

## CASE REPORT

# Anesthesia Management of Prolonged Surgery with Duration of 15 Hours for Correction of Post Koch's Kyphosis

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## ABSTRACT

Anesthetic management of post koch's kyphosis correction of 48 yr old female is discussed. The patient was under anesthesia for long duration of 15 hours which also included Wake up test. After surgery 3 months later patient went home walking. It is emphasized that with good team work between orthopedician, anesthesiologist, chest physician and nursing staff will make it possible to produce excellent outcome in these cases.

**Keywords:** Anesthesia, Deformity, Koch's, Kyphosis, Monitoring, Spine, Test, Wakeup.

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## INTRODUCTION

Patients undergoing surgical correction of kyphosis present many challenges to anesthesiologists due to various pathological and physiological derangements caused by the disease and the demanding nature of anesthesia care required. A thorough understanding of the disease and intraoperative concerns specific to the procedure are needed to provide effective anesthesia care perioperatively. This case report describes a 48-year-old bedridden female who contracted kyphosis secondary to tuberculosis of spine and successful management of the 15 hours long duration surgery which later on made her able to move around.

## CASE REPORT

A 48-year-old female presented with complaints of inability to move both lower limbs for 8 months and

loss of sensation in both lower limbs for 8 months. She does not complain of any bowel or bladder symptoms. Past history revealed that she had undergone 6 months therapy for pulmonary tuberculosis 10 years back. General examination was normal. Auscultation of the respiratory system revealed decreased air entry in the left side. Hemogram, renal function test (RFT), liver function test (LFT) were normal. Chest radiograph revealed fibrosis of left upper lobe with deviation of trachea to the left. Cobb's Angle was 80° in the preoperative X-ray Thoracic Spine (Fig. 1). Arterial blood gas (ABG) analysis showed mild hypoxemia (pO<sub>2</sub>: 67.3). Neurological examination revealed loss of sensation in both lower limbs and grade 2 power of both lower limbs. Airway assessment was normal. Preoperatively, the need for wakeup test and the procedure was explained to the patient in mother tongue since somatosensory evoked potential (SSEP) modality was not available in our hospital.

The proposed surgical plan was D5-D8 decompression with instrumentation and correction of the kyphotic deformity.

After giving injection Midazolam 1 mg intravenous (i/v) and injection Fentanyl 100 mcg i/v, the patient was induced at 9:15 am with injection Propofol 100 mg, and injection Rocuronium 40 mg i/v was used for muscle relaxation. Laryngoscopy revealed a Cormack-Lehane grade 3, and bougie-guided intubation was done and airway secured with 7.0 mm cuffed endotracheal tube. Left radial artery was cannulated for invasive blood pressure (BP) monitoring and central venous access secured by peripherally inserted central catheter line in right median cubital vein. After securing airway, prone positioning of the patient was done and adequate padding of pressure points provided. Dexmedetomidine infusion started at 0.5 mcg/kg/hour and anesthesia was maintained using nitrous oxide and desflurane. Atracurium was used for intraoperative muscle relaxation. injection Hydrocortisone 100 mg and injection Dexamethasone 8 mg given after induction and repeated every 8 hours. Sixth hourly ABG analysis was done.

Wakeup test was performed at 1:15 am and it was confirmed that ankle clonus was present. Surgery concluded at 3:45 am. The patient was hemodynamically

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Fig. 1: Preoperative X-ray spine lateral view; Cobb's angle-80°

stable throughout the procedure. Blood loss was 3000 mL. Total of 4000 mL crystalloids, 1000 mL colloids, 5 units of whole blood, and 6 units of fresh frozen plasma were given. Urine output was 1100 mL.

Postoperatively, the patient was shifted to intensive care unit (ICU) i/v/o prolonged major surgery, on ventilatory support. Patient remained in ICU under the care of anesthesiologists for 5 days. Patient was extubated on 1st postoperative day. After postoperative day 5, the patient was shifted to intermediate respiratory care unit (IRCU) as she developed signs of acute respiratory distress syndrome. In IRCU, she was rehabilitated under the care of chest medicine physicians and physiotherapists.

After rehabilitation for 15 days, the patient was shifted toward where physiotherapy was continued. After 3 months postsurgery, now the patient is mobile and able to walk without support, with grade 5 power of both lower limbs.

## DISCUSSION

Kyphosis is defined as the abnormal excessive anteroposterior curvature of the spine. In many cases, it is associated with scoliosis, which is the abnormal lateral curvature of the spine and the condition is termed kyphoscoliosis.

