

**Case Report**

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# Challenges In Securing Central Venous Access in a Case of Ankylosing Spondylitis with Kyphotic Deformity



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## Abstract

Ankylosing spondylitis is an inflammatory disorder that primarily affects the axial skeleton although extra-articular structures and peripheral joints can also be involved. Over time the disease causes fusion and rigidity of the spine and can result in hyperkyphotic hump. While securing an internal jugular venous access, patients are usually positioned in a Trendelenburg position to distend the vein, increase the cross-sectional area and improve the chance of successful cannulation. We report the case of a 40-year-old male with ankylosing spondylitis with a kyphotic deformity presenting for deformity correction. Due to the severity of kyphosis, had a very limited neck extension the patient was not able to lie supine and thus trendelenburg position was not feasible. In this case report we focus on the challenges involved in securing a central venous access in a suboptimal position and briefly discuss the anaesthetic management.

**Keywords:** Ankylosing spondylitis; central venous access; difficult positioning

## Case Details

A 40-year-old male, weighing 62 kgs presented with deformity of the back since 12 years and was diagnosed with ankylosing spondylitis. It was associated with morning stiffness and dull aching pain that was partially relieved with non-steroidal anti-inflammatory drugs. There was no history of trauma / tuberculosis / fever / weight loss or previous surgeries. The patient had no other comorbidities and had an effort tolerance of more than 4 metabolic equivalents (METS). No other associated features of ankylosing spondylitis were present. On examination, vitals were normal. A kyphotic deformity involving the thoracolumbar vertebrae was noticed (Figure 1). Bilateral lower limb power, deep tendon reflexes and sensory examination were within normal limits. On airway examination, the patient had less than 10 degrees neck extension with adequate mouth opening, intact teeth and a mallampati grade 3. Hemogram, electrocardiogram and 2D echocardiography were within normal limits and pulmonary function tests (PFT) showed a moderate restrictive pattern.

## Anaesthetic management

The patient was brought to the operating room (OR) after an appropriate period of fasting. Standard monitoring was instituted,

and the patient was placed in a semi sitting position as positioning the patient in supine was not possible due to the existing kyphosis. This was done with the help of pillows and sheets stacked in the form of a ramp under the head, neck, and upper back. After preoxygenation, the patient was induced with fentanyl 50 µg intravenously and sevoflurane. Check ventilation was done and then succinylcholine 75 mg IV was given. Patient was intubated with an 8.0 mm cuffed reinforced endotracheal tube in a semi-sitting position with fiberoptic bronchoscope guidance.

A triple lumen catheter was placed in the right internal jugular vein using USG guidance in the semi-sitting position. As the IJV tends to collapse in the sitting position, an inspiratory pause and a positive end expiratory pressure (PEEP) of 10 cm of H<sub>2</sub>O was used to help in the placement. A 20G arterial cannula was placed in the right radial artery. The patient was carefully positioned in prone with adequate padding of the pressure areas and the abdomen was kept free. Anaesthesia was maintained with total intravenous anaesthesia (TIVA) using propofol and fentanyl infusion as Motor evoked potentials (MEP) monitoring was required during the surgery. Intra operative vitals were stable, and the patient had a small pleural tear on the right side during the surgery which was

repaired. During the eight-hour surgery, the blood loss was 3.5 litres which was replaced with 5 units of packed red blood cells, 4 units of fresh frozen plasma, 3 units of platelets along with 3lts of crystalloids and 1.5 litres of hydroxyethyl starch. The urine output

was 850ml. In view of the difficult airway and massive blood loss, the patient was not extubated and was shifted to intensive care unit. The patient was extubated on post operative day 2 and discharged from the hospital after 7 days.



Figure 1: Image showing kyphotic deformity.

### Discussion

Ankylosing spondylitis is an inflammatory disorder that primarily affects the axial skeleton although extra-articular structures and peripheral joints can also be involved [1]. Overtime the disease causes fusion and rigidity of the spine and can result in hyperkyphotic hump. Anesthetic challenges range from a potential difficult airway (due to the involvement of the cervical and thoracic spine) to perioperative complications due to the involvement of cardiovascular and respiratory system [2]. While securing an internal jugular venous access, patients are usually positioned in a Trendelenburg position to distend the

vein, increase the cross sectional area and improve the chance of successful cannulation [3]. Other methods to increase the chances of successful cannulation include application of peep [4], application of liver/abdominal pressure, simulated Valsalva manoeuvre [5] and passive leg raising [6] PEEP increases the intrathoracic pressure impeding venous return and compressing the superior vena cava distending the internal jugular vein. Addition of PEEP also decreases the carotid artery overlap with the IJV [7]. Application of high positive airway pressure may have adverse consequences such as hypotension and an ideal pressure of 20 cm of H<sub>2</sub>O has been suggested to achieve increased vein diameter with a low complication rate [8].



Figure 2: Image showing positioning of the patient during intubation and central line insertion

In our patient, due to the severity of the deformity, Trendelenburg position was not feasible. The application of PEEP and inspiratory pause predictably distended the right IJV, and cannulation was possible in a semi sitting position using ultrasound guidance without any complications (Figure 2).

### Conclusion

Securing central venous access in patients with ankylosing spondylitis can be challenging especially when positioning in supine or trendelenburg is impossible due to the deformity. The application of PEEP and inspiratory pause can make this process a lot easier by distending the internal jugular vein and decreasing overlap with the carotid artery.

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