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The report of double lumen tube anaesthesia in National Cancer Centre of Mongolia

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RESEARCH

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ABSTRACT

If we can successfully place a double lumen tube, then it will ensure safety for our patients throw out the use of one lung anaesthesia. We could achieve adequate oxygen saturation (Spo_2 or SaO_2) with maintenance of PaO_2 the level of 100-150mm Hg.

Key Words
One lung ventilation, thoracic anaesthesia, lung atelectasis

What this study adds:

1. What is known about this subject?
We report the use of a double lumen tube during thoracic surgery for lung isolation in the Mongolian people during clinical practice.

2. What new information is offered in this study?
The successful placement of double lumen tube (Mongolian) during thoracic surgery decreased the intensive care unit days, reduced postoperative complications and reduced mortality.

3. What are the implications for research, policy, or practice?
Patients subjected to successful placement of a double lumen tube combined with the right mode of mechanical ventilation decreased the intensive care unit stay, reduced postoperative complications, as well as reducing mortality.

Background

In Mongolia, cancer is the second leading cause of mortality in the population increasing over the last ten years. In 2015, there were registered 20,003 cancer patients, 3,999 patients of whom died.

Before 2007, thoracic surgery for lung cancer used conventional single lumen endotracheal tubes during general anaesthesia and surgical exposure was not ideal. As well, surgical manipulation impaired cardiac and hemodynamic function, and contributed to unnecessary lung injury. Unfortunately airway contamination and soiling from surgical bleeding often caused intra-operative and particularly, post-operative problems, affecting patient outcomes.

Aims

The use of double lumen tubes for our NCC thoracic surgery patients can optimize lung isolation and separation, which will reduce surgical times and operative complications.

Methods

This study examined the use of double lumen tubes during thoracic surgery in the National Cancer Centre in 2012–2014, 160 patients were included in this study in the time period between 2012–2014. During the study, arterial blood samples (0.1–0.2ml) were taken to measured oxygen partial pressure (PaO_2), carbon dioxide pressure ($PaCO_2$), oxygen saturation (SaO_2) and acidity (PH).

Various modalities of mechanical ventilation were used during this study period (CPAP, PEEP, PSV, PCV, ACV, CMV and SIMV).

Results

We are reporting the results of anaesthesia and surgical departments at National Cancer Centre in the period between 2012–2014. This studies involved 160 cases of open thoracic surgery with DLT.

ICU stay war 2.2±1.35 days, complications were 19.65 per cent and death rate was 1.64 per cent.

In comparison, a 2003 NCC study examining the use of single lumen tubes in lung cancer surgery showed postoperative ICU of stay were 6–10 days, complication rate of -37 per cent, and death rate was 43 per cent (Tables 1-4).

Discussion

Our report shows that 80–90 per cent (84.3 per cent) of double lumen tube placement resulted in a collapsed lung during open thoracic surgery. The American Society of Anaesthesiologists reported that the double lumen tube placement is performed at 28–29cm deep in trachea of patient with 170cm height and 1cm variation occurs in every 10cm.

Since the average height of female Mongolian is 155cm, placements of DLT 27.68±2.47см (p<0.004) deep 33.43±4.25(Fr) (p<0.093) diameter, while average height of male Mongolian is 165cm, so that placements of DLT 28.43±2.6см (p<0.004) deep 37.09±4.69(Fr) (p<0.093) diameter.

Conclusion

1. In the study group double lumen tube placement in woman using 35(Fr) diameters, in males using 37m(Fr) diameter tubes, the appropriate 165cm tall patient`s placement was at a distance of 28.4cm (every 10 cm change 0.78cm in Mongolian).
2. Double lumen tube use improved the patient's surgical experience by reducing post-operative complications by 17.4 per cent and mortality rate by 41.9 per cent. (Although patient profiles between studies were not directly examined.) Peripheral veins oxygen saturation (SpO_2) 95.09 per cent ±1.07, arterial blood oxygen saturation (SaO_2) 92.65 per cent ±5.69 (p<0.032) in one lung anesthesia.
3. In our study, 71.05 per cent of patients received post-operative ventilator support (CPAP, PEEP, PSV, CMV and SIMV) to aid recovery and maybe contributed to improved outcomes.

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PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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Table 1: Incidences of the thoracic surgery in NCC

Subjects	N	%
General subjects		
Male	106	66.3%
Female	54	33.8%
To smoke	103	64.4%
Thoracic level epidural catheterization	137	86.6%
Double lumen tube for central (jugulars internal) vena	108	67.5%
One lung ventilation		
Lung is collapsed completely (blind)	135	84.3%
Lung is not possibility (TBC)	16	10%
Lung is collapsed incompletely (use FBO)	9	5.6%
Air management		
Change Tidal volume, rate	29	18.1%
PEEP	23	14.3%
Postoperative CPAP	11	6.8%
Pathology result		
Squamish Carcinoma	81	50.6%
Adeno carcinoma	42	26%
Tuberculosis	42	26%
Abscess, Ehinococcus	6	3.8%
Others	10	3.6%

Table 2: Type of surgery of the thoracic surgery

Type of surgery		**N**	**%**
Pulmonary surgery	Pulmectomy		
	a. Right	15	9.40%
	b. Left	19	11.90%
	Lobectomy	28	17.60%
	Segmentectomy	20	12.50%
	Others	9	5.60%
Esophagus surgery	Transthoracic esophagectomy		
	a. Right	34	21.30%
	b. Left	22	13.80%
	Transhiatal esophagectomy	10	6%
Impossible surgery(Thoracotomy)		3	1.90%
Total		**160**	**100%**

Table 3: Selected size and types of double lumen tube

Type and size	**N**	**%**
Right double lumen tube	64	40%
Left double lumen tube	96	60%
Size of 37Fr double lumen tube	82	51.25%
Size of 35Fr double lumen tube	78	48.75%

Table 4: The statistical result of double lumen endotracheal tube placement in Mongolia

Subjects	Result	P утга
Tidal volume	7.77±1.07ml/ kg	
TV (one lung)	5.87±0.46ml/kg	$p<0.014$
155 cm height	27.68±2.47cm deep	
165 cm height	28.43±2.6 cm deep	$p<0.004$
Variation SpO_2	95.09%±1.07	
Variation SaO_2	92.65%±5.69	$p<0.032$
Variation of $PaCo_2$	37.11±14.6	$p<0.028$
Variation of PaO_2	119.15±49.52	