

NOKIAS2016
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ABSTRACTS



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KEYNOTE**Human Factors – Error or Safety?***Patrik Nyström*

Arcada – University of Applied Science (UAS), Helsinki, Finland

In the work of patient safety there is often a tendency to refer to human factors (HF) when addressing errors that happened. Human factors is therefore often seen as a label or topic of human error. In safety research there is a growing amount of research that explores the boundaries of traditional view on safety and from which the safety II (Hollnagel E.) concept has been established.

In safety II the focus is on getting as many things as possible go right through a proactive and continuous anticipation of developments and events. The explanation of accidents is that things basically happen in the same way, regardless of the outcome. The purpose of an investigation is to understand how things usually go right as a basis for explaining how things occasionally go wrong. Humans are seen as a resource necessary for the system flexibility and resilience instead of a liability or hazard.

This lecture will highlight interesting details from the safety research and how this affects our safety work depending on what standpoint we take on safety and errors. E.g. Safety I: Things go right when people follow the procedures. Work as done is very close to work as imagined. E.g. Safety II: People successfully adjust their actions in work as done to make sure the correct outcome is produced. The task is to find out, what adjustments are made and what we can learn from those adjustments.

I1

Transfer of information from one unit to another - future scenarios*Tuula Hiekkänen*

Anesthesiologist, Apotti Associate, Oy Apotti Ab, Finland

Information is an essential tool for health care professionals when taking care of the patients and evaluating the quality of care. Good quality information in a right place at a right time brings safety, resolves uncertainty, and leads to right, justifiable decisions.

It has been estimated that up to a third of doctors' work time is taken up by different systems that do not function or are unable to communicate with each other. At the moment, there are hundreds of different data systems in use in the Helsinki Metropolitan Area that do not communicate with each other. In the field of anesthesiology, many units still use paper forms for anesthesia and ICU documentation, and patient information, including history, problems, medication and allergies, has to be manually transferred repeatedly during a standard care process of a surgical emergency case.

Oy Apotti Ab's goal is to be the first in the world to create a shared client and patient information system and operations management system for social services and healthcare. The parties participating in Apotti are Helsinki, Vantaa, Kirkkonummi, Kauniainen and the Hospital District of Helsinki and Uusimaa (HUS), affecting more the 1,6 million Finns. The first implementations proceed in Vantaa and Peijas in 2018.

Having one, shared system for all breaks most of the obstacles with information transfer from one hospital, health center or social service unit to another. Mobile applications will decrease delays in entering notes during home visits or bed side rounds. Everyday life and work will be easier, improved usability will produce more time for clients and patients, up-to-date data will be available securely without delay, regardless of location. The professional can find patients in risk groups, social and health care administration can evaluate the functionality of their unit. The system will also produce work support by reminders and actions triggered by events. And the system will provide operations management, helping to improve care for patients and track quality measures. The residents will have an effortless access to information about their own health, treatment and results, regardless of the time and location. They can make appointments electronically, enter possible home measurement and medication data and fill in the necessary forms.

And finally, different units around the world can share information with each other and when necessary copy and implement good practices from a shared Community Library.

12

How to measure nursing intensity and why should at all?

Satu Rauta

Helsinki University Hospital, Finland

Nursing intensity is described as the amount of nursing care which is needed to give safe and high class care. It is evaluated by nurses themselves through patient's care needs in relation to nurse's contribution to take care for these needs. Measuring nursing intensity is indirect because of the complexity of the environment where the nursing care delivery performs.

In Finland we have an opportunity to use national nursing intensity-instrument (PERIHOIq) to describe and monitor the nursing performance and the care needs of surgical patient in operating departments, day surgery units or post anesthesia care units. The aim of the use of this instrument is to capture the core elements of perioperative nursing, so, what nurses do related to the anesthesia and operation. The nursing intensity-instrument is a part of national patient classification system.

The point is that the frontline nurses themselves evaluate their patients' care needs in relation what they actually do to fulfil these needs using the four-scale instrument which contains six category. As a result patient attain 6-24 nursing intensity points. So, knowledge based on common beliefs became to actual knowledge. The ultimate goal in using patient classification system is to succeed in staff allocation. This will ensure the patients' appropriate care, nurses' suitable workload and organizations' cost-effective performance.

The surgical performance in Finnish hospitals is monitored extensively. Among other things, different time labels calculated from data which were documented in our electronic patient records, number of operations and utilization rates are of common interest. The staff related indicators, like sic absenteeism, turnover rates and job satisfaction illustrate the big picture from the staff's point of view. We have also statistic concerning the outcomes; patient satisfaction, pressure ulcers' incidence, pain rates, and postoperative infections. The significance of the data gathered from patients' nursing intensity is in its value to broaden the viewpoint to tell us the nurses' patient related work. It is worth notice that it is unable to explain everything the nurses do. So besides we must doubt are the nurses doing the right things?

Demand for knowledge based management makes it essential to describe and analyze our performance so it can be lead, managed or administered. We need information about our patients', staff resources and their use to support our decisions. The utilization rely on the reliability and extent of the data gathered with nursing intensity-instrument. Measuring the nursing intensity is in every nurse's professional hands. Evidently, they need equal understanding about patients' care needs and nursing interventions. Their managers in every level must be capable to analyze and translate the information into actions. If these become true, measuring nursing intensity is worth it.

I3

Modern perioperative thermal management

A. Bräuer

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Modern perioperative thermal management aims at the prevention of hypothermia during the perioperative process to protect the patients from all adverse outcomes that are associated with hypothermia. These adverse outcomes include increased blood loss and higher transfusion requirements, higher rates of morbid cardiac events and more surgical site wound infections.

Pathophysiology

Patients start to lose heat during the way from the ward to the operation room due to cold environmental temperatures in the hospital, insufficient insulation of the body and the influence of premedication. This heat loss is then aggravated in the operation room because patients are only minimally dressed and temperatures in the operation room are very low.

During anaesthesia anaesthetics reduce heat production of the body and impair thermoregulation. This leads to a redistribution of heat from the warm core of the body to the colder periphery. Surgical skin preparation and the use of unwarmed intravenous or irrigation fluids can further contribute to the development of perioperative hypothermia.

Components of a modern perioperative thermal management

A modern perioperative thermal management consists of three components.

- Measurement of core temperature
- Prewarming
- Warming during anaesthesia

All three components are important for success.

Measurement of core temperature

Measurement of core temperature should be performed before induction of anaesthesia and during anaesthesia. Early measurement of core temperature before induction of anaesthesia will identify patients that will need prolonged prewarming, whereas core temperature measurement during anaesthesia will show if the chosen thermal management is successful or not.

Prewarming

Intraoperative warming without prewarming is often ineffective. Without prewarming, the redistribution of heat after induction of anaesthesia often causes hypothermia and as a consequence these patients are hypothermic during the first hours of surgery.

Prewarming can be started on the normal ward, in a preoperative holding area, in an induction room or in the operating room. In Germany prewarming in the induction room is the preferred method because it is probably the most practical approach in many German hospitals. However, no single strategy suits all hospitals and all situations.

Warming during anaesthesia

Warming during anaesthesia should be started at the time of induction of anaesthesia. If prewarming is used in the induction room or in the operating room prewarming proceeds to warming therapy during anaesthesia. It is sensible to use the largest forced-air warming blanket that can be used during the operation, because the efficacy of forced-air warming is directly depending on the body surface that is warmed. If high amounts of intravenous fluids and blood products are necessary the additional use of a blood and fluid warming system is necessary.

14

The hospital is on fire*Tommi välimäki*

Safety planner, Hospital district of Southwest Finland, Turku, Finland

FIRE LED TO EVACUATION FROM TURKU HOSPITAL ON 2 SEPTEMBER 2011

A fire broke out at 05.41 hrs on Friday 2nd September 2011 in Turku University Hospital. The fire started in the eastern corridor of the emergency room above a suspended ceiling. The space above the ceiling is occupied by hospital technical equipment and pipes for pressurised air and oxygen. One of the nurse call-out system connection units in the space overheated. Overheating resulted from a short-circuit in the call-out system connectors in a patient room.

The oxygen pipes were damaged by the fire to the extent that it was impossible to determine their condition before the fire. Inaccurate consumption information made it impossible to detect any leaks. However, by excluding various possible causes of the fire, the investigation concluded that the oxygen pipes leaked before the fire broke out. Because of this, the oxygen concentration above the suspended ceiling was higher than normal, which lowered the ignition temperature of the materials, increased the combustion temperature, and increased the speed of the fire's development.

The fire heated the oxygen and pressurised air-pipe connections in the space above the suspended ceiling. This led to the connections' melting and opening, releasing more oxygen into the space.

Smoke spread remarkably quickly through the inlets for electric wires and other HVAC technology located above the doors. It also spread throughout the building, via lift shafts, staircases, air conditioning and inlets. The fire itself spread through the third-floor duct for electric cables. Due to the spread of the smoke, the entire building, apart from the intensive care unit, was evacuated.

No one died in the fire, but three nurses suffering from smoke exposure were taken to the health centre for examination. No injuries to patients were reported. The hospital building suffered considerable damage. The eastern end of the emergency room on the second floor and the ER laboratory corridor on the third floor were completely destroyed. In addition, the hospital premises suffered various degrees of smoke and soot damage. Hospital equipment was rendered unusable. Total damage, including consequential loss, is estimated at EUR 17.5 million.

In order to improve safety, hospitals should have a proactive repair programme covering all the fields of safety. The programme should be implemented and monitored regularly. Nursing homes and other institutions should also have a working system for alerting the management and personnel and for internal communication. In addition it is recommended that all nursing homes and other institutions should be protected with automatic fire extinguishing system (sprinkler).

Specificities in Neuroanaesthesia

Eirik Sjøfteland

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It is essential to know CNS physiology, especially the relationships between cerebral blood flow (CBF), cerebral autoregulation, cerebral perfusion pressure (CPP), intracranial pressure (ICP), and intracranial volume (ICV). CPP is the difference between the arterial blood pressure (ABP) and the ICP. Cerebral autoregulation is influenced by changes in carbondioxide, oxygenation, cerebral disease or trauma and anaesthesia.

The brain should be kept in a relaxed state perioperatively (“brain relaxation”) to obtain good surgical conditions. Close collaboration with the neurosurgeon is essential. Several factors may influence brain relaxation. Keeping close attention to stable haemodynamics as to ABP, CPP and CBF, fluid balance, osmotic pressure (electrolyte disturbances), and to ventilation and oxygenation at all times is essential. A hypervolemic status is probably best avoided, euolemia being the goal.

As to choice of vasopressor, there are no large convincing studies showing which should be preferred (phenylephrine, norepinephrine or dopamine) when considering CPP, CBF or cerebral oxygenation, although other patient factors (eg cardiovascular disease) might influence choice.

Isotonic crystalloid solutions are probably best for intravenous fluid therapy, use of colloids being controversial. Still, there is a lack of large studies in elective neurosurgical procedures to confirm this, with such recommendations being based on studies in traumatic brain injury (TBI) or subarachnoidal haemorrhage (SAH) patients.

As to hyperosmolar therapy both mannitol and hypertonic saline (HTS) may be used in order to improve brain relaxation. A recent meta-analysis showed a slight advantage to HTS. Robust outcome measures were absent, however, with further studies needed to evaluate any differences.

We often rely on indirect monitoring of CBF, basing our anaesthesia approach on estimations of the CPP from ABP measurements (mean arterial pressure, MAP) when there is no ICP measurement available. With an intraventricular drain or intraparenchymal probe in place, the ICP may be measured, and with direct monitoring of the CPP. Direct monitoring of CBF can be obtained by transcranial Doppler (TCD). Direct measurement of cerebral tissue oxygenation is possible and of value as to short time outcome in cerebrovascular surgery. Several methods from intensive care multimodal monitoring of severe TBI- or SAH- patients have been applied perioperatively. These methods are often hampered by cumbersome setups, however, not being practical in surgical settings.

As to short time outcome there are no conclusive studies as to which type of anaesthesia should be preferred (intravenous or inhalational), although a high MAC of volatile anaesthetics might cause cerebral vasodilation. So far, no perioperative pharmacological neuroprotective treatment have proved to be of value as to outcome.

Generally there is a lack of larger randomized controlled trials (RCTs) on how anaesthesia might affect long term clinical outcomes in neurosurgical patients, and multicenter studies are warranted.

I6

Post-operative ICU care of the craniotomy patient*Patricia Bertényi*

RN ICU, Intensive Care Unit, Turku University Hospital, Turku, Finland

Yearly, an average of 25% of all ICU patients in Turku require neuro intensive care. The most common reasons are traumatic brain injury (TBI) and subarachnoid haemorrhage (SAH).

So far, we don't have magic bullets. What is lost in the primary assault (injury, spontaneous bleeding etc.) is lost for good. The main goal of the neuro intensive care is to protect the area surrounding the damaged part to avoid secondary injury and optimize the situation for the surviving brain tissue, to enable its optimal survival.

Multimodal monitoring is essential for the neuro patient. One can create an optimal therapy based on the observed individual pathophysiological changes. Having said that, we still follow established treatment protocols. The maintaining of adequate oxygen levels and ventilation ($PO_2 > 13$ kPa, CO_2 4,5 - 5 kPa), stable and adequate hemodynamics (MAP > 90 mmHg, CPP > 60 mmHg or above), good brain tissue oxygenation levels (BtiO₂ > 20 mmHg) and minimizing intracranial pressure (ICP < 20 mmHg, children < 15 mmHg) are of great importance. We also have to remember to prevent/treat infections, to set the intestinal system in motion through enteral nutrition (to kick start the body's own immune system and immunity response) and maintain an adequate glucose level (P-gluc 6 - 10 g/l), just to mention a few.

Multimodal monitoring and our professional experience and knowledge helps us to recognize when the brain is in trouble. We start a stepwise approach in order to help the brain maintain or regain balance.

In the first phase the sedation and analgesia is intensified, the patient is in deep sleep (RASS -4 to -5) with no regular wake up tests. At this point antiepileptics is at least considered, if not immediately applied.

The second phase consists of considering ventriculostomy and balancing the intracranial pressure situation with it.

