

**SNS 2011**  
Helsinki, Finland  
63rd Annual Congress of the  
Scandinavian Neurosurgical Society

Conference & Events Center



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## Committees and contact information

### Organising committee

Matti Seppälä, neurosurgeon (chairperson)  
Minna Oinas, neurosurgeon  
Mika Niemelä, neurosurgeon  
Hanna Tuominen, neuro-anesthesiologist  
Jaana Kotila, neurosurgical nurse  
Tomi Niemi, neuro-anesthesiologist  
Riku Kivisaari, neurosurgeon and radiologist  
Ritva Salmenperä, nurse manager  
Petra Ylikukkonen, head nurse

### Scientific committee

Juha Hernesniemi, neurosurgeon, professor (chairperson)  
Mika Niemelä, neurosurgeon  
Tomi Niemi, neuro-anesthesiologist  
Juha Jääskeläinen, neurosurgeon, professor  
Anders Paetau, neuropathologist  
Jussi Numminen, neuroradiologist

### SNS 2011 congress secretariat

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## Welcome to SNS 2011

### Dear colleagues,

Neurosurgical procedures have been performed in many parts of the world for thousands of years. One may ask what has ancient trephinations to do with modern high-tech neurosurgery including detailed imaging, neuro-navigation, intra-operative monitoring and sophisticated neuro-intensive care.

Yet the challenge remains the same: to protect the patient and his brain from the threat caused by a disease or traumatic expansion. It is good to remember that neurosurgical procedures are still carried out in many parts of the world in settings not differing much from those of our predecessors times ago.

We meet together in Helsinki for the 63rd Meeting of the Scandinavian Neurosurgical Society to enjoy interesting presentations and good discussions on various topics of up-to-date neurosurgery and conclude it all with a session on international neurosurgery.

An exhibition with the latest up-to-date equipment is available right next to the session hall. Visit our sponsors at the exhibition area during the coffee and lunch breaks!

The meeting is arranged immediately after the Helsinki Live Course 2011 so you can have a chance of spending all week gathering information on how to treat patients better, minimizing surgical risks: protecting brain-protecting function!



**Matti Seppälä**

General secretary of the organising committee

## Congress venue

### Hilton Helsinki Kalastajatorppa

*Address: Kalastajatorpantie 1, FIN-00330 Helsinki*

The congress venue is located 5 kilometres from the Helsinki city centre within an easy tram connection by tram number 4. The tram stop is only 300 metres from the venue. The tram ride to city centre takes about 15 minutes and during this ride you pass attractions like the Finlandia Hall, the Senate Square and the Helsinki Cathedral. The distance to the airport is 20 kilometres. Hilton Helsinki Kalastajatorppa is located in peaceful natural surroundings overlooking the sea.



### Lunch and refreshments

Lunch is included in the participant registration fee. The coffee breaks will take place at the exhibition area.

### Non-smoking policy

Smoking is prohibited in the congress and exhibition areas.

### Telecommunications facilities

Good IT facilities are available at the congress venue and hotel.

### Electricity

Electricity supply in Finland is 220 volts (50 Hz) and wall outlets are to the Northern European Standard (CEE 7/4) with two round contacts. The standard two-pin Euro plug (CEE 7/16) can be connected to these outlets. Most hotels provide 110-volt outlets for shavers.



## General information

### Registration desk

Participants can pick up their personal congress material at the registration desk, which will be open at Hilton Helsinki Kalastajatorppa (*address: Kalastajatorpantie 1*). The congress secretariat will be available to assist you during the congress at Hilton Helsinki Kalastajatorppa.

### The participant registration fees include

- Participation in lectures and access to the poster area and exhibition area
- Congress bag including programme and abstracts
- Admission to Get-together reception
- Coffee at the exhibition area during the breaks
- Buffet lunch
- Certificate of participation

### Name badges

Participants and accompanying persons are obliged to wear the official congress name badges on all congress occasions.

### Certificate of attendance

All participants will receive a certificate of attendance during the congress together with the congress material.

### Dress code

Casual dress is recommended also for official happenings (get-together reception, lectures and meetings). Dress code for the congress dinner is smart casual.

### Currency and credit cards


The official currency in Finland is euro (€). Most major credit cards are accepted in hotels and shops. VISA, Eurocard and Mastercard are accepted at the congress registration desk.

### Tipping

All restaurant prices and taxi fares include service, but good service in the restaurant can be rewarded with a tip. Tipping is at guest's discretion in hotels.

### Liability

By registering into the congress and/or by participating in the exhibition joined to the congress, participants and exhibitors agree that neither the organising committee nor the congress secretariat assume any responsibility for damage or injuries to persons or property during the congress. Participants and exhibitors are advised to organise their own health, travel and personal insurances.

