

*Case Report*

## Successful Spinal Anesthesia in a Case of Achondroplastic Parturient for Cesarean Section: Case Report

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### ABSTRACT

Achondroplastic pregnant patients almost invariably lead to caesarean section due to cephalo-pelvic disproportion. We report a twenty year old short stature primigravida in labour taken for elective caesarean section for cephalopelvic disproportion. On physical examination she was short statured with height of 110 cm and weight of 37 kg. She had large head with frontal bossing and short limb. Examination of spine showed reduced intervertebral space. All clinical examinations were supportive of a diagnosis of Achondroplasia. Spinal anaesthesia was planned. 25G quincke spinal needle was inserted in L4-L5 subarachnoid space with paramedian approach successfully in second attempt. Local anesthetic bupivacaine and fentanyl were given intrathecally. Adequate motor and sensory blockade achieved and surgery went uneventful. Patient was stable intra and post-operatively.

**Keywords:** Achondroplasia, Cesarean section, Spinal anesthesia, anesthetic management.

### INTRODUCTION

Achondroplasia is the most common form of dwarfism (short stature) which results from abnormal cartilage formation at epiphyseal growth plates. [1] Although it is inherited as an autosomal dominant condition, 80% of cases occur sporadically. [2] Incidence of this condition increases with increase in paternal age. [3] It occurs because of abnormal cartilage formation at epiphyseal growth plates. People with Achondroplasia generally have normal intelligence levels, their abnormalities are only physical, and these patients have neurological, cardiopulmonary problems that pose great challenge to anaesthesiologists.

Although rare (Incidents Of approximately 4/100,000), achondroplasia seen more frequently in women. Fertility

rates for women with dwarfism are generally low. [4] Full term pregnancy in these patients almost invariably leads to caesarean section due to cephalo-pelvic disproportion.

In achondroplastic patients general anaesthesia as well as regional anaesthesia posses many challenges to anesthesiologist.

### CASE REPORT

A twenty year old short stature primigravida in labour was taken for elective caesarean section in view of cephalopelvic disproportion. There was no significant family history. On physical examination there was no abnormality in central nervous system, respiratory and cardiovascular system. On physical examination she was short statured with height of 110 cm and weight of 37 kg.

She had large head with frontal bossing and short limb. Examination of spine show narrowed intervertebral space. On airway examination she had two finger mouth opening with mallampati grade 2<sup>nd</sup> and full range of neck movement. Patient was planned for elective cesarean section due to cephalopelvic disproportion. Senior Anesthesiologist was consulted and spinal anaesthesia was planned tentatively.

Preoperative routine investigations were within normal limit. Patient was kept overnight fasting. In the operating room she was placed in supine position with left lateral displacement. Aspiration prophylaxis was done with administration of inj. Ranitidine 50mg iv and inj metochlopramide 10 mg iv and preloaded with 500 ml Ringer lactate.



Fig. 1 Achondroplastic dwarfism patient, 110 cm height.



Fig. 2, On supine position during preanesthetic monitoring

All preparation for difficult intubation kept ready. NIBP, pulse oximetry and ECG monitoring attached. Her preoperative blood pressure was 116/70 mmHg, pulse rate -96/min and Spo<sub>2</sub> -98% on air. She was placed in sitting position. Under all aseptic precaution 25G quincke

spinal needle was inserted in L4-L5 subarachnoid space with paramedian approach successfully in second attempt following failed median approach. After free flow of cerebrospinal fluid inj bupivacaine 5 mg with inj fentanyl 20 ug injected intrathecally and placed in supine

position with 15° left lateral tilt. Blood pressure dropped to 78/50 mmHg after 3 mins of spinal anesthesia. Injection phenylephrine 50 mcg was given and blood pressure rose to preop level. A sensory blockade of T6 level and motor blockade of B3 achieved in 5 mins. Cesarean section started without any complaints and a healthy alive male baby of weight 3.2 kg was delivered after 5 minutes of incision with a apgar score was 8 at 1 min and 10 at 5 mins. Patient was stable during intraoperative as well as postoperative period. A total of 1400ml RL infused perioperatively Patient developed postoperative pain around 130 min from spinal anesthesia. Sensory recovery achieved at 180 min and motor recovery at 220 mins respectively. Patient got discharged on day 7 of postoperative day without any complaints.

