ICU

MANAGEMENT & PRACTICE

INTENSIVE CARE - EMERGENCY MEDICINE - ANAESTHESIOLOGY

VOLUME 18 - ISSUE 1 - SPRING 2018

SPECIAL SUPPLEMENTS

Hamilton Medical symposium:
Optimising patient-ventilator synchronisation

Nestlé Nutrition Institute symposium:
Nutritional challenges in ICU patients

Multiple organ support

Introduction to multiple organ support, *D. Abrams et al.*

From multiple organ support therapy (MOST) to extracorporeal organ support (ECOS) in critically ill patients, *C. Ronco et al.*

Chronic respiratory dialysis, *D. Abrams et al.*

Understanding LVAD & artificial hearts, *N. Aissaoui et al.*

PLUS

CO_2 in the critically ill, *L. Morales-Quinteros et al.*

Immune dysfunction in sepsis, *V. Herwanto et al.*

Hypothermia in neurocritical care patients other than cardiac arrest, *R. Helbok & R. Beer*

Intracranial pressure monitoring devices, *S. Patil & F. Fadhlillah*

Complications of decompressive craniectomy in neurological emergencies, *I. Gonzalez*

A novel communication device for tracheostomy ICU patients, *F. Howroyd*

The Critical Care Resuscitation Unit, *L.I. Losonczy et al.*

Variation in end-of-life care, *A. Michalsen*

Simulate or not to simulate? *M. Poggioli et al.*

Being an expert witness, *J. Dale-Skinner*

Role of the chaplain in the ICU, *K. Jones*

Developing new approaches to patient safety, *J. Welch et al.*

How to provide better intensive care? *J. Takala*

Caring for critically ill immunocompromised patients, *E. Azoulay*

03

9 771377 756005

How to provide better intensive care?

Systems approach and individualised care

Professor Jukka Takala, MD, PhD, is professor of Intensive Care Medicine in the University of Bern, Switzerland, Director and Chief Physician of the Department of Intensive Care Medicine, and Chair of the business unit of Intensive Care Medicine, Emergency Medicine and Anaesthesiology and Pain Medicine at Inselspital, the Bern University Hospital. His research focuses on the pathophysiology of multi-organ failure, splanchnic tissue perfusion, costs and quality of intensive care, resource use and intensive care organisation. He served as President of the European Society of Intensive Care Medicine from 2000 to 2002 and was awarded the Society Medal in 2014. He has been a member of the Editorial Board of ICU Management & Practice from its first issue in 2000.

There is a school of thought that in intensive care medicine practice should change only with randomised controlled trials. What is your viewpoint on this?

Trials do provide advice for practice change, but if you look at the fine detail our practice has changed a lot without the support of randomised controlled trials (RCTs). Intensive care medicine practice is a learning process. In that sense it's more like craftsmanship where you learn as you go along. Looking at the overall improvement of outcomes in the critically ill patient population over the last 30 years or so there is a major improvement, based on comparing the severity of illness scores developed in the 1980s with the outcome of patients now. In most parts of the industrialised world, the actual mortalities are somewhere between 60-70% of those predicted, i.e. the severity-adjusted outcomes are substantially better than they were 30 years ago. Clearly this is a sign that our practice has improved, and only very little of that improvement is based on RCTs.

Why has it improved?

Firstly we have learned what hurts people, and secondly we have learned, as every craftsman learns through doing his practice, how to get better results. It's the complexity of our patient populations that makes RCTs on single interventions not very useful; they are at their best when they show what does harm.

Is enough attention given to control groups in RCTs?

For RCTs on any disease it is extremely important to evaluate whether the control group in the trial represents your usual practice. I think there has been much too little emphasis focused on the characteristics of the control group, because if your control group receives care, which is not at all consistent with usual care, you cannot draw any conclusions. For example, in our systematic review on septic shock trials from 2006-2016 we found 24 RCTs, which had at least 50 patients in the control group, and we found that only 2 of these trials provided enough data to confirm that the control group treatment represented usual care (Pettilä et al. 2016).

How has having a medical emergency team (MET) benefited your hospital, Inselspital? What challenges did you face when you introduced it?

