delirium which could present potential confounders were assessed by auditing patient notes and anaesthetic records.

**Results:** We will present the data from 80 patients. A pilot of 30 patients demonstrated poor sleep (PSQI>5) had an effect size of 0.677, 95% CI -0.0784 to 1.4328,  $v = 0.1486$  on developing post-operative delirium (CAM positive).

**Conclusion:** Poor sleep at home increases susceptibility amongst elders to develop delirium following elective surgery. Characterising this relationship will enable targeted prevention methods.

# Anesthesia and post-operative delirium in elderly patients undergoing hip fracture surgery

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**Background:** The prevalence of postoperative delirium (POD) in patients undergoing hip fracture surgery ranges from 15% to 53%. POD is associated with high mortality, cognitive deterioration, and institutionalization. Among the potential risk factors for POD, anesthesia has been claimed as one of the most important. Here we evaluate the association between type of anesthesia and POD in elderly patients undergoing hip fracture surgery.

**Methods:** This was a retrospective cohort study of 392 patients aged >65 years admitted to the Orthogeriatric Unit, S Gerardo hospital (Monza, Italy) between 2005 and 2011. Delirium was assessed according to the DSM-IV-TR criteria. A multidimensional geriatric assessment was performed at hospital admission. Patients who did not undergo surgical intervention, those with delirium before surgery and those with incomplete data in the medical records were excluded from this study. A multivariate logistic regression model was used to analyse the association between anesthesia [general vs. spinal vs. peripheral neural block (PNB), PNB vs. general + PNB] and POD, after adjusting for potential confounders including age, gender, Charlson Comorbidity Index, ASA score, pre-fracture disability (Katz's ADL Index) and pre-fracture dementia.

**Results:** The mean ( $\pm$  SD) age was 83 $\pm$ 6. The incidence of POD was similar in patients with PNB (37%), with general + PNB (35%), with only general anesthesia (32%) and with spinal anesthesia (20%). After adjusting for covariates, pre-fracture dementia (odds ratio [OR], 5.19; 95% Confidence Interval: 1.62-3.09;  $p=0.000$ ) and pre-fracture disability (OR, 4.53; 95% CI: 1.08-4.01;  $p=0.000$ ) were the only variables predicting POD.

**Conclusion:** The type of anesthesia did not predict POD in elderly patients undergoing hip fracture surgery. Pre-fracture disability and pre-fracture dementia were the only two variables predicting this condition, indirectly suggesting that a multidimensional geriatric assessment can provide anesthesiologists with important information to identify patients at risk for POD.

# Screening for delirium in patients with acute ischemic stroke: Pitfalls and how to overcome them

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**Background:** Patients with acute stroke may suffer from comorbid delirium; prevalence rates are significant, ranging anywhere from 2.3 to 66%. However, these heterogeneous figures also underline diagnostic uncertainty. Standard delirium screening instruments may not be specific enough to disentangle clinical features of delirium from stroke. Therefore, the development of dedicated screening tools seems warranted.

**Methods:** We included consecutive stroke unit patients (n=116) with a baseline NIHSS score of no less than 2. Clinical evidence on admission suggesting non-stroke etiology led to exclusion. Patients were seen on the first day post-stroke and two further times (within 5 days after the event). We performed standard delirium screening (e.g. Confusion Assessment Method-ICU (CAM-ICU)) complemented with formalized gold standard diagnostic criteria. Patients were also tested with non-verbal bedside tools putatively covering the ICD-10 neuropsychological diagnostic criteria for delirium: orientation, attention, executive function/abstraction and immediate recall.

**Results:** The overall incidence of delirium diagnosis was 20.7% (ICD-10 criteria). The neuropsychological domain-specific tests were on par with verbal items (i.e. CAM-ICU) in respect to test characteristics. Moreover, they allowed screening in a relevant proportion of those patients otherwise untestable due to e.g. aphasia.

**Conclusion:** Delirium screening in patients with acute ischemic stroke is complicated by stroke associated deficits. Non-verbal neuropsychological tests may augment screening accuracy.

# Relationship between African American Race and Delirium in the Intensive Care Unit

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**Background:** Multiple risk factors such as age, pre-existing cognitive impairment, and use of sedatives have been associated with delirium in the intensive care unit (ICU), but the relationship between race and delirium is unclear. We performed a prospective cohort analysis to identify whether African American race is a risk factor for developing ICU delirium and to determine how other risk factors for delirium compare between Caucasian and African American races.

**Design:** Observational cohort study.

**Setting:** Medical, Surgical and progressive (step-down) ICUs of an urban, university-affiliated, public hospital/healthcare system.

**Participants:** 3748 consecutive patients aged 18 years and older admitted to ICU services between May 2009 and October 2012.

**Measurements:** The outcome measures of interest were incident delirium defined as first positive Confusion Assessment Method for the ICU (CAM-ICU) result after an initial negative CAM-ICU; and prevalent delirium defined as a first positive CAM-ICU assessment at any point during the ICU stay. Coma was defined as Richmond Agitation Sedation Scale (RASS) score = - 4.

**Results:** The cohort included 1785 African American and 1963 Caucasian patients. Patients did not differ significantly in age, severity of illness, mechanical ventilation or smoking status. African Americans were more likely to be female, and with Medicaid insurance; and less likely to use alcohol. After adjusting for relevant variables, the two patient groups did not differ significantly in incident delirium (5.1% Caucasians vs 4.4% African Americans;  $p$ : 0.51); prevalent delirium (14% Caucasians vs 13.6% African Americans;  $p$ : 0.93); coma (14.1% Caucasians vs 14.2% African Americans;  $p$ : 0.37); and length of hospital stay (9.4 days Caucasians vs 9.6 days African Americans;  $p$ : 0.51).

**Conclusion:** Based on our results, race does not seem to be a risk factor for incident or prevalent delirium in critically ill patients.

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# Posters



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# Epidemiology

# Delirium and Acute Stroke: The incidence, severity and duration of delirium and long term outcomes for patients post stroke and delirium.

Saima Ahmed, John Holmes, John Young

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**Background:** Delirium is an acute generalised impairment of brain function and a common complication of illness in older people. It affects 5 to 15% of patients in general wards, however it is commonly overlooked or misdiagnosed in clinical practice. Previous studies have found that delirium is linked to longer hospital stays, an increased need for institutionalisation and future complications e.g. increased risk of dementia and mortality. Delirium onset may be associated with an acute stroke. The aims of this study were to:

- 1) Identify the incidence, severity and duration of delirium in acute stroke.
- 2) Compare mortality rates in stroke patients with and without delirium.
- 3) Compare long term outcomes for patients with and without delirium.
- 4) Investigate if the type of stroke determines the onset of delirium.
- 5) Identify possible confounding variables that may protect against the onset/ decrease the duration of delirium in stroke.

**Methods:** A systematic review was conducted to investigate the association between delirium and acute stroke. Stroke patients with and without delirium were recruited into a UK based prospective cohort study and followed over six months. Each participant had their stroke diagnosis confirmed by clinical assessment. The presence and severity of delirium was detected and graded during their hospital stay. Other functional assessments were conducted within three days of admission and then six months post stroke.

**Results and Conclusion:** The systematic review highlighted a wide variation in delirium incidence from the studies published. The implications for the proposed study were assessment of long-term outcomes, more inclusive patient recruitment policies and employing reliable diagnostic tools. A total of 295 patients were recruited and data collection is on-going for the study.

This PhD project is funded by CLAHRC for Leeds, York and Bradford and supervised by Dr John D. Holmes and Professor John B. Young.

# Psychotic symptoms in delirium: Hallucinations and delusions manifest more often amongst patients with better physical as well as cognitive status

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**Background:** The aim of the study is to establish the frequency of psychotic symptoms (delusions and hallucinations) in delirium, to assess the link with the age, the level of cognitive functions, somatic condition, psychomotor activity and the survival period.

**Methods:** This study was carried out in a 30-bed Somatopsychiatry Department. There 103 had delirium out of 160 patients who were 65 years or older, and those who from 2003 10 01 till 2005 04 18 were hospitalised in the Department for the first time. Delirium diagnoses were established under DSM-IV classification scientific version. Mental and somatic conditions were assessed under DRS-R-98, MMSE, Charlson's Comorbidity Index, and Acute Psychology score, derived from APACHE II. Death dates were established in accordance to the Lithuanian Ministry of Interior database.

**Results:** Hallucinations were recorded in 48,5% (n=50) of the patients. There were no delusional symptoms or they were not recorded in 77,7% (n=80) of the patients.

The patients with no hallucinations registered, were older (age - respectively 78,38 +/- 4,84 vs 76,16+/-6,42 years; p=0,024) and were known of having more diseases (Charlson's CI - respectively 3,49+/-1,87 vs 2,9+/-1,78; p=0,024) as well as their motor agitation was less expressed (respectively 1,38+/-0,90 vs 1,82+/-0,94; p=0,010). No differences of functional condition indicators were registered among delirious patients with and without delusions.

Although the number of the deceased among those with hallucinations and without them was similar, persons with hallucinations lived longer (respectively 158,48+/-133,0 vs 74,40+/-96,5 days; p=0,045).

**Conclusions:** The results of the study support the hypothesis that if the patients have better functional condition (greater physical and mental abilities), the psychotic symptoms are likelier to manifest during the delirium.

Despite the fact that delusions and hallucinations manifest together during delirium, these are different psychopathological phenomena therefore they should be addressed separately in the future studies.