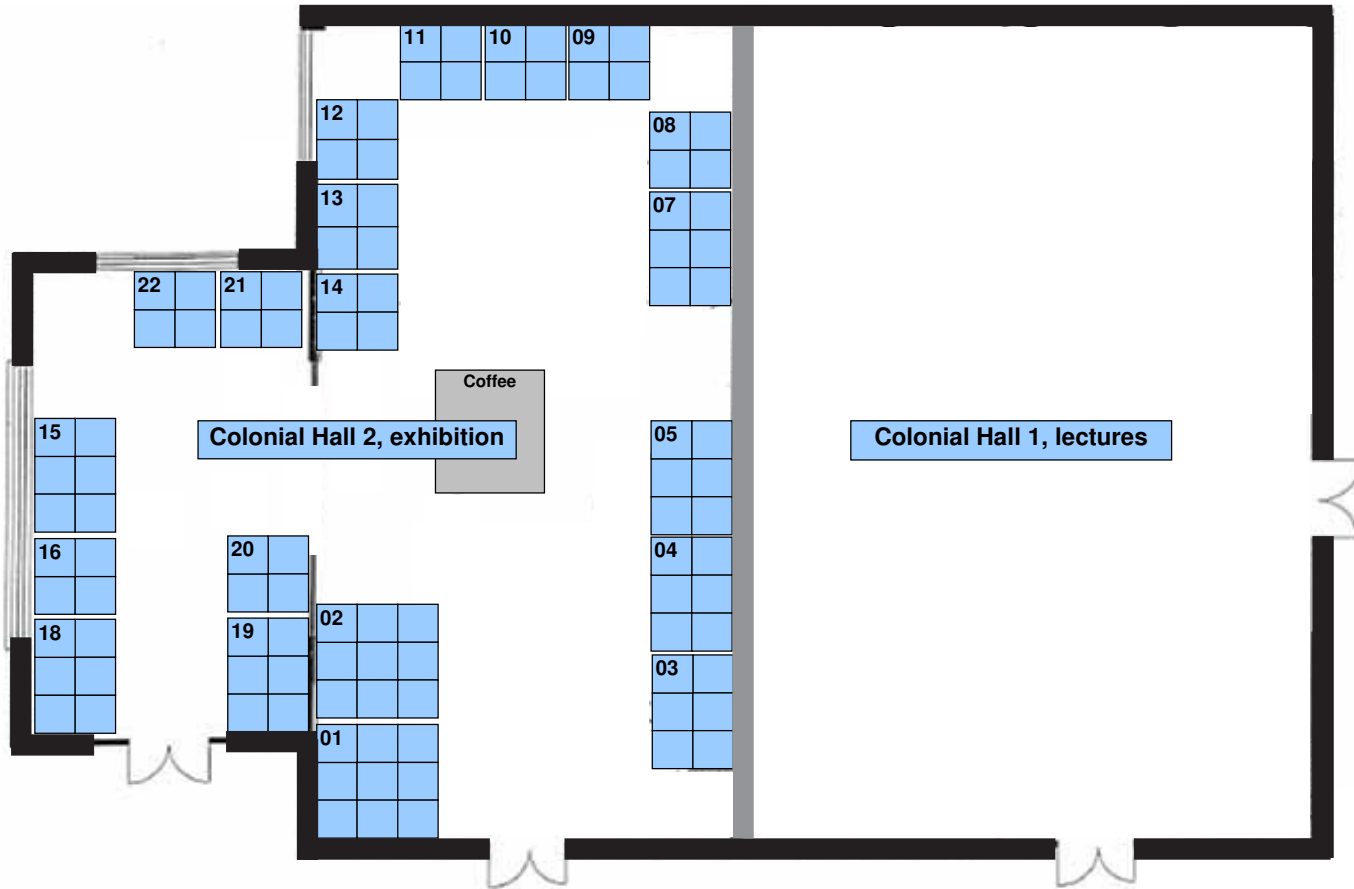


## Exhibition

The commercial exhibition highlighting medical devices and pharmaceutical products takes place next to the congress hall. Access to the exhibition is free for registered participants. The exhibition will be open throughout the meeting hours on Friday and Saturday, 10-11 June 2011.

<b>01</b>	Synthes Oy	9 m <sup>2</sup>
<b>02</b>	B. Braun	9 m <sup>2</sup>
<b>03</b>	Carl Zeiss Oy	6 m <sup>2</sup>
<b>04</b>	Biomet	6 m <sup>2</sup>
<b>05</b>	Brainlab	6 m <sup>2</sup>
<b>07</b>	Johnson & Johnson	6 m <sup>2</sup>
<b>08</b>	Karl Storz Suomi	4 m <sup>2</sup>
<b>09</b>	Medicall Nordic Ab	4 m <sup>2</sup>
<b>10</b>	Steripolar Oy	4 m <sup>2</sup>
<b>11</b>	Baxter Medical Ab	4 m <sup>2</sup>
<b>12</b>	Medac GmbH	4 m <sup>2</sup>
<b>13</b>	Fenno Medical Oy	4 m <sup>2</sup>
<b>14</b>	Anatomics Pty Ltd	4 m <sup>2</sup>
<b>15</b>	Stryker Ab	6 m <sup>2</sup>
<b>16</b>	PO Medica Ab	4 m <sup>2</sup>
<b>18</b>	Leica Nilomark Oy	6 m <sup>2</sup>
<b>19</b>	Medtronic Finland Oy	6 m <sup>2</sup>
<b>20</b>	Elekta Instrument Ab	4 m <sup>2</sup>
<b>21</b>	G. Surgiwear Ltd	4 m <sup>2</sup>
<b>22</b>	Mega Electronics Ltd	4 m <sup>2</sup>

# Exhibition floor plan





## Scientific programme on Thursday, 9 June 2011

15.00–17.00 Board-meeting of SNS

17.00–21.00 Registration open at Hilton Helsinki Kalastajatorppa

19.00–22.00 Get-together at Hilton Helsinki Kalastajatorppa

## Scientific programme on Friday, 10 June 2011

08.00 Registration continues

08.30 Opening of the meeting – Prof. J. Hernesniemi

### **Intracranial tumors**

*Chair:* H. Mäenpää

08.45 Guest lecture – A. Krisht

09.30 Molecular pathology of intracranial tumors – A. Paetau

09.55 Failed radiosurgery of meningiomas – a reflection of tumor biology – M. Seppälä

10.10 Transsphenoidal endoscopic approach for tumours in the sellar region – L. Kivipelto

10.25 Discussion

10.30 Coffee, Posters and Exhibition

### **Intraoperative monitoring**

*Chair:* M. Seppälä

11.00 Preoperative navigated TMS and MEG brain mapping – J. Mäkelä

11.20 Intraoperative stimulation mapping of cortex and white matter – J. Jääskeläinen

11.40 Intraoperative cranial nerve monitoring – A. Muraja-Murro

12.00 Intraoperative monitoring of spinal cord functional integrity – E. Kirveskari

12.25 Discussion

12.30 Lunch, Posters and Exhibition

## Scientific programme on Friday, 10 June 2011

### Aspects of head trauma treatment

*Chair:* J. Öhman

14.00 Non-operative management of raised intracranial pressure – P. Tanskanen

14.30 Surgical decompression for raised intracranial pressure – J. Siironen

15.00 Using evidence-based practice in management of TBI in adults at Helsinki University Hospital – T. Salonen

15.25 Discussion

15.30 Coffee, Posters and Exhibition

### Intracranial Pressure and CSF dynamics

*Chair:* J. Siironen

16.00 Third ventriculostomy versus shunt – A. Karppinen

16.30 Errors related to ICP-measuring and CPP calculation – A. Blommengren

16.45 The Concept of ICP Wave Guided Management of Neurosurgical Patients – P. K. Eide

17.00 A Randomized and Blinded Trial of ICP versus ICP Wave Guided Intensive Care Management on Acute Clinical State and 12 months Outcome in SAH patients – P. K. Eide

