was initiated. Attempted ventilation via the extratracheal lumen with the aid of a standard tracheal tube connector resulted in a large air leak from the proximal airway with insufficient ventilation. The Montgomery T-tube was removed via the stoma by grasping it with haemostatic forceps and applying firm steady withdrawal. The patient’s trachea was intubated via the oral route and the lungs were ventilated with high oxygen concentration. Return of spontaneous circulation occurred shortly afterward. The patient was transferred to the intensive care unit where he required ventilatory support for 10 days. He was then discharged to the respiratory ward with tracheostomy tube in situ having made full neurological recovery.

The Montgomery T-tube is an uncuffed silicone tube that serves as both tracheal stent and tracheostomy. It consists of a long (intratracheal) limb and a short (extratracheal) limb projecting through the tracheostomy stoma (Fig. 1). The extratracheal lumen can be occluded with an attached stopper plug to allow phonation.\(^1\)\(^-\)\(^3\)

Emergency airway management of a patient with a Montgomery T-tube has not been reported before. There are various case reports of airway and anaesthetic management for patients undergoing insertion of the Montgomery T-tube or for patients with Montgomery T-tube in situ undergoing anaesthesia for various procedures.\(^2\)\(^-\)\(^4\)

Our case illustrates the difficulties posed by the Montgomery T-tube in an emergency setting. Unlike standard tracheostomy tubes, the majority of Montgomery T-tubes do not take standard catheter mount connectors due to the variable internal diameter and thickness of the tube. Attempted ventilation via the extratracheal limb is likely to be ineffective due to the air leak via the open upper end of the intratracheal limb. When bag-valve face mask ventilation is attempted, the extratracheal lumen should be occluded to prevent air leak.\(^5\)

The relative rarity of the Montgomery T-tube and the associated unfamiliarity of the device present challenges during emergency airway management. We present a guide for emergency airway care in such situations. We suggest occluding the extratracheal limb and attempting ventilation via a bag-valve face mask or a laryngeal mask airway. If no adequate ventilation is achieved, the Montgomery T-tube should be removed via the stoma. A definitive airway may be established by inserting an appropriately sized cuffed tracheostomy or tracheal tube into the trachea via the stoma or alternatively the patient trachea could be intubated via standard laryngoscopy. The advice of an anaesthetist and otorhinolaryngology surgeon should be sought whenever an acute admission of a patient with a Montgomery T-tube occurs in order to formulate an airway management plan in the case of an emergency. We also recommend that such patients carry a tube identical to the one they have in situ, compatible airway equipment such as appropriately sized tracheal tube connector could be tested and identified in advance.

**Conflict of interest**

None declared.

O. Touma*  
N. Venugopal  
G. Allen  
J. Hinds  
Belfast, UK  
*E-mail: toumao@doctors.org.uk


doi:10.1093/bja/aer183

**Perioperative cardiac arrest after thoracic epidural analgesia in a patient with increased pulmonary artery pressure**

Editor—Patients with pulmonary artery hypertension pose a great challenge for the anaesthetist.\(^1\)\(^ \)\(^2\) There are limited data to support an ideal anaesthetic technique and the use...
of epidural anaesthesia is controversial. We would like to share our experience of a patient with increased pulmonary artery pressure. Consent from the patient has been obtained.

A 59-yr-old lady with a BMI of 46 and past medical history of asthma, type 2 diabetes, hypertension, arthritis, bilateral lymphoedema, and raised pulmonary artery pressure underwent laparoscopic-assisted left adrenalectomy for a non-functioning adrenal tumour. She had two previous uneventful general anaesthetics. Preoperative ECG showed sinus rhythm, normal axis with right ventricular strain pattern. Transthoracic cardiac ECHO was reported as, moderately dilated right heart with at least moderate systolic impairment, estimated elevated systolic pulmonary artery pressure of 68 mm Hg and preserved left ventricular systolic function.

A thoracic epidural was inserted awake with full asepsis at the T6–7 level using a 16 G Tuohy needle with ease. A test dose of 0.25% bupivacaine 3 + 7 ml was given to ensure correct epidural position. General anaesthesia was commenced with remifentanil infusion, propofol, and atracurium. The trachea was intubated with an 8.0 COETT and anaesthesia maintained with remifentanil and isoflurane. The right radial artery and right internal jugular vein were cannulated. The patient was haemodynamically stable with normal arterial blood gases throughout the procedure. Four hours later, towards the end of procedure, an epidural bolus of 10 ml of 0.25% bupivacaine was given and neuromuscular block reversed with neostigmine and glycopyrrolate.

The patient became bradycardic, hypotensive with subsequent asystolic cardiac arrest. One cycle of cardiopulmonary resuscitation was performed; adrenaline 1 mg and atropine 0.6 mg were given after which the patient had a return of spontaneous circulation. The arterial pressure was low, 72/33 mm Hg. There was a frank pulmonary oedema with decreased arterial oxygen saturation of 71% on ventilation with 100% oxygen. Noradrenaline and adrenaline infusion was commenced. The arterial pressure and oxygen saturation gradually improved.

Transthoracic cardiac ECHO was performed by the consultant cardiologist. ECHO showed dilated and impaired right ventricle with evidence of pulmonary hypertension, a good left ventricle, and no evidence of ventricular septal defect or significant mitral regurgitation. The ECG was reported as sinus rhythm with left axis deviation and intraventricular conduction defect. The patient was transferred to ITU; CTPA revealed no pulmonary embolism. Postoperative troponin-I was 0.45 ng ml\(^{-1}\). The patient was ventilated for about 2 days, extubated without any neurological deficit, discharged from intensive care and from the hospital subsequently. The patient is being followed up by the cardiologist and pulmonary hypertension physician.

The safety of epidural anaesthesia in patients at risk of right ventricular pressure overload remains controversial. It has been shown in an animal model\(^1\) that thoracic epidural anaesthesia reduced the haemodynamic tolerance to acute increase in pulmonary artery pressure by inhibiting the right ventricular positive inotropic response. In our patient, we think that the bolus dose of local anaesthetic epidurally would have impaired the cardiac sympathetic response leading to right ventricular failure\(^6\) and subsequently to left ventricular failure,\(^6\) thereby causing haemodynamic collapse and cardiac arrest.

The clinical relevance of this observation is not an argument against the use of thoracic epidural analgesia. Instead, it suggests that patients with raised pulmonary artery pressure with right ventricular pressure overload may be at increased risk of cardiovascular collapse when neuroaxial anaesthesia extends to the cardiac sympathetic nerves. Awareness about this potential interaction could help clinicians optimize the application of epidural anaesthesia in these groups of patients. Although the patient tolerated the epidural bolus of local anaesthetic when awake, subsequent bolus under anaesthesia led to haemodynamic collapse and cardiac arrest. It may be that a bolus given after operation or by infusion rather than intraoperatively would have been better tolerated by the patient.

**Conflict of interest**

None declared.

G. Subash*
S. Mohammed
Sheffield, UK
‘E-mail: shankarsubash@yahoo.co.uk

4 Santamore WP, Dell’Italia LJ. Ventricular interdependence: significant left ventricular contributions to right ventricular systolic function. Prog Cardiovasc Dis 1998; 40: 289–308
doi:10.1093/bja/aer182

**Decompensation of undiagnosed spinal dural arteriovenous fistulae after lumbar epidural injection and spinal anaesthesia**

Editor—Spinal dural arteriovenous fistulae (SDAVF) are vascular malformations present in the dura mater of the spinal cord that result in arteriovenous shunting.\(^1\)