In the third phase hyperosmolar therapy (NaCl 7,5%) is applied regularly or as often as needed. Hypothermia - treatment is also a possibility (usually 35 C). At this point (the latest) an EEG is recorded and depending on the results, antiepileptic medication started or intensified.

The last and fourth step is decompressive craniectomy, which in Finland is considered the last step. If the brain swelling and the problems it creates are still not resolved with this, the prognosis is unfortunately poor.

The staff of the ICU not only takes care of the patient, but also of the patient's family. It is part of our job to support the family, keep them up to date and help them maintain a positive mind set and hope. Sometimes it's also part of our job to help them face the worst possible outcome.

How to treat septic patient during anesthesia?

Kirsi-Maija Kaukonen

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Sepsis is present in around 10% of all critically ill patients. The definition for sepsis is redefined in 2016, Sepsis-3. According to the new definition sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection. Organ dysfunction is defined as an acute increase of Systemic Organ Failure Assessment (SOFA) score ≥ 2 points caused by infection. SOFA score consists of six different areas: cardiovascular, respiratory, renal, liver, neurological and hematologic. The new Sepsis-3 definition also guides to screen for organ failures outside ICUs (e.g. emergency department,) in patients with infection and at least two out of three qSOFA criteria (respiratory rate ≥ 22 /min, altered mentation, systolic blood pressure ≤ 100 mmHg).

Around 20-40% of all sepsis patients in ICUs have infection focus from a site where source control can be achieved, i.e. the patients undergo surgery before or during their ICU stay.

Surviving sepsis campaign has launched guidelines to treat sepsis among other measures to improve outcomes in septic patients. The guidelines have >20 recommendations, of which initial resuscitation, source control, fluid therapy, vasopressor and inotrope use are among the most important ones during anesthesia.

The initial resuscitation goals of CVP >8 mmHg, MAP >65 mmHg and ScvO₂ $\geq 70\%$ have been challenged by three recent large randomized trials that showed no difference between early goal-directed resuscitation and standard of care.

Study	Rivers, 2001	PROCESS, 2014	ARISE, 2014	PROMISE, 2015
Centres	1, US	31, US	51, ANZ + Fi	56, UK
Groups	EGDT vs. Standard therapy	EGDT vs. Protocol care vs. Usual care	EGDT vs. Usual care	EGDT vs. Usual care
Mortality	60 day	60 day	90 day	60 day
Mortality EGDT	44.3%	21.0%	18.6%	29.5%
Mortality Usual care	56.9%	18.9%	18.8%	29.2%
Mortality Protocol care		18.2%		

For source control, the recommendation is less evidence-based. The recommendation is to have the least invasive procedure within 12 hours after the diagnosis is made.

When treating septic patient, the choice of fluid should be crystalloids. If excessive amounts are needed, albumin can be used as an option. The use of hydroxyethyl starch is discouraged due to risk of acute kidney injury in septic patients.

The optimal blood pressure is >65 mmHg. In septic patients, increasing blood pressure to 80-85 mmHg, did not improve survival, but increased adverse effects. If a patient has hypertension in medical history, the need for renal replacement therapy is lower if higher blood pressure is targeted. The first-line vasopressor should be norepinephrine. If septic myocardial depression is present, the first-line inotropic agent should be dobutamine. Blood product administration should be conservative. The targeted hemoglobin concentration of 70-90 g/l is considered sufficient. In cases of ongoing myocardial or cerebral ischemia, the target value can be higher. For optimal dosing of fresh frozen plasma or thrombocytes, there is no good evidence. In case of active bleeding, these products should be used to correct coagulation.

For ventilatory treatment in sepsis patients undergoing surgery, lung-protective strategy should be applied (limitation of volume and plateau pressure).

19

Hydration of the septic patient*Per Henrik Lambert*

Regionshospital Nordjylland, Denmark

There is much we do not know about hydration of the septic patient.

- 1) How much volume is needed?
- 2) When to administer ?
- 3) Which types of fluids ?

Fluid resuscitation is a every day intervention in acute medicine. The selection and use of resuscitation fluids is based on physiological principles, but clinical practice is determined largely by clinician preference, with marked regional variation. No ideal resuscitation fluid exists. There is emerging evidence that the type and dose of resuscitation fluid may affect patient-centered outcomes.

What do we know about types ?

- 1) Synthetic colloids are harmful
- 2) Human albumen is fairly safe
- 3) We do not want to give unnessessarry blood products
- 4) Be carefull with saline

All resuscitation fluids can contribute to the formation of interstitial edema, particularly under inflammatory conditions in which resuscitation fluids are used excessively. Critical care physicians should consider the use of resuscitation fluids as they would the use of any other intravenous drug. The selection of the specific fluid should be based on indications, contraindications, and potential toxic effects in order to maximize efficacy and minimize toxicity.

I will go through the physiological principles of volume resuscitation based on the Frank and Starling theories and look into the hemodynamic variable used to predict fluid responsiveness.

I10

“I’m not ill, just damaged for the rest of my life”. Healthcare-related injuries caused by urinary retention*Eva Joelsson-Alm*

Karolinska Institutet, Stockholm, Sweden

Lower urinary tract symptoms (LUTS) are common health problems. For the individual, LUTS is troublesome and can greatly affect the health-related quality-of-life (HRQOL). One cause of LUTS is urinary retention (inability to void in the presence of a full bladder); a well-known complication following hospital care. If the bladder volume exceeds 500 ml there is a risk of overdistension of the muscle fibres in the bladder wall; bladder distension. This can result in motility problems with post-void residual volumes, urinary tract infections and an inability to void. If the bladder becomes stretched too far, or for a long period, the bladder may be permanently damaged and lose its ability to contract sufficiently for the rest of the person’s life. Bladder damage due to overdistension can be classified as a patient injury; harm caused to a patient as a result of their healthcare, and which could have been avoided.

During the lecture there will be a brief review of a qualitative study with narrative interviews of 20 patients who had reported a healthcare-related injury to the Swedish Patient Insurance LÖF, and who had had their injury classified as avoidable bladder damage due to over-distension. The result showed that micturition problems after bladder distension affected the everyday life through several practical and social constraints. Suffering from pain and infections, impaired sex life and strong concerns for the future were other findings. Lack of knowledge, insufficient routines, mistrust and poor communication between the staff and the patient were contributing factors leading to the injury.

I11**Update on new anticoagulants and treatment of severe bleeding***Eva Joelsson-Alm*

Karolinska Institutet, Stockholm, Sweden

In recent years, several new oral anticoagulants (NOAC) and platelet inhibitors have begun to be used to more and more patients, e.g., as thromboprophylaxis after hip and knee surgery, stroke prevention in patients with atrial fibrillation and treatment of deep vein thrombosis and pulmonary embolism. This means new challenges for the health care as these drugs increase the risk of bleeding complications and impedes an ongoing bleeding. The handling of bleedings in trauma patients and surgery is complex and difficult because the ability to monitor the drug effect is limited. The usual laboratory tests are of little value and special analyzes that are not available in all laboratories are required. Specific antidotes are missing for the majority of the drugs but are under development with promising preliminary results.

What do we do if the patient is bleeding? How can we monitor severe bleeding and how can we face emergent surgery when the patient is at risk for bleeding?

I12

Possibilities with simulation – in education and practice

Tone Johnsgaard and Marit Vassbotten Olsen

Bergen University College, Norway

Establishing simulation centers and using simulation as a pedagogical method are increasing in health professions and education. The resources available for this varies, from simple equipment to advanced departments.

Moving to a new campus in 2014, Bergen University College decided to establish simulation facilities for all educations in the Department for Health and Social Work, and SimArena was planned and built.

Simulated learning has the potential to enable both students and clinicians to engage in critical analysis of their own actions, reflect on their skills and clinical decisions. To guide the development, implementation and evaluation of simulation it is important that the educators use a framework that specifies relevant variables and their relationship. Furthermore it is important to be aware the use of different theoretical perspectives on learning, to achieve the learning outcomes.

As an overriding goal using simulation training in health care and education – the aim is to improve patient safety by allowing the participants to enhance individual and team skills before encountering patients.

In simulation laboratories, the students first train on specific skills. Then they apply these skills in scenario training, first in uniprofessional teams and later in interprofessional teams.

Education of the faculty and staff as facilitators (in the pedagogical method of) in simulation is crucial to run the simulation training.

Involving the clinical staff in the process of training the students is the next area we are exploring. What kind of scenarios are necessary to train before encountering patients– the just in time situations or just in case situations?

How can we prepare together? This is a question we are asking in our project, running together with our colleagues in the clinical field.

This kind of research is important - running simulation centers requires a lot of resources and it is important to know that our simulation training meets the learning objectives set.

I13

Kinaesthetics in anesthesia and intensive care: The resource-based approach to support the patient's body awareness, mobilization and the prevention of complications*Virpi Hantikainen*

University of Applied Sciences FHS St.Gallen, Switzerland & University of Turku, Finland

Kinaesthetics for nursing care was developed by Dr Hatch and Dr Maietta and later by the European Kinaesthetics Association (EKA). It has been taught for 30 years in German-speaking countries and is currently trained in an increasing number of other European countries. Kinaesthetics describes the fundamental nature of human movement competence with regard to functioning, self-efficacy and health development. The core is the communication and interaction between humans, which is carried out while moving. Kinaesthetics aims to promote the awareness of the kinaesthetic sensory system and to increase the quality of interaction and movement in everyday activities. It can be characterized by means of the following six dimensions: interaction, functional anatomy, human movement, human functions, effort and the environment.

In anesthesia and intensive care, movement support of patients is very important. Mobilization situations are complex and nurses need skills to assess and utilize the patient's remaining movement capacities and simultaneously using their own body in an ergonomic way. Challenges to mobilization of ICU patients include e.g. the patient's ability to communicate, many tubes and lines, hemodynamic instability, oxygen desaturation, and accidental extubation. In ICU the adverse effects of bedrest and prolonged immobility are well known. In operating room, the challenges are the patient position that enable optimal access to the surgical site and that causes the least physiological risk for the patient, while also protecting the skin and joints. In operating room the length and time of surgery increase, the incidence and percentage of patients with pressure ulcers also increases.

The goal of Kinaesthetics training and implementing in intensive care/operating room is to develop nurses' movement support skills, which contributes to a reduction of stress and physical strain and has a positive effect for all participants. Kinaesthetics has been implemented in intensive care/operating room at the university hospitals in Bern, Basel (Switzerland), Ulm (Germany) and Linz (Austria) for long. In the central hospital of Vaasa, Finland, training and practice in Kinaesthetics in intensive care started in 2010 and in University hospitals of Oulu and Turku in 2015/2016.

Nurses' experiences of Kinaesthetics in intensive care and operating room are confident. Mobilization of patients has become easier, passive lifting of patients and physical strain of nurses' have decreased, has care situations have settled down, patients are perceived as active participants, patients participate more in mobilization, positioning in bed is more individual and enhance patient's body awareness and daily activities and collaboration between nurses and physiotherapists has improved.

This presentation will consider opportunities and challenges for Kinaesthetics in this increasingly important and complex area of anesthesia and intensive care.

I14**Organ donor in the intensive care***Nina Kallio*

Turku university hospital, Turku, Finland

Finland and several other countries are facing shortage of transferable organs. Many patient die waiting on the transfer queue. It is important that the potential organ donors are identified and obtained to ICU treatment quickly as possible. It is the advantage of the recipient patient, that donor is treated according to the protocol. Organ donation is an expensive operation but will pay off in the long run to the receiving patient's health status changes dramatically better and the quality of life. Future challenges are cultural and religious aspects of immigration and to increase organ donor awareness on the general population.

Critical care involves several steps. It is important to note reliably brain function stops and continues to death. In Finland, organ donation is coordinated by the Helsinki transplantation center and all activities related to the process is guided it through.

At our stand we will all relate to the assignment protocols through. Nursing is a challenge; because we support the relatives of organ donors concerned the transfer process and sorrow. It is very important that donors and their families are treated with respect and ethically correct. When necessary, the discussion must be given plenty of time. After finding a reliable brain death we move to protect the transferable organs. The donor's vital signs will be closely monitored, hemodynamics, kidney condition, lung function is supported according to the protocol.

I15

Organ Transplantation - Cooperation within the Nordic Countries

Carola Schauman
 HUCS, Finland

All Nordic countries have their own transplantation and donation programs. In Sweden there are 4 transplantation centers, in Denmark 3, on Iceland one as in Norway and Finland.

Scandiatransplant is the organ exchange organization for the Nordic countries and it covers a population of about 26.6 million inhabitants. It is owned by the ten hospitals performing organ transplantation in these countries. All Nordic patients waiting for an organ are listed on one common list for each organ. SCTP ensures that all necessary data are available for the transplant professionals to allocate the organs according to rules adapted by the association and monitors compliance with these rules.

Every Nordic transplant center evaluates their own donors, and handles the procurement of the transplantable organs. Of the organs 80-85% are transplanted in the country of procurement. The rest 15-20% of the organs are offered to another Nordic transplant center due to exchange obligation, pay back, or rotation list.

Scandiatransplant 2015:

- 500 Utilized deceased donors (18,77 pmp)
- Organ transplants performed

1204 kidneys (335 were living related)

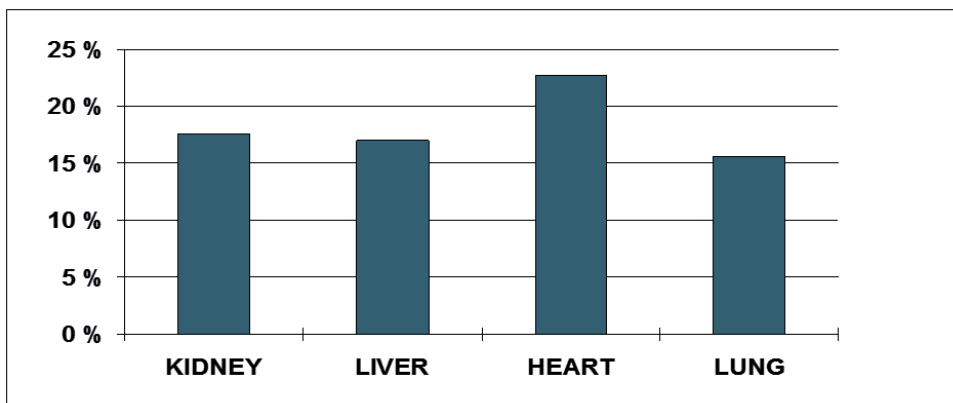
401 livers (5 were living related – 2 were domino)

154 hearts (0 were domino)

141 lungs including heart/lung

- 2402 patients on waiting list at end 2015

Organ exchange between Nordic centers 2015:



I16

The impact of critical illness and the ICU stay on patients' health and recovery: Proactive interventions and outcomes after discharge from the ICU*Rannveig J. Jónasdóttir*

Landspítali – The National University Hospital of Iceland, Reykjavik, Iceland

Critical illness requiring a stay in the intensive care unit can have a long-term effect on patients' health status and is frequently followed by lengthy recovery.