17.15 Discussion

19.00–23.30 Congress dinner at Hilton Helsinki Kalastajatorppa, Round Room



## Scientific programme on Saturday, 11 June 2011

08.00 Registration continues

### Guest lectures

*Chair: J. Hernesniemi*

08.30 Lateral supraorbital approach to anterior skull base meningiomas – R. Romani

08.50 Guest lecture – U. Türe

09.30 Guest Lecture – M. Samii

10.25 Discussion

10.30 Coffee, Posters and Exhibition

### SAH and aneurysms

*Chair: A. Laakso*

11.00 Natural history of partially treated aneurysms – M. Niemelä

11.15 Intracellular signalling pathways and size, shape and rupture history of aneurysms – E. Laaksamo

11.30 Cardiac arrest induced by adenosine in aneurysm surgery – H. Tuominen

11.45 Intracranial arterial aneurysms in pediatric patients – P. Koroknay-Pal

12.00 Setting up an aneurysm data-base – H. Lehto

12.15 Biological and environmental risk factors cause extreme variation in the incidence of SAH –

A population-based prospective study of risk factors – M. Korja

12.30 Genetic factors do not play a significant role in subarachnoid hemorrhage susceptibility –

Nordic twin study of 79644 complete twin pairs – M. Korja

12.45 Discussion

12.50 Lunch, Posters and Exhibition

## Scientific programme on Saturday, 11 June 2011

### **Treatment of complex vascular malformations**

*Chair* M. Niemelä

14.00 Bypasses – M. Lehecka

14.20 Combined single stage endovascular and surgical treatment of brain AVM:s – R. Dashti

14.40 Guest lecture – R. Tanikawa

15.00 Guest lecture – F. Charbel

15.25 Discussion

15.30 Coffee, Posters and Exhibition

### **Other vascular malformations**

*Chair:* M. Lehecka

16.00 Natural history of AVM:s – A. Laakso

16.30 Management of multiple brain cavernomas – J. Kivelev

17.00 The effect of increased Warfarin use on warfarin-related cerebral hemorrhage:  
A longitudinal population-based study – S. Tetri

17.15 Prothrombin complex concentrate improves survival of patients with warfarin associated ICH:  
A longitudinal population-based study – S. Tetri

17.25 Discussion

17.30 Chairmens' and Professors' meeting



## Scientific programme on Sunday, 12 June 2011

08.00 Registration continues

### **International neurosurgery**

*Chair: J. Jääskeläinen*

08.30 Working as a Neurosurgeon in Kolkata, India – M. Lehecka

09.00 Working as a fellow in Helsinki – J. v Popta

09.30 Guest lecture – M. Samii

10.30 Coffee and Posters

11.00 Business-meeting of the Scandinavian Neurosurgical Society  
Awards / B. Braun Medical

12.00 Farewell Lunch

## Social events

### Get-together

Date Thursday, 9 June 2011  
Time 19.00 – 22.00  
Place Hilton Helsinki Kalastajatorppa  
Fee Included in the registration fee

### Congress dinner

Date Friday, 10 June 2011  
Time 19.00 – 23.30  
Place Hilton Helsinki Kalastajatorppa, Round Room  
Fee 60 €



## Abstracts – Oral presentations

### **Failed Radiosurgery for Recurrent Meningioma – A Reflection of the Biological Behaviour of the Tumour**

*Seppälä, M<sup>1</sup>; Collan, J<sup>2</sup>; Kapanen, M<sup>3</sup>; Paetau, A<sup>4</sup>*

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*<sup>3</sup>Helsinki University Hospital, FINLAND;*

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Since 2004 the Departments of Neurosurgery and Oncology at Helsinki University Hospital have treated 36 meningioma-patients with linac-based single-session stereotactic radiotherapy (radiosurgery). In most patients the treatment indication was an asymptomatic local recurrence detected at radiological follow-up after surgical removal of a meningioma. Six patients (17%) have been treated two or three times: altogether eight treatments. The standard doses have been 12-20 Gy depending on the size and location of the tumour. We tried to identify the causes for multiple recurrences. A comparison of the treatment charts for the first, second and eventual third treatment showed in four cases (50%) a clearly different target: a second tumour developing at a distant site along the dural resection margin. In four cases (50%) the second recurrence was closely adjacent to the previously irradiated area, but no complete overlapping was seen. The primarily operated meningioma in all these six patients showed atypical (grade2) features: increased mitotic activity (MIB-index), foci of small necroses and an uneven general architecture. The possible benefit of extending the target area along the dural surface is yet to be determined.

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## **Transsphenoidal endoscopic approach for tumours in the sellar**

*Karppinen, A; Kivipelto, L*

*FINLAND*

During the last few years endoscopic transnasal route to sphenoid sinus and beyond has gained more and more attention. Several reports on extended transnasal surgery to anterior, middle and posterior fossas have been published. What are the indications, limitations and evidence to favour this route over transcranial? The history of microscopic transsphenoidal surgery is very long and it has been the golden standard for approaching pituitary adenomas. The evolution of endoscopic surgery has further improved visibility and access to parasellar areas. The complexity of endoscopic transnasal skullbase operations can be classified from level I to level V (Kassam). Endoscopic pituitary surgery and repair of csf leaks are categorised as level II operations and represent the necessary step in the learning curve before undertaking more complex approaches. All extrasellar extradural (Level III) midline lesions are good candidates for transnasal endoscopic surgery. Suprasellar intradural lesions (Level IV) such as craniopharyngiomas can be resected transnasally through transtuberulum or transsellar route. Even lesions in cavernous sinus are amenable to endoscopic surgery. However the main limitations for endoscopic surgery are firm tumor consistency, involvement or encasement of cerebral arteries or optic apparatus, brain invasion and previous surgery and/or radiation therapy. The advantages of the transnasal approach are: no brain retraction, critical structures like cranial nerves or perforators not obstructing the view, minimally invasive. The disadvantages are: limited manoeuvrability of the instruments (narrow and deep corridor), intricate duraplasty with relatively long learning curve and limited control of vascular lesions (carotid artery bleeding). The two major sources of morbidity in skull base surgery are injury to the vasculature or the cranial nerves. When selecting the appropriate corridor surgeon should maintain the general principle of not crossing the plane of cranial nerves and have a thorough understanding of the surgical relationships of the ICA, VAs, and the circle of Willis. To conclude there is still a heated debate of the superiority or inferiority of the transnasal or transcranial route for intradural parasellar lesions.

