A Preliminary Report on Anaesthesia for Thoracoscopic Oesophagectomy

A T H Sia, MMed, Department of Anaesthesia, Kandang Kerbau Hospital, 100 Bukit Timah Road, Singapore 229899

Summary

The anaesthetic experience in three patients undergoing thoracoscopic oesophagectomy is discussed. The indications for surgery and the premorbid states are outlined. The necessity for one-lung ventilation, with its attendant cardiopulmonary effects, the difficulty of patient access and the assessment of blood loss were the main problems encountered. Pulmonary morbidity was high in the post-operative period despite the avoidance of thoracotomy. Two patients developed persistent vocal cord paralysis. In conclusion, the role of thoracoscopic oesophagectomy needs further evaluation.

Key Words: Thoracoscopic, Oesophagectomy, One-lung ventilation, Pulmonary morbidity, Vocal cord paralysis

Introduction

Respiratory complications such as post-operative chest infection remain as an important cause of morbidity after oesophagectomy. Indeed, only patients who have reasonable cardiopulmonary reserves as well as no metastatic diseases are considered potentially good candidates for oesophagectomy. Avoiding the need for thoracotomy by using video-assisted thoracoscopy was originally attempted to reduce respiratory morbidity. Although the initial results of thoracoscopic oesophagectomy was encouraging in this respect, subsequent reports were conflicting.

This paper discusses the perioperative management and the post-operative complications of three cases of thoracoscopic oesophagectomy.

Case Reports

The demographic profile and the clinical presentation of the three cases were quite varied. (Table I)

The lung function tests were done preoperatively for these patients and all revealed some degree of obstructive pulmonary disease. However, the arterial blood gases were satisfactory. (Table II)

All the patients were advised to stop smoking. Chest physiotherapy, breathing exercises, as well as incentive spirometry exercises were initiated prior to surgery. Bronchodilators were also started for these patients.The first patient also received antibiotics for the infective exacerbation of chronic lung disease.

All the three underwent the three-stage thoracoscopy-assisted total oesophagectomy; with stages one and three being performed in the supine position involving an upper abdominal and a neck incision respectively. Stage two of the operation required the patients to be turned to the left lateral position, the collapse of the right lung with the creation of a low pressure capnothorax to improve exposure.

The patients had invasive blood pressure monitoring in view of the potential risk of haemodynamic changes (due to bleeding, dissection around the mediastinum

Table I
Demographic data and clinical presentation

	Patient 1	Patient 2	Patient 3
Sex	Male	Male	Male
Race	Indian	Chinese	Chinese
Weight (kg)	56	52	57
Age (years)	60	62	70
ASA status	II	II	II
Clinical presentation	Chronic cigarette smoker, with a history of chronic obstructive lung disease. Incidental mass on chest X-ray. Oesophageal carcinoma was confirmed by CT scan, Barium swallow and gastroscopy	Past history of oesophageal carcinoma in 1993 with radiotherapy and chemotherapy instituted then. This time presented with progressive dysphagia over 2 months. No metastatic lesions	Presented with epigastric pain, Gastroscopy showed dysplastic oesophagus and micro-invasive squamous cell carcinoma.

Table II
Results of pre-operative investigations

Investigations	Patient 1	Patient 2	Patient 3
Lung Function Test			
FVC (% predicted)	2.9L (80)	2.8 (90)	2.3 (90)
FEV1/FVC	60%	72%	58%
Arterial blood gases in room air			
pH	7.45	7.43	7.45
pCO_2 (mmHg)	33	41	37
pO_2 (mmHg)	78	92	83
SaO_2 (%)	95	97	96
Serum HCO3 (mMol/L)	24	26	25
Blood haemoglobin (g%)	13.5	11.2	12.3
Serum albumin (g/L)	41	36	39
Serum electrolytes : Na+ (mMol/L)	141	137	142
K+ (mMol/L)	3.9	4.3	4.4
Creatinine (µml/L)	83	73	68

and one-lung ventilation). The intra-arterial line also allowed easy sampling of blood for analysis during the surgery. Central venous pressure was also monitored by either a left subclavian or internal jugular venous catheter (as the third stage of the surgery involved incisions on the right side of the neck). The

monitoring of the trends of the central venous pressure was deemed necessary because of the high possibility of great intra-operative fluid shifts and increased intra-thoracic pressure during one-lung ventilation which would in turn undermine the adequate filling of the heart. Apart from this, The ECG, pulse oximetry, capnography, temperature, inspired oxygen concentration, the airway pressure and urine output were monitored.

