



Single-lumen Tube Are Associated with Improved Oxygenation In Patients Undergoing Thoracoscopic Cardiac Surgery : a Prospective Study

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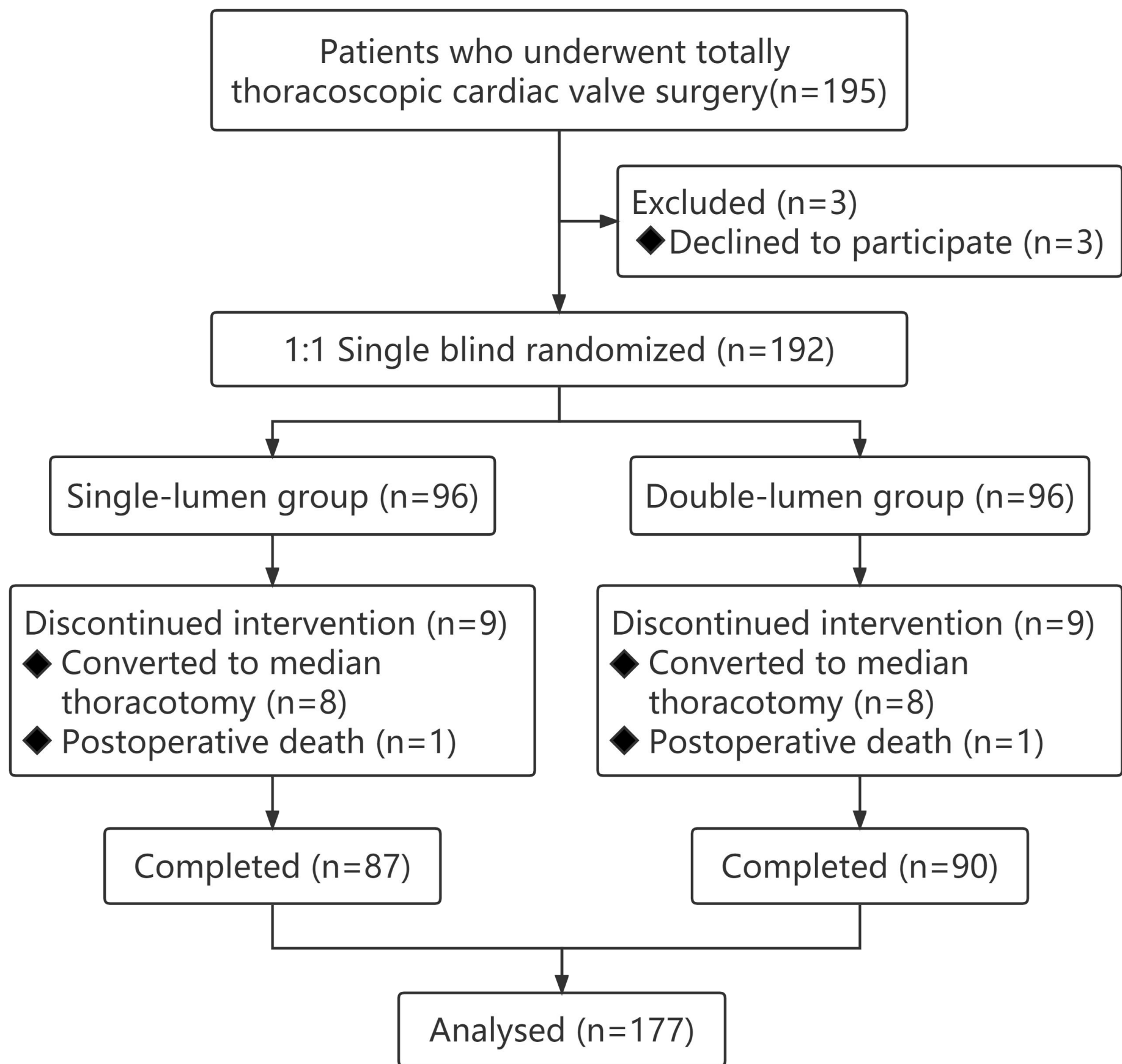
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