# Delirium, inattention and level of arousal as predictors of mortality at one year: A study in hip fracture patients.

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**Background:** The delirium syndrome is associated with poor outcomes including increased short- and long-term mortality. However, there has been little investigation of whether its components such as altered arousal and inattention contribute differentially to poor outcomes. This study compared altered arousal, inattention or delirium during the peri-operative period as predictors of 12-month mortality in a cohort of elderly patients with hip fracture.

**Methods:** Participants (N=108, mean age 80 years, 42 men) were assessed for delirium (Confusion Assessment Method and Delirium Rating Scale-Revised-98), inattention (Edinburgh Delirium Test Box 1) and level of arousal (Observational Scale of Level of Arousal (OSLA) and Richmond Agitation-Sedation Scale (RASS)). Assessments were conducted pre-operatively and up to 6 further times over two weeks. Illness severity and co-morbidity were estimated using the Acute Physiology and Chronic Health Evaluation (APACHE) II score and Charlson Co-morbidity Index (CCI). Odds of death within the 12-month study period (outcome) was modelled using logistic regression.

**Results:** Thirteen participants died during the study period, nine within 6 months of fracture. The association of delirium with mortality (odds of death 2.97,  $p < 0.05$ ) disappeared after adjusting for CCI and APACHE II. There was no univariate association of inattention with mortality. Measures of arousal were more strongly associated with mortality, even after accounting for age, sex, CCI and APACHE II (abnormal OSLA odds of death 2.21,  $p < 0.05$ , abnormal RASS odds of death 2.13,  $p < 0.05$ ).

**Conclusion:** This study suggests that altered arousal is a stronger determinant of 12-month mortality compared to delirium as a syndrome, or inattention. Therefore some components of delirium may matter more than others in determining outcome. Larger studies in hip fracture and other populations should explore this intriguing finding in relation to outcomes (mortality, institutionalisation, dementia) in varying timescales.

# Acute confusion states, pain, functional status and psychological well-being among patients with hip fracture in hospital

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Hip fracture is one of the leading causes for admission at hospital in elderly persons and the incidence of acute confusional (ACS) state is high. ACS strongly affects the patient's outcome with suffering and with extensive care needs and costs. *Aim:* To investigate acute confusional states, pain and pain relief, functional status and psychological well-being among patients with hip fracture during hospital stay. *Method:* The sample consisted of 49 patients with hip fracture, mean age 83 years. They were consecutively admitted to the study at two local hospitals in the middle of Sweden. Data regarding ACS, pain and pain relief were collected by interview and observations using structured questionnaires at four occasions during hospital stay. Data regarding functional status and psychological well-being were collected the day before discharge. *Results.* Thirty two per cent (n=15) met the criteria of ACS at admission and the day after surgery and 14% (n=6) and with longer hospital stay. Additional diagnosis and on-going medication were significantly more among patients with ACS. The ACS patients reported also significantly higher intense pain at rest on admission and the day before discharge in comparison with non- ACS patients. More than half of the patients were dependent in P-ADL and psychological well-being was reported as rather good. *Conclusion.* The study confirm that older patients with hip fracture is a vulnerable group regarding ACS and that pain is not sufficiently treated during hospital stay.

# The relationship between delirium during hospital stay and the risk for mortality and institutionalization.

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*Slotervaart ziekenhuis, A, Netherlands*

**Background:** Delirium is a common syndrome in elderly patients and often has far-reaching consequences for mortality and institutionalization. It doubles the risk for mortality, and triples the risk of institutionalization. Little is known about factors which predict the prognosis of delirium. The purpose of this study is to investigate the influence of the severity of delirium on mortality and institutionalization.

**Method and respondents:** Patients were recruited of the geriatrics department of the Slotervaart hospital in Amsterdam, The Netherlands. Their records were retrospectively screened for the presence of delirium. All relevant information was collected from the medical records. Severity of delirium was assessed using the delirium observation scale (DOS). After the follow-up period of 8 months, treating physicians were asked about their living arrangements and mortality was assessed. Using a cox regression analysis association between the severity of delirium and mortality and institutionalization is analysed.

**Results:** Among 304 geriatric patients, 98 patients (32%) had a delirium at admission or during hospital stay. Of the patients who were not institutionalized before hospitalisation, 40% had to be institutionalised after discharge. Over 90% of these last patients remained permanently institutionalized. The severity of delirium has no significant association with institutionalisation after a delirium. Within 8 months after discharge, 45% of the patients with delirium have died. Patients with a mild delirium had a mortality rate of 21% up to 8 months after discharge, for patients with an average and severe delirium the mortality rate was 49% and 64%. The risk of dying within 8 months after discharge is five times as high for patients with a severe delirium compared to patient with a mild delirium, corrected for gender, age, dementia and severity of illness.

**Conclusion:** Severity of delirium is predictive for mortality after a delirium, but has no association with institutionalization after a delirium

# The consequences of delirium in relation to PTSD, anxiety, depression, and the health-related quality of life after discharge from intensive care

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In the intensive care units (ICUs) sedation strategies have changed in the past decade towards less sedation and daily wake-up calls. Recent studies indicate that no sedation (after intubation) is most beneficial for patients. A smaller number of these patients have been assessed for post-traumatic-stress disorder (PTSD) after ICU discharge, but none of them were assessed for delirium while in the ICU.

The aim of this study was to investigate the consequences of ICU-delirium in relation to PTSD, anxiety, depression, and the health-related quality of life after discharge.

In a prospective observation study with patients admitted a minimum of 48 hours to the ICUs in Aarhus or Hillerød, we included all patients aged > 17 years. Non-Danish speakers, patients transferred from other ICUs and patients with brain injury that made delirium-assessment impossible were excluded. Patients were interviewed at 2 months and 6 months by telephone using six different questionnaires.

After 2 months vs. 6 months, 297 patients vs. 248 patients were interviewed. PTSD was found in 7% vs. 5%, anxiety in 6% vs. 4%, and depression in 10% at both interviews. Delirium had no association with any of the psychometric results. Health-related quality of life (SF-36) was statistically significantly decreased in most of the domains if patients had PTSD, anxiety, or depression but was not associated with delirium.

Conclusion: Delirium did not affect the risk of PTSD, anxiety, or depression. Health-related quality of life (SF-36) was decreased if patients had PTSD, anxiety, or depression but was unaffected by the presence of delirium while in the ICU.

# Long-term outcomes of hyponatremia and delirium in geriatric in-patients

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**Background:** Hyponatremia is a frequent disorder in older patients and constitutes a relevant risk factor for delirium. Long-term effects of hyponatremia with or without delirium have not been described so far.

**Methods:** A prospective case-control study in in-patients of a geriatric hospital. All cases of hyponatremia (Na < 135 mmol/l) in the hospital were identified. Consenting patients with moderate to severe hyponatremia (MSH, Na = 130 mmol/l) were included and matched with normonatremic control patients (NoNa) for gender, age and admission diagnosis. Patients were screened for delirium with the Confusion Assessment Method (CAM). Diagnosis according to DSM IV was then made by clinical interview. Mortality and place of residence were ascertained after 6 months. Frequencies were compared by Chi square test.

**Results:** We included 141 MSH patients into the study (mean age 81.9 years) and matched 141 NoNa controls (mean age 82.8 years). Prevalence of delirium was 20.4% in MSH patients vs. 8.5% in NoNa controls (p=0.006). After six months there was a trend for higher mortality in the MSH group (31.9% vs. 22.7% in matched controls, p=0.082) as well as for the compound deleterious outcome of death or institutionalization (46.1% vs. 34.8%, p=0.052). For patients without delirium hyponatremia was associated with a significant higher risk of a deleterious outcome (54.0% vs. 31.8%, p=0.036). In contrast, in patients who suffered delirium the risk was numerically higher for the control group (53.6% vs. 66.7%, p=0.443). This was confirmed by the fact that delirium almost doubled mortality in the NoNa group (delirium vs. no delirium: 83.3% vs. 45.0%, p=0.011), whereas in the MSH group the difference was smaller not reaching statistical significance (43.4% vs. 29.4%, p=0.086).

**Conclusion:** The long-term mortality of delirium is modified when caused by an underlying treatable disease. Hyponatremia appears to have long-term deleterious effects independent of delirium.

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# Diagnosics

# Documentation of Delirium Diagnosis by General Hospitals and GP Practices in Northamptonshire, UK

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This audit was carried out to ascertain the level of documentation of Delirium in two General hospitals (Northampton/NGH & Kettering/KGH) and GP practices in Northamptonshire, UK, as it was apparent that level of documentation of previous episodes of delirium was poor.

Data was collected retrospectively from paper and electronic data-base, for 31 patients with confirmed diagnosis of delirium in General hospital by the Mental Health Liaison Team (MHLT). We looked at the documentation of diagnosis of delirium by different clinical/administrative groups including mental health liaison team, general hospital doctors, coding department and the general practitioners. We also looked at outcomes for this selected patient group.

**Results:** MHLT has documented delirium diagnosis 100% in hospital records and in the letter to GP, and only 80% in Mental Health electronic records. Out of the confirmed delirium diagnosis for 31 patients, only 41% of hospital discharge summaries had documentation of delirium and only 52% of the diagnosis was coded in General hospital data system. Only 16% of the GP summaries had entry of delirium diagnosis. During the same period there were 4337 patients of over 75 yrs of age was admitted to NGH. There was only 61 diagnosis of delirium made during this period, which is only 1.41%.

