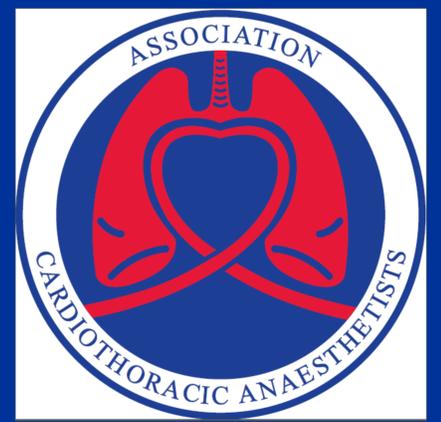


# Critical Care After Lung Resection (CALoR): CALoR-1: A single centre pilot study



## Methods

This study is a retrospective analysis of routinely collected clinical data at Golden Jubilee National Hospital, Clydebank, for the two year period 1st January 2013 to 31st December 2014. Individual patient data was collated from a prospectively completed surgical database (Cardiac, Cardiology and Thoracic Health Information System (CaTHI, Amor Group, Glasgow). Data for ICU patients was obtained from patient notes, the hospital ICU clinical information system (Centricity CIS; GE Healthcare®) and from the Scottish ICU audit database (Ward Watcher; Critical Care Audit Ltd, Yorkshire).

## Results

### Aim 1: Characterise the population

Total Lung Resections (n = 1169)		
	No ICU Admission	ICU Admission
<b>All Patients</b>	<b>97.4% (n = 1139)</b>	<b>2.6% (n = 30)</b>
<b>Age</b>	67 (59-73)	71 (65-74)
<b>Sex</b>		
Female	45%	50%
Male	55%	50%
<b>Type of resection</b>		
Pneumonectomy	67	1
Lobectomy / Bilobectomy	759	27
Sublobar	314	2
<b>Pre-operative Values</b>		
Thoracoscore (%)	1.5 (1.4 - 1.7)	2.2 (1.7 - 2.7)
FEV <sub>1</sub> (L)	2.1 (2.1 - 2.2)	1.8 (1.2 - 2)
%FEV <sub>1</sub>	88.4 (86.6 - 90.3)	80.3 (72.9 - 87.8)
%DLCO	70.7 (69 - 72.4)	61.4 (55.3 - 67.5)

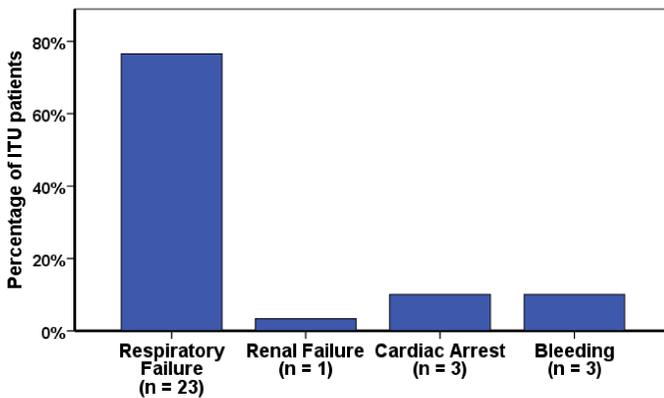


Figure 2. ICU admissions by admission diagnosis.

In our institution over the time period studied, **the incidence of unplanned ICU admission following lung resection was 2.6%**. As might be anticipated, patients admitted to ICU post-operatively were older, and exhibited higher pre-operative Thoracoscore, and poorer pre-operative lung function when compared to patients not admitted to ICU. Whilst the majority of patients are admitted due to respiratory failure, alternative admission diagnoses were seen in nearly a quarter.

### Aim 2: Assess the burden of disease

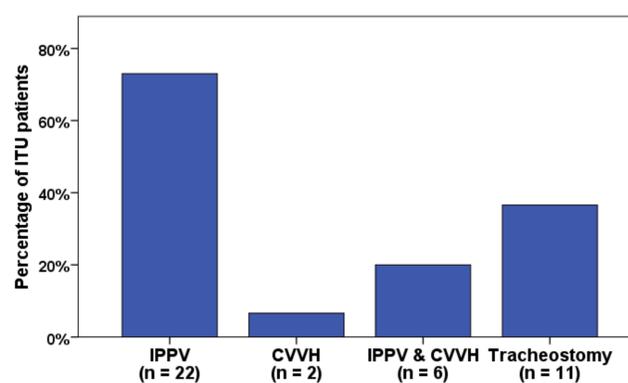


Figure 2. ICU interventions required in 30 patients admitted unplanned to ICU following lung resection.