### Causes

- Postural kyphosis (most common)
- Scheuermann's kyphosis (juvenile osteochondrosis of spine)
- Congenital
- Nutritional

- Tuberculosis (Gibbus deformity)
- Posttraumatic.

### Associated Pathophysiologic Alterations

*Respiratory system:* Restrictive pattern in pulmonary function test (PFT); decreased vital capacity, total lung capacity, inspiratory capacity, inspiratory reserve volume. This is due to abnormal thoracic cage geometry and marked decrease in chest wall compliance.<sup>1,2</sup> Arterial blood gas analysis might show hypoxemia.

*Cardiovascular system:* Pulmonary hypertension (PH), right ventricular failure.

### Preoperative Evaluation

*Location of the deformity:* Thoracic is associated with deranged PFTs and cervical is associated with difficult airway.

Age of onset, etiology, and severity of deformity should be discussed with surgeons.

### History

- Breathlessness, effort tolerance to assess cardiopulmonary reserve
- Cough/wheeze to rule out associated parenchymal lung diseases.

### Physical Examination

- Examination of respiratory system – air entry, adventitious sounds
- Examination of cardiovascular system – signs of PH.

### Airway Assessment

Especially in cervical scoliosis.

### Neurological Assessment

- Documentation of preexisting preoperative neurological status.
- Preoperative counselling of patient if wakeup test is planned.

### Investigations

- Hemogram, RFT, LFT, coagulation studies
- Chest X-ray, electrocardiogram (ECG)
- Echocardiogram
- PFT
- ABG

### Anesthetic Technique

- Induction – Thiopentone/Propofol
- Fentanyl + propofol infusion/dexmedetomidine infusion/isoflurane or desflurane

- Avoid succinylcholine in neuromuscular disorders
- Postoperative pain relief – NSAIDs/opioids
- Standard monitoring – ECG, NIBP, SpO<sub>2</sub>, ETCO<sub>2</sub>
- Invasive BP, central venous pressure monitoring
- Input output/temperature monitoring
- Positioning and pressure point padding.

### Intraoperative Concerns

- Blood loss
- Hypothermia
- Prone position complications
- Spinal cord monitoring.

**Blood loss:** Generally associated with large blood loss. Blood loss can be reduced by controlled deliberate hypotensive anesthesia and maintaining a deep plane of anesthesia. Techniques like preoperative autologous blood donation, acute normovolemic hemodilution, and intraoperative blood salvage can be used to minimize the use of blood transfusion.

**Hypothermia:** Can be prevented using temperature monitoring, warm blankets, warm iv fluids, warm irrigation solutions, and maintaining operating room temperature.

**Prone position:** Prone position has many complications, including peripheral nerve injury, accidental extubation, abdominal compartment syndrome, ischemic optic neuropathy, and the most dreaded central retinal artery occlusion.<sup>3,4</sup> Arms should be abducted to less than 90°, pressure points should be padded, abdomen should be free of any compression. Eyes should be checked frequently. Horse shoe-shaped adaptor can be used for head positioning, which provides superior access to airway and visualization of eyes.

**Spinal cord monitoring:** Postoperative neurological deficit is one of the most feared complication. Wakeup test is the gold standard test for spinal cord monitoring. The procedure should be explained in detail to the patient

during preoperative evaluation. Inhalational agents and muscle relaxants are stopped and the patient is allowed to wake up from anesthesia temporarily. Patient is first asked to grip the hand and then move the leg. Once movement is confirmed, anesthesia and surgery is continued further. There is a chance of accidental extubation, air embolism, and dislodging of instruments during wakeup test. Newer modalities are SSEP and motor evoked potential, which assess the sensory and motor pathways of the spinal cord respectively.<sup>1</sup>

Postoperative challenges are the need for ventilatory support, optimization of pulmonary status, pain management, and mobilization. Incentive spirometry and physiotherapy should be started as early as possible. Adequate analgesia should be provided by the use of NSAIDs/opioids. Bronchodilators can be added to improve ventilation and oxygenation.

### CONCLUSION

Spine surgeries are challenging to the anesthesiologist. Thorough optimization of the patient preoperatively, detailed preoperative assessment, proper monitoring intraoperatively with close attention to spinal cord monitoring, and prone position are needed. These along with postoperative analgesia, physiotherapy, and rehabilitation result in an excellent outcome in these surgeries.

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