Patient outcome-Only 64.5% of patients were discharged back home. 29% needed 24 hour care; 6.5% died in the hospital. At least 25.8% of patients had died within less than 1 year period. (32%) of patients have been given a new diagnosis of dementia within less than one year from Delirium episode.

Conclusion-Delirium is very much under-recognised and under-recorded in our current practice by all clinical/administrative groups. Delirium obviously is related with poorer outcome for the patients. Improvement in documentation of delirium would help clinicians to 'think delirium' and detect and treat early.

# Detection of delirium in geriatric patients: comparative study of the user-friendliness of the DOS, NEECHAM and the CAM algorithm

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**Introduction:** The Delirium Observation Screening (DOS) scale, NEECHAM Confusion Scale and diagnostic algorithm of the Confusion Assessment Method (CAM) are designed to detect delirium, and have shown good psychometric properties. However, a comparative study about their user-friendliness for nurses has not been conducted.

**Aim:** To examine the user-friendliness of the DOS, NEECHAM and CAM administered by nurses in geriatric inpatients, and to determine which scale is given preference for use in daily practice.

**Methods:** Sixteen nurses from one geriatric unit (general hospital) were included, and evaluated delirium in patients on a daily basis during three periods of 21 days. Delirium assessments were performed every other period with a different scale (CAM/DOS/NEECHAM). At the end of each period, nurses had to complete a 'usability' questionnaire of the relevant scale. Thirteen of the 16 nurses returned the questionnaires about the CAM and DOS, 10 of them the questionnaire about the NEECHAM.

**Results:** Generally, nurses experienced the three scales as user-friendly. Considering their complexity and labor intensity, the CAM was selected as least complex (n=9/10) and labor intense (n=10/10) whereas the NEECHAM was determined as the most complex (n=10/10) and labor intense (n=8/10) scale to use. Despite limited complexity and labor intensity of the CAM, more nurses agreed that the DOS adds value to their nursing practice (61.5%; n=9/13) in comparison with the CAM (46.2%; n=6/13) and the NEECHAM (40%; n=4/10).

**Discussion:** Nurses selected the CAM as the least complex and labor intense scale to use. Despite its brevity, previous research warns for the CAM's accuracy when used by nurses in clinical practice (Lemiengre et al 2006). Furthermore, the majority of nurses agreed that, in contrast with the CAM and NEECHAM, the DOS adds most value to their clinical practice. Additional research with a larger sample size is needed to confirm these results.

# Accuracy of diagnosis and documentation of delirium in older patients admitted to the emergency department (ED)

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**Background:** Delirium is an often misperceived healthcare problem that can affect 8 to 10 % of older ED patients. Despite the importance of an accurate and early diagnosis, delirium remains often undetected. We aimed to determine the accuracy of diagnosis and documentation of delirium in the patient file of older ED patients.

**Methods:** The records of 442 older patients (mean age=83.6, SD=4.8) admitted to the ED were reviewed retrospectively for the diagnosis of delirium (or a synonym such as acute confusional state) and the description of (behavioral) symptoms (e.g. (increasing) confusion, somnolence, agitation, aggression, hallucinations). Delirium was assessed by an independent trained rater using the Confusion Assessment Method (CAM). Both the specific (acute onset AND fluctuating course) and the sensitive (acute onset OR fluctuating course) CAM-algorithm were used. The results of the CAM-algorithms were compared with the documentation in the patient file.

**Results:** According to the specific CAM-algorithm, 'full' delirium occurred in 7.7% (n=34) of the patients. No documentation of delirium was found for 11 of these delirious patients (32.4%). The diagnosis of delirium or a synonym was documented in 6 patient records (17.6%). In an additional 17 records (50%), behavioral symptoms of delirium were mentioned, of which the term confusion was the most common symptom used (n=16). According to the sensitive CAM-algorithm, another 37 (8.8%) patients had 'probable' delirium. Thirty-two of these patients (86.5%) had no reported diagnosis, synonyms or related symptoms of delirium; and only 5 (13.5%) records mentioned confusion as a symptom of delirium. In 27 records (6.1%) of patients being not delirious according to the CAM-algorithm, documentation on one or more symptoms of delirium was noted.

**Conclusion:** Delirium is underreported at the ED, which may undermine a proper management of this vulnerable group of patients.

# Screening and followship of Geriatric patients who presented a delirium during a hospitalization in a non Geriatric acute care.

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**Background:** With the development of the mobile geriatric team, we had the possibility to screen and to follow the frail patients hospitalized outside the geriatric acute care. This team comprised of a nurse and paramedics is often called for delirium. The care of delirium is difficult and we would study what can bring this team into this situation.

**Methods:** During a prospective 6 month study (January-June 2012), for all the geriatric patients who have suffered from a delirium in a non geriatric department, the mobile team has analyzed these data: the treatment prior to, the treatment administered for the delirium, if there was a diagnosis of dementia before, the cerebral imaging, the MMSE score, the Katz scale, the restraints, the mortality, where the patient lived before and where he had gone after the hospitalization.

**Results:** 26 patients have presented delirium: 42% in orthopedic surgery, 31% in internal medicine, 11% in digestive surgery, 8% in oncology department, 4% in vascular surgery and finally 4% in urological surgery.

The average age was 85 years old and the ratio of women were 73%.

Patients with treatment for depression were 46,1%; 69,2% with treatment to sleep; 19,2% had neuroleptics before their hospitalization.

23% have received neuroleptics during the delirium; 30,8% of these patients had cognitive disorders mentioned in their medical history. There were only 38.5% who had a cerebral imaging during their hospitalization. We have used restraints in 50%.

The average MMSE was 21,2/30 and the average Katz level was 15/24.

65,4% lived before at home and only 42,3% returned at home but 11,5% were admitted to rehabilitation units; 38,5% were admitted in nursing home and 7.6% passed away.

## **Conclusion :**

This team could screen and collect important data about the frail patients with delirium and could give advice to the other healthcare personnel.

# The Word Building Task as an objective measure of attentional deficits in delirium: exploring the effects of distracters and increased word length

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**Background:** Inattention is a key feature of delirium and yet objective measures for assessing attentional deficits in delirium remain sparse. We previously developed a novel, objective measure of inattention in delirium, the Word Building Task (WBT), implemented on the Edinburgh Delirium Test Box 2. The WBT involves sequences of letters presented for 1.5 seconds, with gaps of 2-5 seconds between each letter. The sequence makes up a word, which participants are asked to state at the end of the presentation. The WBT successfully discriminates between delirium, dementia and normal cognition. In this preliminary study we aimed to explore the effects of greater task difficulty using longer words and adding varying levels of distracting visual stimuli. We evaluated the WBT's performance in detecting delirium and discriminating it from dementia and normal cognition.

**Methods:** Participants were inpatients in geriatrics wards, aged 62-96 years. Groups were: delirium (N=9); dementia no delirium (N=6); controls (N=8). Different levels of attentional demand were modulated by a) varying word length from 3 letter words such as LET to 11 letter words such as INFORMATIVE b) adding flashing light patterns during word presentation. Delirium was assessed with validated measures.

**Results:** The delirium group performed significantly worse than controls ( $p<0.01$ ) but not the dementia group ( $p=0.21$ ) on the WBT. Delirium and dementia groups scored progressively worse on the WBT with increasing word length and/or distraction. DRS-R98 scores correlated with total WBT scores in delirious patients only ( $r=-0.74$ ,  $p<0.001$ ).

**Conclusions:** The results indicate that there is an upper limit for the WBT, beyond which deficits are no longer specific to delirium. More generally, these findings suggest that parameters of objective attentional tasks, such as task complexity, duration and presence of distraction, can be varied in an effort to find the right combination for greatest discrimination between delirium and dementia.

# Delirium in elderly hospitalized patients: validation of a Portuguese version of confusion assessment method

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**Background:** Delirium is a common neuropsychiatric syndrome among elderly hospitalized patients. The early detection of this syndrome is very important, considering the associated negative clinical outcomes. In this context, the Confusion Assessment Method/CAM is a widely used and highly accurate delirium diagnostic tool. It was developed based on the DSM III-R criteria for use by trained staff. The aim of this study was to evaluate the reliability and validity of a Portuguese version of CAM (long version).

**Methods:** The CAM was translated in accordance with standard translation guidelines, with trained researchers and inter-rater reliability assessment. The Portuguese version was tested in a sample of elderly patients ( $\geq 65$  years), with a length of stay over 48 hours, in two intermediate care units of CHSJ, in Porto Portugal. Patients in mutism, blind or deaf, did not speak Portuguese or who scored  $\leq 11$  on the Glasgow scale were excluded. A blinded assessment was conducted by a psychiatrist (DMS-IV-TR criteria, as a reference standard) and by a psychologist (CAM).

**Results:** The Portuguese version revealed good level of comprehensibility and cognitive equivalence with the original English version. Overall inter-rater reliability was very good ( $k > 0.81$ ). In the pilot study ( $n=50$ ), delirium was correctly detected by CAM in 8 out of 11 delirious patients, resulting in a sensitivity of 73% and a specificity of 95%. The results of the final validation study, related with sensitivity and specificity, as well as the convergent validity will be presented.

**Conclusion:** The preliminary results showed that this version is suitable, quick and easy to administer by trained health professionals. Moreover, the Portuguese version could be applicable in intermediate care units, as a diagnostic instrument for detection of delirium in the geriatric inpatient population.

