European Journal of Anaesthesiology 2008; **25:** 860–868

Correspondence

Just a grommet: cardiac arrest in a healthy adolescent

doi:10.1017/S0265021508004018

EDITOR:
General anaesthesia in healthy patients is generally regarded as safe. We present the case of a young, healthy male patient, scheduled for minor surgery in a day case setting, who developed torsade de pointes during anaesthesia.

Case report

A 15-yr-old male patient diagnosed with acute otitis media was scheduled for insertion of a ventilation tube (grommet). His medical history and physical examination was unremarkable and he was graded ASA I. Previous general anaesthesia had been uneventful. Anaesthesia was induced with sevoflurane in oxygen by a facemask. Monitoring included pulse oximetry and capnography. Several short episodes of apnoea were observed during induction and the inspiratory sevoflurane concentration was reduced. Suddenly the plethysmograph readings disappeared and end-tidal CO_2 ($ETCO_2$) rapidly decreased. Torsade de pointes was seen on the electrocardiogram (ECG). The surgical procedure was terminated, the administration of sevoflurane was stopped and 100% oxygen administered. The patient was defibrillated once, which immediately resulted in sinus rhythm. The patient was transported to the ICU and there he regained consciousness soon after. His ECG showed a prolonged QT interval. Six non-sustained ventricular tachycardia episodes were observed in the first postoperative hours. Laboratory studies revealed no electrolyte disturbances. The patient was sent to the cardiologist for further evaluation. There was no history of syncope or congenital deafness in this patient and no family history of unexplained sudden cardiac death or Long QT Syndrome (LQTS). Cardiac echography revealed no abnormalities. A continuous 24-h electrocardiogram showed sporadic ventricular extrasystolic beats; however, the heart-rate-corrected QT interval was normal. Therefore, our patient did not meet the diagnostic criteria for congenital LQTS [1]. The cardiologist concluded that the event was attributable to an acquired LQTS induced by sevoflurane.

Eight days after the event, the patient was re-admitted because of an extensive cholesteatoma involving the semicircular canal requiring middle ear surgery. Monitoring consisted of ECG, pulse oximetry, non-invasive blood pressure and capnography. Medications without known effect on the QT interval were chosen. Induction of anaesthesia was performed with propofol, suxamethonium and the trachea was intubated with a cuffed tube. Anaesthesia was maintained with propofol and remifentanyl and the patient was ventilated with 35% oxygen in air. Near the end of surgery, the patient received morphine and dexamethasone. The perioperative course was uneventful and we did not observe any ECG abnormality.

Discussion

General anaesthesia in children and adolescents has a low complication rate and cardiac arrest is extremely rare. A study of perioperative anaesthetic morbidity in children reported an incidence of adverse events of 3% in 24 165 anaesthetics performed in a paediatric teaching hospital [2]. Cardiac arrest was observed in eight cases – an incidence of 3.3 per 10 000 anaesthetics. Only once was an arrest observed in a child classified as ASA I; this was due to an anaesthetic overdose in a neonate. The initial findings of the anaesthesia-related cardiac arrest registry were reported by Morray and colleagues and revealed an incidence of 1.4 arrests per 10 000 anaesthetics, with a mortality rate of 26% [3]. In 2007 an update from this registry was reported by Bhananker and colleagues. In all, 397 cases were analysed, of which 193 were judged anaesthesia-related [4]. ASA physical status I–II patients accounted for one-third of all anaesthesia-related cardiac arrests. Cardiovascular causes were the most

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Accepted for publication 5 March 2008 EJA 5005
First published online 10 April 2008

common, with underestimation of blood loss and hyperkalaemia from transfusion of stored blood being the most common causes. Six of the medication-related arrests were associated with sevoflurane-related cardiovascular depression.

Congenital long QT syndrome is a condition resulting from mutations in cardiac ion channels, which may lead to potentially fatal ventricular tachycardia [5]. Several genotypes have been identified. Susceptible individuals with a normal QT may exhibit an acquired prolongation of the QT interval under adrenergic stimulation or when exposed to provoking drugs. Lists of drugs known to prolong the QT interval are maintained at http://www.qtdrugs.org. Stressors, such as heart block, hypokalaemia, hypomagnesaemia, acute myocardial infarction, subarachnoid haemorrhage and other central nervous system injuries, may increase the risk of developing torsade de pointes in the presence of a culprit drug. Whyte and colleagues concluded that although sevoflurane increases the duration of myocardial repolarization and prolongs the QT interval in children, susceptibility to torsade de pointes arises from increased transmural dispersion of repolarization. This appears to be unaffected by sevoflurane and therefore the incidence of torsade de pointes is likely to be minimal [6]. Nevertheless, it has been described during sevoflurane anaesthesia in a child [7] although in that case the QT prolongation was attributed to the homoeopathic use of caesium chloride supplements.

In conclusion, although QT interval prolonging effects of sevoflurane have been described, the incidence of developing life-threatening ventricular tachycardia is minimal. Therefore, most anaesthesiologists will not anticipate encountering such a life-threatening cardiac incident solely induced by sevoflurane, in a healthy child scheduled for minor surgery. The case we present however does prove that it can happen any time, anywhere.

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Drotrecogin alfa (activated): diffusion from clinical trials to clinical practice

doi:10.1017/S0265021508004468

EDITOR:
Ridley and colleagues present retrospective data on the use of activated protein C (APC) in five UK hospitals in 2002–2005 [1]. To identify patient groups that might benefit from APC the authors considered it more rational to use their cited approach rather than have further formal appraisal of the drug. The authors discuss the European Medicine Agency (EMEA) 2002 approval but, surprisingly, their crucial decision in early 2007 is not mentioned: the EMEA demanded a new randomized, placebo controlled trial of APC in severe sepsis to clarify the risk/benefit balance

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Accepted for publication 11 April 2008 EJA 5082
First published online 14 May 2008