All the patients were lightly premedicated with benzodiazepines. General anaesthesia was induced in rapid sequence and anaesthesia was maintained with Atracurium, Nitrous oxide Oxygen and isoflurane. All the patients had thoracic epidural catheters inserted at the T6 – T7 levels for intra-operative management of anaesthesia (achieved by boluses of 3-4 mL of 0.5% Bupivacaine) and post-operative analgesia (achieved by mg of Epidural Morphine; 8-24 hourly as required). These patients required double-lumen, endobronchial intubation as the isolation and collapse of the right lung would facilitate the video exposure of the restricted surgical site for thoracoscopic dissection. In all these cases, left-sided Broncho-cath tubes were inserted. The proper placement of the tubes was checked by clinical methods as well as by fiberoptic bronchoscopy. Fiberoptic bronchoscopy was also done after the patients were put in the left lateral position to detect any dislodgement of the tubes during the change in positioning because malpositioning of the endobronchial tubes could occur in spite of satisfactory clinical criteria.

During the initiation of one-lung anaesthesia, the inspired oxygen concentration was increased maximally to approach 100%. The first patient had acute arterial oxygen desaturation to 75% despite that, although subsequently the pulse oximetry reading did improve to 90% with insufflation of oxygen to the non-dependent lung. The second patient experienced minimal change in the arterial oxygen saturation even as the inspired oxygen (FiO_2) was reduced to 0.5 from 1. The arterial oxygen concentration of the third patient was maintained at 95% and above with the FiO_2 of 1. Increases in the airway pressures were detected. This could have contributed to the immediate increase in the central venous pressure as the result of the transmitted overall intra-thoracic pressure. The rise of the end-tidal carbon dioxide levels during one-lung ventilation was easily remedied by an increase of the minute ventilation. (Table III)

Table III
One lung anaesthesia : Parameters (shown as before and after the initiation of one – lung ventilation), the duration and blood loss during theoracoscopic dissection

	Patient 1	Patient 2	Patient 3
Arterial oxygen saturation %	97–75–90 with FiO_2 of 1 (O_2 insufflation to non-dependent lung)	99–98 with FiO_2 of 0.5	99–95 with FiO_2 of 1
Systolic blood pressure (mmHg)	140–100	145–120	170–145
Heart rate (minute)	70–100	85–70	65–75
Central venous pressure (mmHg)	4–7	15–17	2–10
Airway pressure (cm H_2O)	21–40	20–30	19–27
Endtidal Carbon Dioxide (mmHg)	29–44	34–40	30–40
Time of one-lung ventilation (hours)	1.8	1.4	1.9
Blood loss during thoracoscopic dissection (litre)	1.6	0.7	1.2

Post-operatively, all the patients had multiple complications, mainly pulmonary in origin. There was however, no mortality. In the first two patients tracheal extubated was effected within a day of surgery (17 hours and 19 hours respectively) but both developed bilateral vocal cord paralysis requiring re-intubation and the second patient eventually required a tracheostomy. The third patient was not extubated as he had an early onset of severe chest infection (*Klebsiella sp.*) and supraventricular tachycardia post-operatively. Consequently, there was difficulty in weaning him off the ventilator and he was ventilator dependent for the next 3 months. The first two patients also had chest infection post-operatively, albeit to a less severe degree and they were treated in the intensive care unit for one week.

Discussion

The fundamental problems that were faced comprised the need for one-lung ventilation with the collapse of the right lung, the difficulties in the estimation of intra-operative blood loss, as well as serious post-operative pulmonary and airway complications.