In the presentation the physical health status of patients from before intensive care admission to twelve months after discharge from intensive care will be described along with proactive interventions during and after intensive care stay to support patients' health and recovery. Psychological health status is presented with symptoms of post-traumatic stress disorder at three, six and twelve months after intensive care discharge along with difference in physical and psychological health status between and within gender.

The data is from a prospective, comparative study of patients, ≥ 18 years of age, with ≥ 72 hours stay in intensive care. The experimental group (n=83) received structured nurse-led follow-up from intensive care nurses. That comprised clinical surveillance and support with ward visits, a phone call the first week after discharge from hospital to home and follow-up appointment three months after discharge from intensive care. The control group (n=85) received usual care. Health status was measured with SF-36v2 before intensive care admission, at discharge from general ward and three, six and twelve months after discharge from intensive care. Symptoms of post-traumatic stress disorder were measured with Impact of Event Scale-Revised.

The patients had not reached at twelve months the physical health status they had before admission to the intensive care. There was no difference in health status between patients who received structured nurse-led follow-up and patients who received usual care. The physical health status of women was worse than men during all time points. The psychological health of younger women was worse than by older women.

Proactive measures during the intensive care stay such as early mobilisation, promoting comfort and nurse-led follow-up could support patients' long-term health status.

Heterogeneity of this intensive care patients' group and gender differences suggests the importance of individual approach of surveillance, support, and rehabilitation after discharge from the intensive care.

I17

Retrospective descriptive research of patient admitted to the intensive care unit on LS in the period of 1/1-2009-31/12-2013 caused by suicide attempts*Sólrun Joensen*

Landsjúkrahúsið (LS), G1 ICU/ED, Tórshavn, Faroe Islands

Introduction: Statistic from 2014 show that there were 48346 inhabitants in the Faroe Islands, 25125 men og 23221 women. The intensive care unit G1 in Tórshavn yearly admits 1000 patients needing intensive care and observations. A part of these 1000 patients are people who have tried to attempt suicide. According to the public statistics, less than 10 patients are registered during the 5 year period from 1/1-2009 to 31/12-2013. This is not in accordance with observations made in praxis at the intensive care unit. To provide an overview and to characterise the admittance to intensive care unit, due to suicide attempts, **the aim of this study** was to describe the incidence of suicide attempts among the patients in the 5 year period.

Methods: This is done by retrospectively evaluating the intensive units handwritten patient registrations, and computer based records.

Results: 167 patient records were found. The age spread from 13 years to 70 years. 66% women and 34% men. The women represented mostly the youngest part except the age from 40 years-49 years where the men were more presented. 88 suicidal methods were used, mostly medicin - intoxication in different combinations. Paracetamol was the top medicine (32%). 59% were admitted for the first time, and 41% had tried it twice og more. 87% were visited by a psychiatric doctor, and 73% were followed ambulant, 17% were admitted to psychiatric unit in the hospital of Faroe Island while a few were moved to hospitals in Denmark.

Conclusion: The research shows, that the public perception of the state of the public health is erroneous. As intensive care nurses, we are obliged to shed light on these facts. There is a risk that this is the only contact to the health care system, these patients have.

I19

Hyperbaric Oxygen treatment (HBOt) – doctors point of view*Olli Arola*

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Hyperbaric Oxygen treatment is a medical intervention, where the patient breathes 100% oxygen while inside a pressurized chamber. The hyperbaric pressure is usually 2,5 – 2,8 ATA (2,5-2,8 x normal sea level ambient atmosphere absolute pressure) corresponding to diving to 15 msw (=meters of sea water) and 18 msw, respectively.

Rational:

- high pressure compresses body gas bubbles smaller
- small bubbles are more soluble to body fluids (e.g. plasma up to 6%)
- tissue oxygenization is improved and blood oxygen partial pressure is enhanced x10-14
- elimination of unwanted gas bubbles (e.g. nitrogen in decompression sickness) is obtained with controlled decompression
- High tissue oxygen promotes wound healing, neovascularization and controls infection

HBO indications:

Internationally approved and recommended indications (Underwater Hyperbaric Medical Society [UHMS]2016):

1. HBO is essential and principal treatment modality (alternative treatment non-existent):
 - decompression sickness (“divers disease”)
 - air and gas embolism
2. HBO as adjunct to surgical and pharmacologic interventions:
 - severe, symptomatic carbon monoxide intoxication
 - gas gangrene, necrotizing fasciitis and other necrotizing soft tissue infections (e.g. deep neck infections, mediastinitis)
 - treatment resistant problem wounds, e.g. chronic diabetic and other ischemic limb wounds
 - crush injuries and open fractures
 - post-radiotherapy osteoradionecrosis of the jaw, dental operations (pre- and postoperative)
 - Radiotherapy-induced cystitis and proctitis
 - Sudden deafness/ noise-induced hearing loss
 - Central nervous system abscess (brain abscess, spinal epidural abscess)
 - Central retinal artery occlusion
 - Skin graft flaps; in particular head and neck
3. HBO is presumably ineffective:
 - sclerosis multiplex
 - tinnitus
 - stroke
 - sport injuries

HBO contraindications:

- untreated pneumothorax
- certain medications (disulfiram, doxorubicin, cisplatin, bleomycin)
- severe claustrophobia
- upper airway infections with severe excretions
- convulsions

HBO complications:

- barotrauma (ear, sinuses etc)
- oxygen toxicity
- lung injury
- temporary myopia

Indications are illustrated with real case discussions

I20

Hyperbaric oxygen treatment – nurse’s point of view*Kari Keski-Saari*

Intensive Care Unit for adults, Turku University Hospital, Turku, Finland

HBO therapy has been administered since 1968 in Turku University Hospital. The first chamber was a monoplace chamber. The first multiplace chamber was purchased to ICU in 1992. It made possible to have a nurse with a patient in the chamber. Trained nursing staff and appropriate equipment makes it possible to treat critically ill patients safely in hyperbaric environment.

ICU and HBOT unit moved to the new T-hospital in 2013. The new environment had space for a multiplace chamber and two monoplace chambers. HBO unit grew to 230m² and got a bigger up-to-date multiplace chamber.

Trained ICU nurse works as an operator. HBOT unit has patients from ward and ICU. Minimum number of personel during treatment is two for safety reasons according to EUBS guideline (1).

65% of HBO treatments were carried out in monoplace chamber in 2015. Chamber is pressurized by 100% oxygen. Normal ward patients get their treatments mainly in a monoplace chamber. Operator guides patient about chamber safety, pressure equalization and principles of treatment. Operator and an assistant nurse monitor the HBO treatment. Electronic devices inside the monoplace chamber are forbidden for safety reasons. I.V. infusions and epidural infusions are not possible during monoplace chamber treatment. There are instructions in our hospital care guideline’s site on how to prepare a patient for HBOT.

35% of HBO treatments were carried out in multiplace chamber in 2015. Chamber is pressurized by air. Patient breathes oxygen via mask, hood or ventilator. ICU patients HBO treatment is mainly in a multiplace chamber. ICU patients HBO treatment staff during treatment are operator, two hyperbaric nurses, ICU nurse and HBO doctor.

Equipment in multiplace chamber have to be specially made for HBOT for safety reasons. We have there e.g. patient monitoring system with defibrillator, syringe pumps, ventilator and special made bed and antidecubitus mattress.

ICU nurse has a special checklist for patient’s preparation before HBOT and after HBOT. ICU nurse is often busy carrying out septic HBOT patient’s e.g. fluids, medication, extensive wound areas, CT scan and operations.

Hyperbaric nurse has to have ICU experience minimum 2 years and they need medical certification, specific education and test compression with an experienced nurse. There are a few absolute contraindications to work in a HBO chamber. Hyperbaric nurses have periodical medical examination every fifth or third year. Operator must monitor nurses exposure time and follow the diver’s table to reduce the risk of decompression sickness.(2)

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Perioperative pain management in children

Stefan Lundeberg

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Pain in pediatric patients is still undertreated. This partly referred to limited knowledge as well as insufficient protocols and routines. It is also know that long term pain can be initiated by high pain levels in the postoperative phase, in all ages. The aim is to accomplish, for the individual patient, an acceptable pain condition with as little side effects as possible.

Unacceptable pain levels can be limited by preventing pain before surgery in the preoperative phase and of special interest is to reduce windup (hyperalgesi). Postoperatively analgesics should be administered around the clock. The route of administration also plays an important role to optimize the analgesic effect. For example paracetamol should preferably be given by the intravenous route during the per- and initial postoperative period. Different origins of pain also should be taken into account when choosing the most effective treatment strategy. A multimodal approach is today the preferred mode of treatment plan, although there is limited scientific publications to support this.

As part of a multimodal strategy several analgesic could be used as paracetamol, cox-inhibitors, corticosteroids, local anesthetics, alfa-2 adrenergic receptor agonists (clonidine, dexmedetomidine), ketamine/s-ketamine, opioids/opioid combinations and gabapentin. Codeine should no longer be used in children and the use of tramadol is quite questionable as part of the standard postoperative pain treatment. Adjunctives could furthermore be helpful in more complex pain states. Diazepam is effective in reducing muscle spasm and reduces pain indirectly.

Pain assessment and monitoring of safety parameters (sedation level, respiration rate) and side effects are in addition important in order to achieve an effective and safe treatment. Side effects should be treated if troublesome. Nausea and vomiting from opioids is the most common side-effect and is not only caused by the direct effect on brainstem centers.

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I24

Emergency situations with children undergoing anesthesia*Olli Vänttinen*

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Critical incidents have been reported to occur in 0,5-3 % of pediatric anesthetic procedures while cardiac arrest seems to occur in 0,05-0,09 % of anesthetics. Critical incidents are almost four times more common in infants less than one year of age compared with older children. An essential feature of these incidents is that majority of them are related to airway and respiratory problems. Cardiovascular complications are far less common in children than in adult population.

An understanding of the anatomical and physiological features of the respiratory system of children is crucial when taking care of these patients. The airway is narrower in children than in adults and its tendency to obstruct and collapse is greater. The treatment algorithm for laryngeal spasm must always be clearly in mind and an airway management plan should be made for each patient individually. The respiratory reserves of a small infant are poor and their tendency to develop lung atelectasis is significant. For these reasons the importance of sufficient ventilation and oxygen content at all times is emphasized.

Progressive hypoxemia leads to hemodynamic collapse through bradycardia very rapidly and the only effective treatment is the restoration of oxygenation. Small children are also susceptible to hypovolemia and hemodynamics can easily be compromised for example by hemorrhage. For these reasons continuous respiratory and hemodynamic monitoring is vital. Even cardiac arrest situations in hospital setting have a remarkably good prognosis in children when the resuscitative measures have been started early and aggressively.

It has been reported in several studies (both adult and pediatric) that human factors are associated in even more than 50 % anesthesia complications and a significant proportion of complications are potentially preventable. Thus proper planning and preparedness together with sufficient skill and experience in pediatric anesthesia are considered the cornerstones of safe practice.

The lecturer will present a patient case which hopefully highlights some of the topics mentioned above.

I26

Quality of ICU patient's sleep

Marita Ritmala-Castren

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Natural sleep has important restorative functions on all of us. It plays an essential part in our well-being. A normal good night's sleep consists of light sleep, deep sleep and rapid eye movement (REM) sleep. During deep sleep, the body's energy sources are restored and tissue repair is at its strongest. REM sleep is needed for the mind to process the past day's experiences and clean and restore the brain's energy stores. Sleep deprivation has been shown to increase sympathetic activity and affect negatively different endocrinological functions, immune system, and cognitive functions. Acute lack of sleep is known to cause patients fatigue, irritability, disorientation and hallucinations. All this may have deteriorating effects on patients' recovery from their illness or trauma. Lack of sleep is also believed to be a risk factor of delirium during their stay in an intensive care unit (ICU).

Acutely ill mechanically ventilated ICU patients sleep poorly suffering from sleep deprivation. Awakenings are frequent and patients are commonly deprived of deep and REM sleep stages, while they may appear to be sleeping. Even the use of sedative medication does not guarantee good sleep, as sedatives can interfere with normal sleep stage variation and lighten sleep. In a Finnish study, 114 non-intubated ICU patients' evaluated the previous night's sleep with Richards-Campbell Sleep Questionnaire. Evaluations varied extensively as the patients' answers fell into the whole scale from zero to 100, and standard deviations were high. Sleep depth was rated the worst and falling asleep the best of the RCSQ sleep domains. In another Finnish study 21 non-intubated ICU patients' sleep was measured with a polysomnography. The results confirmed that variation between patients was extensive as total sleep time ranged from zero to 10.3 hours. Seven patients slept longer than 7.5 hours, and five patients slept less than two hours. Sleep was mostly light as the relative amount of light N1 sleep was high and the amounts of deep N3 sleep and REM sleep were low. Patients' sleep was very fractional as there were a median of 33 [16, 44] awakenings per patient and 3.7 [1.8, 5.9] awakenings per hour during the polysomnographic recording.