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## Abstracts – Oral presentations

### **Third ventriculostomy (ETV) versus shunt**

*Karppinen, A*

*FINLAND*

The management of hydrocephalus is a never-ending problem. The procedures (ETV, shunt) might seem simple, but the pathophysiology of hydrocephalus is complex and probably poorly understood. The classification of hydrocephalus to obstructive and communicating forms has been the paradigm for several decades. However this does not explain the radiological appearance of communicating hydrocephalus where ventricles enlarge but subarachnoid space does not. The 'new' hydrodynamic concept of hydrocephalus might explain this with decreased intracranial compliance, which increases the systolic pressure transmission and ultimately leads to ventricular dilatation and narrowing of subarachnoid space. This theory also explains why some patients with 'communicating hydrocephalus' improve after ETV. The best indication for ETV is acute obstructive hydrocephalus. Shunting on the other hand is 'one size – fits all'-procedure. How these operations compare to each other? There are several reports on failure rates for both procedures but no prospective randomized studies comparing ETV and shunt. Patient selection plays a major role in ETV: failure rates range between 8 and 69%. Shunt survival however is rather universal: approximately 40% of shunts fail within two years after the insertion. The longer the follow-up is the better ETV compares with shunt. The procedure related risks of ETV are considered to be slightly higher than risks of shunting. The surgeon has to consider whether to 'front-load' the risk with an ETV for possible long-term benefit or 'back-load' the risk with a shunt (in long-term all shunts fail).

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## Errors related to ICP-measuring and CPP calculations

Blommengren, A; Bellander, B

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**Background:** The use of continuous intracranial pressure (ICP) monitoring and calculation of cerebral perfusion pressure (CPP) is a useful part in management of patients with brain injuries (1,2). Intraventricular ICP is the most accurate pressure measurement (2). Correct ICP measurements and CPP calculations depends on the accuracy of the transducers, their leveling and proper zeroing. Different zero-points for ICP measurements are used today, from the forehead to the auditorial meatus. Furthermore, zero-points for mean arterial blood pressure (MAP), used for CPP calculation, varies from the pteryon to the anterior axillar line in the 4:th intercostals space. CPP is also depending on the positioning of the patient, flat or head up tilt up to 30 degrees.

**Aims:** To analyze the accuracy of ICP measurements and CPP calculations.

**Methods:** Zero-points for ICP measurements were analyzed in 100 patients treated at the neurointensive care unit at Karolinska university Hospital Solna (KS), Sweden. Using a laser-pointer device the difference between the Pteryon, which is the used zero-point at KS, and the actual level of the transducer in each patient was measured. Different zero-points for MAP, the Pteryon and the anterior axillar line in the 4:th intercostals space, was used for calculation of CPP. The tilt up degree of the patient was noted and if the tilt up was not 30 degrees, the patient's position was corrected and another measurement was performed. The differences in ICP and CPP were noted.

**Findings:** There is a significant difference in ICP and CPP values depending on how the zero-points are used and the patients are positioned.

**Conclusion:** Guidelines concerning practical ICP monitoring and CPP calculation is necessary. Until this has been reached it is of uttermost important that all presented articles present the zero-points and the positioning of the patients when ICP and/or CPP values are discussed. 1. Guidelines for cerebral perfusion pressure. Brain Trauma Foundation. J Neurotrauma 1996;13:693–7 2. Winn, H.R. (Ed.). Youmans Neurological Surgery, (5th Ed.). (2004). Philadelphia, PA: Saunders.

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## Abstracts – Oral presentations

### The Concept of ICP Wave Guided Management of Neurosurgical Patients

Eide, P<sup>1</sup>; Sorteberg, W<sup>2</sup>

<sup>1</sup>Oslo University Hospital/University of Oslo, NORWAY;

<sup>2</sup>Oslo University Hospital, NORWAY

**Background:** We have moved from treating neurosurgical patients according to their static intracranial pressure (ICP) to managing them according to their dynamic ICP. While mean ICP reflects the static ICP, the mean ICP wave amplitude (MWA) reflects the dynamic ICP. The MWA relates to intracranial compliance (ICC; intracranial pressure-volume reserve capacity) in a manner where high MWAs reflect low (poor) ICC and low MWAs indicate a normal intracranial pressure-volume relationship.

**Aim:** To describe the concept of ICP wave guided management of neurosurgical patients.

**Methods:** In patients undergoing ICP monitoring, we use a computerized system for automatic identification of the cardiac induced pressure waves. The pressure parameters, including the MWA, are computed from the verified single ICP waves, and revealed online during monitoring. Patients are managed in order to obtain a MWA <5 mmHg.

**Findings:** During the last 5 years we have implemented the concept of ICP wave guided management in patient groups such as those with acute cerebrovascular disease (intracranial bleeds such as subarachnoid hemorrhage) and patient groups with various types of cerebrospinal fluid disorders. The concept of ICP wave guided management has improved outcome.

**Conclusions:** The concept of ICP wave guided management allows tailoring management according to the need of the individual patient,

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## **A Randomized and Blinded Trial of ICP versus ICP Wave Guided Intensive Care Management on Acute Clinical State and 12 months Outcome in SAH Patients**

*Eide, P<sup>1</sup>; Bentsen, G<sup>2</sup>; Sorteberg, A<sup>2</sup>; Marthinsen, P<sup>2</sup>; Stubhaug, A<sup>2</sup>; Sorteberg, W<sup>2</sup>*

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*<sup>2</sup>Oslo University Hospital, NORWAY*

**Aim:** To investigate the effect on acute clinical state and outcome of mean intracranial pressure (ICP) - versus mean ICP wave amplitude (MWA) guided intensive care management in patients with aneurysmal subarachnoid hemorrhage (SAH).

