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## DOUBLE LUMEN INTUBATION; RELIABILITY OF AUSCULTATORY METHOD?

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**ABSTRACT...** **Introduction:** Auscultation is well established and most commonly used method for checking of correct placement of Double Lumen Tube(DLT). Now with widespread availability of fibre optic bronchoscope, confirmation of DLT placement by fibre optic bronchoscope is recommended by many and considered mandatory by some anaesthetist. **Objective:** To discuss method of insertion and reliability of auscultatory method to confirm correct placement of double lumen tubes. **Study design:** Observational. **Place and duration:** Combined Military Hospital Rawalpindi from 16th Nov 2003 to 13th July 2007. **Material & Methods.** We have performed about one thousand one hundred and fifty double lumen intubation without use of fiberoptic bronchoscope. **Results:** 85% of patients did not need any tube adjustment during surgical procedure. Only 15% cases required tube adjustment intra-operatively. None of procedures were abandoned due to double lumen tubes problems. **Conclusion:** We conclude that auscultation is not that unreliable though not perfect method of DLT placement. Use of fiberoptic bronchoscope is recommended but not mandatory for DLT placement. Anatomical malpositioning detected by fibre optic bronchoscope which according to some studies is 70 to 80% does not necessarily translate into physiological malfunctioning.

**INTRODUCTION**

With advancements in anaesthetic technique and expertise, more complex and extensive surgical procedures are now being performed. Collapse of one lung for surgery on lung or to improve access to surgical field for aortic, spinal and chest surgery is one example of anaesthetic contribution to facilitate surgical procedure. There are various ways of isolating both lungs but double lumen tubes have stood the test of time because of their desirable features. Bjork and Carlen introduced double tubes in 1950. Modern DLT are less traumatic, tissue friendly and user friendly as well. Generally indications for DLT are absolute and relative.

Absolute indication are prevention of spoilage from opposite lung, control of single lung ventilation and bronchopulmonary lavage. Relative indication are all those which are used to facilitate surgical access. Fiberoptic bronchoscopy(FOB) is ideal method to insert and check the position of DLT.

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There are other methods to insert and check the position of DLT which are in use since introduction of DLT and before invention of FOB. We here present experience of 1150 DLT insertion without use of FOB.

Auscultation is well established and most commonly used method for checking of correct placement of Double Lumen Tube (DLT)<sup>5</sup>. Now with widespread availability of fibre optic bronchoscope, confirmation of DLT placement by fibre optic bronchoscope is recommended by many and considered mandatory by some anaesthetist<sup>1,2</sup>.

## METHOD

### Objective

To discuss method of insertion and reliability of auscultatory method to confirm correct placement of double lumen tubes.

### Study design

Observational

### Place and duration

Combined military hospital Rawalpindi from 16<sup>th</sup> Nov 2003. To 13<sup>th</sup> July 2007.

Informed consent was waived as it was an observational study utilizing parameters taken as a part of standard clinical practice. All cases that have undergone double lumen tube intubation during this period were included. Data was collected from patient anaesthetic record and if there was any doubt about clarity of record anaesthetist was contacted in person or by telephone. Total 1150 double lumen intubations were carried out during this period. One thousand and two were left sided double lumen tubes and one hundred and forty eight were right sided tubes. Left sided tubes were used in preference to right sided tube because of favourable anatomy of left main bronchus.

The tubes used were disposable PVC Mallinckrodt DLTs-Bronchocath - size 35 in women and 37 in men<sup>8,9</sup>. Tubes of other manufacturers were also used keeping in view the availability and cost of tube but these constitute less than 10% of total tubes. Most of patient were

evaluated a day or more before surgery but 10% patient were seen on day of surgery. Standard monitoring, ECG NIBP and pulse oximetry was started before induction<sup>2,8</sup>. Depending upon general condition of patient thiopentone atracurium morphine and inhalational agent usually isofluran were used as a routine. Changes in this routine were allowed on discretion of anaesthetist responsible for the case. All DLI were performed either directly by consultant anaesthetist or by trainee under direct supervision of consultant. Interconsultant communication was free and frequent. It was mandatory to inform senior consultant if things were not going according to plan.

