Should all critically ill ventilated patients receive muscle relaxants for intrahospital transfers?

Critically ill patients may require transfer within hospitals for several reasons, including transfer to operating theatres for urgent surgery, to radiology for urgent imaging and intervention, or from emergency departments and wards to critical care for stabilization. The decision to transfer a critically ill patient requires careful planning and decision making, with trained personnel and appropriate monitoring, equipment and emergency drugs all established before starting a transfer (Association of Anaesthetists of Great Britain and Ireland, 2009).

Critically ill patients are usually sedated for transfers to maintain airway control, protect cerebral and cardiovascular function, and provide opioid analgesia. The use of muscle relaxants, such as non-depolarizing neuromuscular agents like atracurium and rocuronium, to 'paralyse' critically ill patients requiring mechanical ventilation for intrahospital transfers often divides opinion among anaesthetists. There is little evidence relating to the use of muscle relaxants when transferring the critically ill – the advantages and disadvantages of doing so are discussed here.

Advantages

Patient safety is the primary concern during critical care transfers. Effective use of neuromuscular relaxants removes the possibility of patient movement, thus helping to minimize risks during transfer. Muscle relaxation reduces the risk of the patient coughing on endotracheal tubes and, therefore, extubation and interference with mechanical ventilation. The National Audit Project by the Royal College of Anaesthetists (2011) revealed over 25% of major airway events occurred in critical care or emergency department situations, with displaced tracheostomy and endotracheal tubes the greatest cause of critical care morbidity and mortality. Muscle relaxation also reduces the risk of inadvertent removal of invasive lines, e.g. arterial or central venous lines, as a result of patient movement.

Muscle relaxation is advantageous for transfers to the radiology department, as reducing patient movement minimizes the risk of movement artefacts when performing imaging studies, and improves operator conditions during interventional procedures on critically ill patients.

Ventilator equipment used for critical care transfers varies depending on hospital resources. Muscle relaxant use can help to ventilate patients on older portable ventilators without synchronized support modes by reducing patient interference with mechanical ventilation.

Disadvantages

Neuromuscular blockade with muscle relaxants introduces the risk of drug side effects, with significant clinical sequelae in the critically ill. Non-depolarizing muscle relaxants are associated with histamine release and subsequent increased incidence of bronchospasm, which can increase airway pressures and cause difficulties in ventilating patients. Neuromuscular blockers carry a significant risk of anaphylactoid reaction, and have been associated with critical illness myopathy when used as intravenous infusions (Hund, 1999).

Use of muscle relaxants also introduces risk of awareness, which may cause significant psychological distress and morbidity. To counteract this risk, sedative drugs such as propofol or midazolam may be used. However, excess use of sedatives with muscle relaxants carries harmful side effects, including hypotension, cardiovascular instability (Cannon et al, 2001), and emergence delirium from sedation (Lepousé et al, 2006).

The time required for muscle relaxants to metabolize and their effects to wear off may delay care of critically ill patients. Patients with established multidisciplinary critical care management might suffer delays in respiratory weaning from mechanical ventilation, in receiving physiotherapy, and in improving communication with speech therapists on their return to critical care following transfers through use of muscle relaxants and concomitant sedation. Time for muscle relaxants to wear off may also cause delays in assessing neurological status, e.g. after transfers for computed tomography for neurosurgical indications.

Muscle relaxant use removes the ability to use synchronized support modes, such as pressure support or continuous positive airway pressure, with modern portable ventilators and thus prolongs respiratory weaning from mechanical ventilation in patients with established weaning plans.

Conclusions

There are advantages and disadvantages to using muscle relaxants for intrahospital transfer of critically ill patients. Patient safety during critical care transfers remains the primary concern of the anaesthetist. A balanced decision on using muscle relaxants should be made based on the clinical experience of the doctor performing the transfer and the severity of the patient's illness. BJHM

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