

Case Report



SOI: <http://s-o-i.org/1.15/ijarbs-2016-3-8-22>

Anaesthetic management of kyphoscoliotic gravida scheduled for emergency caesarean section

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Abstract

Kyphoscoliosis though a rare deformity is one of the cause for chronic extrinsic restrictive pulmonary disease. Here we are reporting a 24 year old primigravida with severe thoracolumbar kyphoscoliosis scheduled for emergency LSCS. Though both regional and general anaesthesia are not contraindicated, we managed this case using spinal anaesthesia without any peri-operative complications.

Keywords: Kyphoscoliosis; Spinal Anaesthesia; Malignant hyperthermia

Introduction

Kyphoscoliosis is a spinal deformity characterized by anterior flexion (kyphosis) and lateral curvature (scoliosis) of the spine. Idiopathic variety ^[1] (80%) being most common, begins during late childhood and may progress in severity during periods of rapid skeletal growth. The incidence of idiopathic kyphoscoliosis is approximately 4 per 1000 population ^[2] and females are affected four times more often than males. It can be associated with diseases of the neuromuscular system, such as poliomyelitis, cerebral palsy, and muscular dystrophy ^[3]. Kyphoscoliosis has no effect on the fertility; however pregnancy may exacerbate both the severity of spinal curvature and cardiorespiratory abnormalities.

Case Report

A 24 year old primigravida weighing 52 Kg (height 148cm) with severe thoracolumbar kyphoscoliosis was scheduled for emergency caesarean section due to non progression of labor with fetal distress (FHR: 168 bpm). Past history revealed that her spinal abnormality began in childhood with no history of trauma or tuberculosis. There was no other complaint until

pregnancy when she developed dyspnea on exertion during second trimester, the severity of which progressively increased.

Her family history was also significant for anaesthetic consideration as she had two elder brothers who expired at an age of 10 years, 7 years when they were being operated for fracture humerus and fracture calcaneum respectively. The only thing she and her family reported was that they had suffered some unexpected reaction under anaesthesia which lead to their death.

Physical examination was done in operation theatre which revealed pulse rate of 120 bpm, respiratory rate 32 min, BP 136/92 mm of Hg, SPO₂ on air was 96%, no other abnormality was detected in cardiorespiratory system. Spine examination revealed severe thoracic kyphosis with lumbar scoliosis on left side. Airway assessment shows Malampati Grade I with normal thyromental distance of 6.5 cm, neck movements and mandibular protrusion were normal (Table 1).

This was her first visit to the hospital and she had not undergone any antenatal check-up or any lab investigation. Due to fetal distress only single arterial blood sampling was performed which revealed Hb: 10.5gm%, PaO₂: 90 mm of Hg, PaCO₂ 30 mm of Hg, pH 7.42, Na⁺ 134 meq, K⁺ 4.4 meq/l. She was put on oxygen therapy through oxygen mask. Injection ranitidine 50 mg/iv, ondansetron 4mg/ iv were given.

Due to the history suggestive of malignant hyperthermia in her siblings and known association of kyphoscoliosis with muscular dystrophies there were two plans, either go for total intravenous anesthesia or regional anaesthesia. As all investigations were in normal limit and well known benefit of spinal anaesthesia over general anaesthesia, it was decided to attempt lumbar puncture.

Patient was preloaded with 500 ml of ringer lactate. With continuous oxygen supplementation she was placed in sitting position. After full aseptic precautions lumbar puncture was performed by 25G Quincke spinal needle in L3- L4 interspace via paramedian approach. Puncture was successful in second attempt

and with free flow of CSF, injection bupivacaine 0.5% heavy 1.5 ml with injection fentanyl 25ug was administered. Patient was turned supine with pillow under shoulder to prevent high block. Vital parameters (SPO₂, BP, ECG) were continuously recorded.

The sensory block was achieved up to T6 level after 5 minutes and blood pressure came down to 90/64 mm of Hg, injection ephedrine 7.5 mg was administered after which BP raised to 108/76 mm of Hg and there was no further dip. After that surgery went off smoothly and she delivered a live male baby weighing 2.4 Kg with APGAR score of 8/10 at 2 min. Patient was kept in postoperative unit with oxygen supplementation till the effect of spinal anaesthesia weared off.

On second postoperative day, X-ray spine (AP and lateral view) and X-ray chest were done. X ray chest showed the overcrowding of the ribs with reduced lung span. In lateral view Cobb's angle was 30°C. Patient was discharged on 5th postoperative day uneventfully and there was no postdural puncture headache.

