Critical Care After Lung Resection (CALoR) – Influence of Anaesthetic and Analgesic Technique

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INTRODUCTION

Un-planned critical care admission is a devastating complication of lung resection, associated with increased mortality and additional burden on healthcare services [1]. Existing data indicate that 2.8-18% of patients require unplanned intensive care following pulmonary resection [2]. Within the UK Association of Cardiothoracic Anaesthesia and Critical Care's annual collaborative audit into Critical Care Admission following Lung Resection (CALoR) we sought to investigate the influence of anaesthetic and analgesic techniques on the need for unplanned post-operative critical care.

DATA

This was a multicentre retrospective audit examining adult patients undergoing lung resection in the years 2013-2014. Demographic and clinical data was collected on every patient fulfilling **inclusion criteria*. Control data was collected from a minimum of three consecutive contemporaneous control patients undergoing surgery prior to each case.

Un-planned critical care admission formally defined as:

- patient required intubation for invasive ventilation and/or
- renal replacement therapy (RRT) post-operatively;
- unplanned mechanical ventilation immediately postoperatively for greater than 12 hours

METHODS

Association was sought between mode of anaesthesia (total intravenous anaesthesia (TIVA) vs volatile) and analgesic technique (epidural vs paravertebral) and the need for critical care admission. Multivariate regression analyses were performed on a 'complete record' basis for each variable. A sensitivity analysis was conducted as both variables of interest had over 20% missing values. We devised an imputation model using multiple imputation by chained equations and estimates were compared with those from the complete-record model.

RESULTS

Data was returned by sixteen centres. Sufficient data for analysis was available from 7,431 patients; 7178 controls and 253 cases. The overall incidence of unplanned ICU admission was 2.26% (n=253).

Analgesia was provided by epidural in 26.9% and paravertebral blockade in 41.8%; 77.2% of cases received volatile anaesthesia. Across univariate, complete-case and multiple imputation models there was a strong and significant effect of both anaesthetic and analgesic technique on need for critical care admission. Patients receiving TIVA were estimated to have approximately half the odds of critical care admission compared to those undergoing volatile anaesthesia, whilst patients receiving epidural analgesia had just over half the odds of admission compared to those receiving paravertebral (*Table 1*).

Table 1. Association Between Anaesthetic and Analgesic technique and critical care admission

Exposure	Univariate			Complete-record model*			Imputation model*		
	N	OR	95% CI	N	OR	95% CI	N	OR	95% CI
Anaesthetic technique	4,318			3,970			7,401		
Volatile		1.00			1.00			1.00	
TIVA		0.59	0.41- 0.84		0.45	0.32- 0.65		0.50	0.34-0.69
Analgesic Technique	3,683			3,668			7,431		
PVB		1.00			1.00			1.00	
Epidural		0.77	0.57- 1.05		0.57	0.41-0.78		0.57	0.41-0.79

*adjusted for age, sex, resection type, surgical approach

CONCLUSIONS

- This large retrospective study suggests a significant effect of both anaesthetic and analgesic technique on patient outcome.
- The results in favour of both TIVA and epiduralanalgesia might be considered to conflict with recent studies.
- We suggest that as a community of thoracic anaesthetists, it is incumbent on us all to attempt to address these fundamental questions in well conducted, large-scale randomised controlled trials.

REFERENCES:

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