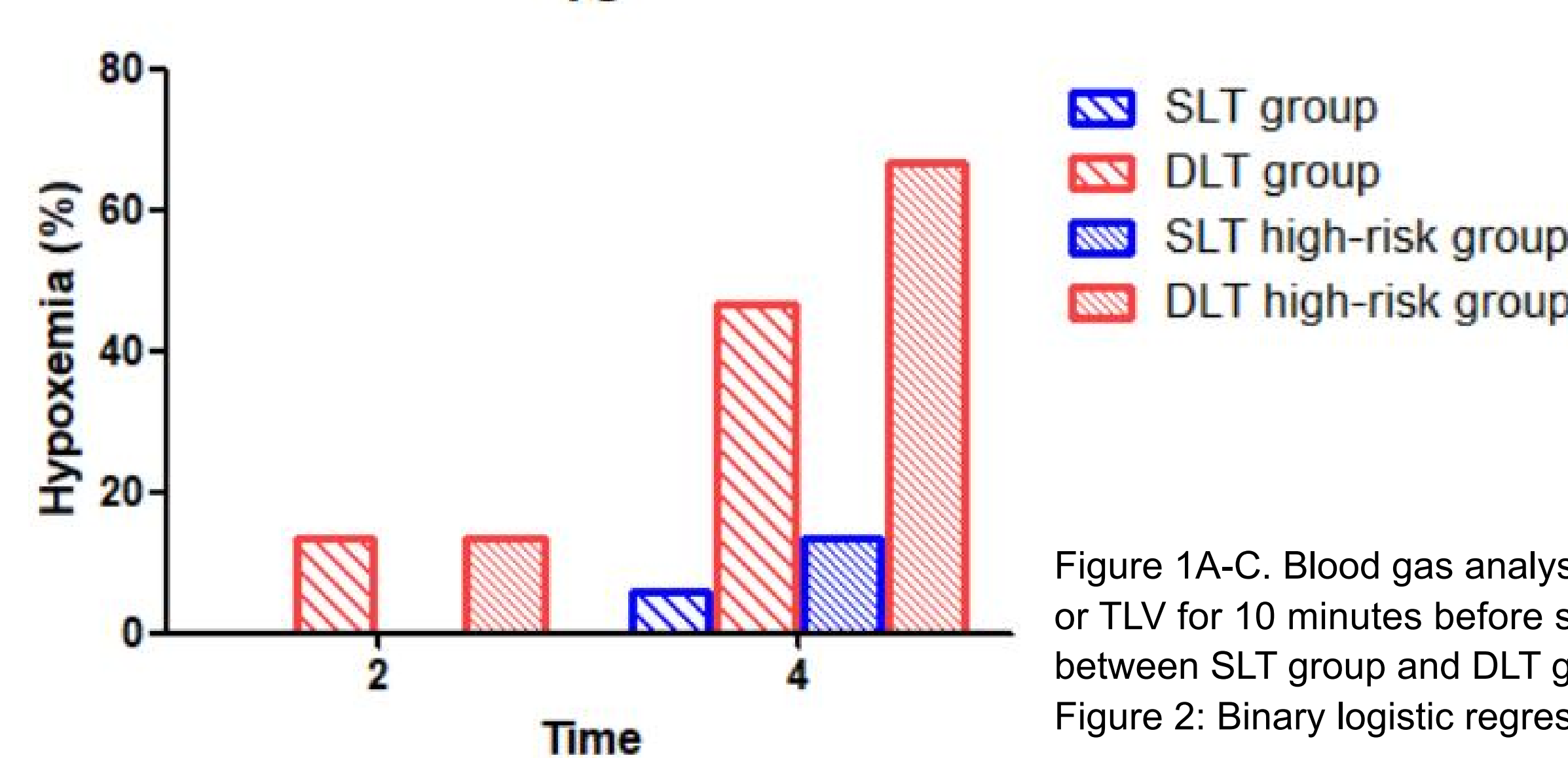
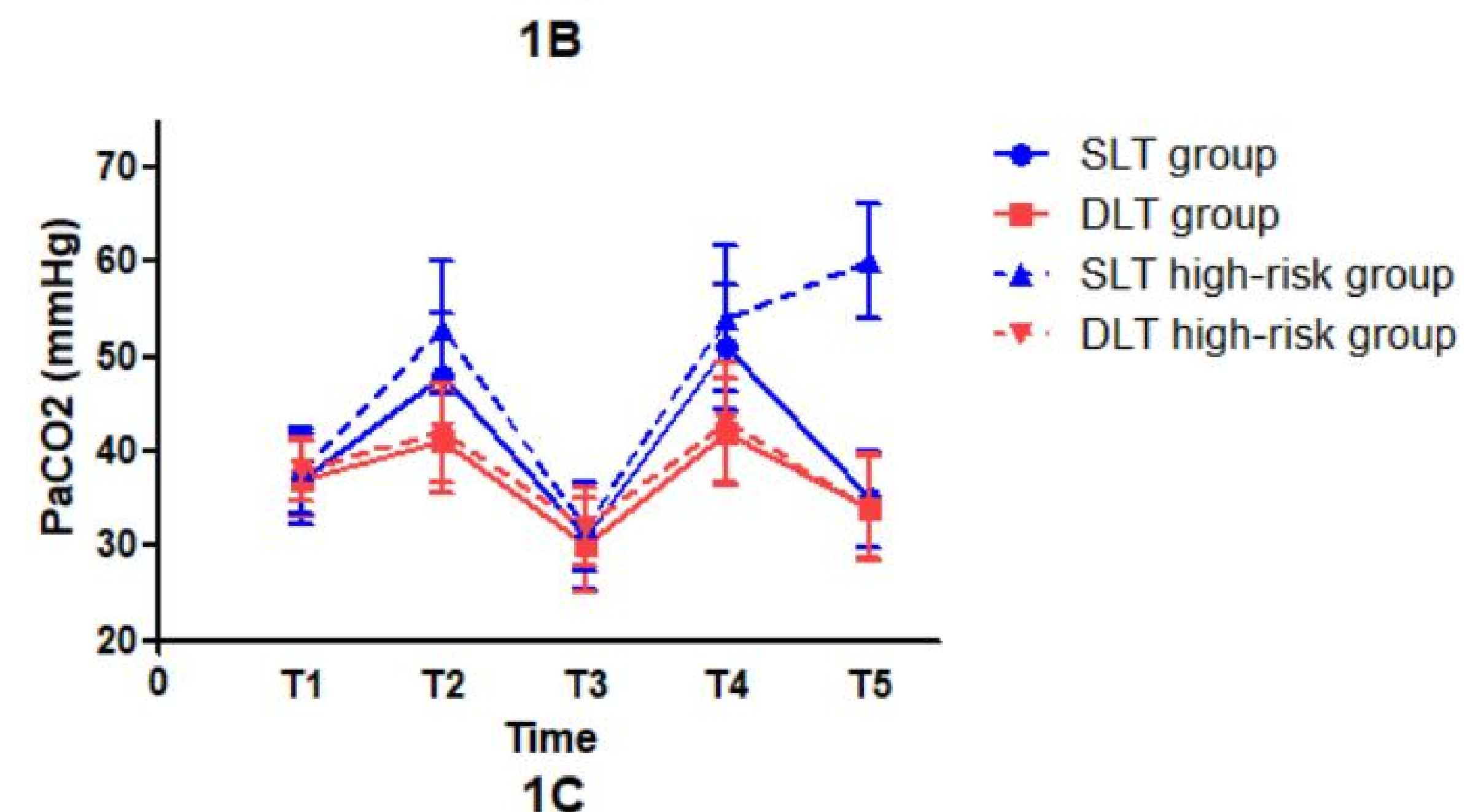
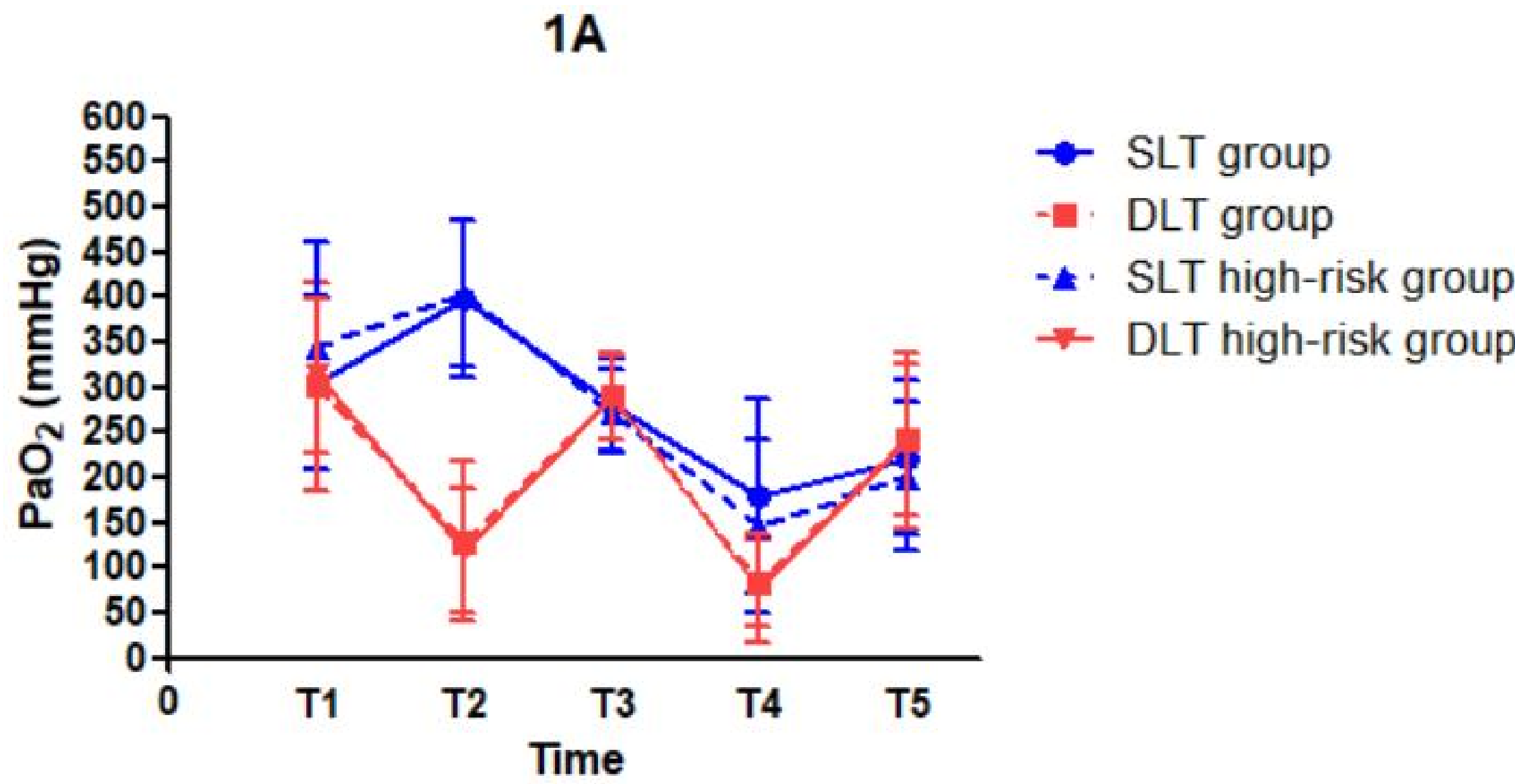
Introduction