Post-operative ICU admissions (n=30)	
Duration of Ventilation (Days)	5.5 (2 - 16.5)
Length of Stay (Days)	
ICU	8.5 (3 - 17)
Hospital	24.5 (13.3 - 35.3)
Hospital Mortality	26.7%

The burden on both patients and resources resulting from post-operative ICU admission is considerable, with long periods of mechanical ventilation and prolonged ICU and hospital stay. Nonetheless, approximately three quarters of patients survive to hospital discharge.

### Aim 3: Investigate the influence of anaesthetic and surgical technique

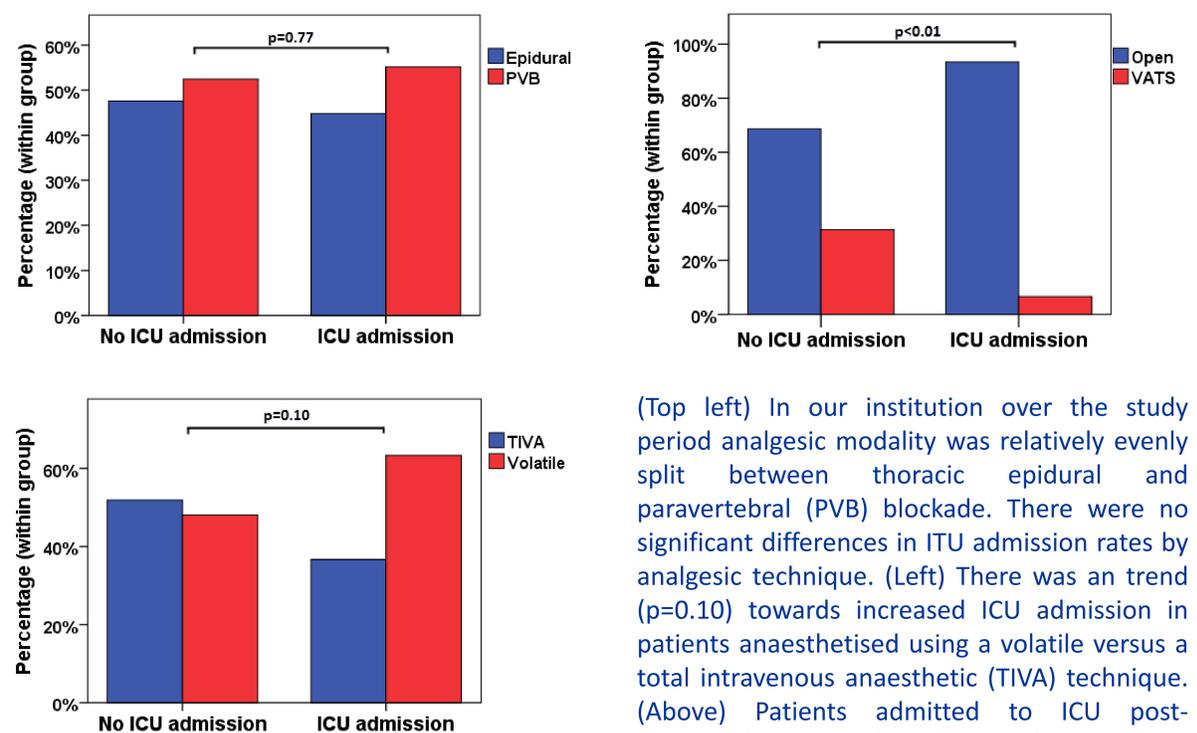


Figure 3. Proportion of patients admitted to ICU by anaesthetic and surgical technique.

(Top left) In our institution over the study period analgesic modality was relatively evenly split between thoracic epidural and paravertebral (PVB) blockade. There were no significant differences in ICU admission rates by analgesic technique. (Left) There was a trend ( $p=0.10$ ) towards increased ICU admission in patients anaesthetised using a volatile versus a total intravenous anaesthetic (TIVA) technique. (Above) Patients admitted to ICU post-operatively are significantly more likely to have undergone an open compared to video-assisted thoracoscopic (VATS) lung resection ( $p<0.01$ ).

## Conclusions

The purpose of this single-centre pilot study was to illustrate 'what might be possible?', in a larger multi-centre study. The 2.4% incidence of post-operative ICU admission and 26.4% hospital mortality observed compare favourably to published reports, which suggest a 6.3-18% ICU admission rate with a mortality in this group of up to 46%. This study suggests that both type of maintenance anaesthetic, and choice of surgical technique may influence ICU admission rates. Unfortunately in the current dataset, numbers in the ICU group ( $n=30$ ) are insufficient to allow comprehensive multivariable adjustment for the many potential confounders influencing choice of anaesthetic and surgical technique. We suggest however that these and many other questions may be pursued further in a larger multicentre dataset as proposed in the CALoR study.