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CASE REPORT

# Where Spinal Anesthesia is Not the Final Word- Cesarean Section under General Anesthesia in a Primi Gravida with Severe Scoliosis and Type 4 Placenta Previa: A Case Report

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## Abstract

Both neuraxial and general anesthesia present unique challenges to the anesthesiologist when managing a pregnant patient with scoliosis. The type and duration of scoliosis and the Cobb's angle are key determinants of the degree of respiratory compromise. Pregnant women with scoliosis are anticipated to have deformities in the vertebra, which can render subarachnoid or epidural anesthesia technically challenging. The pulmonary complications following scoliosis add to the physiological changes in pregnancy and can make mechanical ventilation fraught with challenges. We hereby present the anesthetic concerns involved in the management of a parturient with severe scoliosis, gestational hypertension, gestational thrombocytopenia, and placenta previa posted for cesarean section.

## Keywords

Scoliosis, Cesarean section, Anesthesia, Pulmonary

## Introduction

Scoliosis is an abnormal lateral curvature of the spine, whereas kyphosis is its anteroposterior angulation. Scoliosis is associated with rotation of vertebra and deformity of the rib cage [1]. Whether scoliotic curve progression accelerates during pregnancy is a matter of debate, with some anecdotal evidence citing an increased rate of curve progression in patients treated with orthotics [2]. The functional and anatomical changes to the spine in pregnancy when compounded by pre-existing scoliosis, makes neuraxial blockade technically difficult.

Respiratory system involvement with advancing degrees of scoliosis leads to restrictive lung disease, alveolar hypoventilation, shunting, and cor pulmonale [3]. Scoliosis involving the thoracic vertebrae leads to reduction in the number of alveoli, further hindering ventilation [4]. Additionally, pregnancy leads to increased intra-abdominal pressures and subsequent basal atelectasis, leading to reduced functional reserve. Institution of mechanical ventilation and general anesthesia in such patients can is onerous, with challenges aplenty.

Thus, both neuraxial and general anesthesia pose unique concerns to the anesthesiologist when managing a pregnant woman with scoliosis. We present the anesthetic management of a case of uncorrected severe scoliosis in a parturient with gestational thrombocytopenia and type 4 placenta previa, posted for caesarean section.

## Case Report

A 24-year-old primi gravida, with congenital kyphoscoliosis presented at 36 + 3 weeks of

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gestation with type 4 placenta previa and gestational thrombocytopenia. She was also diagnosed with gestational hypertension in the 7th month of gestation and started on oral anti-hypertensives. She had no imminent symptoms and was hemodynamically stable with a heart rate of 80/min, blood pressure 112/74 mmHg, $SpO_2$ 98% on room air, and a breath holding time of 21 seconds. Her investigation reports were hemoglobin- 8.7 gm/dl, platelet count- 99,000/cu.mm, and urine protein creatinine ratio- 0.17. Local examination revealed lateral deviation of mid, lower thoracic and lumbar spines, with narrow intervertebral spaces without overlying bony tenderness. Her systemic examination was unremarkable, and airway was adequate. Being pregnant, an MRI spine was performed instead of an X-ray, and revealed a Cobb's angle of 52 degrees, indicating severe scoliosis (Figure 1). Her echocardiogram showed no evidence of right ventricular dysfunction. She was taken for surgery under intermediate risk of postoperative pulmonary complications.

After shifting to the operation theatre, IV access was secured with 18 G cannula, and standard monitors ($SpO_2$, ECG, and NIBP) were attached. The patient was then preoxygenated with 100% oxygen, and rapid sequence induction was done with Sellick's maneuver. Her trachea was intubated with 6.5 size endotracheal tube, and lower segment caesarean section was subsequently performed. Care was taken to avoid hypercapnia, hypoxia, acidosis, as these would increase pulmonary artery pressures. The intraoperative and postoperative period was uneventful; and patient was discharged on day 7 postop.

## Discussion

Scoliosis is seen in 2% of the population, with a higher female preponderance [5]. The deformities tend to manifest during periods of rapid growth, such as adolescence. The attendant cardiorespiratory complications increase in severity with higher grades of scoliosis and can lead to death within the fifth decade of life, if left untreated.

The type and duration of scoliosis, and the Cobb's angle are principal determinants of the severity of scoliosis, which in turn, governs the degree of pulmonary involvement. Cobb's angle is a radiological measurement taken on the chest X-ray, and when the angle exceeds 60 degrees, the chest wall compliance is affected and restrictive lung pathology ensues, leading to a reduction in various lung volumes and capacities, such as tidal volume (TV), forced expiratory volume (FVC), and forced expiratory volume in one second (FEV1) [6]. Surgical correction is indicated when Cobb's angle surpasses 50 degrees in thoracic and 40 degrees