Non-intubated ICU patients' sleep appears to be as light and fragmented as is the sleep of mechanically ventilated patients, and the quantity of sleep is much less than in healthy adults. However, there is large variation between the patients. Patients' sleep should be supported by providing as quiet surroundings as possible, dimming the lights, and making patient as comfortable as possible. Few sleep promotion guidelines and care bundles exist (e.g. Kamdar et al. 2013; Elliott & McKinley 2014). Their use is recommended to support patients' good night sleep.

I27

Pain management of ICU patients with dexmedetomidine*Mikko Kuoppamäki*

Orion Pharma/Development, Turku, Finland

Recently published guidelines recommend patient-centred ICU care with lighter sedation, the goal being a comfortable, calm and co-operative patient. Dexmedetomidine is an alpha2-receptor agonist indicated for light to moderate ICU sedation with additional analgesic properties.

Individually tailored pain management is an important part of a patient-centred ICU care. When possible, proper analgesia should precede sedation. Pain treatment should be individualised and frequently assessed. Opioids are important to ensure effective analgesia, but their exposure should not be too high and non-opioids such as dexmedetomidine are recommended to be used.

Pain is closely related to agitation and delirium in ICU patients. Pain in patients with unnecessary deep sedation is difficult to assess and therefore patients may remain undertreated despite of considerable pain. Lighter sedation is known to improve communication between the patient and family members and ICU staff. This in turn is likely to facilitate adequate pain management as patient reported pain is regarded more reliable than that derived secondarily from other symptoms or signs. Lighter sedation will also facilitate better quality of sleep, earlier mobilization, less delirium and decreased likelihood of long-term psychological and cognitive problems.

This presentation will review the main aspects of dexmedetomidine and its usage in sedation and pain management in the ICU.

128

Early Identification of the septic patient*Per Henrik Lambert*

Regionshospital Nordjylland, Denmark

The Third International Consensus Definitions Task Force defined sepsis as “life-threatening organ dysfunction due to a dysregulated host response to infection.”

Based on a consensus process using results from a systematic review, surveys, and cohort studies, septic shock is defined as a subset of sepsis in which underlying circulatory, cellular, and metabolic abnormalities are associated with a greater risk of mortality than sepsis alone. Adult patients with septic shock can be identified using the clinical criteria of hypotension requiring vasopressor therapy to maintain mean BP 65mmHg or greater and having a serum lactate level greater than 2 mmol/L after adequate fluid resuscitation.

The Surviving Sepsis Campaign was launched in 2004 as a global initiative to improve survival and reduce the morbidity associated with sepsis. Rapid response systems and development of care bundles have been central to the initiative. Ward nurses, who are at the bedside of patients in hospital, are in a key position to identify early stage sepsis and development of organ failure.

We have implemented a clinical tool for triage of sepsis and organ failure at the ward, an alert and treatment flow chart, reinforced by training, to improve clinical observations. This may lead to fewer patients developing sepsis, and might improve in-hospital survival among patients with septic shock.

Increased compliance with sepsis performance bundles is associated with a 25% relative risk reduction in mortality rate.

Performance metrics can drive change in clinical behavior, improve quality of care, and decrease mortality in patients with septic shock.

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Intensive care of the septic patient*Matti Reinikainen*

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“Infection” means a disease that is caused by bacteria or a virus (or other micro-organisms). Most infections are limited locally to a part of the body or are otherwise mild, but some become dangerously severe. According to the recently updated definitions, “sepsis” means “life-threatening organ dysfunction caused by a dysregulated host response to infection” (Singer et al. 2016). In other words, sepsis is a serious illness that arises when the body’s response to an infection is so strong that it causes organ dysfunctions and threatens to damage the body. Septic patients have a higher risk of death than e.g. patients with ST-elevation myocardial infarction (Singer et al. 2016).

The following steps are the essentials of treating a septic patient:

1. Prompt recognition of sepsis is the mainstay of treatment.
2. Act without delays! Sepsis is an emergency that must be dealt with immediately.
3. Take the following laboratory samples: Blood gas analysis, lactate, electrolytes, glucose; haemoglobin, blood cell count; CRP; creatinine, bilirubin, INR, blood culture, and, depending on the clinical presentation, cultures from other possible sources of infection (urine, tracheal aspirate, pus from abscesses, wound secretions, cerebrospinal fluid, ...)
4. Ensure enough staff is available so that monitoring, treatments, and investigations can be managed promptly.
5. Start fluid resuscitation immediately. Most clinicians recommend using either Ringer’s solution or a balanced crystalloid. Saline (NaCl 0.9%) can probably be used as well, but some are worried about possible harmful effects of hyperchloremia caused by large doses of saline. The passive leg raising test is a good test to assess fluid responsiveness: when elevation of the legs doesn’t improve the hemodynamics, the patient will probably not benefit from any more resuscitation fluids.
6. Adequate antibiotics must be given quickly (within 1 h of meeting a high risk patient). If possible, take the blood culture before giving antibiotics, but taking microbiological samples should not delay the initiation of antibiotic therapy.
7. Support tissue perfusion and oxygenation with vasoactive medication and ventilator treatment as needed. The main goals are good oxygenation, correction of lactic acidosis and good urine output.
8. Search for the source of infection and adjust treatments accordingly (including surgery in case of bowel wall perforation, drainage of abscesses, etc.). A careful clinical examination is the first step, but radiological investigations are also essential (chest X-ray is basically always needed, and a CT scan of the chest and abdomen is quite often necessary as well). For septic patients in intensive care, the sources of infection are most commonly in the lungs or abdomen. Skin and soft tissue infections are also common, as are infections originating from the urinary tract. Many other potential sources also exist (central nervous system, oral cavity, vascular devices, etc.).

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130

Patient's privacy in the operating department*Mari Saanisto*

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Privacy is a basic human right and one of the key issues in health care. Safeguarding patient's privacy is legal and ethical duty of a nurse. Realization of patient's privacy is a vital part of high-quality health care: It promotes patient's well-being, affects sense of dignity, and increases satisfaction with care. Privacy as a concept is multidimensional and hard to define. It is cultural, individual, and situational.

Operating department is a special nursing environment with its' own special culture. Patient's possibilities to control his own privacy is limited (in general anesthesia, for example). That's why nurse working in the operating department plays a gatekeeper's role as patient's advocate and privacy protector. Only little attention has been attributed to patient's privacy in the operating department in previous studies.

Increased use of health care technology, patient databases, and use of social media set challenges to patient's privacy. In the end, the most important threat to patient's privacy is a health care professional. Nurses' knowledge, skills, attitudes, and professional ethics are in the spotlight when improving better practices and better ethical safety.

L1**Mahdollisen elinluovuttajan tunnistaminen***Juha Grönlund*

TYKS

Elinsiirto on tietyissä tautitiloissa ainoa parantava hoitokeino. Tilanteesta riippuen siirtoelimen saaminen voi olla potilaalle hengenpelastava tai elämän laatua kohottava tekijä esimerkiksi dialyysihoidoista eroon pääsy. Vaikka elinsiirtotoiminta vaatiikin varsin raskaan organisaation, sen on todettu olevan varsin kustannustehokasta. Pula siirrettävistä elimistä kuitenkin rajoittaa elinsiirtojen määrää.

Munuaissiirto voidaan tehdä myös elävältä omaisluovuttajalta. Muissa tilanteissa elinluovutus voi tulla kyseeseen vain aivokuolleeksi todetulta henkilöltä. Vakavasta aivovaurioista esim. traumaattinen aivovamma, aivoverenvuoto, aivoinfarkti, hypoksisiskeeminen tai anoksinen aivovaurio kärsivä potilas voi olla mahdollinen elinluovuttaja. Jos potilaalla todetaan lähestyvään aivokuoleman merkkejä (syvä tajuttomuus, reagoimattomuus imuille tai intubaatioputken liikuttelulle, laajat valojäykät pupillat) tulee arvioida potilaan soveltuvuus elinluovuttajaksi. Toivottomassakaan tilanteessa tällaisen potilaan hoidosta ei tule luopua, tai hoitoa rajoittaa, ennen kuin mahdollisuudet elinluovutukseen on pohdittu.

Elinluovutukselle ei ole ikärajaa. Vaikeakaan perussairauskaan ei automaattisesti ole este elinluovutukselle. Riittää, että siirrettävä elin on terve. Mahdollisesta luovuttajasta kannattaa ottaa jo varhaisessa vaiheessa yhteyttä elinsiirtotoimistoon. Vasta-aiheita luovutukselle ovat vain : muu kuin keskushermoston maligniteetti, HIV, hepatiitti B tai C. Muissa tilanteissa elinsiirtotoimisto ratkaisee luovuttajan soveltuvuuden tapauskohtaisesti.

Kun aivokuolema on todettu ja päätös elinten irrotuksesta on tehty, siirtyy hoidon painopiste irrotettavien elinten elinkelpoisuuden turvaamiseen.

Ensisijainen tavoite on luovutettavien elinten riittävän hapentarjonnan ja kudospesuun turvaaminen. Ennen irrotusleikkausta luovuttajaa on hoidettava teho-osastolla tai vastaavassa hoitoyksikössä.

Osalle elinsiirtojonossa olevista potilaista ei löydy sopivaa siirrettä riittävän nopeasti. Tavoitteena tuleekin olla, että yhtään mahdollista elinluovuttajaa ei jää tunnistamatta.

Kyseessä saattaa olla jonkun jonossa siirrettä odottavan ainoa mahdollisuus.

L4**Arteriaverikaasuanalyysi***Ville-Veikko Hynninen*

TYKS

Valtimoverestä tehtävä verikaasuanalyysi on ehkä tärkein laboratoriotutkimus anesthesiologiassa ja tehohoidossa. Toistettujen verikaasuanalyysien avulla voidaan varmistaa potilaan happeutumisen sekä ventilaation riittävyys. Hengityksen arvioinnin lisäksi verikaasuanalyysin toinen keskeinen tehtävä on elimistön happo-emästasapainon seuranta. Verikaasuanalyysillä saatavien suureiden (pH, hiilidioksiosapaine, bikarbonaatti ja emäsyylimäärä) perusteella happo-emästasapainon häiriöt voidaan jakaa respiratorisen tai metabolisen komponentin aiheuttamaksi, mikä taas mahdollistaa häiriön kohdennetun hoidon. Nykyään verikaasuanalyysiaattoreita löytyy yleisesti päivystysasemilta, leikkaussaleista sekä teho-osastoilta. Tällöin näyte saadaan nopeasti analysoitua, tulokset ovat käytettävissä muutamassa minuutissa ja toistetuilla näytteillä voidaan potilaan vointia seurata lähes reaaliajassa. Verikaasuanalyysin tulkinta vaatii systemaattista lähestymistapaa ja perusfysiologian tuntemusta. Arteriaverikaasuanalyysi-luennolla käydään läpi verikaasuanalyysin tulkintaan tarvittava fysiologia ja harjoitellaan systemaattista tulkintaa potilasesimerkkien avulla.

L5

ROTEM® kokoveren hyytymistutkimuksena*Antti Laine*

HUS, Meilahden sairaala

Ihmisen veren hyytyminen on monimutkainen prosessi, joka etenee useissa vaiheissa. Primaarihemostaasissa verihituleet aktivoituvat kudosaaurion laukaisemina muodostaen tulpan verisuonivaurion kohtaan. Sekundarihemostaasissa hyytymiskaskadin hyytymistekijät, faktorit, aktivoituvat putousmaisesti muodostaen lopulta trombiinia, joka pilkkoo fibrinogeenin fibriniiniksi. Fibrini muodostaa verihituleetun lopulta hajottavat. Hyytymisjärjestelmässä vallitsee normaalitilanteessa herkkä tasapaino, jota erilaiset lääkkeet tai sairaudet herkästi horjuttavat. Järjestelmän toimintaa on perinteisesti arvioitu verisolujen määriä ja veriplasman hyytymisaikoja mittaamalla. Ei-päivystyksellisessä tarkemmassa analysoinnissa käytetään yksittäisten komponenttien määrän ja aktiivisuuden mittauksia. Nämä perinteiset laboratorioanalyysit ovat kuitenkin aikaa vieviä; nopeimmatkin päivystystutkimukset vaativat 45-60 min näytteenotosta valmistuakseen.

1950-luvun taitteessa alettiin ensimmäistä kertaa tutkia kokoveren hyytymistä viskoelastisin menetelmin. 1980-luvulla menetelmä herätti suurempaa kiinnostusta verensiirtoalgoritmien kehittelyn myötä. Sittenkin menetelmät ovat kehittyneet varsin näppäriksi ja kustannustehokkaiksi hyytymisen ja sen häiriöiden arvioinnissa. Tällä hetkellä markkinoilla on kolme kaupallista kokoveren hyytymistutkimusta: ROTEM®, TEG® ja SonoClot®. Näiden laitteiden toiminta perustuu kokoveren hyytymiseen erilaisia aktivaattoreita hyödyntäen ja hyytymistapahtumaa reaaliaikaisesti seuraten hyytymän muodostumisesta sen hajoamiseen, ajan funktiona.

ROTEM®-laitteessa pieni määrä verta laitetaan näytekuppiin ja siihen lisätään kulloistakin tutkimusta varten erityinen aktivaattori (kudostekijä tai muu), ja näyteveren hyytyminen normaalissa kehon lämpötilassa rekisteröidään näytteessä pyörivän pinnan välityksellä. Hyytymän muodostuessa pinnan pyöräminen hidastuu ja tämä muutetaan graafiseen muotoon tietokoneen ruudulle. Näyttöön piirtyvä ”makkara” kuvaa hyytymisen alkamista, hyytymän muodostumisen nopeutta ja syntyneen hyytymän lujuutta. Mikäli hyytymän hajoaminen on poikkeuksellisen nopeaa, se nähdään myös 60 minuutin ajan aikana. Ensimmäiset käyttökelpoiset, hoitoa ohjaavat tulokset saadaan 5-10 minuutissa näytteen ajon aloittamisesta. Tuloksen perusteella voidaan arvioida, tarvitseeko potilas hyytymistekijöitä, verihituleita tai esim. fibrinogeeniä. Näytteeseen voidaan lisätä muita reagensseja esim. hepariini vaikutuksen kumoamiseksi tai verihituleiden toiminnan estämiseksi, jolloin voidaan selvittää spesifisesti tietyn tekijän osuutta hyytymän muodostumisessa.