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# Portuguese version of the family confusion assessment method (FAM-CAM): Preliminary results

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**Background:** The observations of families and/or caregivers on mental status changes in their hospitalized elderly relatives, when shared with health professionals, can have an important role in the early identification of delirium as well as its management. In this context, the Family Confusion Assessment Method/FAM-CAM, derived from the original CAM instrument, was recently developed to screen for delirium by interviewing family caregivers. The aim of this study is to present the translation and cultural adaptation process and preliminary results of the Portuguese version of FAM-CAM.

**Methods:** The translation process of FAM-CAM was carried out, according to ISPOR guidelines, with trained researchers. After that, a pilot-study was carried out with a sample of families and/or caregivers of elderly patients, hospitalized for at least 48 hours, in two intermediate care units in CHSJ, in Porto, Portugal. Inclusion criteria were: patient knowledge to enable reporting on his/her mental and physical abilities and staying at patient's bedside daily during hospitalization. Families/caregivers aged under 18 years and who did not speak Portuguese were excluded.

The sensitivity and specificity of the FAM-CAM (administered by a trained researcher) were assessed against CAM rating and DSM-IV-TR standard delirium criteria.

**Results and conclusion:** The FAM-CAM was successfully translated by the Portuguese team, with reflection and consensus of the instrument's contents and structure. The Portuguese version revealed good level of comprehensibility and cognitive equivalence with the original English version. The results related with sensitivity and specificity will be presented.

The present work was supported by Foundation for Science and Technology/FCT (SFRH/BD/63154/2009).

# Phenomenology of Delirium: Awareness vs. Consciousness or DSM-5 vs DSM-IV

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**Background:** The new version of DSM-5 provides nearly the same criteria as DSM-IV with an exception: Category A. The DSM-5 requires a disturbance in awareness while DSM-IV, a disturbance in consciousness. However awareness is not the same as consciousness. In this study we examined the concordances between awareness and consciousness and the agreement between DSM-5 and DSM-IV.

**Methods:** All acute medical admissions 70 years and over, were approached within 72 hours of admission. Exclusion criteria: terminal phase of illness, severe aphasia, intubated, severe sensory problems, non-English speakers or those whose consultant physician does not assent.

Patients eligible for inclusion were assessed on Day 0, 3, 7, 10 of their admission. During the assessment each individual was scored on a range of scales: MoCA, DRS-98R, CAM, RASS and the subscale of levels of consciousness and awareness of surroundings from RCDS; APACHE II, CAPE and BARTHEL index. Demographic data and a medication list were also recorded.

**Results:** Preliminary results of the first 123 participants;

Mean age: 81.3 SD (6.7) range 70-100 years old

Females 60(48.9%)

Delirium according CAM 21 (17.1%)

Delirium according DRS-98R (DRS-98R=16:delirium, between 8 and 15:subsyndromal delirium, =7:no delirium).

Delirium 23 (18.7%)

Subsyndromal delirium 28 (22.8%)

No delirium 72 (58.5%)

Previous cognitive decline: 76 (61.8%)

RCDS (awareness and consciousness)

Mean awareness: 0.4, SD (0.8) range 0 to 3

Mean consciousness 0.4 SD (0.8) range 0 to 5

Correlation (agreement) between awareness and consciousness Kendal's Tau =260, p=0.026

Using the awareness definition of delirium 8 participants with full awareness of surroundings have been indentified as delirious according to DRS 98, while using the consciousness definition 12 participants where indentify as delirious.

**Conclusion:** DSM-IV and DSM-5 detect two slightly distinct populations with delirium. Awareness and consciousness are not the same. DSM-5 is more restrictive in indentifying delirium.

# Confusion Assessment Method: Translation and Validation for the Portuguese Population

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**Background:** Acute confusion and delirium are common phenomena, especially in elderly people hospitalized in non-psychiatric acute wards. However, in Portugal, there are few validated psychometric instruments that can help to identify these conditions in clinical context.

**Objectives:** To translate and validate the Confusion Assessment Method (CAM) for the Portuguese population.

**Method:** A methodological study was conducted in order to evaluate the psychometric properties of the CAM diagnostic algorithm, using DSM-IV-TR criteria as gold standard. To do so, it was selected an accidental sample including 100 hospitalized elderly people (= 65 years) in Internal Medicine, Surgery, Intensive Care Unit, Orthopaedics and Psychiatry wards. The CAM was translated recurring to translation and back-translation.

**Results:** In terms of the psychometric properties, using the sensitive and specific scoring method, respectively, the results observed were: values for sensitivity - 67% (in both cases); values for specificity - 94% and 97%; values for positive predictive accuracy - 25% and 40%; and values for negative predictive accuracy - 99% (in both cases). The CAM was shown to have convergent validity with NeeCham Confusion Scale and concurrent validity with DSM-IV-TR criteria. The inter-rater reliability was 100%.

**Conclusions:** The CAM is an instrument with good sensitivity, very good specificity and easy to use for delirium screening. In cases of acute confusion the CAM should be used prudently, and should be complemented by NeeCham Confusion Scale.

**Keywords:** confusion; delirium; validation study; Portugal.

# Confusion assessment in the Acute Care Setting

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**Background:** Ability to diagnose delirium relies on being able to describe its features which can be psychomotor and psychiatric. General medical doctors and nurses are rarely trained in the language of psychiatry. In the acute medical arena, language used in mental state assessment is often restricted to a few broad terms such as 'confusion', the definition of which are unclear, and unsystematic. Missing features of delirium makes diagnosis of delirium difficult crucial to further care planning. We hope to develop a method of systematising the mental state examination in a formatted tick-box style, developing terms commonly used in this setting.

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**Method:** The patient population consisted of all short stay patients over the age of 65 years admitted to the unit within a 2 month period. We retrospectively analysed admission notes awaiting discharge summary letters in the month of November 2011. We systematically analysed the notes for relevant diagnoses, method of cognitive assessment used, and noted all descriptive terms used in medical or nursing notes to describe the patient's mental state.

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**Results:** The study included 147 patients over the age of 65 years who had been admitted for a short admission at the Royal Infirmary in Edinburgh. Patients either stayed on the assessment unit or a short stay ward and length of stay ranged between 1-7 days. 48% of patients had an Abbreviated Mental Test Score completed as part of their admission assessment. 40% (28) of those patients tested positive (AMT Score <8/10). 35 different terms were variably used to describe cognitive state.

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**Conclusions:** Rates of cognitive screening appears higher in this setting where the AMT questionnaire is printed as part of every admission clerking booklet. Much information is included in the notes outside of the AMT which may be more helpful in diagnosing an acute change in cognition if systemised.

# Comparison of wrist actigraphy and video-based actigraphy for delirium detection in ICUs

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**Background:** Delirium in ICU-patients is mostly assessed by the CAM-ICU and ICDSC at least twice daily. With its fluctuating course delirium is still easily missed. Hence, there is need for an objective, (semi-) automated, continuous measurement method. Disturbed motor activity pattern (DMAP), a frequent manifested feature in delirious patients, could be interesting for delirium detection. Measurement of DMAP to detect delirium is reported in a few studies, all making use of on-body accelerometer-based techniques. However, these techniques measures movements of one part of the body, missing movements of the rest of body. Video-based actigraphy monitoring has the advantage that altered motions of the whole body can be observed without extra on-body sensors. This could be an interesting method for objective delirium detection. The captured video will be analyzed for DMAP that could be indicative of delirium. Advanced image analysis allows for a more detailed analysis of the context of the movement, going beyond mere activity counts.

**Objective:** To determine if DMAP measured with video-based actigraphy are indicative for delirium and can be used for continuous delirium detection in ICU-patients.

**Method:** An observational case-control study including delirious and non-delirious patients. Besides video-monitoring (24-hrs a day, maximum 5 days), a wrist Actiwatch is used measuring activity level of the arm. Patients are screened using CAM-ICU 3/day, and by a delirium expert screening.

**Results:** In total 31 patients, mean age of 67.8 years, were included of which 21 (67%) were delirious and 10 (33%) were not. Preliminary results showed that activity levels measured with of video-based actigraphy compared with Actiwatch has important advantages to determine whole body activity level. Furthermore, we were able to identify from the video-images DMAP possibly related to delirium.

**Conclusion:** Preliminary results show that for measuring DMAP in delirious patients video-based actigraphy monitoring is superior to wrist-based accelerometer techniques.

# Temperature variability during delirium in ICU patients: an observational study

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**Background:** Delirium is an acute disturbance of consciousness and cognition. It is a common disorder in the intensive care unit (ICU) and associated with impaired long-term outcome. Despite its frequency and impact, delirium is poorly recognized using delirium screening tools. A completely new approach to detect delirium is to use monitoring of physiological alterations. Temperature variability, a measure for temperature regulation, could be an interesting component to monitor delirium, but whether temperature regulation is different during ICU delirium has not yet been investigated. The aim of this study was to investigate whether ICU delirium is related to temperature variability. Furthermore, we investigated whether ICU delirium is related to absolute body temperature.

**Methods:** We included 24 patients who experienced both delirium and delirium free days during ICU stay, based on the Confusion Assessment Method for the ICU as conducted by a research-physician or -nurse, in combination with the inspection of medical records. We excluded patients with conditions affecting thermal regulation or therapies affecting body temperature. Daily temperature variability was determined by computing the mean absolute second derivative of the temperature signal. Temperature variability (primary outcome) and absolute body temperature (secondary outcome) were compared between delirium- and non-delirium days with a linear mixed model and adjusted for daily mean Richmond Agitation and Sedation Scale scores and daily maximum Sequential Organ Failure Assessment scores.

