Commentary

Recently published papers: Clunk-click every trip, smile, but don't stop for a drink on the way

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Abstract

Reviews of the risks associated with intrahospital transfer and prolonged spinal immobilization made uncomfortable reading in August. Studies on the timing of tracheotomy and a potential role for exogenous surfactant will have done little to allay controversy. We are reminded of the neutrality of the Swiss, and gain valuable insight into prognostic tools in mechanically ventilated patients with cirrhotic liver disease.

Keywords cirrhotic liver disease, exogenous surfactant, intrahospital transfer, spinal immobilisation, tracheotomy

The risks associated with interhospital transfer are widely accepted; less is known about patient transfer within hospitals. Beckmann and coworkers [1] sought to redress this through a review of reports submitted to the Australian Incident Monitoring Study in Intensive Care (AIMS-ICU). Their results, although by their own admission lacking numerator or denominator values, and prone to both volunteer and selection bias, are perhaps unsurprising. Of the reports, 31% detailed serious adverse outcomes; 39% of these involved problems with equipment (principally failures of power supply to monitors and infusion pumps, and problems with intubation equipment) and with access to patient elevators. Of the patient/staff issues that comprised the remainder, poor communication was most commonly quoted. Other problems included malpositioning of the artificial airway, dislodgement of vascular access, inadequate monitoring and incorrect patient handling. Contributing factors were divided into system-based and human-based factors. Prime among the former were communication problems, inadequate protocol and equipment failure. Of the human-based factors, errors in judgement and problem recognition, failure to follow protocol, undue haste and inadequate patient preparation were common. Harm was limited with almost equal frequency by 'rechecking the patient' and 'rechecking equipment'. The most eye-opening statistic was that, in 82% of cases, detection of incidents was by nursing staff. Are nurses intrinsically more eagle-eyed, or are doctors merely better at brushing near misses under the carpet?

Transfers may be further complicated by the presence of cervical collars and spinal precautions. Morris and coworkers [2] reminded us of the complications of prolonged spinal immobilization as they sought to derive an evidence-based protocol to facilitate the identification or exclusion of cervical spine injury. Principal among these is cutaneous pressure ulceration, occurring in up to 55% of patients [3]. Other complications include elevated intracranial pressure, difficulty in obtaining airway control and central venous access, poor mouth care, pulmonary aspiration, failed enteral nutrition, restricted physiotherapy and deep vein thrombosis. Of the current imaging modalities, plain cervical radiography combined with computed tomography (CT) has a similar sensitivity (>99%) to magnetic resonance imaging and dynamic fluoroscopy in the detection of unstable cervical spine injury. The authors proposed removal of spinal immobilization and precautions if plain radiographs and directed high-resolution CT of the craniocervical junction and

APACHE = Acute Physiology and Chronic Health Evaluation; APS = Acute Physiology Score; ARDS = acute respiratory distress syndrome; CT = computed tomography; ICU = intensive care unit.

any other suspicious areas fail to provide evidence of traumatic abnormality. Nevertheless, it may be that the number needed to treat using helical multiplane CT of the entire cervical spine to detect a further injury beyond directed scanning is as little as 8–22 [4,5]. Perhaps the greatest concern was that only 60% of orthopaedic surgeons believed prolonged immobilization to present a serious risk to the patient [6].

Spinal immobilization may delay tracheotomy, the timing of which remains controversial. Rumbak and coworkers [7] prospectively randomized critically ill medical patients projected to need ventilatory support for more than 14 days to either early percutaneous dilational tracheotomy within 48 hours or delayed tracheotomy at days 14–16. Exclusions included those requiring mechanical ventilation with positive end-expiratory pressure greater than 12 cmH_2O, and those whose necks, for anatomical reasons, made it technically difficult to perform a percutaneous tracheotomy. The results in the early group appear impressive, indicating significantly less mortality (31.7% versus 61.7%) and pneumonia (5% versus 25%), and less time in intensive care and on mechanical ventilation. This control group mortality figure is surprisingly high in this cohort of patients, and one must consider the fact that the study was powered only to demonstrate a reduction in pneumonia. Interestingly, the Kaplan–Meier curves of time to death appear to separate at around the time of tracheotomy in the delayed group. How confident can projections of required ventilatory support be, particularly during the first 48 hours? We hope that Tracman, the multicentre UK trial that expects to recruit more than 1200 patients, will provide more answers.

Spragg and coworkers [8] conducted two multicentre randomized double-blind trials involving 448 patients with acute respiratory distress syndrome (ARDS), in which they compared standard therapy alone with standard therapy plus a maximum of four intratracheal doses of a recombinant surfactant protein C-based surfactant given within 24 hours. They failed to demonstrate any difference between control and treatment groups with regard to mortality or need for mechanical ventilation. Those in the surfactant group had significantly greater arterial oxygen tension : fractional inspired oxygen ratios between 4 and 24 hours after the first dose, although this difference was not apparent by 48 hours. It seems unlikely this is the end of the road for exogenous surfactant; *post hoc* analysis suggested there may be some survival benefit in those with direct lung injury (e.g. pneumonia, aspiration) as opposed to those with ARDS of indirect cause (e.g. sepsis), and on the grounds of their oxygenation data the authors queried the possible benefits of a longer treatment period.