ROTEM®-tutkimuksen edut ovat sen nopeus, helppous ja luotettavuus. Kokoveren hyytymisessä ollaan lähempänä in vivo -tapahtumia, kuin veren osasia analysoidessa. Tuloksista nähdään mahdollinen hyperfibrinolyysi, jota ei luotettavasti voida perinteisillä laboratoriotutkimuksilla osoittaa. Laitteen pienhkö koko ja suhteellisen helppo käyttö ovat omiaan tuomaan sen leikkaus- tai teho-osastoille vieritestikäyttöön. Sen on osoitettu vähentävän postoperatiivista verenvuotoa sekä turhia verensiirtoja ja olevan kustannustehokas hyytymistutkimus. Erityisen runsaasti menetelmää on tutkittu sydänkirurgisilla, maksa- ja traumapotilailla. Tutkimuksen pohjalta on kehitetty runsaasti erilaisia algoritmeja kliinikon työtä ja päätöksentekoa helpottamaan.

Viskoelastisten hyytymistutkimusten rajoitteena ovat hinta ja kykenemättömyys tunnistamaan esim. von Willebrandin tautia tai tiettyjä antikoagulaatiohoitoja, esim. aspiriini vaikutusta. Täytyy muistaa, että edelleenkin ei olla elimistön sisäisissä olosuhteissa, virtaavassa veressä, vaan muovikupissa, joten hyytymän muodostuminen ei ole täysin luonnollista. Viskoelastiset hyytymistutkimukset, kuten ROTEM®, lyövät itseään läpi kiihtyvään tahtiin ja ovat osoittaneet hyötynsä usealla saralla. Tutkimus on kiivasta ja laitteet yleistyvät suomalaisissakin sairaaloissa. Nämä testit tuovat erinomaisen lisän potilaan tutkimiseen ja hoitoon sekä säästävät tutkitusti verituotteita ja sitä kautta kustannuksia, kunhan testien tulkinta on asianmukaista ja rajoitteet pidetään mielessä.

L6

Hengityksen fysiologia*Walteri Siirala*

TYKS

Hengityksellä tarkoitetaan tässä yhteydessä hengityskaasujen (happi O₂ ja hiilidioksidi CO₂) vaihtoa verenkierron ja ulkoilman välillä. Aikuinen ihminen kuluttaa keskimäärin 250 ml:aa happea minuutissa. Valtaosan kuluttamastaan hapestasta (noin 180 ml, eli 70 %:a) elimistö käyttää tärkeimpien elinten kuten aivojen, sydämen, maksan sekä munuaisten perusaineenvaihdunnan (PAV) ylläpitämiseen. Jäljelle jäävän hapen elimistö käyttää lihaksiston, suoliston sekä muun tukikudoksen toiminnan ylläpitämiseen. PAV:n kuona-aineena syntyvän hiilidioksidin (noin 200 ml/min) elimistö tuulettaa pois ensisijaisesti keuhkojen kautta, tai varastoi verenkiertoon ja kudoksiin bikarbonaatti-ionina (HCO₃⁻) karboanhydraasi entsyymien avulla.

Hengityskaasujen vaihto verenkierron ja ulkoilman välillä tapahtuu keuhkorakkuloissa (alveoleissa). Sisäänhengityksen aikana pallea ja ulommat kylkivälihaksen supistuvat, jolloin rintaontelon tilavuus kasvaa ja sen sisällä oleva keuhkokudos laajenee. Muodostuneen alipaineen ansiosta ilma virtaa alveoleihin. Kutakin alveolia verhoava hiussuonten muodostama verkosto, johon happi siirtyy alveoli-ilmasta ja josta hiilidioksidi siirtyy alveoli-ilmaan. Sisäänhengitys on aina aktiivinen (energiaa kuluttava) tapahtuma, jota ohjaa aivorungossa sijaitseva hengityskeskus. Hengityskeskus arvio hengityksen riittävyyttä mittaamalla sekä veren, että keskushermoston hengityskaasu-, sekä vetyionipitoisuuksia usean eri reseptorin kautta ja suhteuttaa hengitystaajuuden ja syvyyden kuhunkin tilanteeseen kulloinkin riittäväksi. Uloshengityksen aikana sisäänhengitysilhakset rentoutuvat ja saavat tilaisuuden levätä.

Verenkierrossa happi kulkee pääosin hemoglobiiniin sitoutuneena ja osin plasmaan liuenneena. On huomattava, että elimistö kykenee käyttämään hyödyksi vain hemoglobiiniin sitoutunutta happea. Veren kokonaishappipitoisuutta voidaan laskea seuraavasti:

$$\text{Happipitoisuus CaO}_2 \text{ (ml)} = (\text{Hb} \times \text{SaO}_2 \times 1.36) + (0.0031 \times \text{PaO}_2)$$

Kuten kaavasta käy ilmi, ovat hemoglobiinin määrä ja saturaatio ratkaisevassa asemassa arvioitaessa veren hapenkuljetuskykyä. Terveen aikuisen koko verimäärä voi siten sitoa noin 1000 ml:aa happea hemoglobiiniin ollessa 140 g/l. Mikäli hemoglobiinin määrä puolittuu, puolittuu myös veren CaO₂. Sen sijaan, mikäli hapen osapaine puolittuu, pienenee SaO₂ ja siten veren CaO₂ vain noin 200 ml eli 20 %:a. Tämä selittyy hemoglobiinin happisaturaation ja plasmaan liuenneen hapen osapaineen välisellä S:n muotoisella yhteydellä (dissosiaatiokäyrällä). Siksi kriittisesti sairailta potilailta on ensisijaisen tärkeää seurata hemoglobiinin pitoisuutta ja happisaturaatiota sekä erityisesti niiden muutoksia toimenpiteen/tehohoidon aikana.

Hiilidioksidin osapaine voi veressä nousta pääasiallisesti kahdella mekanismilla; joko hiilidioksidin tuoton lisääntymisellä (kuume, rasitus) tai puutteellisella alveolituuletuksella (ventilaatiovajausta). Tilaa, jossa hiilidioksidipitoisuus on koholla ja pH laskee, kutsutaan respiratoriseksi asidoosiksi. Kliinisesti respiratorinen asidoosi ilmenee puhekyvyn vaikeutumisenä, syketaason nousuna, tiheänä tai vähentyneenä hengityksenä, tajunnantason alentumisena ja lopulta hengityksen pysähtymisenä. Tilan korjaaminen edellyttää hiilidioksidin tuuletuksen tehostamista mekaanisella ventilaatitukihoidolla.

Vaikean hengitysvajauksen tai yleisanestesian aikana elimistö ei kykene huolehtimaan riittävästä hengityskaasujen vaihdosta, ja tällöin ventilaatiota on tuettava mekaanisesti. Hengitysteiden keinotekoinen turvaaminen ja mekaaninen ventilaatiohoito ovat siten yksi keskeisimpiä elintoimintoja tukevia hoitomuotoja sekä leikkaus-, että teho-osastoilla. Siksi hengityksen fysiologian ymmärtäminen on oleellinen osa anestesia-, ja tehohoitotyötä tekevän henkilökunnan ammattitaitoa.

L7

Anestesiatyöaseman ventilaatiomoodit*Pekka Rantio*

GE Healthcare

Uusimmat anestesiatyöasemat mahdollistavat moderneja teho-osastoventilaattoreita vastaavan tasoisen anestesian aikaisen potilaan ventiloinnin. Luennolla käydään lävitse nykyaikaisen anestesiatyöaseman tarjoamia mahdollisuuksia potilaan keuhkoja suojaavan anestesian aikaisen ventilaation toteuttamiseen, sekä käsitellään uusien ventilaatiomoodien käytettävyyttä ja toimintaa. Luennolla käsitellään myös spontaanihengitystä tukevien ventilaatiomoodien käyttöä ja niiden hyödyntämistä apuvälineinä potilaan spontaanihengityksen palautumisessa. Lisäksi luennolla perehdytään keuhkojen rekrytointiin anestesiaventilaattorilla.

L8

Suurivirtauksinen nenäkanyyli*Heikki Ekroos*

HUS

Suurivirtauksinen nenäkanyyli (SVNK) on ollut käytössä jo kauan pediatri-indikaatioissa sekä akuuttihoitossa että lasten tehoilla. Aikuisille SVNK on ollut käytössä vuosia, mutta käyttö ja käyttöindikaatiot ovat olleet hakesessa. Tutkimusnäytön myötä SVNK:n käyttö on lisääntynyt ja varsinkin teho-osastoilla ja tehovalvonnoissa. Käyttö erikoissairaanhoidon päivystyksissä lisääntyy koko ajan.

Koska virtaus on suuri (30-60 L/min), pitää sisäänhengitysilmä kostuttaa ja lämmittää. Suuri virtaus mahdollistaa kuolleen tilan täyttymisen ylähengitysteissä ja mahdollistaa paremman ventilaation. Suurempi virtaus mahdollistaa myös tarkemman hapen annon akuutti tilanteessa, koska potilaan vaatima sisäänhengitysvirtaus on lähes sama kuin laite antaa.

Lisäksi suuren virtauksen tuottama paine, n. 1-3 cmH₂O, mahdollistaa pienen positiivisen ilmatiepaineen uloshengityksen lopussa, joka vähentää hengitystyötä. Samalla paine parantaa hapetusta ja pitää ilmatiet auki uloshengityksen aikana eli keuhkot tyhjenevät paremmin. Samalla tuuletetaan hiilidioksidi anatomisesta kuolleesta tilasta. Koska sisäänhengitettävä ilma on n. 37-asteista ja kostutettua, niin mukociliaarinen funktio säilyy ja liman irrotus alkaa heti. Potilas kokee lämmityksen ja kostutuksen miellyttävänä.

Paras näyttö on hypokseemisessa hengitysvajauksessa. Perinteinen happihoito suurensi kuolemanriskiä 2-kertaiseksi ja NIV-hoito 2.5-kertaiseksi verrattuna suurivirtauksiseen nenäkanyylihoitoon. Suurivirtauksinen nenäkanyylihoito vähensi myös respiraattoripäiviä verrattuna muihin hoitoihin Huonohappinen potilas sekä päivystyksessä että tehostetussa hoidossa hyötyy SVNK-hoidosta.

Jos SVNK on käytössä intubaation aikana, niin vältytään vaikeilta desaturaatioilta. Vastaavasti kun SVNK on käytössä extubaation yhteydessä, niin syntyy vähemmän desaturaatioita, reintubaatioita sekä muuta hengitystuen tarvetta. Erityisesti immunosuprimoiduille potilaille SVNK on erinomainen, koska sekä NIV että respiraattorihoito lisäävät heillä komplikaatoriskiä.

Pitkän teho/NIV-hoidon jälkeinen vieroittaminen onnistuu hyvin SVNK-hoidolla intermittoiden. Myös SVNK-hoito hypokseemiselle potilaalle bronkoskopian yhteydessä on järkevää. Uusin näyttö COPD-potilaille on myös rohkaisevaa, koska SVNK-hoito ei lisää hiilidioksidiretentiota.

SVNK on perinteistä happihoitoa tehokkaampi, vähintään yhtä hyvä tai parempi kuin NIV hypokseemisessa hengitysvajauksessa. SVNK estää respiraattorihoitoon joutumista ja vähentää respiraattoripäiviä. Näin ollen myös tehohoitoajat voivat lyhentyä. SVNK-hoidon näyttö vahvistuu koko ajan ja alkaa olla varsin käypää hoitoa.

L9

PICC-Perifeerisesti asetettu keskuslaskimokatetri

Oskar Nyholm
HUS

Ääreislaskimon kautta asennettuja keskuslaskimokatetreja on laitettu potilaille jo kymmenien vuosien ajan. Sairaanhoidajavetoinen PICC-katetrien asennus alkoi Yhdysvalloissa 1970-luvun alussa, Ruotsissa ja Tanskassa vastaavasti 1990-luvun alusta. Kaikkiaan maailmalla näitä katetreja asennetaan tänä päivänä useita miljoonia, mutta Suomessa vasta alle tuhat vuodessa. Suomessa sairaanhoitaja PICC-katetrin asentajana on vielä harvinaisuus. Italiassa PICC-katetri on jo osin alkanut syrjäyttää perinteisen kaula- tai solislaskimoon asennetun keskuslaskimokatetrin mm. trakeostomia- ja palovammapotilailla.

PICC-katetreja on avoimia ja kiinteitä. Avoimiin katetreihin laitetaan asennuksen yhteydessä takaisku- tai neutraalipaineventtiili, joka estää ilman pääsyn potilaaseen ja toisaalta verenvuodon ulospäin. Avoimessa katetrissa on varmistuksena myös sulkija. Kiinteällä kolmitoimiventtiilillä varustetussa katetrissa venttiili on integroitu joko katetrin distaaliseen tai proksimaaliseen osaan.

Katetrin asentaminen on turvallista, koska PICC-katetri asennetaan potilaan olkavarren ääreislaskimosta ultraääniavusteisesti ja potilaan veren hyttymisstatuksen toleranssit ovat suurempia kuin perinteisen keskuslaskimokatetrin. Kustannuksiltaan PICC-katetri on myös kilpailukykyinen vaihtoehto, koska sitä voi käyttää useamman kuukauden ajan. Katetrin kautta voi antaa ärsyttäviä lääkkeitä, sytostaatteja, antibiootteja, verit tuotteita ja ravitsemusliuoksia. Siitä voi myös ottaa verinäytteitä. Näin potilaan hoidossa voidaan käyttää väkevämpiä ravitsemusliuoksia ja säästää potilas ylinesteytykseltä.

PICC-katetri helpottaa potilaan hoitoa niin sairaalassa kuin kotona. PICC-katetrin etuna on pienempi määrä katetritukoksia, infektoita ja potilaan mahdollisuus saada hoidot kotonaan. PICC-katetri on myös huomaamattomampi vaihtoehto avohoitopotilaalle, koska sen saa piiloon hihan alle.