**Results:** Temperature variability was increased during delirium-days compared to days without delirium ( $\beta_{\text{unadjusted}}=0.007$ , 95% Confidence Interval (CI)=0.004 to 0.011,  $p<0.001$ ). Adjustment for confounders did not alter this result ( $\beta_{\text{adjusted}}=0.005$ , 95% CI=0.002 to 0.008,  $p<0.001$ ). Delirium was not associated with absolute body temperature ( $\beta_{\text{unadjusted}}=-0.03$ , 95% CI=-0.17 to 0.10,  $p=0.61$ ). This did not change after adjusting for confounders ( $\beta_{\text{adjusted}}=-0.03$ , 95% CI=-0.17 to 0.10,  $p=0.63$ ).

**Conclusions:** Our study suggests that temperature variability is increased during ICU delirium.

# Validation of the German translation of the Strain of Care of Delirium Index

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**Background:** Caring for patients in delirium is stressful and frightening for hospital staff. Prior to implementing a prevention and management program for delirium, a baseline measurement of the level of distress was needed. The Strain of Care of Delirium Index (SCDI) is a psychometrically valid instrument to measure stress related to caring for patients with delirium. Up to now, however, no validated German version existed.

The aim of this study is to validate the German translation of the SCDI in the Swiss acute care setting.

**Methods:**

**Design:** This is a cross-sectional study. The SCDI was translated from English to German according to the Brislin Protocol. Content validity of the German SCDI was checked and the modifications needed were done by an expert panel. Principal component analysis was carried out to establish the internal structure.

**Sample and Setting:** All nursing personnel, physical therapists and resident physicians of the University Clinic for Orthopedic and Trauma Surgery in a university hospital in Switzerland were asked to complete the SCDI in February 2010.

**Results:** The final version of the German translation was found to be clear and understandable.

87.5% of the distributed Questionnaires were returned (n=112).

The German translated SCDI showed good validity of the internal structure: Principal component analysis showed that 25% of the information was shared among the items (Cronbach's alpha = 0.81). This increased to 54% if four factors were retained, which showed the same structure as in the original English version, factor loadings of the items on their respective components all being over 0.46.

**Conclusion:** The German translation of the SCDI is valid and can be used in Swiss University Hospitals to measure staff difficulty in caring for patients with delirium.

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**Risk factors and  
etiology/  
pathophysiology**

# The later decline in cognitive functions does not delay death: it shortens the time from the beginning of the fall in cognitive functions till death

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**Background:** It is believed that the earlier the onset of dementia, the more quickly different complications (including delirium) occur and the sooner the patient dies. The aim of the study was to establish the correlations between the age before the fall of cognitive functions (fcf), age before death, duration from the fall of cognitive functions till death and the duration from delirium till death.

**Methods:** Both parts of the study (retrospective ( $r^1$ ) and prospective ( $r^2$ )) were carried out in a 30-bed Somatopsychiatry Department (Vilnius Psychiatric Hospital) with patients 65 years or older. During the retrospective part of study 203 medical records of demented patients with delirium were investigated, during the prospective part of the study data of 103 patients with delirium and fall of cognitive functions were included. The fall of cognitive functions (fcf) and the beginning dates of delirium were established with regard to objective data, recorded in different medical documents and in the cases when there were no such records, the authors relied on data from the relatives. The ages and durations were calculated: *age before fcf*, *age before death*, *duration from fcf till the death*, *duration from delirium till the death*.

**Results:** Results of both parts of study were quite similar. Age before fcf was directly related to age before death ( $r^1_{\text{agefcf:agedeath}}=0.923$ ,  $p<0.001$ ;  $r^2_{\text{agefcf:agedeath}}=0.846$ ,  $p<0.001$ ), but inversely related to fcf before death ( $r^1_{\text{agefcf:fcfdeath}}=-0.203$ ,  $p=0.007$ ;  $r^2_{\text{agefcf:fcfdeath}}=-0.293$ ,  $p=0.007$ ). Age before fcf was inversely proportional to duration from fcf to delirium ( $r^1_{\text{fcfdel:agefcf}}=-0.220$ ,  $p=0.002$ ;  $r^2_{\text{fcfdel:agefcf}}=-0.269$ ,  $p=0.006$ ).

**Conclusions:** 1. The later the fall in cognitive functions, the shorter the period from the fall of cognitive functions, as well as from delirium, till death. 2. The older the patient to experience the fall of cognitive functions, the faster delirium symptoms develop.

# Development of Delirium in elderly with cognitive impairment

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Several studies have shown the relationship between cognitive impairment and development of Delirium in elderly hospitalized patients. We study the prevalence and incidence of Delirium in elderly hospitalized patients and the relation with prior cognitive impairment and depression.

Our study involved hospitalized elderly patients for whom it was requested geriatric consultant during hospitalization due to acute confusional state, cognitive impairment or mood disorders, during a 8 months-period. All patients underwent a comprehensive geriatric assessment including cognitive and functional status and detection of behavioural disturbance with Neuropsychiatric Inventory (NPI). Diagnosis of delirium was made with Confusion Assessment Method (CAM) and Delirium Rating Scale (DRS).

The sample consisted in 62 patients ( mean age:  $80,7 \pm 7,2$ ). A percentage (43,5%) of patients already referred to a geriatric memory clinic, 71% of all sample have a cognitive impairment or dementia before hospitalization, 45,2% had mood disorders, 21% had previous delirium during past hospitalization. Mean MMSE was  $17,6 \pm 6,0$ . 75,8% of the sample meet DSM IV criteria for Delirium. We identified all clinical subtypes of Delirium (11% hypoactive, 39 % hyperactive, 23% mixed form, 11% subsyndromal). We found a relation between incidence of delirium and moderate-severe cognitive impairment (chi-square 8,6,  $p=0,01$ ). No relation were found with prior depression. Mean age of delirious patients was higher ( $t=2,12$ ,  $p=0,03$ ), and their functional levels measured with ADL ( $t=-2,88$ ,  $p=0,006$ ) and IADL ( $t=-3,36$ ,  $p=0,001$ ) were lower. Applying ANOVA to evaluate the variability of DRS we found that mean scores of DRS were able to define presence/absence of Delirium and also to differentiate sub-syndromal delirium from delirium [ $F(4,57)=24,05$ ,  $p=0,000$ ]. In our sample, as well as described in literature, we found a *positive correlation between development of delirium and low level of cognitive and functional impairment*. More studies are needed to define preventive interventions in these high-risk patients and therapeutic approach (psychosocial interventions especially).

## Short and intensive observation for elderly people in the post-earthquake

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In May 2012 Mirandola was hit by a strong earthquake that forced thousands of elderly people to leave their homes. Within few days a tent with 8 beds for short geriatric observation (OBI) was set up. During the hospitalization patients received diagnostic and therapeutic interventions. Transfers from OBI to Nursing Homes (n = 52 of the 143 patients) were achieved thanks to the connection with a Center for Protected Discharges. In two months n° 143 elderly (85 F, 58 M) were admitted to the OBI. Mean age ( $\pm$  SD) was 78.9 ( $\pm$  7.6) years (range 65-98); mean hospital stay was 1.2 days (range 1-6). More than one third of hospitalizations related to older people with dementia or with initial cognitive deterioration (70.8% with AD, 10.4% with VD; 18.8% with MCI). Patients with dementia were significantly older ( $83.6 \pm 6.1$  years) than cognitively intact patients ( $76.7 \pm 7.3$  years) ( $F(1,141) = 32.1$ ;  $p < 0.001$ ). N° 41 patients manifested a delirium with a mean age ( $\pm$  SD) of  $82.9 (\pm 6.9)$  years, significantly higher than that of elderly patients ( $77.4 \pm 7.3$  years) without delirium ( $F(1,141) = 16.7$ ,  $p < 0.001$ ); 72.9% of the patients showed a Delirium superimposed on dementia (DSD, n = 35 out of a total of 48) compared to only 6.3% of patients without dementia (n = 6 out of 95) ( $\chi^2 = 69.2$ ;  $p < 0.001$ ). In octogenarians, the prevalence of dementia exceeded 60% and was higher than 80% of the DSD. Although 58% of the elderly went back at home the presence of delirium increases the risk of institutionalization, especially in patients without cognitive impairment ( $\chi^2 = 9.6$ ;  $p = 0.02$ ). Our experience confirms, in line with the literature data, the extreme vulnerability of the elderly with cognitive impairment and the need for prevention of acute events such as delirium.

# Anticholinergic drugs end the incidence of delirium and subsyndromal delirium in acute care

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**Background:** There is a known association between anticholinergic drugs use and incidence of cognitive impairment and its severity. Nevertheless the impact of these drugs in delirium has been scarce evaluated. A previous study showed the relationship between anticholinergic drugs and severity of delirium, but the influence of them in the incidence of this syndrome is actually a gap in the literature.

**Objective:** Our goal is to evaluate the association between anticholinergic drugs and the incidence of delirium and subsyndromal delirium also their severity in acute care.

**Methods:** We have conducted a cross-sectional prospective multicenter study of all patients admitted to three Geriatric Departments in tertiary hospitals. To discriminate the medication with anticholinergic effects we used the Anticholinergic Cognitive Burden (ACB) Scale. Confusion Assessment Method was used for diagnosing delirium and Marcantonio's criteria were used to identify subsyndromal delirium. The DRS-R-98 scale was also used as a continuous variable of the degree of delirium. Barthel index and Cumulative Illness Rating Scale in Geriatrics were also recorded.