## DISCUSSION

Achondroplasia is the most common condition associated with short-limbed dwarfism. It occurs in approximately 1 in 15,000 to 1 in 40,000 live births. Achondroplasia dwarfism can be inherited in an autosomal dominant pattern. However, 80% achondroplasia occurs with no family history. The characteristic features of achondroplasia include typical facial and airway features like to limited neck extension, large head, large tongue and narrowed nasal, oral, tracheal and pharyngeal airway along with disproportionate short stature, and an exaggerated lumbar lordosis. Anaesthetic management is challenging as patients are at increased risk of airway complications if administered general anaesthesia due to alteration in normal airway anatomy. Regional anaesthesia like neuraxial anaesthesia is also difficult to carry out because of thoracolumbar deformity and spinal canal stenosis [5] leading to controversy over the dose requirement for spinal anaesthesia.

In our patient there was reduction in the in vertebral space with exaggerated lumbar lordosis. We have decided to

proceed with neuraxial anaesthesia as it is preferred for elective cesarean section unless contraindicated. Neuraxial anaesthesia can be given by either a single shot intrathecal anaesthesia or combined spinal epidural anaesthesia. Ultrasound guided neuraxial blockade is advisable but due to in availability of ultrasound machine in our hospital setup, we planned to proceed with the blockade using landmark technique. We didn't prefer combined epidural anaesthesia which is supposed to be the technique of choice in these kinds of patients because of the anatomical difficulties present in our patient. We have also prepared for administering supplementation or general anaesthesia if required. Patient was placed in sitting position after monitoring as in lateral decubitus position her spines were not easily palpable because of the lordosis. In sitting position L3-L4 intervertebral space was identified by palpating the bilateral iliac crest. We attempted a median approach for lumbar puncture but it was a failure as we found difficulty in inserting the needle due to reduced space. Second attempt was done para-medianly and lumbar puncture was successful with free flow of CSF. Now the main part of the procedure is how much local anesthetic drug to be injected and need for any adjuvants. Literature from various case reports have mentioned varying local anesthetic drug with variable doses and also different adjuvants. Our hospital protocol is giving hyperbaric bupivacaine for cesarean section as it produces dense motor and sensory block for cesarean section. We decided to give 1 ml (5 mg) of bupivacaine along with Inj fentanyl 0.3 ml (15 mcg). We have not added any solution to increase the volume as it might alter the baricity and also variable levels of blockade can occur. After injecting the drug she was placed in supine position with 10° trendelenberg position and 15° left lateral tilt. A motor blockade of Bromage 3 and sensory blockade of T4 achieved after 5 and 10 mins of the spinal anaesthesia respectively

Previous studies have used 1.3 ml of

0.5% hyperbaric bupivacaine with 10 mg of fentanyl, [6] but these studies reported a transient decrease in blood pressure, or 1 ml of 0.5% hyperbaric bupivacaine with 10 mg of fentanyl. [7] But, none of the studies gave any rationale for drug dosage of intrathecal bupivacaine used

Samra et al conducted a study in finding the appropriate dose of 0.5% hyperbaric bupivacaine in spinal anesthesia for dwarf parturients. They suggested from their observations that the dosage in these patients should be not more than 0.06mg / cm of patient height in order to prevent higher level blockade and associated hemodynamic and respiratory complications. Our patient received 5mg bupivacaine (0.045 mg /cm height) which was well within the maximum dosage mentioned by Samra et al. [8]

As far as airway and spine is concerned in these patients. Any previous CT/ MRI images can help us to rule out difficult intubation and neuraxial blocks which will make the anesthetic practice a better one.

## CONCLUSION

There are greater than hundred different types of dwarfism, many of which have specific implications for the anesthesiologist. Although each particular disorder is relatively rare, the large number of dwarfs ensures that any practicing anesthesiologist is likely to encounter these patients.

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