COMPARISON OF TWO METHODS OF DOUBLE LUMEN TUBE PLACEMENT IN NATIONAL CANCER CENTER OF MONGOLIA

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The goals of this retrospective study were to compare two methods of double-lumen tube (DLT) placement used for elective thoracic or esophageal surgery and to identify factors which provide a rational basis for placement technique.

METHODS:

We performed during 2012-2014 period in National Cancer Center of Mongolia placement of DLT in 160 ASA II-III patients scheduled for thoracic or esophageal surgery procedures either according to the conventional blind method or under direct vision using a fiber optic bronchoscope.

Combined anesthesia using inhalation anesthesia with isoflurane associated with thoracic epidural analgesia was used in most patients requiring one- lung ventilation after right or left – sided endobronchial intubation.

Data collected from files of patients and anesthetic records are expressed SPPS 20 as mean +/- SD. Paired-simple t-tests, One way ANOVA. Was used to detect significant differences ($p<0, 05$).

RESULTS:

We are reporting 2012-2014 anesthesia and surgical departments at National Cancer Center. In our study involved all 160 open thoracic surgery cases with DLT. Were excluded 4 case to very short and tail height (140 less than , 190 more than) and weight (35 kg less than, 150kg more than), 2 case often because to very low hemoglobollin (we are doesn't have arterial laboratory result) level, 2 cases thorax was not open (explorative esophageal cases) and we feature due 160 records of patients;

106 male (mean age 55 $\pm$ 13 years) and 54 female (mean age 57$\pm$ 10 years) were analyzed. 64.4% of all patients were smoked. Type of surgery is detailed in Table 1 DLT was placed left 60% (n=96), right 40% (n=64) and 5.6% (n=9) cases fiber optic bronchoscopes by was used after blind placement DLT, total lung collapse was achieved.

Incidences of the thoracic surgery

Table 1

Subjects	Cases	Percentage
Including to the study	168	
Excluding from the study	8	
Total(thoracotomy, thoracoscopy)	160	
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%
Type of operation		
Operation of lung	81	50.6 %
Operation of esophagus	56	35 %
Diagnostics thoracoscopy	3	1.9 %
Other operations	20	12.5 %
One lung ventilation		
Collapsed lung right side	96	60%
Collapsed lung left side	64	40%
Total collapse of the lung (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%
Squamish Carcinoma	81	50.6 %
Aden carcinoma	42	26 %
Tuberculosis	42	26 %
Abscess, Ehinococcus	6	3.8 %
Others	10	3.6 %

Total and partial collapse of the lung were achieved in 84.3 and 5.6 % of patients respectively where collapse was not obtained in 10% of them due to pathologic anatomical structure of the lung (Table 2).

In study had anesthesia mean tidal volume 7.77±1.07 ml/kg, mean one lung volume 5.87±0.46 ml/kg ($p<0.014$), the women DLT mean size 35.43±2.25 Fr, mean deep 27.68±2.47 cm, the man DLT mean size 37,09±4.69 ($p<0.093$),mean deep 28.43±2.6 cm ($p<0.004$). During anesthesia monitored average SpO_2-95.09% ± 1.07,in analyzed arterial blood average SaO_2- 92.65%± 5.69 ($p<0.03$).

The statistical result of double lumen endotracheal tube placement

Table 2

Subjects	Result	P утга
Tidal volume of both lungs	7.77±1.07 ml/ kg	
Tidal volume of one lung	5.87±0.46 ml/kg	p<0.014
Female (Mongolian)	35,43±2.25 (Fr)diameter	p<0.093
Male (Mongolian)	37,09±4.69 (Fr) diameter	
Female (151-160 cm height)	27.68±2.47cm deep	
Male (161-170 cm height)	28.43±2.6cm deep	p<0.004
In non invasive(SpO_2)	95.09% ± 1.07	
In arterial blood(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	

Type of surgery

Surgery type	N	%
Esophagus surgery:		
Ivor Lewis	37	23.1%
Other	19	11.9%
Lung surgery:		
Pulmectomy	24	15%
Lobectomy, segmectomy , other resections	57	35.6%
To probe thoracotomy	3	1.9%
Other(Tuberculosis, Ehinococcus, …stomy)	20	12.5%

Discussion

In reports it shows that 80-90% of double lumen tube placement performed a collapsed lung in open thoracic surgery. The result of our study which is 84.3% (collapsed lung) is overlapped to this report. In reports of Association of American Anesthesiologists, the double lumen tube placement is performed 28-29cm deep in trachea of patient with 170cm height and 1 cm variation occurs in every 10 cm.

The result of our study is overlapped to these reports, in that average height of female Mongolian is 155-165 cm, so that placements of DLT27.68$\pm$2.47см ($p<0.004$)deep 35,43$\pm$2.25 (Fr)($p<0.093$)diameter, average height of male Mongolian is 155-165 cm, so that placements of DLT 28.43$\pm$2.6см ($p<0.004$) deep 37,09$\pm$4.69(Fr)($p<0.093$)diameter.

Conclusion: One lung anesthesia separating two lungs by double lumen tube (DLT)–the advantages of the method are allowing surgeons to operate safely in collapsed side of lung; there are a few reports of airway damages. Usage of the double lumen tube will be increased widely in anesthesia for operations of cancer of lung, esophagus and thoracic aneurism aorta…through world standard.

- Air management of double lumen tube with correct procedure and placement in a lung during operation have many benefits which less risk for patient and operation team, less length of operation time, and decreased complication and mortality.

Key words: Thoracic Anesthesia, Double Lumen Tube for Anesthesia, Tidal volume, one lung volume.

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