**Results:** We studied 85 patients, 56% women, Barthel 62 (SD: 32), age 87 (SD: 6), CIRS-G 24 (SD: 6.85). Three quarters (75.3%) of patients had at least one CAM positive item, and half of them with at least 13 points in the DRS-R-98 scale. The prevalence of delirium was 53% and 22.3% for SSD. An association between anticholinergic drugs use (ACB scale) and delirium and subsyndromal delirium was found ( $p < 0.05$ ).

**Conclusion:** In acute care, the use of anticholinergic drugs seems to be a risk factor to development of delirium and subsyndromal delirium.

# Heart rate variability in intensive care unit patients with delirium

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**Background:** Delirium is common in intensive care unit (ICU) patients. The phenomenology of delirium suggests an altered sympathovagal balance, as symptoms of irritability and tachycardia may be associated with increased sympathetic activity, while lethargy and decreased attention may suggest increased parasympathetic activity. However, autonomic function has never been investigated in ICU patients with delirium.

**Methods:** We assessed autonomic function using heart rate variability (HRV) in 13 ICU patients with ICU delirium and 12 ICU patients without delirium. We excluded patients with conditions or medication affecting HRV. HRV indices were assessed in the frequency domain using 5-minutes segments of electrocardiogram recordings with fixed low-frequency (LF, 0.04-0.15 Hz) and high-frequency (HF, 0.15-0.40 Hz) regions according to the guidelines. The LF component of HRV reflects both sympathetic and parasympathetic tone, whereas the HF component reflects parasympathetic tone. The LF/HF ratio is a measure of sympathovagal balance. HRV indices were logarithmically transformed for use in analysis and compared with Student's T-tests.

**Results:** Clinical characteristics of the study population did not differ between the two groups, including severity of disease assessed with Acute Physiology and Chronic Health Evaluation version IV and Sequential Organ Failure scores. During the measurements patients with delirium and without delirium had similar mean (standard deviation, SD) heart rate (87 (20)/minute vs. 88 (13)/minute,  $p = 0.86$ ) and respiratory rate (21 (6)/minute vs. 20 (4)/minute,  $p=0.82$ ). Overall, there was no difference observed between patients with delirium and those without delirium by logarithmically transformed mean (SD) LF [2.8 (1.9) vs. 3.1 (1.9),  $p = 0.76$ ] or the LF/HF ratio [-0.7 (1.0) vs. -0.1 (1.1),  $p = 0.16$ ].

**Conclusion:** Our study suggests that autonomic function is not different between ICU patients with and without delirium. This might be due to an already altered sympathovagal balance in critically ill patients.

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# Prevention and treatment

# Developing a strategy for the systematic appraisal of delirium guidelines

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**Background:** Multiple clinical practice guidelines for delirium have been written, despite the lack of high level evidence for the pharmacological and non-pharmacological management of delirium. These guidelines are not easily sourced by common search methods, such as PubMed and Scopus, and thus require a broader search strategy. There is also an outstanding need for a formal critical assessment of the quality and validity of published delirium guidelines.

**Methods:** A systematic search for existing clinical practice guidelines on delirium is being performed in multiple electronic databases: Cochrane Library, Medline, Embase, CINAHL, PsycINFO, Scopus and TRIP database. Guideline organisation databases and websites of national delirium associations will be searched. A hand search of Google and Google Scholar will be conducted to further supplement the search.

**Results:** Delirium guidelines retrieved from the systematic search will be described and also categorized according to data source and clinical setting, e.g. palliative care, intensive care, elderly care.

The Appraisal of Guidelines Research and Evaluation (AGREE) instrument, which focuses on the guideline development process, will be utilized by 2 independent reviewers to appraise the quality of the guidelines. Standardized domain scores of evaluated guidelines will be reported.

**Conclusion:** The sourcing of delirium guidelines requires a formal systematic literature search. All guidelines should be formally appraised to ensure only those of high-quality undergo adaptation and subsequent implementation into clinical settings.

# Prevention of delirium in older people in hospital - feasibility and acceptability of the Prevention of Delirium (POD) Programme

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**Background:** Delirium is the most frequent complication for older people following hospitalisation. Evidence suggests it could be prevented in about 75% of patients using multi-component interventions. We have developed a multi-component intervention (the Prevention of Delirium (POD)) Programme designed to be integrated into ward routines without the need for additional resources. POD targets 10 known, modifiable 'clinical factors' for delirium and involves a role for hospital volunteers. We are now in the latter stages of a pilot study to test the feasibility and acceptability of POD implementation, to provide a realistic assessment of the practical, professional and cultural issues involved in changing practice.

**Method:** We are using a case study approach in six wards (four hospital trusts) to explore: implementation process; impact on staff workload and patient and carer satisfaction; acceptability to patients, carers, staff and volunteers.

**Results:** Data collection on the impact of POD on staff workload, patient satisfaction with care and acceptability to patients, carers, staff and volunteers is on-going and results will be presented. POD has been implemented and delivered in five wards. A potentially generalisable implementation strategy has emerged, including ALL of the following pre-requisites for 'site readiness': 1. Engagement of senior nurse, ward manager, voluntary services manager; 2. Named person to drive implementation forward; 3. Dedicated time (one day a week) of a senior, experienced nurse to lead implementation; 4. Total staff on duty =6.

**Conclusions:** Implementation and delivery of POD is feasible in 'site-ready' wards.

# Inteventions for preventing Intensiv Care Unit (ICU) delirium - a systematic review

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**Background:** Intensive Care Unit (ICU) Delirium is a disturbance of consciousness with inattention, changes in cognition or perceptual disturbance developing over a short period, and fluctuating over time. The prevalence varies from 20% to 80 %. Adverse events include prolonged ICU stay and length of hospital stay (LOS), higher mortality, self-extubation, self-removal of catheters and increased costs. ICU delirium is also associated with long-term cognitive impairment.

**Aim:** To examine the evidence for an effect of interventions for preventing ICU delirium in adult ICU patients.

**Methods:** A systematic review

**Inclusion Criteria:** Randomized controlled trials enrolling medical and surgical ICU patients > 18 years and examining the following types of interventions:

Non-pharmacological and/or pharmacological interventions aiming to prevent ICU delirium versus standard ICU care and/or placebo.

**Primary outcomes:**

1.1 Incidence of delirium, assessed using the CAM-ICU or the ICDSC

1.2 In-hospital mortality within 30 days

**Secondary outcomes:**

2.1 Number of delirium and coma-free days in the ICU

2.2 Duration of mechanical ventilation

2.3 LOS in the ICU

2.4 Adverse events

**Data analysis:** Two authors will independently evaluate included trials using the Cochrane Collaboration Risk of Bias (ROB) tool and GRADEpro software. We will summarize the evidence using metaanalysis if appropriate. Otherwise, data will be summarized narratively.

**Data analysis:** We have at present included 4 trials in the review and are in the process of evaluating studies and extracting data. We look forward to presenting the results of the review at the EDA meeting in Belgium in September 2013

**Implications:** In light of the high prevalence of ICU delirium, the adverse sequelae for patients and increased costs for society, investigation the evidence for interventions for preventing delirium in ICU patients is highly relevant.

# Improving Delirium detection in the emergency department

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Recently, we could show that early detection and systematic management of delirium is able to influence the course of delirium in patients with cognitive impairment. More recently, we expanded our early detection and management premises by introducing our approach in the emergency department. For the early detection of delirium we used a two-step-approach. We started with the screening for attention deficits and proceeded with a formal Confusion Assessment Method assessment in the case of impaired attention. We will present data about the feasibility of this approach and figures about nurses' and doctor's detection rates of delirium in the emergency department. The analysis of the data is still ongoing.

# Screening, Prevention and Treatment of Delirium in Orthopedic and Trauma Patients in a Swiss University Hospital - Part II: An Action Research Project

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**Background:** Results from our 2010 baseline data analysis showed delirium in 5 - 71% of our orthopedic and trauma patients, depending on the risk factors. Symptoms of delirium were present in 46% of the patients older than 65 years who had emergency hip surgery. This increased to 71% in patients with dementia. Patients with delirium require an increased intensity of care and the Strain of Care of Delirium Index showed high results for nurses. The goal of this action research project was to improve nurses' competence in identifying patients at risk for delirium, and implementing screening, prevention and treatment practices by developing a guideline for practice.

**Methods:** The project took place from 2010 to 2012 in the Department of Orthopedic Surgery and Traumatology, University Hospital of Berne. Descriptive statistics were used to analyze the baseline data and regression analysis was carried out to determine risk factors.

Using a procedural approach, an interdisciplinary group of nurses and physicians developed an evidence-based guideline for delirium prevention and treatment using action research methods.

**Results:** The guideline contains 5 steps: 1. Identification of patients at risk for delirium based on our baseline data. 2. Delirium screening with DOS (Delirium Observation Screening). 3. Interventions to prevent delirium. 4. Pharmacological and non-pharmacological interventions to treat delirium. 5. Ongoing education of nurses and physicians.

Process of implementation: All nurses participated in an education program to increase their knowledge of delirium. In addition, 30% of the nurses received in-depth training to maintain their skills. A Delirium Service was established to supervise and coach nursing teams. Networking with Swiss University hospitals was established to ensure a superior quality of care.

**Conclusions:** Informal training, observation and feedback was beneficial. A study to test the efficacy of the program will begin in autumn 2013.