Nykyisen taloudellisen tilanteen vallitessa haetaan kustannussäästöjä kaikissa kohteissa ja pyritään saamaan toiminta mahdollisimman tehokkaaksi. Näin myös sairaalassa, joissa lean –käsite on tullut tutuksi liki jokaiselle työntekijälle. Sairaanhoidajan asentaessa PICC-katetria, voidaan anestesia- ja lääketieteelliset tekemään omia ydinosaamistaan vaativia tehtäviä. Sairaanhoidajan bedside -katetrinlaittokustannukset ovat pienemmät kuin lääkärin laittamana leikkaussalissa tai rtg-osastolla.

PICC-katetrin laitto on myös vähemmän invasiivisempi toimenpide kuin laskimoportin tai perinteisen laskimokatetrin asennus, ja näin miellyttävämpi potilaalle. Lisäksi oman toimenkuvan laajentaminen tuo haasteita työhön ja lisää työviihtyvyyttä. Laajalti tutkittu ja kiistattomasti osoitettu asia on myös se, että kun toiminta keskitetään suppeammalle määrälle ihmisiä, on komplikaatioita selvästi vähemmän.

L10

Obstetristen hätätilanteiden anestesia*Marja-Leena Jaakola*

TYKS

Obstetriset hätätilanteet voivat pahimmillaan olla henkeä uhkaavia sekä äidille että sikiölle.

Suomessa äitiyskuolleisuus on maailman pienimpiä (1-7 tapausta/vuosi), mihin on myötävaikuttanut mm. kehittynyt äitiysneuvolajärjestelmämme.

Pääosa äitiyskuolemista liittyy verenvuotoon, infektoihin, kohonneeseen verenpaineeseen (pre-eklampsia ja eklampsia) sekä synnytyskomplikaatioihin. Monet obstetriset hätätilanteet liittyvät akuutin vuodon hallitsemiseen ja hoitoon.

Synnytyksen jälkeisten repeämien korjauksessa ja hematoomien avauksissa vaaditaan hyvä analgesia/anestesia. Tämä on toteutettavissa synnytysanalgesiaa varten asetettua epiduraalikatetria käyttämällä tai spinaalipuudutuksella. Preoperatiivisesti on hyvä varmistua laskimoyhteyden toimivuudesta sekä verenvuodon määrästä. Terve synnyttävä pystyy kompensoimaan jopa lähes 40 % veritulavuuden menetystä ennen kliinisten merkkien (hypotensio, takykardia) ilmaantumista.

Verenvuoto ennen synnytystä tai synnytyksen aikana saattaa liittyä istukan poikkeavaan sijaintiin tai kiinnittymiseen (etinen istukka, placenta accreta, increta tai percreta). Istukka voi myös irrota ennenaikaisesti (ablatio) tai kohtu voi repeytyä (trauma, vanha kohtuarpi). Etinen istukka voi aiheuttaa kivutonta verenvuotoa raskauden III trimesterissä. Kaikukuvauksella (UÄ) voidaan selvittää etisistukan tarkempi sijainti (marginaalinen, osittainen, täydellinen). Jos vuoto jatkuu tai sikiön vointi huononee, joudutaan kiireelliseen tai jopa hätäsektioon. Kiireellisyydestä riippuen käytetään joko puudutusta tai yleisanestesiaa. Etisen istukan sektiossa tulee varautua normaalia runsaampaan verenvuotoon. Ennen sektorin aloittamista on varmistettava riittävän kokoisen laskimokanyylin moitteeton toiminta sekä punasolujen välitön saatavuus leikkauksosastolla.

Synnytyksen jälkeistä verenvuodon riskiä lisäävät istukan tai sen osien jääminen kohtuun, mikä estää kohtua supistumasta normaalisti. Istukka voidaan joutua irrottamaan käsin ja tarvittaessa varmistamaan kohtuontelon tyhjentyminen kaapimalla. Toimenpiteen anestesiaamuodon valintaan vaikuttavat vuodon määrä (hypovolemian vaikeusaste) ja potilaan kliininen tila. Toimenpide vaatii kohdun ja perineaalialueen analgesiaa (Th 10-S3) ja on hereillä olevalle potilaalle epämiellyttävää. Spinaali- tai epiduraalipuudusta käytettäessä on suositeltavaa käyttää lievää sedaatiota esim. midatsolaamilla.

Kohdun supistusheikkous (atonia) on vähintäänkin osatekijänä 80-90 %:ssa synnytyksen jälkeisistä verenvuodoista. Atonian riskiä lisäävät mm. pitkittynyt synnytys (runsas oksitosiinin käyttö), monisyntyttäjäisyys, istukan poikkeava kiinnittyminen, makrosomia, polyhydramnion, obeseetti ja aikaisempi synnytysvuoto. Atoniatilanteessa kohtua yritetään saada supistumaan kaksin käsin painamalla ja kohtua hieromalla sekä oksitosiini- ja tarvittaessa prostaglandiini-infuusiota käyttäen. Viimeisinä keinoina kajoavat toimenpiteet (kohtuvaltimoiden embolisaatio, hysterektomia) saattavat olla tarpeen äidin hengen pelastamiseksi. Ennen toimenpidettä tulisi arvioida verenvuodon määrä, huolehtia infuusioreittien riittävydestä, ottaa sopivuuskoe sekä tarvittavat laboratorionäytteet ja varata veri- ja hyytymistekijätuotteet. Massiivisissa vuotoissa verituotteiden anto ja hyytymistekijöiden korvaus on aloitettava välittömästi odottamatta laboratoriovastauksia. Jos vuoto on runsas, yleisanestesia on suositeltavin, aspiraatioprofylaksiaa unohtamatta. Hypovolemisilla potilailla anestesian induktiossa voidaan käyttää etomidattia tai ketamiinia.

Lapsivesiembolia on harvinainen, äkilliseen verenkierron kollapsiin, sydänpysähdykseen ja jopa synnyttäjän kuolemaan johtava hätätilanne. Tehostuneiden hoitomahdollisuuksien vuoksi kuolleisuus lapsivesiemboliaan on laskenut 1970-luvun yli 80 %:sta parhaimmillaan 13 - 35 %:iin. Lapsivesiemboliassa lapsivettä ja sikiöperäisiä partikkeleita pääsee äidin verenkiertoon aiheuttaen pienten verisuonten mekaanisen tukkeutumisen. Viime aikoina lapsivesiembolian patofysiologiaan on arveltu liittyvän immunologisia mekanismeja ja sitä on myös kutsuttu raskauteen liittyväksi anafylaktoidiksi reaktioksi. Lapsivesiembolian ja keuhkoembolian erottaminen voi olla vaikeaa, mutta lapsivesiemboliaan liittyy tyypillisesti nopeasti kehittyvä koaguloopatia (DIC). Sikiön voinnin muutos saattaa edeltää äidin oireiden ilmaantumista. Lapsivesiembolian hoito on ensisijaisesti oireenmukaista: hengityksen ja verenkierron elvytys ja tukeminen sekä koaguloopatian hoito.

L11**Elottoman hätäsektio kentällä, case***Miretta Tommila*

TYKS

Raskaana olevan sydänpysähdys on länsimaissa harvinainen, mutta dramaattinen tilanne, jossa vaakalaudalla on kahden elämä. Sydänpysähdys voi johtua raskauteen liittyvästä tilanteesta tai muusta sairaudesta, vammasta tai jopa iatrogeenisesta syystä. Raskausviikolta 20-24 eteenpäin kasvava kohtu painaa makuuasennossa ollessa aorttaa ja alaonttolaskimoa huonontuen laskimopaluuta ja kohdun verenkiertoa. Vaikka kohtua kallistettaisiin vasemmalle, niin äidin raskauden aiheuttamat anatomiset ja fysiologiset muutokset huonontavat merkittävästi äidin paineluelvytyksen tehoa.

Raskauden aiheuttamien muutoksien vuoksi ajatellaan, että varhain elvytyksen aikana tehty hätäsektio parantaa äidin spontaanin verenkierron palautumismahdollisuuksia. Nykyisissä elvytyksen hoitosuosituksissa kehoitetaan tekemään hätäsektio 4-5 minuutin kuluessa sydänpysähdyksestä, mikäli äidin elvytystoimille ei saada vastetta. Lapsen evakuoiminen kohdun ulkopuolelle mahdollistaa myös vastasyntyneen elvytystoimien aloittamisen. Raskauden kesto vaikuttaa merkittävästi vastasyntyneen selviytymismahdollisuuksiin.

Tässä esityksessä käydään läpi raskaana olevan elvyttämiseen liittyviä asioita ja kerrotaan tapauselostus kenttäolosuhteissa tehdystä hätäsektiosta elvytyksen aikana.

L12**Synnytykseen liittyvät verenvuodot***Anna-Mari Saarikoski*

KSSHP

Synnytykseen liittyvät verenvuodot voidaan jakaa tapahtuma-ajan mukaan: ennen, aikana ja jälkeen synnytyksen. Toinen jako voidaan tehdä vuodon aiheuttajan mukaisesti. Onko synnä atonia eli kohtu ei supistu kunnolla, istukan jääminen kohtuun vai repeämät/ ruptuurat? Aiheuttajasta riippuen vuodon hallintaan käytetään erilaisia keinoja.

Tilastojen mukaan Suomessa noin 1/1000 synnytyksessä tapahtuu henkeä uhkaava verenvuoto. Vuositasolla tämä tarkoittaa noin 60 synnyttäjää. Synnyttäjän massiivisen vuodon hoito aloitetaan viimeistään silloin kun vuotomäärä on 1 500 - 2 000 ml, ja vuoto jatkuu runsaana. Alatiesynnytyksessä normaaliksi vuodoksi on määritelty 500 ml ja sektiossa 1000 ml.

Nopea tilannearvio on äärimmäisen tärkeää, koska synnyttäjien vuodot voivat olla hyvin nopeita ja runsaita. Lisäksi on pyrittävä nopeaan todellisen vuotomäärän arviointiin, oltiin sitten synnytys- tai leikkaussalissa.

Kaikille synnyttäjille annetaan kohtua supistavia lääkkeitä heti napanuoran katkaisun jälkeen. Kohdun supistamattomuuteen, vuotoa aiheuttavaan atoniaan voi olla monia eri syitä. Esimerkkeinä kohdun ylivenyttyneisyys, monisynnyttäjäisyys tai infektiot. Uhkaavissa tilanteissa rutiinilääkkeiden annoksia voidaan uusia tai aloittaa supistavien lääkkeiden antaminen infuusiona suoneen tai jopa suoraan kohtuonteloon.

Toinen syy synnytyksen jälkeisiin vuotoihin on istukan jääminen kohtuun tai irtoaminen palasina, jolloin kohtu ei supistu ja synnyttäjä vuotaa. Syitä istukan irtoamattomuuteen ja kohdun sisään jäämiseen ovat atonia tai istukan poikkeuksellinen kiinnittyminen kohtulihakseen. Se, kuinka kauan istukan irtoamista ja syntymistä voidaan odotella, riippuu siitä kuinka runsaasti äiti vuotaa. Massiivisesti vuotavat istukkaretentio-potilaat ovat hätäsektioiden ohella toinen synnyttäjien potilasryhmä, joka saa tulla leikkaussaliin hätätyönä ilman hoidonvarausta.

Kolmantena synnä vuotoihin ovat erilaiset repeämät ja ruptuurat. Erittäin harvinainen on kohturepeämä esimerkiksi voimakasenergisestä vamman yhteydessä. Aikaisempien toistuvien sektioiden tai muiden kohtulihakseen kohdistuvien leikkausten seurauksena voi kohdun seinämä ohentua arpialueelta raskausaikana niin, että tällainen ohentunut kohdunseinämä voi revetä pikkuhiljaa tai kovia kipuja aiheuttaen supistusten/synnytyksen yhteydessä. Alatiesynnytyksessä tai imukupissa voi repeytyä kohdunsuu, emättimen seinämä, väliliha tai peräaukon sulkijalihas. Repeämiä voi tulla myös sektion aikana. Lapsen ulosautossa ohueksi venytynyt kohtulihak voi revetä hankalasti emättimen suuntaan tai sivuille. Vaikeassa ulosautossa voidaan joutua tekemään kohtulihakseen apuviiltoja. Näissä tilanteissa äiti voi vuotaa nopeasti useita litroja.

Uusimpiin vuodon hallintakeinoihin kuuluvat erilaiset tamponointikatetrit. Tilanteen mukaan yksi- tai kaksipalloiset katetrit voidaan asettaa paikoilleen joko alateitse tai sektiossa. Tamponaatio aikaan saadaan nestetäytteisillä palloilla. Muita keinoja ovat mm. seuraavat: Sektiossa löysästä kohdusta voidaan ommella napakka paketti, jolloin estetään vuodon kertyminen kohtuonteloon. Kohtuvaltimoiden embolisatiota voidaan käyttää vuodon hallintakeinona kun akuutein vuototilanne on ohi, mutta leikkausalue vain tihkuttaa. Kohtuvaltimoita voidaan sulkea ompelemalla leikkauksen aikana. Jos mikään edellisistä ei helpota tilannetta, on edessä kohdunpoisto.

Hätäkeino, jota ei tule unohtaa on aortan kompressio. Sillä voidaan ostaa aikaa esim. muiden jo aikaisemmin esitettyjen keinojen valmisteluun sekä vuodon korvaukseen tilanteissa, joissa potilaan hemodynamiikka romahtaa äkillisen runsaan vuodon seurauksena.

Oleellista on pitää mielessä seuraava sääntö: Jos yksi keino ei auta, ollaan valmiina viivyttämättä siirtymään ja kokeilemaan seuraavaa.

L13**Komplikaation tunnistaminen heräämössä***Maiju Salovaara-Hiltunen*

HUS

Äkilliset, henkeä uhkaavat komplikaatiot huomataan yleensä helposti, viimeistään kun tilanne on jo vakava. Miten saada haaviin uhkaava tilanne jo alkuvaiheessa? Miten tunnistaa hyvin kompensoivan potilaan tilanteen huononeminen ajoissa? Mitä pitäisi tarkkailla ja ennenkaikkea mitä hoitajan tulisi tiedostaa potilasta heräämössä hoitaessaan?