- Double-lumen tube (DLT) :**
Large outside diameter, small inside diameter: It is easy to cause airway damage and its airflow resistance is high.
Symptoms of airway damage: Hoarseness and sore throat occurred in 10-47.4% and 23.7%-40.3%, respectively.
Fiberoptic bronchoscopy (FOB) : FOB is the standard way to determine location, but it can prolong anesthesia time and increase the cost.
- One lung ventilation (OLV) :**
Worse oxygenation: The incidence of hypoxemia is 6.5-18%, which is mianly related to the patient's physical state, the surgical time, and the existence of intraoperative lung injury.
Higher postoperative pulmonary complications.
High-risk patients are not available.
- Single-lumen tube (SLT) with double lung ventilation (DLV)** has been used in thoracic surgeries, but **there is no clinicla trials** of its application in totally thoracoscopic cardiac surgery.

Methods



Results



	SLT group (n=87)	DLT group (n=90)	P value
Intubation operation time (s)	36 (27, 46)	49 (40, 67)	< 0.001
Duration of making chest skin incision to start CPB (min)	15 (11, 21)	22 (17, 32)	< 0.001
Initial intubation failure (%)	1	16	< 0.001
Displacement of endotracheal tube (%)	0	2	0.497
OLV or DLT < 10 mins (%)	0	20	< 0.001
Poor visual exposure (%)	7	2	0.096
Postoperative reintubation (%)	0	2	0.497
Hoarseness 1 week after surgery (%)	20.7	36.7	0.019

Table 1: Comparison of clinical data between SLT and DLT.