Table 1. Physical examination of patients with Pulse rate, NIBP, SPO₂ in operative conditions

Time	Pulse rate (beats per min)	NIBP (mm of Hg)	SPO ₂ (%)
Preoperative			
	120	136/92	94
Intraoperative			
5 min	134	90/64	99
10 min	112	108/76	99
20 min	100	112/80	99
30 min	96	110/82	99
40 min	92	112/84	99
Postoperative			
1 hour	98	122/86	98
2 hour	102	128/88	99
3 hour	100	126/82	98

Discussion

Though globally kyphoscoliosis is a rare deformity, it is one of the common cause for chronic extrinsic restrictive pulmonary disease. The severity of kyphoscoliosis is best determined by measuring Cobb's^[4] angle which is an angle between the perpendiculars of the lines drawn parallel to the upper border of the highest and lower border of the lowest vertebrae. Weinstein and colleagues^[5] reported that Cobb's angle above 60 degrees results in progressive

pulmonary and cardiac failure. Harrison et al reported that pulmonary impairments are most notable at kyphosis angles >55 degrees^[6]. Other factors affecting severity of functional impairment includes: age of onset (earlier the onset more severe the lung impairment), number of vertebrae involved and a cephalad location of the curve. In pregnancy both the severity of spinal curvature and cardiorespiratory abnormalities are exaggerated.

Normally pregnancy is associated with 40 - 50% increase in minute ventilation^[7]; this is mainly due to increased tidal volume, with relatively unchanged respiratory rate. These adaptations are not possible in kyphoscoliotic patients and diaphragm is entirely responsible for all increments in minute ventilation. After midgestation as the enlarging uterus enters the abdomen the diaphragmatic movement gets hampered which leads to decrease in functional residual capacity and closing capacity. Small tidal volumes and increased dead space ventilation leads to tachypnoea. Their coughing ability is also poor which results in frequent pulmonary infections. Thus ineffective ventilation leads to ventilation perfusion mismatch, arterial hypoxemia and increase in pulmonary artery pressure. Death during peripartum period is common in parturient with pulmonary hypertension^[8]. Kyphoscoliotic patients have increased pulmonary and peripheral vascular resistance and are not able to increase their cardiac output (40 -50 %) which is seen normal pregnant females. Any abrupt demand can precipitate cor pulmonale. These patients are at increase risk for malignant hyperthermia^[9] too. These cardiopulmonary changes result in increased maternal morbidity and mortality.

Both regional and general anaesthesia can be used in these patients with advantages and disadvantages. General anaesthesia with controlled ventilation though seems to be ideal is associated with many problems. There might be an abrupt increase in pulmonary artery pressure viz nitrous oxide leading to right heart failure. IPPV decreases venous return, this along with negative inotropic effect of anaesthetic agents can lead to severe hypotension. These patients are at risk for malignant hyperthermia, so all triggering agents should be avoided. Neuromuscular agents should be used with caution due to associated myopathies and dystrophy. Postoperatively elements of laryngeal incompetence and impaired swallowing further decreases the airway defence mechanisms. All these factors together can lead to delayed extubation and requirement for postoperative ventilation^[10]. The main problem associated with spinal anaesthesia is technical difficulty and its unpredictable effect.

Arguments in favour of regional anaesthesia includes no fetal compromise, no risk of malignant hyperthermia, better postoperative analgesia and least effect on cardiopulmonary reserve. Severe kyphoscoliosis is associated with decreased volume of CSF^[11] and higher block can be achieved with lower doses. In this case also 1.5 ml bupivacaine + 25ug fentanyl resulted in T6 blockade.

Conclusion

A pregnant female with kyphoscoliosis associated with family history of malignant hyperthermia is an anaesthetic challenge. This report shows successful management of such a patient using spinal anaesthesia without any post-operative complication.

Summary

Kyphoscoliosis though a rare deformity is one of the cause for chronic extrinsic restrictive pulmonary disease. Here we are reporting a 24 year old primigravida with severe thoracolumbar kyphoscoliosis scheduled for emergency LSCS. Though both regional and general anaesthesia are not contraindicated, we managed this case using spinal anaesthesia without any peri-operative complications.

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How to cite this article:

Chavi Sethi, Rupesh Kumar and Sharad Srivastava. (2016). Anaesthetic management of kyphoscoliotic gravida scheduled for emergency caesarean section. *Int. J. Adv. Res. Biol. Sci.* 3(8): 132-135.