### METHOD OF INSERTION OF DLT

DLT were checked for patency of both lumen and leakage of both cuffs<sup>3,4</sup>. Stylet was placed in bronchial lumen and tube was advanced with bronchial lumen facing anteriorly until it passes beyond vocal cords<sup>4,9</sup>. Stylet was removed at this stage. DLT was turned about 80 degree counter clock wise for left sided tube and 70 to 80 degree clock wise for right sided tube and advanced further until resistant was felt. At this stage tube was withdrawn 1.5 to 2 cm and bronchial cuff was inflated and breathing circuit was attached via double connection and tracheal port clamped. Ventilation was started via bronchial lumen and air entry was checked on upper and lower part of lung on that side, tube was manipulated to have equal air entry on upper and lower part of lung.

Tracheal port was then unclamped and bronchial port clamped. Ventilation started via tracheal lumen. Air entry on that side was checked<sup>2</sup>. If there was reduced air entry or increased airway pressure, bronchial cuff was slightly deflated if ventilation on tracheal side improved tube was not far enough in and bronchial cuff was obstructing air flow to opposite side. DLT was advanced further and air entry and airway pressure checked again. If there was no difference in air entry or airway pressure on deflation of bronchial cuff, DLT was too far in, tracheal lumen was too near the carina. DLT was then pulled out slightly and air entry and airway pressure checked again. Bronchial port was unclamped and air entry checked on both side<sup>6,7</sup>.

## RESULTS

Using conventional method of double lumen intubation 85% of cases did not need any tube adjustment during surgical procedure. 15% of cases needed DLT adjustment intraoperatively, DLT migrating out was more common than migrating in. Chances of opposite lung intubation was <2%. Three cases required intermittent double lung ventilation because of  $S_pO_2$  falling below 88% and DLT adjustment maneuvers did not improve the  $S_pO_2$  in these cases.

One case had left main bronchial injury that was repaired during same procedure. There was no mortality attributable to DLT in our study.

## DISCUSSION

Usually we are dealing with diseased lungs, it becomes difficult to decide whether decreased air entry is because of diseased lung or malposition of DLT so preop workup helps a lot<sup>2</sup>.

Normally recommended rotation to left or right is 90 degree<sup>1,2,10</sup> but we found that slight less degree of rotation decreases chances of opposite lung intubation. In our study frequency of opposite lung intubation was <2%.

Chances of esophageal intubation are as much as with single lumen intubation.

Occasionally keeping the stylet up to bronchial intubation helps to guide the DLT in respective bronchus<sup>7</sup>. This maneuver is not without risk. There are chances of bronchial injury<sup>8</sup>. There was one case of bronchial damage in our study.

We used slightly less than 90 degree rotation toward respective bronchi, it was more important for right-sided tubes where chances of opposite lung intubation increase as rotational angle increases >80.

Pulling of tube back 1.5 to 2cm after resistance is felt when advancing the DLT needs less manipulation for correct placement of DLT.

For checking of placement of DLT initial tracheal cuff

inflation and checking of bilateral breath sounds is of limited value. Suppose if there is no air entry on tracheal side, it gives no clue what to do. Similarly if there is decrease air entry on bronchial side it gives no clue what to do. So it is better to skip this step and go directly to bronchial cuff inflation and checking of air entry on that side. Afterward tracheal cuff be inflated and by that one can reasonably be sure what to do if there is inadequate air entry on tracheal side.

Interconsultant communication is very important. Serious difficulties can be overcome by fresh and experienced help.

Medicine is ever changing and changing at very rapid pace in 21<sup>st</sup> century. With development and availability of new equipment invasive procedures are becoming safer and safer, but these equipments are not readily available in some places. Moreover there is learning curve to use new equipment and it takes sometime to develop. We are not saying in any way that fiberoptic bronchoscope is not necessary for DLI rather it is a perfect method of DLT placement and afterward management but what we want to highlight is the point that auscultatory method of DLT placement and its further management is reliable though not perfect method wherever DLT is clinically indicated.

## CONCLUSION

To confirm the position of DLT, auscultatory method is reliable alternative to fiberoptic bronchoscopy, specially when the latter is not available.

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**Common sense  
is not  
so common**

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