FIGURE The portable epidural anaesthesia trolley. The multiple electrical outlet power bar mounted on the back allows a single wall plug to power the monitors and light source.

resuscitation capability as is provided in our full operating/delivery suites.

The oxygen saturation monitor offers the significant advantage of non-invasively and continuously monitoring heart rate and oxygenation. This is of critical importance in our labour rooms where room lighting is still less than adequate for clinically assessing the patient's colour. We would suspect many other Case Rooms are similarly deficient in this regard.

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Transfusion-related 2-to-1 electromechanical block during surgery

To the Editor:

The complications of massive blood transfusions are well-known.[1] Some are related to citrate binding of calcium[2–5] while others are due to the high potassium content of stored blood.[6] Here we report a case of a 2-to-1 electromechanical block which we believe to be transfusion-related.

A previously healthy 31-year-old male suffered a knife stab to the abdomen during an altercation. After a rapid-sequence anaesthetic induction using ketamine and succinylcholine, an emergency exploratory laparotomy was undertaken. Because of severe hypovolaemia, rapid blood transfusion was undertaken through three #14 gauge IV lines, two of which were connected to blood warmers. Four units of type-specific uncrossmatched blood were given initially, followed by crossmatched blood as it became available. After about 12 units of packed cells had been given over 1.5 hours, it was noticed that the T-waves of the ECG had become peaked and that the QT interval had lengthened to the point that each T-wave was superimposed on the P-wave of the next cardiac cycle. Shortly thereafter only alternate QRS complexes resulted in pulses on the arterial blood pressure monitor and on the pulse oximeter display. At this time the systolic blood pressure had decreased from about 110 mmHg to 75 mmHg. The electrical heart rate was 90 beats $\cdot$ min^{-1}. One gram of calcium chloride was immediately given IV, which restored the ECG, blood pressure and blood pressure waveform to its previous status. With continued vigorous transfusion of packed cells and other blood products a second identical episode occurred about 20 min later. This also responded promptly to calcium chloride. (The remainder of the surgery and postoperative course was uneventful.) Blood samples taken after the second episode (following the administration of two grams of calcium chloride) revealed a potassium of 6.4 $mmol \cdot L^{-1}$ and a total calcium of 1.95 $mmol \cdot L^{-1}$. Nasopharyngeal temperature was 33.3° C.

In view of the prolonged QT interval and its reversal with calcium, the events described are compatible with hypocalcaemia from citrate binding of calcium.[5] Also, the rate of blood transfusion was in the range where citrate toxicity might be expected.[1,3] Finally, a total calcium level of 1.95 $mmol \cdot L^{-1}$ after the administration of 2 g of calcium chloride suggests prior hypocalcaemia. However, it is also possible that the concurrent transfusion-related hyperkalaemia ($K^+ = 6.4$ $mmol \cdot L^{-1}$) played a role in the observed events, even though the only sign of hyperkalaemia noted was peaked T-waves. Previous reports[2,4,5] have noted QT prolongation or hypocalaemic myocardial failure as a consequence of massive blood transfusion. We believe this is the first reported case of transfusion-related hypocalcaemia/hyperkalaemia resulting in a 2-to-1 electromechanical block. Current recommendations regarding calcium administration during rapid blood transfusion remain widely divergent.[1] However, a direct relationship between QT prolongation and hypocalcaemia has been established both clinically and experimentally,[5] and may herald the need for calcium administration. Similarly, the occurrence of an electromechanical block in the setting of a rapid blood transfusion likely indicates the need for calcium administration.

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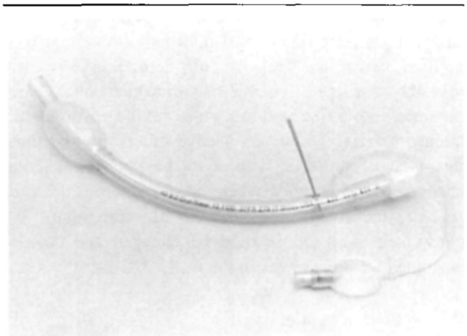
Another cause of tracheal tube failure

To the Editor:
We recently encountered a problem with a tracheal tube which in our experience is unique.

A 55-year-old man with triple vessel disease was being anaesthetized for coronary artery bypass surgery. Preoperatively the machine was checked in the usual manner and a 9 mm ID Shiley tracheal tube with a high residual volume cuff was cut to the appropriate length. The cuff of the tracheal tube was inflated and no leak was identified. The patient was brought into the room, the usual monitors were attached and anaesthesia was induced using fentanyl, diazepam and pancuronium. The trachea was intubated under direct vision without difficulty. There was good air entry bilaterally, but a persistent leak was audible despite large volumes of air (>20 ml) being injected into the cuff. At this point the pilot balloon was checked and appeared to be functioning normally. The leak persisted, the cuff was then deflated and the tracheal tube removed. The patient's airway was maintained with bag and mask and the tube was again checked. The cuff was fully inflated and no air was seen to be leaking from it. The pilot balloon was also was intact and functioning normally. The tube was then reinserted, again under direct vision. The cuff was inflated, laryngoscopy showed the tube to be passing between the vocal cords and the cuff not to be herniating through the cords. A clearly audible leak was again heard, and because of the persistence of the leak the tracheal tube was changed. A new 9 mm tracheal tube was inserted under direct laryngoscopy. With 5 ml of air in the cuff, no leak was heard. The old tracheal tube was then closely examined and the source of the leak was identified. A small hole was found to be present, through the wall of the tracheal tube, at the site where the catheter from the pilot balloon enters the wall of the tracheal tube. The attached figure shows a toothpick passing through the hole in the wall of the tracheal tube.



FIGURE

When intubating adults, the cuff is inflated to facilitate mechanical ventilation and to minimize the risk of aspiration of gastric contents. Inability to seal the cuff against the tracheal wall means there is a problem with the integrity of the cuff pilot balloon system, herniation of the cuff through the cords because of proximal placement of the tube, or the presence of tracheomalacia.[1] In addition