Luennolla lähestytään aihetta yleisesti ilmiönä eikä yksittäisiin komplikaatioihin keskitytä tarkemmin. Käydään läpi muutamia työkaluja helpottamaan ja yhtenäistämään hoitoa; kansainväliseltä kentältä perusmenetelmiä sekä Töölön sairaalan ortopedisen leikkausosaston heräämön ja vuodeosastojen yhdessä luoma, hiljattain käyttöön otettu check lista –ratkaisu.

O1**ERP – Patient centered care throughout the continuum of care in esophageal surgery**

Åsa Frölander & Anna Jacobson

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Care program for faster recovery after surgery, Enhanced Recovery Program (ERP) is well established in colorectal surgery, but ERP for oesophagoectomy had not been implemented in Sweden earlier. We want to present our introduction of ERP esophagus.

At Karolinska University Hospital, Huddinge, Gastro center upper abdominal surgery conducts a regional mandate for esophagus surgery. This is major surgery that involves long operations and long hospital stays, sometimes with complications and intensive care as a result.

A multidisciplinary team from the Karolinska University Hospital, Huddinge with Mats Lindblad at the head went on a field trip to the Royal Surrey County Hospital in Guildford, England.

The purpose of the study tour was to take part of their care with an elaborate ERAS concept for esophagus patients.

Based at the Royal Surrey County Hospital concept, an Enhanced Recovery Program was created at Karolinska University Hospital, Huddinge. The aim was to change the care to facilitate the postoperative recovery.

With Enhanced Recovery Program the Royal Surrey County Hospital had shortened the lengths of stay in hospitals to 8 days and then discharge to home.

As a comparison Karolinska University Hospital had about 20 days of hospital stay. Inspired and motivated by the Royal Surrey County Hospital a multi-professional team prepared a care program Enhanced Recovery Program for patients undergoing esophagus surgery at Karolinska University Hospital, Huddinge.

The surgical technique has evolved and today it is mostly esophagus resections with minimally invasive techniques, laparoscopy and thoracoscopy instead of the previously laparotomy and thoracotomy.

The impact of the Nurse Anesthetist in charge of the patients with ERP of esophagus resections resulted in only small changes in work, but ended up with big different in patient care.

The length of the Karolinska University Hospital, Huddinge is not yet down in the eight days the Royal Surrey County Hospital have but are on track.

After the introduction of ERP esophagus, the proportion of respiratory complications has decreased from 31% to 16%.

Anastomosis leakage is unchanged at 17%.

The need for ICU care declined steadily from 34% to 10% and the number of patient days in the ICU fell from 7 to 5.

The total time of hospital stay gradually dropped from 20 days in the 11.

The most important changes in care were: preoperative patient information, early surgical boot, targeted fluid therapy, higher level in head position in post-operative care, early and intensive mobilization and follow-up adjustment.

The work also led to improved teamwork with better working environment and increased patient involvement.

The lecture will be an insight into how well the nurse anesthetist and the multi-professional team have introduced and conducting with Esophagus resection per operative today. The lecture will also describe the results until today.

O2

Quality of nursing and care burdened measurement during intensive care in relation to patient outcome*Ann-Charlotte Falk*

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INTRODUCTION

Intensive care is one of the most resource-intensive forms of medical care due to severely ill patients. During recent years the quality of intensive care has been in focus however there is still lacking result from nursing point of view. **OBJECTIVES:** To describe nurse/patient ratio in relation to Care burdened measurement (VTS) and optimal medical and nursing-related result usually used indicators as mortality and complications during intensive care. **METHOD:** This is a retrospective registry study includes a survey of critical care of registry data (all patients > 15 years) receiving care in two general Level I critical care units with similar rate of admissions during 2010-2014. Data of nurse/patient ratio is collected from each unit. The data is analyzed by descriptive and comparative statistical methods.

RESULTS

The result showed differences in specialized nurse/patient ratio of 0,5:1 to 1:1 ratio and Care burdened measurement (VTS) despite similarities in admission rate. Differences in cause of admission (surgical vs medical) and in the amount of unexpected surgery patients were found. Differences were also found in mean time on non-invasive ventilation and mean time on ventilator. Complications during critical care was measured by readmission and unplanned reintubation and showed that unplanned reintubation varied between 2.4-1.6 percent. ICU mortality showed differences with the lowest ICU mortality in the hospital with lower nurse/patient ratio. However, 30 days mortality was lower in the hospital with higher nurse/patient ratio. Further analysis is needed. **CONCLUSIONS:** Preliminary results show differences in nurse/patient ratios and Care burdened measurement (VTS) with differences in and quality measurements in general critical care units.

O3**Mentorship for nurses in intensive care**

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Introduction

The intensive care unit at Karolinska University Hospital is a large workplace with many employees. The critically ill patients require staff with substantial medical competence, capacity to an intense pace of working, considerable flexibility and an ability to cooperate.

After introduction, about 6 to 8 weeks for nurses and 3-4 weeks for assistant nurses, the newly employed are to function autonomously. Nurses new to intensive care initiate a transition period of about two years when they begin their employment in an intensive care unit. During this period they can often experience stress and a feeling of being overwhelmed. This may also occur to assistant nurses new to intensive care.

Mentorship provides guidance, personal development and exchange of knowledge. While offering mentorship to new employees they will be given an opportunity to develop as professionals and personally but also be given support to feel secure and to integrate with the workplace, the team and the organization. The knowledge and experience already existing within the organization are utilized, since the mentors are experienced nurses from the own team.

Objectives

The purpose was to introduce and evaluate mentorship for a group of newly employed intensive care nurses and assistant nurses new to intensive care.

Methods

Six nurses and two assistant nurses participated as mentees in the project. They were matched with a mentor that they were to meet during one hour about every third week for six months. Each pair planned the meetings together and the dialogue took place during workhours, preferably when the shift changed.

Both mentees and mentors were asked to answer a questionnaire towards the end of each individual mentorship period, one mentor had completed her employment towards the end and therefore didn't get a questionnaire. The mentors were to answer nine open questions and the mentees eight.

Result

Fifteen questionnaires were handed out, eleven were answered.

All mentees, except one, were positive towards mentorship. They had felt supported and experienced it positive to have someone to reflect with. All mentors were positive continuing as mentors and thought that the mentorship had developed them in different ways. Almost everyone thought that the mentorship started too late, about five months after employment, and wanted it to start straight after the introduction. The most frequent obstacle was to find time for dialogue and be able to meet, sometimes the planned time for dialogue were cancelled due to high workload.

Conclusion

Staff, management and the participants of the project share a positive attitude towards mentorship which enables the project becoming permanent.

Mentorship should be optional and the start individualized. It's important to release the mentee and mentor from work to make dialogue possible. Planning must be done in advance and be prioritized.

O4

Competence areas in anaesthesia nursing care: Delphi study

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Introduction

In order to fulfil the complex needs of patients undergoing surgery and anaesthesia, anesthesia nurses require a well-developed knowledge and special skills in both the technical and caring dimensions of anaesthesia nursing. In addition, they are expected to be experts and able to make flawless and rapid judgments in the operating theatre or post-anesthesia care unit, and to deal professionally with the ethical issues in these environments. ICN defined competence as the effective application of a combination of knowledge, skill and judgement demonstrated by an individual in daily practice or job performance. To date, little information is available as regards competence areas such as knowledge, skills, and judgement required in anaesthesia nursing field.

Objectives

The purpose of this study is to identify, synthesize and describe competence areas required in anaesthesia nursing care.

Methods

Scoping literature review and Delphi technique were used. A search in CINAHL, MEDLINE, and ERIC was carried out to identify empirical studies (English and Finnish) measuring nurse competence in anaesthesia nursing care (1994 - 2015). Additionally, Delphi technique was carried out on using the experts (n=8). The experts described what competence is required in anaesthesia nursing care. Sixteen relevant references and 8 expert's essays were analysed. A narrative synthesis approach was undertaken to analyse the data.

Results: Under the three main categories (knowledge, skills, and value/attitude), total ten competence areas were identified. Category of knowledge has three competence areas: 1) Medical knowledge related to anaesthesia care, 2) knowledge of anaesthesia nursing process (e.g. assessment, planning, and implementation), and 3) professional knowledge such as standard and legislation. Skill category has four competence areas: 1) skills of critical thinking and decision-making, 2) skills involved in anaesthesia nursing process (e.g. administrating, monitoring, maintaining, documenting, and reporting), 3) clinical management skills such as pain, crisis, and airway management, and 4) collaborating and consulting skill. Category of value/attitude has 1) value for safe care such as safety and advocacy, 2) value of high-quality care including respect, comfort and individualized care, and 3) value of efficiency.

Conclusion

Ten competence areas of knowledge, skills and value/attitude were described. In order to provide safe care for patients as well as maintain the credibility of nurses by providing the capabilities to correspond to dynamic circumstances, a system of competence assessment in anaesthesia care is demanded. These competence areas can be used as valuable information to assess anaesthesia nurse competence. Nurses in anaesthesia care have a primary responsibility for providing safe care through continuous professional development. This study may be used to support nurses when reflecting on their practices to identify areas of strength and weakness.

O5

An observational study of Swedish registered nurse anesthetists' perioperative patient advocacy*Ann-Sofie Sundqvist¹, Marie Holmefur², Ulrica Nilsson², Agneta Anderzén-Carlsson³*

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Introduction

Patient advocacy is multifaceted, and has been described as supporting patients emotionally, preserving the patients' dignity, acting against unethical and incompetent treatment, speaking up for patients, and protecting patients from harm. Since advocacy implies taking action on behalf of another, it is of particular interest to study this phenomenon in the perioperative environment where patients are vulnerable due to sedation or general anesthesia.

Objectives

The aim was to describe the nurse anesthetists' patient advocacy actions during the perioperative phases; what they do, with whom they collaborate and what trigger their actions.

Methods: Sixteen non-participating observations with eight registered nurse anesthetists (RNAs), followed by a field interview were carried out during October throughout December 2015. Each RNA was observed twice when he/she performed perioperative care in connection with general anesthesia. The field notes from each observation and interview were transcribed verbatim, and the process for data abstraction and synthesis was conducted with a directed content analysis. The four predefined categories: Protecting, Value preserving, Supporting, and Informing, identified in an integrative review of perioperative nurses' experiences of advocacy formed the theoretical framework.

Results

The preliminary results revealed that all of the four categories from the theoretical framework were covered in praxis. In order to achieve a successful outcome for the patient the RNAs' collaborated with many different health care professionals that were engaged in the patient care, i.e. anesthesiologists, surgeons, operating room nurses, auxiliary nurses, and nurses at the postoperative care unit. A sudden unexpected statement from the surgeon, an eye contact with the operating room nurse, a quick glance at the patient or the patients' vital parameters on the monitor, were all small subtle signs indicating that something was not quite right and triggered the RNAs to advocate on behalf of the patient.

Conclusion

Since the RNAs' internationally have varied roles and responsibilities, this study can be a meaningful contribution to achieve a greater understanding of the RNAs perioperative patient advocacy, which in the future could form a base for theory development within the perioperative nursing context.

O6

Nurse Consultant a new supportive role for Critical Care Nurses to bridge the knowledge and skill gap*Eva Barkestad*

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Background

The purpose of this project was to introduce a Nurse Consultant, a modified liaison nurse role at a Swedish hospital during on call hours. In Australia, a liaison nurse support the nurse on wards as a way of improving the nursing care offered to patient. The Liaison Nurse has it´s background in Intensive Care and is a relatively new development of the Critical Care Nurse, (CCN) role. A pilot study introducing the Nursing Consultant was performed over a period of six months at a Swedish hospital involving three general wards. All with different specialities, one surgical ward , one orthopaedic ward and one emergency medical unit participated in the pilot project. In Sweden many of the nurses working on wards are inexperienced and have worked a short time. Sometimes they come across tasks they have little or no knowledge of how to perform. This has sometimes caused stressful situations and feeling of inadequacy for the nurses. The CCN is an experienced nurse with a postgraduate education and she is also well familiar with some of the task the nurses on the ward has problems with. The Nursing Consultant´s role in the project was to be supportive and pedagogic to the nurses on the wards.

Aims and objectives

To explore if there was any need of support from more experienced colleagues, and if so, what kind of support the nurses on the general ward wanted help with.

Method

Data was collected from all the assignments the Nurse Consultant got from the ward nurses for a period of 6 months.

Result

In total, 54 assignments were performed. Principally during evening and night shifts. The nurses on the general wards wanted help with tasks they seldom or never had performed. 19 % of the assignments were about management or administration of drugs in central venous lines. Other tasks the ward nurses asked for help with, were medications and how to use different medical devices. The nurses on the general wards expressed that they very positive to the project and they also felt the Consultant Nurse had an impact on their own personal professional development.

Conclusion

The project showed that the Consultant Nurse had an important supportive role and made a difference for the nurses on the general wards. The Consultant Nurse helped them to perform tasks they were not familiar with and also improved nursing care to patients. The Nursing consultant also helped the general nurse to develop personal knowledge and skills.

P1**When does it hurt? A correlation between ischemia and pain**

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Introduction

Trans-Catheter-Valve-Replacement (TAVI) is performed in local anaesthesia at Odense University Hospital. During the TAVI procedure the femoral artery is cannulated with a sheath and thereby potentially obstructing the flow to the lower limb, thus increasing the risk of ischemia which can be measured by Near-Infrared Spectroscopy (NIRS). Ischemia can lead to patient discomfort and pain in the lower limb during the procedure. Since the patients are awake under the TAVI procedure; it is possible to compare the pain score using Numerical Rating Scale (NRS) and ischemia in the lower limb detected by NIRS. A decrease of 30% from baseline in NIRS was defined as limb ischemia.

Objectives

To perceive knowledge whether NIRS can predict when patients experience pain related to ischemia by exploring the correlation between a 30% decrease from baseline in NIRS score and patient's experience of pain.

Methods

A total of 25 patients (age 57-91 years) undergoing elective TAVI were included in a pilot study between August 2014 and May 2015. The variables of limb ischemia detected by NIRS and patient's perception of pain using NRS were recorded at five minutes intervals before start and until the end of the TAVI procedure.

