Editor—We report a case of MEN2A syndrome who underwent bilateral laparoscopic adrenalectomy and staggered total thyroidectomy and radical neck dissection with intraoperative nerve monitoring. Multiple Endocrine Neoplasia (MEN) is a syndrome which involves more than one endocrine gland. There are 3 types and further subtypes of MEN. MEN2A is characterized by medullary thyroid cancer (97%) with phaeochromocytoma (50%) and hyperparathyroidism (20%).1 2

A 25-year old female suffered from bilateral goitre later diagnosed as bilateral medullary thyroid carcinoma. No tracheal compression was seen on CT, and metanephrines and normetanephrines were markedly elevated without demonstrable hypertension. CT scan of adrenals revealed 1 cm right nodule and 5.8 cm left nodule. A diagnosis of MEN2A was made supported by genetic test. Blood pressure and electrocardiogram (ECG) were normal. The patient received propranolol 20 mg and prazosin 2 mg daily for 2 weeks, later increased to 6 mg daily in divided doses 2 days before surgery for adequate alpha blockade.3

Monitoring included ECG, invasive blood pressure, pulse oximeter, central venous pressure and a bispectral index (BIS) monitor. Vasoactive drugs were made readily available. Anaesthesia was induced with propofol 2 mg kg\(^{-1}\), fentanyl 5 mcg kg\(^{-1}\) and rocuronium 40 mg. She was intubated uneventfully and mechanical ventilation commenced at tidal volumes 5 ml kg\(^{-1}\). Anaesthesia was maintained with an oxygen/air mixture and using Target Controlled Infusions (TCI) of remifentanil (4 ng ml\(^{-1}\) effect mode) and propofol (3 mcg ml\(^{-1}\), Schenider regimen).

During right adrenalectomy, there were several surges in blood pressure as well as bradycardia which usually occurred during adrenalectomy for phaeochromocytoma. Frequent adjustment of propofol (4 mcg ml\(^{-1}\)), remifentanil (5 ng ml\(^{-1}\)) and sodium nitroprusside (SNP) (3 mcg kg min\(^{-1}\)) were required. Once blood supply to adrenal gland was severed, haemodynamic parameters were normal. However, during left adrenalectomy and manipulation of the large tumour, changes in blood pressure were much more pronounced requiring much higher doses TCI drugs and SNP and the control in blood pressure was inadequate. Intravenous phentolamine 1 mg bolus was administered resulting in immediate desired response but led to persistent tachycardia which was treated with 5 mg labetalol. Once left adrenalectomy was completed, there were no more haemodynamic changes. After adequate analgesia and successful extubation, patient was transferred to high dependency unit and then to a general ward and later discharged home after 5 days.

Six weeks later, she was scheduled for total thyroidectomy and radical neck dissection with intraoperative nerve monitoring. Haemodynamic parameters were within normal limits.

After loading dose of hydrocortisone 200 mg and routine monitoring, anaesthesia was induced with propofol 2 mg kg\(^{-1}\) and fentanyl 1.5 mcg kg\(^{-1}\) and rocuronium 0.5 mg kg\(^{-1}\). The trachea was intubated with an oral nerve integrity monitor (NIM) Flex\(^{\text{TM}}\) EMG oral endotracheal tube (Medtronic Xomed, Inc, Jacksonville, USA) to monitor intraoperative recurrent laryngeal nerve function.\(^{4}\) Anaesthesia was maintained with TCI with remifentanil (2–4 ng ml\(^{-1}\) effect mode) and propofol (2–3 mcg ml\(^{-1}\) Schenider regimen) and BIS values were kept between 40 and 60 and no further muscle relaxant was administered. The patient remained stable throughout the surgery lasting 14 h. After extubation, she was transferred to a High Dependency Unit and discharged home after one day. The patient remained well for the two more surgical follow ups and remains well under the care of an endocrinologist.

We had no previous experience of managing MEN2A patient and the literature search did not offer any meaningful practical advice.\(^{5} \text{ }^{6}\) We managed this case based on our experience of managing routine adrenalectomy for phaeochromocytoma.
Intraoperative variations in blood pressure and heart rate are known to occur but the haemodynamic changes were much more pronounced in our patient during tumour manipulation and excision compared with phaeochromocytoma. We also suggest that total thyroidectomy and radical neck dissection for cancer is likely to be prolonged and the surgery should be staggered for minimizing haemodynamic changes and the use of an EMG reinforced endotracheal tube for intraoperative recurrent laryngeal nerve monitoring may be helpful.

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Declaration of interest
None declared.

Elevated serum concentrations of erythropoietin after xenon anaesthesia in cardiac surgery: secondary analysis of a randomized controlled trial

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Editor—Recently, the World Anti-Doping Agency officially added xenon to its list of banned substances, brought on by reports indicating that some athletes used xenon, beginning at Olympic Games at Athens in 2004 until Sochi in 2014.

Accumulating evidence indicates that xenon has various beneficial biological effects on the human body. In particular, its capability to improve myocardial contractility and to activate hypoxia-inducible factor-1α (HIF-1α), resulting in an increase of circulating erythropoietin concentrations, renders xenon an attractive option to enhance the performance of elite athletes. Researchers and clinicians started a discussion about the clinical benefit in support of humans exposed to high demand for oxygen. In particular, patients after cardiac surgery frequently experience haemodilution, blood loss, and an inflammatory response that may result in myocardial function and organ dysfunction. Given the promising properties of xenon, we supposed it to represent an attractive option as an anaesthetic during cardiac surgery and evaluated its safety and feasibility. Apart from the favourable effects of xenon on blood flow, metabolism, and haemodynamics, little is known about its effects mediated at the molecular level. Ma and colleagues and Goetzenich and colleagues supposed the preconditioning effects to be mediated by an activation of HIF-1α and its downstream effectors. While the measurement of HIF-1α is restricted to tissue samples, no study has investigated the effect of xenon on the downstream targets of HIF-1α, including erythropoietin, which provides various anti-inflammatory and protective effects.

Using a database and serum samples from a recent randomized controlled trial that demonstrated the safety and feasibility of xenon anaesthesia in patients undergoing coronary artery bypass grafting surgery, we performed a secondary analysis and evaluated the effect of xenon anaesthesia on circulating concentrations of erythropoietin. In brief, 30 patients undergoing elective coronary artery bypass grafting surgery were enrolled in this prospective, randomized, controlled trial and allocated to receive either balanced xenon or sevoflurane anaesthesia.

Blood samples were collected before surgery, at admission to the intensive care unit, and 24 h thereafter for the measurement of erythropoietin by the automatic IMMULITE®/IMMULITE 1000 Epo procedure (Siemens, Llanberis, UK).

The measured erythropoietin concentrations after xenon anaesthesia demonstrated a significant increase on the first postoperative day (8.7 (sd 4.3) vs 12.9 (sd 7.4); P=0.017; Fig. 1A). Given that androgens, including testosterone, are known to...

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