With increasing pressures on intensive care beds, and increasing public expectations, difficult decisions regarding admission to intensive care arise daily. Escher and coworkers [9] asked Swiss intensivists to rate the importance of 19 factors associated with patients or the intensive care setting, and respond to eight hypothetical scenarios, each of factorial design. Their prime goal was to determine the presence of any bias against those with cancer. Of the respondents, more than 80% rated as important or very important the prognosis of the underlying disease and of the acute illness. More than 70% considered the patients' wishes important, and around half the number of available beds. The responses to the scenarios were perhaps more enlightening. Having cancer had no influence on the probability of admission in five scenarios. Those considered upbeat and sociable or strong and courageous were more often admitted than those who were sad and withdrawn or anxious and discouraged, although fewer than 10% of respondents considered emotional state as important when they initially scored patient factors. An explicit request from the family increased the likelihood of admission. Possible differences between the real and the hypothetical may be highlighted by the decision of 82% of the fair-minded Swiss to admit in the scenario designed to engender refusal, that of respiratory failure in relapsing acute leukaemia.

Knowledge of the relative import of the underlying disease and the acute illness may guide decisions to admit, and Rabe and coworkers [10] sought to clarify whether the poor outcome of ventilated cirrhotic patients is related to the severity of their underlying liver disease, or that of the acute illness that precipitated admission. Their retrospective analysis compared clinical and laboratory parameters of intensive care unit (ICU) survivors and ICU nonsurvivors in 76 such patients. While in the ICU 59% died; of those who spent more than 1 week in the ICU 64% died. These figures are comparable to those from previous series. Total protein, bilirubin concentration, prothrombin time, creatinine and alanine aminotransferase differed significantly between survivors and nonsurvivors.

The Child-Pugh score [11] differed significantly between groups and was related to mortality, but its clinical components (the presence of ascites or encephalopathy) did not. There was no significant difference between the Acute Physiology Score (APS) component of the Acute Physiology and Chronic Health Evaluation (APACHE) II score between groups, despite a significant difference between APACHE II scores. Suspicion of infection at time of intubation based on clinical status and imaging/laboratory results also differed significantly, although C-reactive protein did not. Regression analysis attached significance to the Child-Pugh score and clinical suspicion of infection, but not the APS. In unshown data, bilirubin concentration had the highest predictive value of the laboratory parameters of the Child-Pugh score. Rabe and coworkers [10] concluded that liver function rather than disease severity influences outcome in mechanically ventilated cirrhotic patients. The frequent lack of a febrile response and abnormal haemodynamics of those with

cirrhosis may hinder the recognition or exclusion of infection, thereby robbing the clinician of an apparently important prognostic tool. Could bilirubin concentration alone predict prognosis adequately robustly in this setting to shed the Child-Pugh score?

Competing interests

The author(s) declare that they have no competing interests.

References

1. Beckmann U, Gillies DM, Berenholz SM, Wu AW, Pronovost P: **Incidents relating to the intra-hospital transfer of critically ill patients.** *Intensive Care Med* 2004, **30:**1579-1585.
2. Morris CG, McCoy W, Lavery GG: **Spinal immobilisation for unconscious patients with multiple injuries.** *BMJ* 2004, **329:** 495-499.
3. Davis JW, Parks SN, CL Detlefs MD, Williams GG, Williams JL, Smith RW: **Clearing the cervical spine in obtunded patients: the use of dynamic fluoroscopy.** *J Trauma* 2000, **39:**435-438.
4. Berne JD, Velmahos GC, El-Tawil Q, Demetriades D, Asensio JA, Murray JA, Cornwell EE, Belzberg H, Berne TV: **Value of complete cervical computed tomographic scanning in identifying cervical injury in the unevaluable blunt trauma patient with multiple injuries: a prospective study.** *J Trauma* 1999, **47:**896-892.
5. Nunez DB, Zuluaga A, Fuentes-Bernardo DA, Rivas LA, Becerra JL: **Cervical spine trauma: how much more do we learn by routinely using helical CT?** *Radiographics* 1996, **16:**1307-1318.
6. Morris CG, Mullan B: **Clearing the cervical spine after polytrauma, instituting unified management for unconscious victims in the intensive care unit.** *Anaesthesia* 2004, **59:**755-761.
7. Rumbak MJ, Newton M, Truncale T, Schwartz SW, Adams JW, Hazard PB: **A prospective, randomised, study comparing early percutaneous dilational tracheotomy to prolonged translaryngeal intubation (delayed tracheotomy) in critically ill medical patients.** *Crit Care Med* 2004, **32:**1689-1694.
8. Spragg RG, Lewis JF, Walmrath H-D, Johannigman J, Bellingan G, Laterre P-F, Witte MC, Richards GA, Rippin G, Rathgeb F, *et al.*: **Effect of recombinant surfactant protein C-based surfactant on the acute respiratory distress syndrome.** *N Engl J Med* 2004, **351:**884-892.
9. Escher M, Perneger TV, Chevrolet J-C: **National questionnaire survey on what influences doctors' decisions about admission to intensive care.** *BMJ* 2004, **329:**425-428.
10. Rabe C, Schmitz V, Paashaus M, Musch A, Zickermann H, Dumoulin F-L, Sauerbruch T, Caselmann WH: **Does intubation really equal death in cirrhotic patients? Factors influencing outcome in patients with liver cirrhosis requiring mechanical ventilation.** *Intensive Care Med* 2004, **30:**1564-1571.
11. Pugh RN, Murray-Lyon IM, Dawson JL, Pietroni MC, Williams R: **Transection of the oesophagus for bleeding oesophageal varices.** *Br J Surgery* 1973, **60:**646-649.