

## Curved Knife “Khukuri” Injury in the Back and Anaesthesia Induction in Lateral Position for Thoracotomy

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### ABSTRACT

Penetrating injury in the back with knife (Khukri) demands induction of anaesthesia and intubation in lateral position. In thoracic injury a double lumen tube placement is required to facilitate one lung ventilation during thoracotomy. In emerging situation, we could successfully execute induction of patient in right lateral position using right sided DLT for left thoracotomy. Its correct placement was confirmed by fiberoptic bronchoscopy. In conclusion right-DLT intubation can be performed without difficulty by conventional direct laryngoscopy using Macintosh blade in lateral position.

**Keywords:** *khukuri knife, lateral position, one lung ventilation, thoracic injury*

### INTRODUCTION

Airway management in patient with penetrating injury at thoracic paravertebral region is difficult as patient cannot be laid supine for intubation. With the weapon in situ, the most accessible position for intubation remains the lateral position. Even conventional tracheal intubation is more difficult in lateral position than in supine position.<sup>1</sup> Therefore, placement of double lumen tube in lateral position was evenly challenging. We wish to share our experience of anaesthetic induction and intubation in a patient in lateral position for emergency thoracotomy following penetrating injury of left thorax.

### CASE REPORT

A 26 yrs male was brought in emergency room with stab injury on the back by ‘*Khukuri*’ (Nepali knife). He was referred from Zonal hospital with left intercostal tube drain and *Khukuri* in-situ. Its handle was protruding from left paravertebral region at T<sub>8</sub>-T<sub>9</sub> spines (Figure

1). Chest X-ray showed curved knife pointing towards diaphragm with pleural effusion on left side (Figure 2). Left thoracotomy was planned under general anaesthesia.

Electrocardiography lead-II, pulse oximetry and intra-arterial pressure monitoring was established before induction. Considering normal air entry on right side and left pleural effusion in chest x-ray (Figure 2), right lateral position (normal lung down) was preferred during induction of anaesthesia. Two hands technique was used for cricoid pressure by the assistant (Figure 3) and rapid sequence induction was done with propofol (120mg) and suxamethonium (100mg) intravenously. After visualizing vocal cords by direct laryngoscopy, right sided double lumen tube (Rt-DLT) (Broncho-Cath™ R-DLT from Mallinckrodt Inc. St-Louis, MO, USA) was inserted (Figure 3). Cricoid pressure was released after the inflation of tracheal cuff. Position of the tube was

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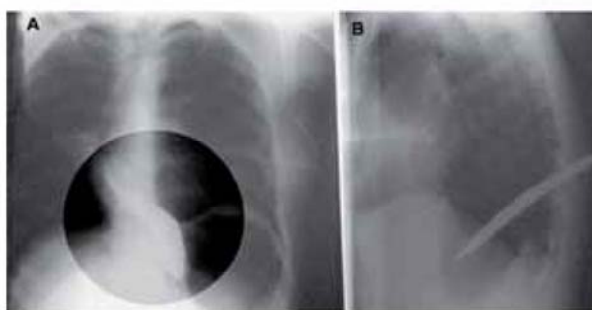
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confirmed by alternately clamping tracheal and bronchial tube to check adequate chest movement and air entry in each hemithorax. The position of the bronchial opening was aligned with right apical bronchus using fiberoptic bronchoscope. We maintained anaesthesia with air-oxygen mixture ( $\text{FiO}_2=0.4$ ), isoflurane (1.5%vol), pethidine (60mg) and vecuronium. Oxygen (100%) was delivered and then tracheal limb was left open to facilitate collapse of left lung and surgery. Arterial blood gas analysis done 45 min after initiation of one lung ventilation showed pH-7.38,  $\text{PaCO}_2$ -44mmHg,  $\text{PaO}_2$ -270mmHg,  $\text{HCO}_3^-$ -25.8meq/l, Hct-32.6%, lactate-2mmol/l and  $\text{SaO}_2$ -99.7%.



**Figure 1.** Khukuri handle protruding from left T8 –T9 paravertebral region with patient in prone position



**Figure 2.** Antero-posterior and lateral chest radiographs showing the weapon taking its natural course downward

Patient was haemodynamically stable during surgery. Blood loss (1 l approx.) was replaced with Ringer's lactate (2.5 l) and Dextran-40 in NS (500 ml). The weapon penetrated left thorax after breaking 8<sup>th</sup> rib posteriorly and injured diaphragm without injuring lung, pericardium or great vessels in the thorax. After removing weapon and diaphragmatic repair, left intercostal drain was placed to close thoracotomy. Both lungs ventilation was resumed to turn patient supine for

laparotomy. It revealed no injuries to abdominal organs. At the end of surgery, double lumen tube was replaced with the single lumen tube and patient was shifted to intensive care unit (ICU) for ventilatory support in next 10hrs after which he was successfully extubated and discharged from hospital after 6 days.



**Figure 3.** Placement of Rt-DLT (Bronchocath) in right lateral position while maintaining cricoid pressure

## DISCUSSION

To accommodate the dictum of keeping weapon in-situ till weapon is surgically exposed, our patient having penetrating injury in the left thorax, the choices of induction of anaesthesia in right lateral position of the patient was distinctly advantageous in maintaining oxygenation, placing Rt-DLT and successfully managing left thoracotomy.

In presence of *Khukri* in back at thoracic level patient could not be laid supine so induction of anaesthesia was indicated in lateral position. Considering left sided thoracic injury with normal right lung, right lateral position was preferred to improve oxygenation for its better perfusion and ventilation. Induction of anaesthesia and Lt-DLT intubation under direct laryngoscopy has been reported in left lateral position.<sup>2</sup> However, our patient needed to be anaesthetized in right lateral position, so we preferred Rt-DLT over left-DLT for its easier insertion into the wider and straighter right bronchus than left bronchus.

Recent study has also supported use of Rt-DLT over Lt-DLT for left thoracotomy.<sup>3</sup> It avoids the possible ball valve like obstruction of the tracheal opening approximated with the tracheal wall due to mediastinum downward shift or the bronchial cuff herniation over the carina occluding right bronchus.<sup>4</sup> It is unlikely with Rt-DLT use. The right lateral position can also be associated with mediastinal shift under gravitational effect to alter left main bronchus angulation and the difficulty in Lt-DLT placement.<sup>4</sup> The Rt-DLT malposition and displacement is a main cause for hypoxaemia in patient positioning from



supine to lateral.<sup>5,6</sup> However in our patient as intubation was done in right lateral position, further continuation in same position for surgery was again favourable to use Rt-DLT.

Since we anticipated easy laryngoscopy (Mallampati-I; wide mouth opening >3cm; thyromental distance 6 cm) in our patient, we used conventional Macintosh laryngoscope in right lateral position to visualize vocal cords to pass Rt-DLT under vision. *Khukuri* although

stabbed straight into left thorax took its natural curve downwards to injure diaphragm, which was surgically repaired from left thoracotomy.

In conclusion, thoracic penetrating injury with weapon in-situ does not allow supine position during induction of anaesthesia. Right lateral position allowed easy placement of right sided double lumen tube for left thoracotomy.

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