**Methods:** A randomized and blinded single-center trial (Clinical-Trials.gov: NCT00248690) enrolled aneurysmal SAH patients during the time period November 2005 – January 2008. Patients were randomized to two different types of management: maintenance of mean ICP <20 mmHg or MWA <5 mmHg. Primary outcome measures were daily acute clinical state according to Glasgow Coma Scale (GCS) in non-intubated patients and outcome in all patients after 12 months as assessed by the Rankin Stroke Score (RSS).

**Findings:** Ninety seven patients were included in the study. The only management modality that differed between the two treatment groups was the volume of CSF drainage during the first week. Both the mean ICP and mean ICP wave amplitude were significantly lower during this week in the MWA group. The GCS during weeks 1-3 was nearly significantly higher in the MWA group (P=0.065). RSS in all patients at 12 months were significantly better in the MWA.

**Conclusions:** Lowering of mean ICP and mean ICP wave amplitude through extensive CSF drainage during the first week improves outcome at 12 months after aneurysmal SAH. Management is crucial during the first week and should be aimed at lowering ICP wave amplitude. Thereby the functional outcome of SAH can be improved. There possibly exists a functional penumbra that can be rescued or lost early after an aneurysm bleed.

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## Abstracts – Oral presentations

### **Biological and environmental risk factors cause extreme variation in the incidence of SAH – population-based prospective study of risk factors**

*Korja, M<sup>1</sup>; Silventoinen, K<sup>1</sup>; Laatikainen, T<sup>2</sup>; Jousilahti, P<sup>2</sup>; Hernesniemi, J<sup>1</sup>; Kaprio, J<sup>3</sup>*

*<sup>1</sup>Helsinki University Central Hospital, FINLAND;*

*<sup>2</sup>National Institute for Health and Welfare, FINLAND;*

*<sup>3</sup>University of Helsinki, FINLAND*

**Background:** We aimed to identify risk factors for subarachnoid haemorrhage (SAH) and characterize subgroups with a particularly high incidence of SAH.

**Methods:** The population-based cohort consisted of 68 050 Finnish persons (25-74 years old at enrollment), who were selected throughout Finland every five years from 1972 until 2007. A health-related questionnaire and clinical examination was carried out at enrollment. First ever SAH incidents between 1972 and 2007 were prospectively identified from the nationwide Finnish Cause of Death Register and the Hospital Discharge Register.

**Results:** 425 persons experienced SAH during the total follow-up time of 1,216,211 person-years. The overall SAH incidence was 34.9 (95% CI 31.8-38.4) per 100,000 person-years among  $\geq 25$ -year-old persons, and increasing incidence with age was evident especially among women. Female sex (HR 1.64; 95% CI 1.14-2.36), elevated ( $\geq 82$  mmHg) diastolic blood pressure values (HR 2.14-2.67), current smoking (HR 3.12; 95% CI 2.11-4.62) and increased ( $\geq 86$  grams/week) alcohol consumption (HR 1.76; 95% CI 1.12-2.78) at enrollment were the major risk factors for SAH. Depending on the risk factor profile, the SAH incidence varied between 0 and 255.8 per 100,000 person-years.

**Conclusions:** Most of the major risk factors contribute to the SAH risk more in women than in men. The interindividual variance in the SAH incidence depends on case-specific clustering of environmental and biological risk factors. Differences in study populations' risk factors may have confounded the results of many previous SAH studies. Screening and treatment of incidental aneurysms should perhaps be based on risk factor profiles.

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## Genetic factors do not play a significant role in subarachnoid hemorrhage susceptibility –

### Nordic Twin Study of 79 644 complete twin pairs

Korja, M<sup>1</sup>; Silventoinen, K<sup>2</sup>; McCarron, P<sup>3</sup>; Zdravkovic, S<sup>4</sup>; Skytthe, A<sup>5</sup>; Haapanen, A<sup>6</sup>; de Faire, U<sup>4</sup>; Pedersen, N<sup>4</sup>; Christensen, K<sup>5</sup>; Koskenvuo, M<sup>2</sup>; Kaprio, J<sup>2</sup>

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**Background:** It would be essential to clinicians, familial aneurysm study groups, and aneurysm families to understand the genetic basis of subarachnoid hemorrhage (SAH), but there are no large population-based heritability estimates assessing the relative contribution of genetic and environmental factors to SAH.

**Methods:** We constructed the largest twin cohort to date, the population-based Nordic Twin Cohort, which comprised 79 644 complete twin pairs of Danish, Finnish, and Swedish origin. The Nordic Twin Cohort was followed up for 6.01 million person-years using nationwide cause-of-death and hospitalization registries.

**Results:** One hundred eighty-eight fatal and 321 nonfatal SAH cases were recorded in the Nordic Twin Cohort. Thus, SAH incidence was 8.47 cases per 100 000 follow-up years. Data for pairwise analyses were available for a total of 504 SAH cases, of which 6 were concordant (5 monozygotic and 1 opposite sex) and 492 discordant twin pairs for SAH. The concordance for SAH in monozygotic twins was 3.1% compared with 0.27% in dizygotic twins, suggesting at most a modest role for genetic factors in the etiology of SAH. The population-based probability estimate for SAH in dizygotic siblings of a patient with SAH is 0.54%, and only 1 of 185 full siblings experience familial SAH. The corresponding risk of SAH in monozygotic twins is 5.9%. Model-fitting, which was based on the comparison of the few monozygotic and dizygotic pairs, suggested that the estimated heritability of SAH is 41%.

**Conclusions:** SAH appears to be mainly of nongenetic origin, and familial SAHs can mostly be attributed to environmental risk factors.