We had the usual challenges of any MET system, which is to obtain access to patients not directly under the team's treatment. There are often obstacles from the primary specialities who take care of patients to allow access from a different team. However, we first assessed the size of the problem in our own hospital. Once we had those numbers it was fairly easy to convince the other departments that there are problems which can be met by the MET team. The MET team was introduced first as a project, was formally evaluated afterwards, and when we presented the results, there was overwhelming support from all departments to continue to establish it as a productive system (Etter et al. 2014). We have now had it almost 10 years

and the number of emergency admissions from the wards has been reduced substantially. In-hospital cardiac arrests decreased and the outcomes for patients who are admitted from the normal wards to the ICU are no different from those patients who come as emergencies directly to the ICU. This was not previously the case. It shows that the earlier recognition of problems in these patients brings them faster to the ICU. What is also important is that only half of the patients with a MET call need to come to the ICU. With the other patients problems can be resolved at the bedside.

The clinical prediction model for identifying patients at high risk of death in the emergency department that was developed at your hospital performed better than non-systematic triaging. Has the model been externally validated or implemented at your hospital?

We created a prediction model for ED patients (Coslovsky et al. 2015), which has not been externally validated, but we have taken it to use in a slightly modified form in the usual triage practice in the ED and it has been very welcome. The simple signs that tell you that an intervention by a doctor is urgently needed have really helped the practice.

Your research has found that despite considerable variability in outcome and resource use only few factors of ICU structure and process are associated with efficient use of ICU and that this suggests that other confounding factors play an important role (Rothen et al. 2007). Please comment.

This evaluation is based on the variable that we created, the standardised resource use (SRU). This means that we can estimate the resources used to produce a surviving patient and by adjusting this for the severity of the patient, we can calculate the SRU, which is the economic equivalent to the standardised mortality rate (SMR). It shows how many resources are needed for a severity-adjusted survivor. If we look at studies using the SMR which look at the factors predicting the differences, they can perhaps find variables explaining up to 40% of the variability in the SMRs. What is even more intriguing is that if you look at the resources, the differences there are much higher. The SMR may be 2-3 times different between units in a similar healthcare system, but even in a very homogeneous healthcare system you can see up to a 6-times difference in SRU. The way we manage these patients and the resources we need to provide survivors from patients of similar severity is extremely variable, and it makes the cost of ICU care highly variable.

> "only half of the patients with a MET call need to come to the ICU"

How do you go about investigating it?

It is difficult. We are currently doing a study, which includes about 35 ICUs in three countries. We will look at the structures in detail, how the units operate and the staffing—how it's allocated, the on-call, night-time and late day duty systems, and the availability of specialists. We will then investigate the individual components of cost in great detail. We have access to drug and materials use, personnel costs and so on. We want to find out variables which could be associated with better performance, both economically and in terms of survival.

How can technology help improve ICU quality in real time?

One of the key issues is that we can detect evolving disorders and complications in organ functions earlier than we do today. There are different ways to approach it. One is to make the evolution of patients over time better visible. That can be used with fairly simple technology providing the display of data we have in a context-sensitive format. Of course it uses information technology, but it's really rudimentary because we are taking the data that is already available, just displaying it better and combining it for better interpretation. In the future we will have artificial intelligence that will help to detect changes earlier and bring the doctors to patients earlier than they would do when they just notice a disorder that has already manifested itself. That's where there is great potential, and I am sure that we will see more and more intelligence implemented in these patient data management systems in the near future.

What is the ideal practice for sedation in the ICU?

The ideal is to sedate as little as possible and keep the patient awake when it's possible for the comfort of the patient. Of course we need to be selective and individualise sedation so that patients who are so unstable that their being awake may further compromise their vital functions do receive sedation. The best approach is to provide comfort. The eCASH position paper summarises the main principles: compassionate care with focus on patient comfort, analgesia, minimal sedation, good communication between the patient and care team and family (Vincent et al. 2016). There is nothing that could be perceived as a magic solution for sedation problems, but we have come to understand much better that being deeply sedated is not the comfort that we should be providing for patients, but being awake and without pain is mostly the best status for the patient. If they need some support, for example for normalising sleep, we can of course provide that, but many patients prefer to be awake, without pain.

There is more emphasis now on tracking long-term outcomes of ICU survivors—moving beyond 28-day mortality. You've noted that such outcome data is not readily available in Switzerland for data protection reasons. How might that hold back research?

I am pleased to say that this has just changed, and we have access to non-survival data. Deaths can be accessed and recorded. We are just implementing that into our clinical data warehouse in the hospital so we can follow up long-term outcomes of patients. It is extremely important. We know from previous trials in general populations that if ex-patients are alive one year after discharge from hospital then mortalities have traditionally approached those of the age and sex-matched general population. Nowadays

when more and more sick patients survive, this may be very different, and therefore the assessment of excess mortality post-ICU stay is a very important component to evaluate whether we are doing the right thing or not.

