A case of intraoperative pyrexia

B O'Brien, T Kamaraj, G Ormonde

A 14-year-old boy was admitted via accident and emergency after a road traffic accident. Open fractures of his left radius and ulna required urgent fixation so he was assessed preoperatively. Previous surgery for correction of strabismus had been uneventful and he was otherwise well. He had eaten just before the accident and had suffered significant blood loss. Intravenous fluids and blood were infused to restore haemodynamic stability. Examination was otherwise unremarkable. His temperature was 36°C. Premedication with atropine was prescribed and rapid sequence induction planned using thiopentone and suxamethonium. Cefuroxime was given as an antimicrobial.

In theatre anaesthesia was induced uneventfully and he was intubated. Cyclimorph was given for analgesia. As surgery began he was spontaneously breathing sevoflurane in nitrous oxide and oxygen. A foil cap, a 'space blanket' and blood-warming device were used.

The electrocardiogram, blood pressure, oxygen saturation and temperature were monitored and, as surgery commenced, all was well. Respiratory gas concentrations were also recorded. After 30 minutes of surgery it was noticed that end-tidal carbon dioxide had risen to 60 mmHg and, suspecting respiratory depression, the anaesthetist commenced mechanical ventilation. Despite this it continued to rise, so other explanations were sought. The soda-lime cannister was fresh, inspired carbon dioxide was normal and depth of anaesthesia seemed adequate. The patient's temperature was now 38°C. The blanket and foil cap were removed and the registrar sought help from the consultant on call, fearing the possibility of malignant hyperpyrexia (MH). Intraoperative pyrexia carries a broad differential diagnosis, but the following possible causes were considered:

1. Trauma
2. Underlying infection
3. Febrile reaction to drugs (especially atropine) or blood transfusion
4. Rare systemic diseases
5. MH.

Trauma is a diagnosis of exclusion, and preoperatively the patient was not pyrexial or systemically unwell; thus the first two options were rejected. There was no way to rule out drug or transfusion reactions, although the time course was not especially convincing.

Preoperatively he recounted no symptoms suggestive of systemic conditions (porphyria, hyperthyroidism or phaeochromocytoma) that might explain his hypermetabolic state. While MH would account for this, the patient had previously had uneventful surgery under general anaesthesia. When given suxamethonium, masseter spasm — typical of MH — had not occurred. However, in MH treatment with dantrolene causes few side-effects and is life saving, so this option was chosen.

Surgery was stopped, a clean breathing system was applied and dantrolene was given intravenously, at 1 mg/kg initially. Ice packs were applied and cold normal saline administered while monitoring continued. An intensive care bed was arranged and blood tests sent. No arrhythmias occurred and the patient awoke uneventfully despite a creatine phosphokinase level of 17070 U/litre and potassium of 7.4 mmol/litre. He remained well and surgery was finished several days later under total intravenous anaesthesia. Muscle biopsy subsequently confirmed the presence of MH.

Despite its rarity anaesthetists must be aware of MH's existence, presentation and treatment. It is estimated to occur once in 62 000 anaesthetics. A genetically mediated, potentially catastrophic reaction to suxamethonium or anaesthetic vapours, it involves excessive calcium release in muscles producing prolonged disorganized contraction and heat production. Acidosis, hyperkalaemia and myoglobinaemia ensue. Even when other explanations of fever may seem more probable, MH should not be dismissed; it is not precluded by a family or personal history of uneventful anaesthesia.

It is not known why MH fails to present in some cases only to emerge in a later operation. Suggested factors include choice of drugs, inadequate level of monitoring and short procedures failing to provoke the condition. The genetic complexity of the condition explains the variable degrees of susceptibility (Denborough, 1998). In this case, computerized records show that all was well for about 30 minutes of surgery.

When other factors mitigate against an already rare diagnosis it is tempting to dismiss it. Delaying this diagnosis could have been catastrophic, while rapid recognition of MH may have been life-saving, so it is essential to maintain a high index of suspicion. The associated mortality rate has fallen from about 80% to under 10% since the 1960s: one of the major successes of medicine in recent years. HM

Dr B O'Brien is Specialist Registrar in Anaesthesia, University Hospital, Galway, Ireland, **Dr T Kamaraj** is Registrar and **Dr G Ormonde** is Consultant in Anaesthesia, Waterford Regional Hospital, Ireland

Correspondence to: Dr B O'Brien

Denborough M (1998) Malignant hyperthermia. *Lancet* **352:** 1131–6