POSTOPERATIVE PULMONARY COMPLICATIONS AFTER MINIMALLY INVASIVE ESOPHAGECTOMY: ROLE OF INTRAOPERATIVE MECHANICAL VENTILATION.

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Argomento: Anestesia generale

Background

Postoperative pulmonary complications (PPCs) occur in 20-40% of patients after esophagectomy¹. Early ARDS may be related to lung injury induced by suboptimal intraoperative mechanical ventilation².

Our aim was to evaluate the impact of intraoperative tidal volume (Vt) and PEEP settings on PPCs after minimally invasive esophagectomy (MIE) performed at our Institution.

Methods

In this study we enrolled 52 patients who underwent MIE trough laparoscopic abdominal approach and VATS in prone position without one lung ventilation (OLV) from January 2015 to December 2017. Final analysis was conducted on 44 patients for incomplete data in 8 cases.

Results

14 (31.8%) patients developed PPCs (see table); ARDS occurred in 5 (11%) patients.

Patients with PPCs had a lower tidal volume (Vt) during VATS (p=0.028) and during laparoscopy (LPS) (p=0.02).

No association was found between PPCs and thoracic surgical time duration, PEEP setting, maximum P_aCO_2or minimum $P_aO_2values$.

There was no relationship between intraoperative Vt and first P_aO_2/F_1O_2 ratio after intensive care admission (ICU) (R=0.04, p=0.73), nor between intraoperative Vt and duration of postoperative mechanical ventilation (MV) (R=-0.078, p=0.67).

Conclusions

We found that higher Vt during VATS and LPS in this cohort of patients was protective against PPCs. However, even in PPCs group, mean Vt can be considered protective since it was less than 8

mL/Kg. Low PEEP was set in both groups but no relationship between PEEP and PPCs was highlighted.

We argue that in PPCs group lower Vt in addition to low PEEP values may have induced cyclic alveolar opening and closing with the consequent atelectasis development because of the lung collapse given by surgical pneumothorax.

The presence of PPCs significantly increased MV duration, ICU length of stay (LOS) and hospital LOS (p < 0.001).

References

¹ Semin Thorac Cardiovasc Surg. 2014 Winter;26(4):287-94.

² Br J Anaesth 2016 Sep;117(3):375-81.

	Total	PPCs	No PPCs	P value
n° of patients	44	14 (31.8%)	30 (68.2%)	
LPS Vt (mL/Kg)	7.4 (±1)	6.9 (±1.1)	7.6 (±0.9)	0.02
VATS Vt (mL/Kg)	6.8 (±1.3)	6.3 (±1.2)	7.1 (±1.3)	0.028
VATS duration (min)	97.9 (±32.7)	91.7 (±34.6)	100.9 (±31.4)	0.18
PEEP in VATS (cmH2O)	3.7 (2.9)	3.8 (2.9)	3.7 (2.9)	0.46
Intraoperative P _a CO ₂ max (mmHg)	46.9 (±6.5)	48.3 (±10.5)	46.3 (±5.9)	0.25
Intraoperative P _a O2 min (mmHg)	107.2 (±36.8)	95.3 (±30.0)	113.5 (±38.5)	0.12
ICU LOS (days)	6 (12.4)	14.1 (19.5)	2.3 (1.6)	0.001
Hospital LOS (days)	22 (±16.8)	33.4 (±21.1)	16.7 (±10.9)	< 0.001
MV duration (hours)	70.7 (±133.3)	208.7 (±187.3)	16.4 (±22.7)	< 0.001
Patients with preoperative lung disease	7 (15.9%)	3 (42.9%)	4 (57.1%)	0.6

Table 1: Main results of the study.

Legend LPS: Laparoscopic time; VATS: VideoAssisted ThoracoScopy; Vt: Tidal Volume; ICU: Intensive Care Unit; LOS: Length Of Stay; MV: Mechanical Ventilation; PPCs: Postoperative Pulmonary Complications.