	Hypoxemia group (n=42)	non-hypoxemia group (n=48)	P value
Atrial fibrillation	21 (50.0)	14 (29.2)	0.043
Albumin(g/L)	39.3 (37.2,42.4)	41.9 (39.2,45.6)	0.015
Preoperative LVEF(%)	63 (60,66)	66 (63,70)	0.005
T1 SaO ₂ (%)	100 (100,100)	100 (100,100)	0.002
T1 PaO ₂ (Every increase of 10mmHg)	24.9 (17.5,31.0)	32.1 (25.5,46.4)	0.001
CPB time	170 (152,228)	159 (127,185)	0.018

Table 2: Univariate analysis. The DLT group was divided into hypoxia group and non-hypoxia group according to whether the SaO₂ at T4 was < 90%.

Figure 2

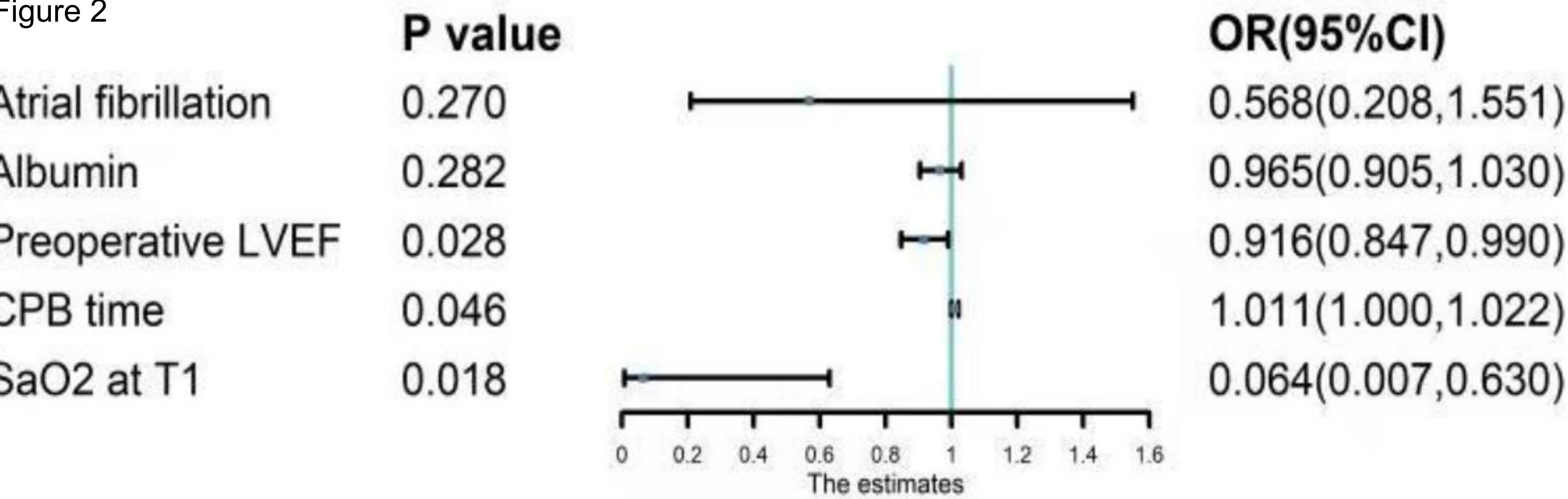


Figure 1A-C. Blood gas analysis value during the intervention. Data of A and B are presented as mean ± standard deviation; T1: after intubation; T2: OLV or TLV for 10 minutes before starting CPB; T3: 1 hour after CPB; T4: OLV or TLV for 10 minutes after stopping CPB; T5: admitted to the ICU; *: P < 0.05 between SLT group and DLT group; High-risk group:pulmonary ventilation function examination suggested moderate to severe ventilation dysfunction.

Figure 2: Binary logistic regression analysis of hypoxia in DLT group.

Conclusions

- ✓ SLT is easier to operate and causes less airway trauma than DLT.In most cases, the exposure of visual field dose not been affected by SLT.
- ✓ SLT with DLV significantly increases the PaO₂ and the PaCO₂ than DLT with OLV.
- ✓ The results of SLT with DLV in high-risk patients are consistent with the above.
- ✓ CPB time is a risk factor for postoperative hypoxemia in the DLT group, while preoperative LVEF and SaO₂ at T1 were protective factors.

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