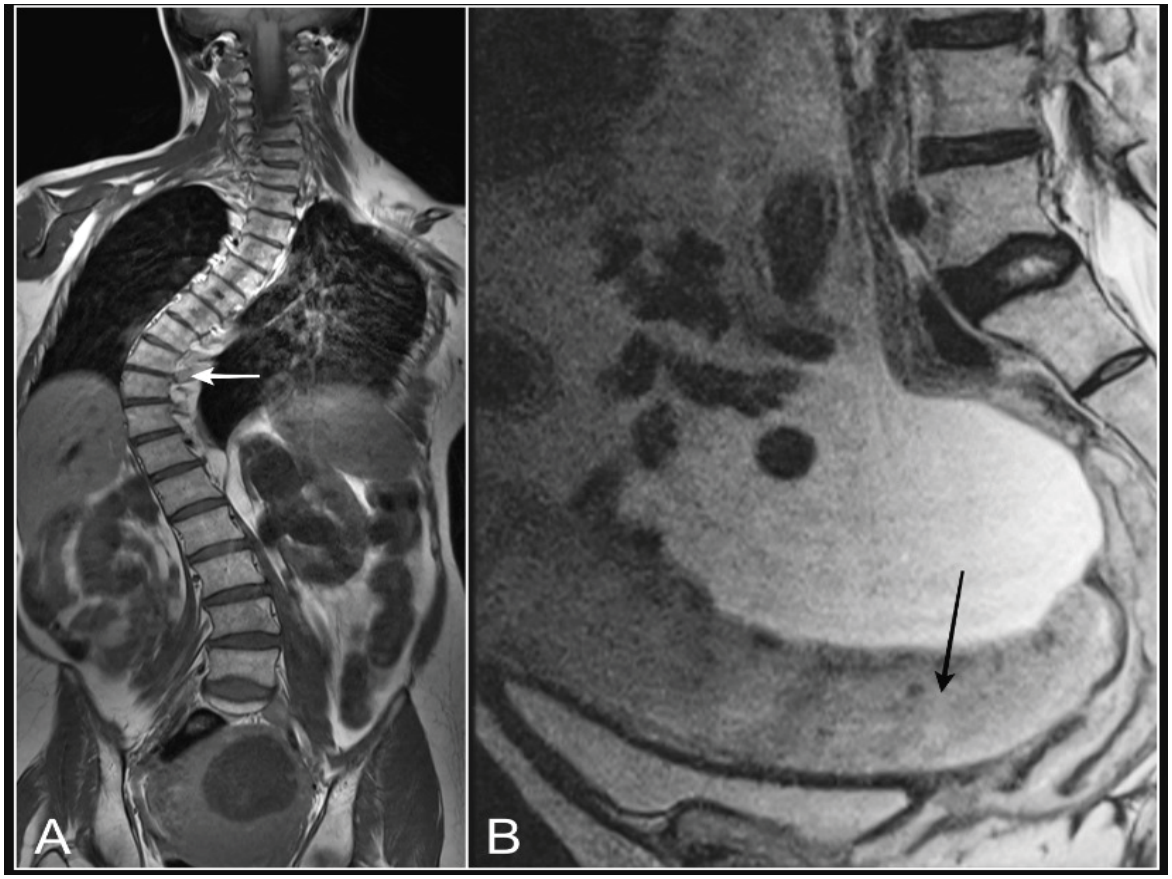


**Figure 1:** MRI of the patient: (a) White arrow indicates severe dextroscoliosis of the dorsolumbar spine in coronal section; (b) Sagittal section of the pelvis shows a low lying placenta (black arrow) completely covering the internal os.

in lumbar vertebrae, with the sole aim of halting the progression of cardiorespiratory disease [7].

Pregnant women with scoliosis are at an increased risk of operative delivery due to cephalopelvic disproportion. The resultant distortion of neuraxial anatomy in scoliosis renders spinal or epidural approaches technically challenging and can require multiple attempts which leads to patient discomfort and anxiety. The increased abdominal pressure and engorged epidural veins in pregnancy predisposes to high level of block, which can be further compounded by the presence of scoliosis. The physiological changes in pregnancy worsen respiratory function in a scoliotic patient with restrictive lung disease and can make general anesthesia fraught with challenges. In severe cases, rotation of trachea and bronchi, along with airway edema makes laryngoscopy and endotracheal intubation difficult [4]. Our patient had gestational thrombocytopenia and type 4 placenta previa which increased the risk of blood loss during surgery. Hence, choosing general anesthesia was a prudent and pragmatic decision in her case. Other situations where general anesthesia is preferred in scoliosis are maternal preference, severe cardiopulmonary disease, and when neuraxial techniques fail [1]. Scoliotic patients with pre-existing neuromuscular weakness, severe restrictive pulmonary profile, or with a vital capacity less than 30 ml/kg often need postoperative mechanical ventilation and delayed extubation [8]. Our patient lacked any predictors of difficult extubation, and hence underwent an uneventful recovery in the postoperative period.

## Conclusion

Thus, scoliosis is an anesthetic challenge, irrespective of the mode or technique of anesthesia. The suitability and technical feasibility of one modality over the other depends on multiple patients and surgery related factors and needs to be assessed on a case-to-case basis.

## Declaration of Patient Consent

The authors certify that they have obtained all appropriate consent forms from the parents of the patient. In the form, the parent/s has/has given consent for their child's images and other clinical information to be reported in the journal. The parent/s understands that her name and initial will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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## Conflicts of Interest

There are no conflicts of interest.

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