# The Oslo study of clonidine in elderly patients with delirium: LUCID

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**Background:** Delirium is a common complication of acute somatic disorders in the elderly. Despite the severe impact on elderly people's health, carer burden and healthcare costs, understanding of clinical trajectories and effective treatment options is poor. The purpose of this randomised, controlled, parallel group pilot trial is to explore the potential superiority of clonidine vs placebo in decreasing delirium symptoms in patients diagnosed with delirium. Clonidine is an alpha-2-adrenoceptor agonist activating presynaptic inhibitory receptors, and exerts a general inhibitory influence on the sympathetic nervous system.

**Methods:** Patients admitted to the acute geriatric ward with delirium or subsyndromal delirium will be randomised (n=100) to orally administrated clonidine or placebo. Day 1/loading doses: 100 µg every 3<sup>rd</sup> hour until maximum 4 doses. Day 2-7/maintenance doses: 100 µg BID. Duration of treatment is maximum 7 days. Assessment of hemodynamics (blood pressure, heart rate and ECG) and of delirium will be performed daily.

**Results:** The primary endpoints are the severity and duration of delirium measured by MDAS and CAM. Secondary endpoints include the use of rescue medication for delirium; pharmacokinetics and pharmacodynamics of clonidine; cognitive function after 4 months; length of hospital stay and need for institutionalization. Differences in MDAS between the treatment groups over time will be analysed by a mixed linear model. Time to resolution of delirium as measured by CAM will be analysed by logrank tests.

**Conclusion:** Hopefully, LUCID will contribute to knowledge about the pharmacological treatment of delirium in the elderly, and may also shed light on relevant pathophysiological hypotheses. The study protocol has been approved by The Regional Ethics Committee, and recruitment is scheduled to begin in October 2013.

# Impact of regular haloperidol on agitation in critically ill patients: a secondary analysis of a double-blind randomized controlled trial

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**Background:** Agitation in critically ill patients has harmful consequences. Agitation is assessed using the Richmond Agitation Sedation Score (RASS). A score of 0 is alert and calm and +2 is agitation characterised by frequent nonpurposeful movements and 'fighting' the ventilator. There is recognition of the importance of maintaining patients at an optimal RASS, easily roused and co-operative. The aim of this analysis of the Hope-ICU study was to investigate if patients who received haloperidol had decreased agitation compared with placebo.

**Methods:** The Hope-ICU study was a double-blind, allocation concealed, placebo-controlled randomised trial in a UK intensive care unit (ICU) in critically ill patients at high risk of delirium. Patients were randomised (1:1) to receive haloperidol 2,5mgs or 0,9% saline placebo intravenously 8 hourly up to 14 days. RASS was assessed 4 hourly by bedside nurses, the highest daily RASS each study day was documented. Patient sedation as required was maintained using fentanyl and propofol infusions while ventilated.

The outcome was the proportion of patients with a documented RASS =+2 on any day.

**Results:** One hundred and forty two patients were randomised. For this analysis patients were included if their RASS was =+2 for the study period. Nineteen patients in the haloperidol group and 25 in the placebo group were in ICU for the whole 14 days. A lower proportion of patients had a RASS of = +2 in the group who received haloperidol compared with those who received placebo (median 13% [IQR 8.75 - 17] vs. 20% [IQR 17.5 - 26.75] respectively;  $p = 0.0075$ ).

**Conclusions:** Our results suggest that regular haloperidol decreases agitation in critically ill patients. Further research is needed to determine if regular haloperidol is beneficial in maintaining target sedation in critically ill patients.

# Functional and cognitive decline in a patient on valproic acid; think of measurement of the unbound concentration

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**Introduction:** valproic acid is widely prescribed as anticonvulsant or mood stabilizer and more frequently prescribed in elderly patients. In case an intoxication is suspected, a total valproic acid serum concentration is measured. We will present a 73 year old male with post-stroke epilepsy using valproic acid with unexplained cognitive and functional decline. The total valproic acid concentration was within normal limits, but the unbound valproic acid concentration appeared to be at toxic level.

Next we will discuss in which situation an high unbound concentration of valproic acid can be expected, why it is most prevalent in elderly patients and whether routine measurements of the unbound concentration in all patients is needed.

**Results:** A literature search in PubMed was performed using the terms: unbound valproic acid, intoxication, elderly. Only English articles were selected by abstract. This yielded (only) 5 relevant articles concerning elderly and/ or the pharmacokinetics of unbound valproic acid.

**Conclusion:** it is important to realise that the total valproic acid concentration should be interpreted with caution in elderly. The hepatic clearance of the unbound fraction is lower in the elderly and is more easily influenced by the presence of enzyme inducing comedication (Lampon, Ups J Med Sci 2012 Mar;117(1):41-6, Bauer, Clin Pharmacol Ther 1985;37(6):697-700, Fattore, Epilepsy Res 2006;70(2-3):153-60). Furthermore hypoalbuminemia is more often found in elderly and critically ill patients which causes elevation of the unbound valproic acid concentration (De Maat, Ann Pharmacother 2011;45(3), Haroldson, Ann Pharmacother 2000;34(2):183-7). We recommend measurement of the unbound valproic acid concentration based on some well-defined criteria and we do not recommend routine measurements in all patients because of cost considerations.

# Risk of QT-prolongation in patients with delirium: study protocol

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**Background:** The prevalence of delirium in a general hospital population varies between 5 and 30%. Haloperidol is considered as first line treatment for delirium, despite its potential to prolong the QT interval (an important phase in the electrical heart cycle) with an increased risk of arrhythmias (Torsade de Pointes) and sudden cardiac death. It is recommended to carefully monitor this risk, especially with patients who have other risk factors (e.g. electrolyte disturbances) or with high doses of haloperidol. However, clear data about the prevalence of QT-prolongation in clinical practice are not available.

**Methods:** The aim of this project is to document the prevalence of QT-prolongation in a population at risk. Two studies in patients suffering from delirium will be performed in the University Hospital of Leuven:

- In an epidemiological point prevalence study, medication profiles of patients with haloperidol treatment will be checked for drug interactions with risk of QT-prolongation. Additional risk factors for developing QT-prolongation will be documented.
- In a clinical study, the effect of haloperidol on the QT-interval will be investigated by taking electrocardiograms before and after the start of haloperidol. Additional clinical risk factors and lab results (potassium, liver and kidney function) will be taken into account.

**Results of a similar study in psychiatry:** An epidemiological study in 6 psychiatric institutions in Flanders has already been performed. The medication profiles of 592 patients (with different disorders and treatments) were screened and 113 drug interactions with risk of QT-prolongation were found in 43 patients (7.3%).

**Conclusion:** This project will provide more insight in the risk for QT-prolongation in delirant patients treated with haloperidol. Our ultimate goal is to develop decision algorithms that take into account the individual risk factors of the patient and that can be used by health care professionals to manage the risk of QT-prolongation.

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# Knowledge, education and training

# Junior Psychiatry Doctors' Knowledge and Attitudes towards Delirium

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**Background:** Delirium is a common and complex neuropsychiatric illness which is under-diagnosed with up to one-third of cases not detected in clinical practice. Psychiatrists should be able to diagnose delirium and be familiar with the NICE guidelines regarding management. The aim of this study was to determine the level of knowledge and attitudes towards delirium of junior doctors working in psychiatry.

**Methods:** A questionnaire was submitted to doctors from Foundation Year 2 to ST8 currently working in psychiatry jobs.

**Results:** 30 questionnaires were completed. 10% of respondents were Foundation Year 2, 57% were CT1- CT3 and 33% were ST4-ST8. 83% of doctors felt happy that they could make an accurate diagnosis of delirium most of the time. 83% never used the Confusional Assessment Method to assist with diagnosis. 43% of doctors felt they required training on delirium. The most common psychiatric drugs being prescribed for delirium were Haloperidol and Lorazepam. 43% indicated that they did not feel confident in prescribing anti-psychotic drugs in accordance with NICE guidelines for delirium. 93% of doctors felt that education and training of staff was more important than a delirium pathway/protocol or a designated delirium unit.

**Conclusion:** The results of this study show that only 7% of doctors felt happy that they could make an accurate diagnosis of delirium all the time. 43% of the doctors surveyed felt they required training and did not feel confident in prescribing in accordance with NICE guidelines. Previous studies show that staff who had received education on delirium identified significantly more cases of delirium than staff on a control ward. Education and training on the diagnosis and management of delirium should be incorporated into local academic teaching programmes.

# Simulation training for learning communication skills with confused patients

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**Background:** Verbal and non-verbal de-escalation techniques are recommended for the management of hyperactive delirium and these and other therapeutic communication skills with confused patients (TCSCP) are embedded in the training curriculum for Geriatric Medicine. Simulation provides an education platform for clinicians to become immersed in realistic scenarios with experiential learning and a focus on improving non-technical as well as technical skills.

**Methods:** 11 specialist trainees in Geriatric Medicine attended 2 simulation days, each involving 3 curriculum-mapped clinical scenarios (using high-fidelity life-size manikins and patient-actors) designed to educate on TCSCP. Trainees participated in scenarios individually or in small groups whilst others watched live audio-visual transmission remotely. Debriefs by trained faculty were completed after each scenario. Participants completed pre-and post-course questionnaires, containing quantitative questions (based on linear 0-100 and Likert scales), open-ended qualitative questions, and post-course guided telephone interviews.