The ability to promote adaptive learning is the challenge for leadership: how to guide team members through problem solving with motivation and confidence, rather than autocratically dictating a solution (Zante et al. 2016). As an ICU director, how do you achieve this in your own department?

I think you could have different answers from my staff and myself! The main issue is to make sure to understand the difference between discussions on the patient data, the patient's clinical course and what we have done versus what is being perceived as personal criticism or evaluation. We are in the business of trying to save lives. We need to be very open and critical about what we have done and what we plan to do for patients. Since there is seldom only one solution we have to keep our eyes open so we do the best for what is in the interest of the patients. Sometimes it can be a conflict between individuals' preferences and what is good for the patient, or what is good for the department. It's one of the most difficult challenges in the ICU, and I am not at all sure if I have the answer.

You have argued for rethinking resuscitation endpoints and moving to permissive hypotension and a tissue perfusion-based approach (Dünser et al. 2013). Please comment.

The issue is that if we take a fixed target value of any physiologic variable, e.g. blood pressures, for all patients, we end up with over-treating some patients and under-treating others. We have pretty much overlooked the potential of our cardiovascular support to cause harm to our patients. What we have observed in our clinical practice is that patients are reaching what I would say are clinical endpoints of being stable with values for different variables that are often much lower than what are recommended in guidelines. We have taken the approach that we are trying to assess how the resuscitation or haemodynamic support based on simple clinical variables can perhaps end in better outcomes than just resuscitating patients with fixed numbers. It's amazing that if you look at most clinical trials on septic shock, for example, everybody does something else than what is predicted by the protocols. So for example blood pressure targets have never been investigated properly—it makes much more sense to tailor treatment per patient rather than for a fixed number.

In relation to the clinical significance of monitoring perfusion in non-vital organs you've suggested that reliance on simple methods, such as capillary refill time, skin temperature and mottling score, must be emphasised and exploited (Lima and Takala 2014).

First of all I want to bring the doctor to the patient to make a clinical assessment. Secondly, what we have learned is that as far as the patient's peripheral perfusion is good, overall tissue perfusion is unlikely to be a problem. Those are easily available clinical tools that we can bring everywhere as quickly as possible, and the nursing staff can use these to monitor patients.

Giving volume to fluid responders as long as they respond should not become the iatrogenic syndrome of the decade; the same is true for failure to give volume to fluid non-responders, who need fluids to maintain their stressed volume while restoring perfusion of vasoconstricted vascular beds (Takala 2016). Please comment.

The use of what we call dynamic haemodynamic variables has resulted once again in a simplistic approach. If you see variation in blood pressure people tend to believe that these patients are a) volume responders and b) they need volume. Both of them are not true, because basically the physiology is more complex. You can have the same variables reflecting completely different phenomena such as fluid responsiveness in patients with hypovolaemia versus right ventricular dysfunction in patients with for example sepsis or septic shock. If we uncritically just give fluids to all these patients we will do something which is harmful, especially because being fluid responsive is a normal status. Giving fluids to all "fluid responsive" patients until they become fluid unresponsive creates a new pathology—many of these patients do not need additional fluids. ■

References

Coslovsky M, Takala J, Exadaktylos AK et al. (2015) A clinical prediction model to identify patients at high risk of death in the emergency department. Intensive Care Med, 41: 1029-36.

Dünser MW, Takala J, Brunauer A et al. (2013) Re-thinking resuscitation: leaving blood pressure cosmetics behind and moving forward to permissive hypotension and a tissue perfusion-based approach. Crit Care, 17(5): 326.

Etter R, Takala J, Merz TM (2014) Intensive care without walls - introduction of a Medical Emergency Team system in a Swiss tertiary care centre. Swiss Med Wkly, 144: w14027.

Lima A, Takala J (2014) Clinical significance of monitoring perfusion in non-vital organs. Intensive Care Med, 40(7): 1052-4.

Pettilä V, Hjortrup PB, Jakob SM et al. (2016) Control groups in recent septic shock trials: a systematic review. Intensive Care Med, 42(12): 1912-21.

Rothen HU, Stricker K, Einfalt J et al. (2007) Variability in outcome and resource use in intensive care units. Intensive Care Med, 33(8): 1329-36.

Takala J (2016) Volume responsive, but does the patient need volume? Intensive Care Med, 42(9): 1461-3.

Vincent JL, Shehabi Y, Walsh TS et al. (2016) Comfort and patient-centred care without excessive sedation: the eCASH concept. Intensive Care Med, 42(6): 962-71.

Zante B, Dietler RE, Takala J (2016) Internal reporting system: we must look behind the curtain. Intensive Care Med, 42(6): 1100.