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## Abstracts – Oral presentations

### **The effect of increased warfarin use on warfarin-related cerebral hemorrhage: A longitudinal population based study**

Tetri, S<sup>1</sup>; Huhtakangas, J<sup>2</sup>; Juvela, S<sup>3</sup>; Saloheimo, P<sup>4</sup>; Bode, M<sup>5</sup>; Hillbom, M<sup>2</sup>

<sup>1</sup>Oulu University Hospital/ Department of Neurosurgery, FINLAND;

<sup>2</sup>Oulu University Hospital/ Department of Neurology, FINLAND;

<sup>3</sup>Turku University Hospital/ Department of Neurosurgery, FINLAND;

<sup>4</sup>Kellokoski Hospital/ Department of Neuropsychiatry and Psychogeriatrics, FINLAND;

<sup>5</sup>Oulu University Hospital/ Department of Radiology, FINLAND

**Background:** Warfarin use has rapidly increased with the aging of population. We investigated temporal trends in the incidence and outcome of warfarin-related ICHs (WA-ICH) in a defined population.

**Material and Methods:** We identified all subjects with first-ever ICH during 1993–2008 among the population of Northern Ostrobothnia, Finland. The number of warfarin users was obtained from the national register of prescribed medicines kept by the Social Insurance Institution of Finland. We calculated annual incidence of WA-ICHs, 28-day case fatality and deaths from the primary bleed.

**Results:** The number of warfarin users among the population increased 3.6-fold from 0.68 in 1993 to 2.28% in 2008. Of total of 982 patients with ICH, 182 (18.5%) had WA-ICH. One-year survival was 35.2% among warfarin users and 67.9% among non users. The annual incidence of WA-ICHs ( $p=0.062$ ), the annual 28-day case fatality per 1,000 users ( $p=0.002$ ) decreased during the observation period. Warfarin users were older (mean difference 6.6, 95% CI 5.0-8.1,  $p<0.001$ ) than non users. Admission INR values above therapeutic range (2.0-3.0) became less frequent through the observation period suggesting improved control of anticoagulant therapy by time.

**Conclusion:** The annual incidence of WA-ICHs and case fatality to the disease did not increase but rather decreased although the number of warfarin users almost quadrupled in our population.

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## **Prothrombin complex concentrate improves survival of patients with warfarin associated ICH:**

### **A longitudinal population based study**

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**Background:** Warfarin-associated cerebral hemorrhage (WA-ICH) carries poor outcome due to rapid hemorrhage growth. We investigated whether reversal of INR with prothrombin complex concentrate (PCC) improves survival of patients with WA-ICH.

**Material and Methods:** We identified all subjects with WA-ICH during 1993–2008 among the population of Northern Ostrobothnia, Finland. From year 2004 onwards, PCC was used in Oulu University Hospital (which is the only hospital treating ICH patients), to counteract the effect of warfarin in patients with WA-ICH. We compared outcomes of subjects diseased before and after 2004.

**Results:** We found altogether 182 subjects who were stricken by ICH while on warfarin. One-year survival was significantly ( $p=0.022$ ) higher for those 61 subjects diseased during 2004-2008 (44.3 %) than for those 121 diseased during 1993-2003 (30.6 %). In multivariate analysis, PCC treatment protected (OR 0.289, 95% CI 0.083–1.008,  $p=0.051$ ) against early death (2-day). However, the number of subjects with severe disability increased. Thromboembolic complications did not occur more frequently among those treated with PCC. Careful selection of patients for warfarin and better control of warfarin treatment in addition to PCC contributed to improved outcome.

**Conclusion:** After installing PCC treatment, survival of WA-ICH patients improved among the population of Northern Ostrobothnia.

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## Abstracts – Poster presentations

### **Epidemiological analysis of 189 cases of traumatic intracranial extradural hematoma treated by surgery**

*Vitorino Araujo, J; Todeschini, A; Saade, N; Veiga, J, Santa Casa de São Paulo Medical School, BRAZIL*

**Introduction:** The mortality of patients with extradural hematomas (HED) in the early twentieth century was about 80% and thus represent a true emergency neurosurgery. In the 70's with the advent of angiography in the diagnosis, the HED had a mortality rate exceeding 30%, the HED currently represents about 1% to 5.5% of intracranial lesions in patients with head trauma with a mortality that can reach 20%. The purpose of this paper is to present our experience with 189 cases of extradural hematomas treated surgically in one of the largest emergency hospitals in Brazil.

**Method:** This study includes a retrospective analysis of 189 cases of HED diagnosed by computed tomography (CT) and underwent surgery, admitted in the Emergency Center (PSCT) of Santa Casa de Misericórdia de Sao Paulo in the period January 2001 until January 2007.

**Results:** In our department we observed that the HED appears more often in males, in the fourth decade of life, mainly as a result of falls, but also due to different forms of accidents related to traffic and inter-personal aggression. On admission we observed a clinically Glasgow Coma Scale between 13 and 15 (49.7%), and skull fracture was present in 45.0%, and pertinent to mention the involvement of the temporal region in most cases. The most frequent location of HED was in temporo-parietal region (26.5%) and was associated with other intracranial lesions in 32.8% of cases. The length of hospital stay was less than 7 days in 40.7% and 76.2% at hospital discharge of patients were in satisfactory clinical condition, with no observed neurologic sequelae or deficits minimal.

**Conclusion:** This study aimed to define the epidemiological profile of our population and thus constitute a useful tool in the promotion of preventive measures in public health.

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## **Meningioma associated with intracranial subdural hematoma acute non-traumatic.**

### **Case Report and Literature Review**

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**Introduction:** The description of spontaneous bleeding associated with meningiomas is uncommon, with an incidence of 1.3%. The first time series of meningiomas, were made by Cushing and Eisenhardt (313 cases) and Hoessly and Olivecrona (280 cases) and no mention cases associated with spontaneous hemorrhage.