**Results:** On pre-course questionnaires, no trainees reported previous formal training in TCSCP. TCSCP were rated 'very helpful' (5/5) and a daily-needed skill (7/7) on 5 and 7-point Likert scales respectively. Mean confidence in managing delirium using TCSCP improved from 70/100 pre-course to 80/100 post-course ( $p=0.03$ ). At post-course interview, TCSCP were described as 'useful in managing confused patients' and an important training issue by all. Simulation was considered to be a helpful modality for TCSCP training, with actor feedback highly regarded. All trainees described a more patient-centred attitude to their communications skills after completing the course. Barriers to learning reported were the 'stressful environment' of simulation and suitably challenging cases.

**Conclusion:** Learning TCSCP was shown to be important to specialist trainees in Geriatrics but with limited formal education available. Simulation training for delirium management and learning TCSCP is feasible and was considered to be useful and effective in improving the confidence levels of specialist trainees.

# **Excellence in Dementia care in acute hospitals - Introducing the Dementia Outreach Team - Improving Quality and Safety in care**

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We recognised within our trust the impact of ignoring people with dementia during hospital admission leads to increased confused, disorientation, longer admissions, falls, infections, dehydration and weight loss. The department of health (2009) dementia strategy identified objectives improving quality of care for people with dementia in hospital. A care bundle was developed identifying elements significantly impacting on care to this client group. The elements were communication, environment, nutrition and hydration, supported by a patient centred documents. The outreach team implemented this care bundle trust wide. They provided support and training for staff to implement this care bundle effectively. The dementia strategy also highlighted a need for early diagnosis and quality information for patients and carers. We developed a referral system for staff to ensure patients with delirium were appropriately screened. Patients and carers who require further support are appropriately referred to services such as memory clinics, mental health teams and support groups such as the Alzheimer's Society. Through care integration our quantitative targets have been to reduce the use of anti psychotics, length of hospital admission, falls, pressure sores, use of catheters, weight loss and deterioration in mobility. We have been able to achieve this through collaborative working with the inpatient teams such as mental health, physiotherapists, dieticians and the ward teams. Through training and supporting staff in dementia awareness and care, ward moves during admission have been significantly reduced. We have improved the number of people who return to their address from which they were admitted through care integration with the community statutory and non-statutory services. Our qualitative targets were positive feedback from our patients and carer's. All our feedback has been positive and patients and carer's in the community have reported feeling less anxious about future hospital admissions to our trust knowing our service is available.

# Exploring recognition and assessment of delirium symptoms by palliative care nurses using the Critical Incident Technique

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**Background:** Delirium is prevalent in palliative care inpatient settings, but is often is under-recognised and undertreated despite being potentially reversible. Nurses working in palliative care inpatient settings have an important role in early recognition of delirium symptoms and knowledge of their views, experiences and practices is integral to improving patient outcomes.

**Method:** The Critical Incident Technique (CIT) was used to guide semi-structured interviews with specialist palliative care nurses. Nurses were given a case vignette of a palliative care patient with unrecognised hypoactive delirium and asked to recall and recount a similar clinical incident. Incidents that were recalled and clearly described by participants were analysed using thematic content analysis.

**Results:** Thirty nurses working across nine specialist palliative care inpatient settings in three Australian states participated in face-to-face (n=25) or telephone (n=5) interviews. Twenty participants gave detailed descriptions of at least one incident involving delirium recognition and assessment, generating 28 incidents for data analysis. Major themes arising from these critical incidents include: 1) The delirium experience; 2) Nursing practice in delirium recognition and assessment; and 3) Learning occurs as a result of uncertainty and difficult situations.

**Conclusions:** This study revealed some practice strengths of palliative care nurses in the recognition and assessment of patients' delirium symptoms: compassion, communication and use of a holistic approach. Less effective practices related to difficulties in framing and in naming delirium, and there was an absence of delirium education and the systematic use of delirium tools. This study will inform development of this emergent area of palliative care nursing practice.

# Delirium: National survey of knowledge and attitudes among doctors

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**Introduction:** Delirium is underdiagnosed and undertreated. Our previous UK study of junior doctors' understanding of delirium in 2007 demonstrated an appreciation of the high prevalence and clinical significance of delirium but a poor understanding of the diagnosis and treatment. We aim to identify any significant change in knowledge since 2007, in light of the increasing prominence and emphasis of delirium in training curricula and since the publication of a UK national guideline in 2010.

**Methods:** For this repeat cross-sectional study, a large cohort of junior doctors in the UK is being surveyed between March and May 2013. We have used questionnaires to test knowledge of delirium prevalence, diagnostic criteria using DSM-IV, use of specific screening tools, association with adverse outcomes and pharmacological management. A convenience sample of junior doctors working in acute medical specialties and emergency medicine has been targeted at each participating site.

**Results:** The survey is currently three quarters complete. We have recruited more than 50 acute NHS hospitals and anticipate a final sample size of more than 1000 junior doctors. This will make it the largest ever survey of junior doctors' knowledge of delirium. The full results are expected by mid-2013.

**Discussion:** Although there have been previous studies of junior doctors' understanding on this topic, the results of this survey will be of particular interest in view of the large sample size and the fact that this is a re-survey following the introduction of a national guideline. Uniquely, this allows for a nationwide assessment of the impact of this guideline on the practice of clinicians most likely to see delirium presentations, namely junior doctors.

# Development of the Delirium Early Monitoring System (DEMS)

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**Background:** Delirium is a common condition with estimated prevalence variance from 13% of young patients to 53% of older patients in hospital. However, a central challenge relates to translating delirium knowledge into effective practice and reported rates of under diagnosis vary from 33 to 72%. In order to address this difficulty, we developed an innovative tool which crucially links screening to action.

The aims of this study are to improve monitoring for delirium in the context of an acute organic old age psychiatry ward and to evaluate feasibility of the Delirium Early Monitoring System (DEMS).

**Methods:** DEMS was derived from the Cognitive Assessment Method (CAM) due to the NICE guideline requirement to adopt the short CAM to complete an assessment of delirium in clinical practice. Using a visual chart we asked nursing staff to assess for delirium twice daily. Points were allocated dependent on the degree of change detected. An algorithm encouraged staff to look for causes of delirium and to alert medical staff to patients who were scoring highly and therefore possibly having a delirium. Concurrent staff training was undertaken to skill staff in delirium prevention and management. Furthermore DEMS was validated by means of gold standard as determined by a Liaison Old Psychiatrist who assessed blind for delirium as per DSM IV.

**Results:** Data is currently being collected. Initial feedback from staff suggests that DEMS is feasible and desirable.

**Discussion:** To our knowledge this is the first early warning score system for delirium. It has the potential, if effectively implemented, to prevent, monitor and treat delirium. An additional benefit may that by embedding delirium assessment within the routine care processes it can facilitate delirium best practice and lead to a greater degree of systems learning.

# Phases during hospitalization - nurses' experiences with delirium among elderly patients with fractures

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**Background:** Delirium is a frequently occurring condition in hospitalized elderly, especially among those with fractures, and is associated with serious complications, prolonged hospitalization and delayed rehabilitation. The purpose of the study was to investigate nurses' experiences in identifying, preventing and treating delirium among elderly hospitalized for orthopedic surgery in different phases within the hospitalization. Methods: Fifteen nurses from orthopedic departments in southern part of Norway took part in focus group interviews. Qualitative content analysis was used.

**Results:** The results indicate that limited attention and inadequate procedures in the different phases provided distinct challenges. The admission phase was characterized by lack of systematic routines in identifying and reporting delirium. The preoperative phase was interpreted as particularly critical for development of delirium, while nurses described a system reducing their possibility to prevent it. The nurses reported that their clinical judgments to a small extent had resulted in better procedures in example prioritizing frail patients or ensuring best practices for adequate fluid and nutrition preoperatively. In the postoperative phase, attention towards delirium was first focused if hyperactive delirium was confirmed. In discharge conversations with the patients and their relatives experiences related to delirium only to a small degree were carried out.

**Conclusion:** Increased skills and implementation of evidence-based procedures in nursing practice to meet the elderly's need for security and to reduce the risk of delirium seems necessary. Inadequate procedures in each phase of a hospitalization in connection with orthopedic surgery can cause that important prevention and treatment is not initiated. Knowledge that enables nurses to identify patients at risk of delirium and establish preventive measures needs increased focus. Distinct focus of delirium seems required.

## LOCAL SUPPORTING ORGANIZATIONS

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- Belgische Vereniging voor Gerontologie en Geriatrie (BVGg)  
Société Belge de Gérontologie et de Gériatrie (SBGG)
- Nationaal verbond voor Katholieke Vlaamse Verpleegkundigen en Vroedvrouwen (NVKVV)
- Belgian Society of Intensive Care Medicine (SIZ)
- Vlaamse Vereniging voor Psychiatrie (VVP)
- UZ Leuven
- KU Leuven
- Belgian Society of Emergency and Disaster Medicine (BeSEDiM)





NOVEMBER 6<sup>th</sup>·7<sup>th</sup>

**CREMONA**

I T A L Y



2014

9<sup>th</sup> ANNUAL MEETING

EUROPEAN DELIRIUM ASSOCIATION

BRAIN AGING 2014

**DARKNESS AND LIGHT**  
OF DELIRIUM IMPLEMENTATION IN CLINICAL PRACTICE

LOCAL ORGANIZING COMMITTEE

Alessandro Morandi (chair), Giuseppe Bellelli, Simona Gentile, Marco Trabucchi

EXTERNAL COMMITTEE

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



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