Firstly, the technically difficult thoracoscopic dissection renders the near total collapse of one lung and therefore, the requirement of one-lung ventilation a pre-requisite of anaesthesia for this surgery. Therefore the usefulness of the paediatric fiberoptic bronchoscope to check the proper positioning of the double-lumen endobronchial tube cannot be overemphasized. The proper positioning of the endobronchial tube is confirmed by the visualisation of the proximal edge of the blue endobronchial cuff at the carina as the tube enters into the left main bronchus; with the bronchoscope inserted in the trancheal lumen. Furthermore, with the bronchoscope in the bronchial lumen, the orifices of the upper and lower bronchi are visualised. One clinically important malposition is that of a left-side tube being inserted too far distally and this can only be reliably detected by bronchoscopy[1]. None of the patients in this series had dislodgement of the endobronchial tubes during re-positioning. Drastic changes in the haemodynamic and respiratory variables have been reported during one-lung ventilation for this type of surgery. Even though clinically evident changes did occur in our patients' cardiopulmonary parameters, they were essentially either easily treatable or deemed to be within acceptable limits without untoward adverse effects.

The only exception was the first patient who had acute arterial oxygen desaturation at the onset of one-lung ventilation. Hypoxaemia during one-lung ventilation in spite of the inspired oxygen approaching unity could be attributed in part to the impaired hypoxic pulmonary vasoconstriction reflex in the chronically diseased lungs. Even though progressive fluid transudation in the dependent lung could be another possible mechanism of hypoxaemia, this would be an unlikely explanation in this patient as the desaturation occurred promptly at the onset of one-lung anaesthesia. Moreover, the arterial oxygen saturation recovered quickly with the insufflation of oxygen to the non-ventilated lung, suggesting that some alveolar capillary units remained in continuity with the airways and the insufflation of oxygen reduced the intra-pulmonary shunting.

The additional equipment and personnel required in this procedure will compete with the anaesthetist in accessing the patients. Also, the estimation of blood loss during surgery is difficult as it can be concealed in the thorax. The visibly limited operative field and the usage of irrigation fluid would make one resort to serial haemoglobin measurements and continuous intra-arterial/central filling pressures as guides to fluid maintenance and blood transfusion.

All our patients developed serious post-operative complications despite the avoidance of thoracotomy. Early tracheal extubation (ie less than 24 hours post-operatively) has been advocated to reduce total ventilation time and the duration of stay in the Intensive Care Unit; which can in turn be translated to a significant reduction in cost and morbidity. However, this was not quite successfully accomplished in our limited series. Other groups of authors also shared our experience in this respect[2,3]. The occurrence of recurrent laryngeal nerve palsy has been frequently reported for oesophagectomy; arguably more commonly in the transhiatal approach. However, as evidenced by our observation (as well as several other authors'), the thoracoscopic approach also has a high incidence of this complication[3]. The issue as to whether the damage

occurs more commonly in the vicinity of the aortic arch or the neck remains largely unresolved.

In conclusion, this preliminary report suggests that thoracoscopic oesopagectomy is associated with a high morbidity and this must be taken into consideration by those who are likely to undertake such a procedure. The role of this procedure in the treatment of oesophageal cancer certainly needs further evaluation.

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A Report of Two Non-AIDS associated Kaposi's Sarcoma in Malaysia

S E Choon, MRCP*, J J Khoo, MPath**, *Department of Dermatology, **Department of Pathology, Hospital Sultanah Aminah, Johor Bahru, 80100 Johor

Summary

Kaposi's sarcoma is an uncommon cutaneous neoplasm seen classically in elderly males of East European or Jewish extract. It has been known to be endemic in sub-Saharan Africa for many years. Numerous cases had been described in patients on long-term immunosuppressive therapy and in patients living with acquired immunodeficiency syndrome (AIDS). In spite of the increasing number of organ transplant recipients and people living with AIDS. Kaposi's sarcoma remains rare in Asia. We report two cases seen in Johor, Malaysia.

Key Words: Kaposi's sarcoma, Non-AIDS associated, Malaysia

Introducation

Kaposi's sarcoma (KS) was first described in 1872 by a Hungarian dermatologist, Moritz Kaposi. During the next century, this uncommon tumour was seen in four different clinical settings[1]. Classic KS occurs in elderly men (male/female ratio, 10-15:1) of Mediterranean, East European or Jewish heritage. The lesions are