Result

The result showed that 10 out of 25 patients had a 30% decrease from baseline measurement in NIRS after 25 minutes. 50% (5 patients) of the patients with a 30% decrease in NIRS experienced pain related to ischemia. A tendency was seen towards a correlation between a 30% decrease in NIRS and patient's experience of pain after 25 minutes until end of the procedure.

Conclusion

NIRS might be a useful tool as a predictor for whether the patients experience pain related to ischemia during the TAVI procedure. Further studies with inclusion of a larger scale are needed to finally conclude the usefulness of NIRS as a tool to predict pain.

P2

T-Balance® suit or Forced Air Warming in Prevention of Perioperative Hypothermia, a randomized controlled trial*Irene Brodshaug*¹, *Tomas Drægning*², *Johan Ræder*^{3,4}

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Introduction

Unintended perioperative hypothermia with core temperature below 36.0 °C is a common complication in general anaesthesia and associated with several adverse effects in the surgical patient.

Objectives

In this study we compared passive insulation and conservation of body temperature with the thermal suit T-Balance® versus conventional forced air warming (FAW) in prevention of perioperative hypothermia.

Methods

The study was a prospective, open, randomized, controlled trial. 30 patients scheduled for orthopedic spinal surgery were randomized into two groups. The intervention group received the thermal suit T-Balance® (n=15) 30 minutes before start of anaesthesia and throughout the perioperative period. The control group (n=15) received FAW during surgery. Core temperature was measured using a non-invasive zero-heat-flux probe (SpotOn™) placed in the patients forehead. Core temperature was obtained before premedication (baseline) and every ten minutes after induction of general anaesthesia. Last measurement was obtained 15 minutes after admission to the post anaesthetic care unit (PACU) or when the hypothermic patients returned to 36.0 °C in the PACU. Core temperature from the zero-heat-flux device was compared with oesophageal temperature intra-operatively. Statistical significance was considered at P-value ≤ 0.05.

Results

No statistically significant difference (ns) was found between the groups for the primary outcome, core temperature 30 minutes after induction of general anaesthesia. Mean core temperature then and standard deviation (±SD) in the T-Balance® group was 36.2 °C ± 0.4 °C and for the control group 36.4 °C ± 0.5 °C (P = 0.353). Perioperative hypothermia occurred in 16 patients (53.3%): 10 (66.7%) patients in the T-Balance® group and 6 (40%) in the control group (ns). Time required to re-establish normothermia was significantly longer in the T-Balance® group, mean 108 ± 111 minutes than for the control group 33 ± 59.5 minutes, (P = 0.03). Core temperature readings were similar in 28 % of the measurements between SpotOn™ and the oesophageal probe. In the remaining 72% the SpotOn™ read a higher temperature in 66 % and the oesophageal probe in 6 %.

Conclusions

T-Balance® and FAW have similar effect in prevention of hypothermia 30 minutes after induction of general anaesthesia. Still, in about half of the patients in both groups, mild perioperative hypothermia occurred. Passive insulations with T-Balance® was slower in re-establishing normothermia. Active warming with FAW was overall better in this study.

P3**Creating a Mobile Emergency Team (MET) – a retrospective study at Zealand University Hospital, Køge, Denmark**

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Introduction

MET was introduced in April 2015 at Zealand University Hospital, Køge. The vision was not only to minimize cardiac arrests, but also to facilitate the health professionals at the wards in an educational way. This, supported by the knowledge and the skills possessed by the critical care nurses working at the ICU.

Objectives

The MET began by educating the critical care nurses, using simulation training. Afterwards the nurses and doctors at the wards were instructed in how and when to use the MET. All health professionals can call the MET, if they need support dealing with patients having respiratory or circulatory challenges, at all times. If the nurse can not leave the ICU because of bustle, the call will be forwarded to the ICU doctor. The MET includes not only the critical care nurse, but also very importantly the nurse and doctor from the ward.

The aim of this study was to evaluate the MET activations during a period of 6 months from July to December 2015.

Methods

A retrospective study was conducted by investigating a total amount of 112 MET charts, out of these, 12 journals were excluded, ending up with a total amount of 100 charts. The MET charts were filled out by the team who was a part of the particular MET. Both medical and surgical wards were represented in this study. An Excel file was used for data extraction and calculations.

Results

The response time from the ward calling, until the critical care nurse arrived, was a median of 6 minutes. A MET visit lasted a median of 25 minutes. Most often (48%), it was a nurse from the ward who contacted the MET for help, the doctor called 26% of the times. A total amount of 42% of the calls was during daytime. The most common reason for calling was concerns about the patients' respiratory status (83%). An amount of 200 interventions were performed. Some patients had more than one. The most common intervention was CPAP (Continuous positive airway pressure) 22% of the visits were oxygen therapy (13%), arterial blood gas (12%), tracheal suction (12%), and positioning the patient in the bed (12%).

Conclusion

This analysis indicates that respiratory problems were the main reason for calling MET. The interventions included CPAP, suction and oxygen therapy. Those who contacted MET the most, were nurses from the ward. We do not know if we have succeeded in decreasing the cardiac arrests. It is an issue with many confounders and we do not have that result at the moment.

P4

Preventing Hypothermia in Patients Undergoing Major Spinal Surgery During Anesthesia*Mia Granum¹, Karin Kaasby¹, Karin Aagaard¹, Søren Skou², Mette Grønkjær³*

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Background

Major spinal surgery tend to be lengthy with an increased risk of hypothermia. Mild hypothermia can trippel the incidence of morbid cardiac outcome, triple the incidence of surgical wound infection, increase surgical blood loss and the need for allogeneic transfusion by about 20%.

A local quality improvement project of patients undergoing spinal fusion surgery showed that 67 % were hypothermic at the beginning of surgery. Several patients expressed feeling cold at the arrival to the operating theatre.

Aim

To evaluate if Bairhuggers Full Access Underbody blanket can prevent hypothermia at initiation if used as prewarming and intraoperative warming compared to the results from the local quality improvement project. Furthermore, to explore patients' experiences of comfort in relation to their temperature.

Method

Temperature of the patients (n?30) will be assessed at arrival to the operating theatre, after insertion of bladder catheter, at the start and end of surgery and at arrival to the recovery unit, using the bladder temperature.

The patients' experiences of comfort will be evaluated with a 5-point Likert scale at the arrival to the operating theatre and after ten minutes of active prewarming with Bairhuggers Full Access Underbody blanket.

Ten randomly chosen patients will be observed preoperatively and later interviewed in order to obtain further information regarding their experiences of comfort in relation to their temperature.

Conclusion and perspectives

The project is ongoing. By increasing our knowledge on Bairhuggers Full Access Underbody blanket and its effects in preventing hypothermia as well as gaining insight to patients' experiences of comfort in relation to temperature, we anticipate to improve pre-anesthetic care and minimize risk factors associated with hypothermia in patients treated with spinal fusion surgery.

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P5

The effect of a new perioperative practice model on patient, nursing and organisational outcomes – study design

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Introduction

Anxiety, fear and pain are known to weaken and delay patients' recovery after surgical procedures. This research follows a pilot study, where a new perioperative model of caring was tested with patients undergoing a hip or a knee replacement surgery under spinal anesthesia. In this new model the one and same anesthesia nurse took care of the patient during the entire perioperative process (pre-, intra- and postoperative phase) and even paid the patient a visit to the ward the next day after surgery. The study findings showed that the patients experienced the new model of perioperative care as beneficial. They experienced that they received individual care in which they had the opportunity to participate. They also experienced the emotional support as crucial.

Aim and objectives

The aim of this study is to improve the surgical patients' care process. The objective is to explore the effect of a new perioperative practice model on 1) patient outcomes (satisfaction, surgery-related anxiety, and quality of life), 2) nursing outcomes (organizational engagement), and 3) organization outcomes (timeline of surgical care process).

Methods

A longitudinal untreated control group design with pre- and posttests will be followed. The randomized patient sampling (N=400) will include voluntary adult surgical patients undergoing a hip or a knee replacement procedure. The patient data will be collected with 1) The Good Perioperative Nursing Care Scale developed by Leinonen and Leino-Kilpi. 2) 15D; a generic, 15-dimensional, self-administered instrument for measuring health related quality of life among adults, developed by professor Sintonen; and 3) STAI, The State-Trait Anxiety Inventory; a definitive instrument for measuring anxiety in adults developed by Dr. Spielberger. The personnel data will be collected by the Nurse Engagement Survey, developed by the Global Centre for Nursing Executives to measure the nurses' organizational engagement and the factors affecting it. The surgical care process data will include various time stamps from the Operating Room Management System and the Hospital Information System.

Results

The patient recruitment will start in early autumn 2016; thus no results will be available before 2017.

Significance

There are several concerns in current specialized health care that this research will address. The new health care legislation in Finland gives the patient the right to choose the place of care. Thus, the patient satisfaction with the care is an important part of an organizations' competitiveness. In addition, the health care organizations have to deal with worsening lack of nursing resources. New nursing practices may enhance the attraction of nurses.

P6

Same day surgery patient's psychological symptoms twenty four hours and four days after anesthesia*Thordis Borgthorsdottir, Lara Asmundsdottir, Maria Asgeirsdottir*

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Aim /s

To investigate the psychological recovery of same day surgery patients the first four days after anesthesia. Design. A prospective, explorative panel study design was used. Patients 18 years and older, scheduled three days in advance to have same day surgery were offered participation in the study. Exclusion criteria were staying overnight at the hospital, not being able to read and write Icelandic and that vision, hearing or psychological status did not compromise the patients ability to answer the study questionnaire. The Quality of recovery-40 (QoR-40) was used to measure recovery on days 1 and 4 after surgery. The QoR-40 is composed of five dimensions: Physical comfort (12 items), Emotional state (9 items), Physical independence (5 items), Psychological support (7 items) and Pain (7 items). Individual items are scored on a five-point Likert scale with total score ranging from 40 (poor quality of recovery) to 200 (excellent quality of recovery). In addition to the QoR-40 the study questionnaire asked about tiredness, soreness and thirst at T2 and T3 and about general physical and psychological health at T1 and T3. Data was collected, from November 1st 2012 until March 1st 2013, before surgery (T1), day one after surgery (T2) and day four (T3) after surgery.

Results

Participants were 564 on day one (T1) and 425 (75,4%) on T2 and T3. More than half were women (55,8%), 78,5% were married or cohabiting. About one fourth (26,1%) of the patients had general surgery and one fifth (19,2%) had urological surgery. Significantly more patients reported their psychological health as rather good or very good on T1 (90,7 %) compared to T3 (85,7 %; Chi-square, $p < 0,001$). There was a significant difference ($p < 0,001$; t-test) on the mean QoR-40 score on T2 ($M = 175,1; sf = 17,4$) and T3 ($181,1; sf = 16,6$). The same applied to all the subscales of QoR-40 and the individual symptoms tiredness, hoarseness and thirst. Majority of participants had received psychological support from nurses on T2 and from family and friends on T3. The most common sign of positive emotional state was feeling comfortable and feeling in control on both T2 and T3. Few patients had negative feelings.

Discussion

The findings of this study show that most of patients have good psychological health in general, but feelings of negative emotional state rise slightly on the fourth day after anesthesia. Patients and families should therefore receive information and education about what to expect after surgery and anesthesia and patients in need of special follow up should be identified as soon as possible.

P7

IFNA accreditation 2015**The Specialist Training Program for Nurse Anesthesia in the Eastern Part of Denmark***Dorthe Tofte¹, Britta Toftlev Johansen²*

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Introduction: This abstract describes the course and outcome of the voluntary accreditation of the Specialist Training Program for Nurse Anesthesia in the Eastern Part of Denmark.

Objectives: The objective for seeking voluntary accreditation was to investigate whether the Program meets IFNA's training standards. The standards are primarily designed to ensure that nurse Anaesthetist students gain specific skills during training. At the same time, we hoped for an international assessment of the weaknesses and strengths of the program.

Methods: After IFNA's approval by the Council of Nurse Anesthesia Education Eastern Part of Denmark's application for Level 3 Accreditation, a process began November 2014. It started with a web-based questionnaire sent out by the University of Lund, comprising 60 questions directed at: anesthesia students, educators, managers, anesthetists, theoretical training managers and administrators in the region.

At the same time we prepared a Self-Study design of IFNA's Educational Standards for Preparing Nurse Anesthetists.

After IFNA's representatives had approved the material and analyzed the survey, three of the members visited Denmark for three days: Marianne Riesen (Team Chair) from Switzerland, Jackie S. Rowles (President of IFNA and Team Member) from Chicago and chairman of FASAIO Dorte Sjøderberg (Local Expert) and Ingrid Andersson (1st Vice President IFNA) from Lund, as a trainee during the visit.

The representatives focused on selected areas: interviews with anesthesia trainees, specialist Council Presidents, anesthesiologist, nurse anesthetist educators and theoretical training manager.

The representatives observed the education in a classroom, an anesthetist nurse student in clinical practice, and visited the Copenhagen Academy for Medical Education and Simulation (CAMES)

The visit ended with a review of the observations and a preliminary evaluation.

Results and conclusion: The specialist Training Program for Nurses in Nurse Anesthesia in the Eastern Part of Denmark has subsequently achieved accreditation at Level 3 and is now the 7th educational institution that is accredited worldwide.

The representatives from IFNA emphasised the following strengths:

- The program is financed by funds from Region / State. Therefore it is not necessary to seek external funding.
- The program's focus on the patient safety.
- The participants are always with a graduate supervisor during the first six months of the program.
- The participants are tutored intensively in clinical skills. The main clinical skills are trained through the implementation of 17 competence cards, 350 hours of theoretical training, as well as 9 days of instruction in CAMES.
- The clinical teachers have daily contact with students during their clinical work. The clinical teachers are all nurse anaesthetists and educated at a masters level.

The IFNA's representatives suggested following improvements in the education:

- Increased focus on preparing each student for Continuous Professional Development (CPD).
- Increased focus on literature search.
- Increased focus on documenting everyday learning in clinical practice.