**Method:** A case report and literature review.

**Case Report:** The LHCB patient, male, 52, admitted to our emergency department with sudden headache four days ago. The neurological examination patient was unchanged, only complaining of headache of moderate intensity irradiation with fronto-temporal region. He did not report any episode of trauma or abuse alcohol. Laboratory tests were within normal limits. Directed CT scan without contrast, with the presence of dural hypodensity right fronto-temporal image surrounded by hyperdense fronto-temporo-parietal region with approximately 2.5 cm. The RM showing in greater detail the anatomical relations and size of the lesion, allowing a more adequate surgical access. The patient was submitted craniotomy fronto-temporo-parietal, when a lesion yellow-gray with dimensions of 8.0 X 5.0 cm, associated with acute subdural hematoma. Directed excision of the lesion en bloc together with the dura and held duroplastic with galea-aponeurotic. The pathological examination confirmed the diagnosis of meningothelial meningioma associated bleeding. The patient was discharged after five days without complications.

**Discussion:** There are several hypotheses that attempt to explain the occurrence of spontaneous bleeding in patients with meningiomas. Distension of vessels by tumor growth with subsequent rupture and hemorrhage. Rupture of vessels secondary to direct invasion by tumor cells. Venous hypertension secondary to local tumor. The assumptions were developed by histopathological analysis of selected cases, possibly a combination of some theories are associated with the genesis of this unusual event. Other factors such as histological subtype, location, age and sex, showed no significant relationship to a hemorrhagic event. Histopathology of our case was not observed areas of necrosis or thrombosis of intratumoral vessels. Over the past four years 115 patients were operated in our department, and only 1 case of subdural hematoma associated with meningioma therefore an incidence of 0.8%, comparable with that described in the literature.

**Conclusion:** Subdural hematoma associated with meningioma should always be considered in adults with signs of acute or chronic subdural hematoma without history of trauma or other risk factor (alcoholism, coagulopathy, etc.) and especially in cases with atypical radiological presentations.

**References:** 1. Worm, PV, et al. Subdural hematoma in a patient with meningioma. *Arq. Neuropsiquiatr* 2009;67( 2A ): 308-310. 2. Di Rocco, F, et al. Intracranial meningiomas associated with non-traumatic chronic subdural hematoma. *Acta Neurochir (Wien)* 2006 148: 1097-1102. 3. Others 23

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## Abstracts – Poster presentations

### Malignant Chondroid Syringoma Occipital

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**Introduction:** The malignant chondroid syringoma, also called cutaneous malignant mixed tumor of the skin, is an extremely rare tumor derived from sweat glands. with approximately 40 cases reported. Prevails among women with higher prevalence in the sixth decade of life. Usually affects the trunk and distal ends of members. **Method:** Case report and literature review.

**Results:** VAB, female, 31, was admitted to our hospital due to severe amblyopia framework and bilateral papilledema. The patient reported that two months ago she developed headache in occipital region and a progressive decrease in strength in the left arm. 1 week ago showed bilateral blurred vision with rapid progression to blindness. The ectoscopy presented with an ulcerated lesion in the occipital region caked with infiltration to the deep levels and elimination of thin purulent discharge. The neurological examination found himself underactive, oriented in time and space, without déficts engines and cranial nerves, the left dysmetria and bilateral blindness associated with papilledema. CT scan was performed in the presence of infiltrating lesion in the occipital bone erosion and significant vasogenic edema in the occipital lobe. The patient underwent excision of the expansive process associated with occipital skin flap preparation and adaptation of galea-aponeurotic in dural lesion.

**Discussion:** We present a case of malignant chondroid syringoma with invasion of the central nervous system. Rare disease with preferential involvement of trunk and distal extremities. In 60% of cases presents with locoregional metastases, especially to lungs, lymph nodes and bones. Histopathology shows epithelial and mesenchymal differentiation, hence its synonymy of cutaneous malignant mixed tumor. The immunohistochemical studies have demonstrated that tumor cells co-express S-100 protein and cytokeratin, and smooth muscle actin, consistent with immunophenotype of myoepithelial cells. Treatment is essentially surgical and healing can be achieved when performed with resection and wide safety margin.

**Conclusion:** The patient underwent complete macroscopic excision of the lesion, but after 9 months aproximadamadamente local recurrence occurred with the invasion of torcula Herophilus .. Due to the Karnofsky scale score of less than 70, radiotherapy was instituted. After 2 months the patient died from infectious complications. In our review we found no cases of central nervous system invasion by malignant chondroid syringoma. The inability to accomplish resection with wide safety margin, makes the curative treatment of this disease, undoubtedly a great challenge to neurosurgical practice.

**References:** 1- Takahashi J., et al."Malignant chondroid siringoma with bone invasion: a case report and review of the literature" Am J Dermatopathol 2004, 26 (5):403. 2- Kiely, JL. et al. Malignant chondroid syringoma presenting as multiple pulmonary nodules. Thorax, v.52,p.395-6,1997.

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## Improved long term survival among glioblastoma patients – Analysis of treatment results from 1991 to 2008 in the Helsinki University Central Hospital

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**Background:** Prognosis of glioblastoma has been dismal. This has had its reflections to treatment strategies making neurosurgeons and oncologists less eager to retreatments. During the past few years much has happened in the primary treatment of glioblastoma. Results show improved outcomes after more radical operations (1). Combination of temozolomide to radiotherapy is shown to improve significantly both progression free survival and OS in a randomized study(2).

**Aim:** The aim of this study was to investigate whether improvements in treatment strategies are reflected to glioblastoma patients' survival in an unselected patient population treated in the Departments of Neurosurgery and Oncology in the Helsinki University Central Hospital.

**Methods:** The time from diagnosis to death is analyzed from periods 1991-2, 1996-7, 2001-2, 2004-5 and 2008. In each period there were 30, 53, 75, 66 and 48 glioblastoma patients, respectively.

**Findings:** In the periods of 1991-2, 1996-7, 2001-2, 2004-5 and 2008 the proportion of patients living less than 6 months has not changed: 37%, 38%, 23%, 27% and 31%, respectively. In contrast, the proportion of patients living more than 2 years has increased markedly during the past years: 0%, 7%, 7%, 15% and 25%. Only in the last series from year 2008 there were patients aged more than 65 years living longer than 2 years (3 patients, 23%). All 12 long term survivors had primarily received chemoradiotherapy with adjuvant temozolomide. There were macroscopic radical operation in 3 patients, resection in 7 and biopsy in 2 patients. Five of them have not progressed so far, 4 are reoperated, 6 have had reirradiation, 1 BNCT, 6 patients chemotherapy.

**Conclusion:** The improvements in glioblastoma treatment are reflected to increase in the proportion of long term (>2yrs) survivors but not in short term (<6kk) survivors. The results are comparable to the selected series in a large randomized study (2).

**References:** 1. Stummer W ym. Lancet Oncol 2006;7:392-401 2. Stupp R ym. NEJM 2005;352 (10):987-96

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## Abstracts – Poster presentations

### **Surgical Versus Conservative Management of Spontaneous Supratentorial Intracerebral Haemorrhage in End Stage Renal Failure: A Retrospective Review**

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**Background:** Surgical management of patients with spontaneous supratentorial intracerebral haemorrhage (ICH) and end stage renal failure (ESRF) remains controversial. From our literature search, this is the first study comparing the outcomes of these patients managed surgically and conservatively.

**Aim(s):** The aim of the study was to evaluate the outcome of surgical versus conservative management of ICH in ESRF patients. Primary outcomes were death and the Glasgow Outcome Scale (GOS) at 1 year follow up. Secondary outcome was the modified Rankin Scale (mRS).

**Methods:** A retrospective review of all patients admitted with spontaneous supratentorial ICH and concomitant ESRF in the Neurosurgical Unit of the National University Health System (NUHS), Singapore, between January 2005 and December 2009. The outcomes of patients who were treated surgically versus conservatively were analysed.

**Findings:** A total of 2092 patients were admitted to NUHS for ICH during the 5 years study period. Of these, 21 patients were found to have spontaneous supratentorial ICH with concomitant ESRF. The mean follow-up period was 12.7 months (ranging 0 to 65 months). 2 patients were lost to follow-up. At presentation, 6 (33.3%) in the conservative group versus 2 (66.7%) in the surgical group had poor Glasgow Coma Scale (GCS) ( $\leq 8$ ). 3 patients underwent surgical treatment and the rest were treated conservatively. At 1 year follow-up, 2 (66.7%) and 12 (66.7%) of the patients from the respective group were dead. 3 (100%) of the patients who underwent surgery versus 14 (87.5%) of the patients treated conservatively had poor GOS (1-3). All the patients were noted to have poor mRS (3-6) at 1 year. There was no statistical significant difference ( $p > 0.05$ ) in the patients' age, gender, mortality, poor GOS or poor mRS between the groups.

**Conclusions:** Although a smaller proportion of patients in the conservative group presented with poor GCS, there was no difference in the mortality and neurological outcome of ICH patients with ESRF at 1 year follow up regardless of operative or conservative management. ESRF patients with ICH generally have dismal prognosis and should be managed conservatively. However, a future larger prospective study should be conducted to further evaluate this.

## **Mentoring model for Neurointensive care in Helsinki University Central Hospital**

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Mentoring is proved to be important part of professional development that can be carried out in different stages of nurse's careers. Retention of nurses is high worldwide also here in Finland. The changes in our society require nursing staff to be responsible for their knowledge and development of skills. Nurses turnover on the first year of practice ranges between 35%-60%. The first three to six months are very stressful time and risk to make mistakes is high. New staff has very little experience in clinical skills but they are required to bear full responsibility of patient care. We have created mentoring model for new staff for their support after orientation period. The pilot project was carried out at 2009-2010. Mentor plays a vital role in proving opportunities for learning and development of their knowledge in neurointensive care. Mentor and novice nurse have meetings once a month and they can discuss on relevant issues consider of patient care and work relationship. Mentoring model includes also orientation on children's care carried out in neurointensive clinic and organ donor management. We employed self-administered questionnaires to all mentors and novice nurses after the mentoring period which is one year. The results of the mentoring pilot are comparable with earlier research information. Results of mentoring seem to be a useful tool in developing professional skills for all participants. Main results for mentoring are that peer support in nursing and problem solving is increased. New nurse's self-confidence and courage is increased in nursing. Mentoring also increases worker's commitment to work and work community and helps resource utilization. It has been presented that mentoring creates positive atmosphere and trust between workers. Mentoring is a new kind of structure witch is aiming at professional development and supporting commitment to work. Organization will benefit from reduced staff turnover, work efficiency and increased well-being as well as tacit knowledge in the transition to a new generation.

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## Abstracts – Poster presentations

### Using evidence based practice in management of Traumatic Brain Injury in Helsinki University Hospital

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Traumatic brain injury (TBI) is one of the main causes of death and disability in young adults worldwide (1). TBI causes both physical and psychological dysfunction leading to temporary or long term consequences. These consequences make TBI a public health problem. From the population of Finland the incidence of these consequences is estimated to be 2.3%, and TBI is also the most common cause of death for adults under 45 years. TBI can be divided into two areas; the primary injury and the secondary injury. The primary injury occurs at the time of the insult, and can be focal or diffuse. The secondary injury occurs some time after the primary injury and can be caused by extracranial or intracranial factors (2). The secondary injuries are often the result of events that occur in intensive care setting: hypoxemia, hypotension, and intracranial hypertension. It has been widely documented that evidence based practise and interventions reduce secondary brain injury and improve outcome (3). Studies have shown that outcome after severe TBI is highly dependent on the quality of the critical care management, and it has been suggested that the patients are twice as likely to survive if they are treated in a specialist neurosurgical centre (3). In the neurosurgical intensive care where the authors work there are nursing and medical protocols that are based on carefully chosen studies and recommendations. This evidence based practise ensures that the patients receive high quality care. There is mandatory training for the nursing staff twice a year, where the staff reviews these protocols. The training also includes clinical practice for using new equipments. One way to ensure that information is available is to use shared database where all protocols and guidelines are published. In this presentation the authors will explore the protocols used in the Helsinki University Hospital from the nursing point of view.

**References:** 1) European Journal of Neurology 2005 Jun;12 Suppl 1:85-90 2) Smith M; Neurocritical care: has it come of age? British Journal of Anaesthesia 2004 Dec Vol 93 No6 3) Iacono L.A ; Exploring the Guidelines for the management of Severe Head Injury Journal of Neuroscience Nursing 2000 Feb Vol 32 No 1

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