



Pregnancy with Short Stature - Challenges for Anesthesiologist to estimate dose of Hyperbaric Bupivacaine and manage Physiological Changes during cesarean section: A Case Series

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Abstract

Short stature female presenting for lower segment cesarean section poses a clinical challenge to anesthesiologists. There can be 100 of causes of short stature, out of which major one is achondroplasia. There is risk for regional as well as general anesthesia in such patients like airway complications, difficulty in dose estimation of hyperbaric bupivacaine, risk of high spinal, failure of neuraxial block due to spinal deformities and spinal canal stenosis. All these risks lead to controversies in choosing type of anesthesia and dose of spinal bupivacaine. Here we present a case series of three patients who underwent cesarean sections under Spinal Anesthesia. The most important point is the careful perioperative management.

Keywords: Short stature, Hyperbaric Bupivacaine, Spinal Anesthesia.

Case – 1

A 26-year-old primigravida with cephalo-pelvic disproportion was posted for emergency cesarean section as she presented with labour pains at 37+2 weeks of gestation. There was no previous history of anesthesia exposure. Pregnancy was uneventful till that day. She has completed all antenatal visits at Local hospital.

Physical examination revealed that her height was 128 cm and weight was 52 kgs. Intellect was normal with normal limbs. On airway examination she has short neck, large tongue with all intact teeth. Mouth opening was adequate, MMP score

was 3 with adequate neck movements. There was no visible spinal or any other deformity. Systemic examination was normal in respect to all systems. All preoperative investigation required for emergency LSCS were within normal limits. Fetus development was also normal as per ultrasonographic records.

Routine noninvasive monitoring was established which included ECG, Pulse oximeter and NIBP. Her baseline vitals were normal i.e. 108/min HR, SpO₂- 98 % and NIBP was 134/86 mmHg. An 18 G intravenous access was obtained and co-loading with ringer lactate was done while patient was in

Left Lateral position. Spinal anesthesia was planned to carry out caesarian section. Under all aseptic precaution skin was infiltrated with Lignocaine 2% 2ml at L3-L4 space. A Quinke tip needle 26 g was inserted in L3-L4 space and after free flow of CSF 8 mg of 0.5% Hyperbaric Bupivacaine is given. A sensory block of T4 was obtained. There was a sudden fall in Blood pressure to 80/45 mmHg which was managed by 50 mcg of Phenylephrine and 100 ml bolus of IV ringer lactate. Rest of surgery remained uneventful which lasted for approximately 35 minutes. Post-surgery patient was stable with no motor power in lower limbs, a sensory level of T6 and stable hemodynamics. Patient was discharged from hospital after 3 days. Postoperative course was uneventful.

Case – 2

A 29-year-old primigravida with Cephalo-pelvic disproportion was posted for emergency cesarean section as she has antepartum hemorrhage at 38 weeks of pregnancy. She was having 120 cm height and 58 kg body weight. She was a booked patient and was planned for elective Cesarean section, but presented with antepartum hemorrhage and was urgently took for surgery. Pregnancy was uneventful till date. She never underwent any previous surgery and or anesthesia exposure.

She has normal intellect with normal limbs but there is spinal deformity with scoliosis in lumbar region which was not evaluated. There was no neurological sign and symptoms and no history suggestive of any cardiorespiratory compromise during pregnancy or during any time in life. On airway examination, there was reduced mouth opening and MMP score was 3. Neck movement was adequate all preoperative investigation required were within normal range along with fetal development on ultra-sonographic records.

Routine noninvasive monitoring was established along with 2 units of PRBC in hand. Baseline vitals were HR -120/min, BP was 110/68 mmHg and SpO2 was 98%. Two wide bore I.V. (16 G)

cannula were placed and co-loading was done with 500 ml of Ringer lactate. Patient was kept in left lateral position and under all aseptic precautions using 26 G Quinke tip spinal needle 7 mg of 0.5 % Hyperbaric Bupivacaine was given in L4-L5 space after injecting skin with 2% lignocaine. A sensory block of T4 has been obtained. Due to anticipation of Blood Loss One unit of PRBC was already started along with Intravenous fluids. There were no requirements of vasopressors during the surgery. Surgery went uneventful with good fetal outcome. Surgery was lasted for 30 minutes and post-surgical stay was uneventful.

Case – 3

A 32-year-old primigravida presented for emergency cesarean section for cephalo-pelvic disproportion with labour pains at 37 weeks of gestation. She was having 126 cm height and 62 kg body weight. She was a booked case at local hospital. She has normal intellect along with normal limbs and spinal deformity. She has no cardiorespiratory issues during pregnancy. She has normal airway and normal baseline investigation and she was planned for Spinal anesthesia.

Routine non-invasive monitoring was established and HR was 98/min, NIBP was 140/86 mmHg and SpO2 of 98 %. An 18 G Intravenous access was established and she was placed in left lateral position and under all aseptic precaution spinal anesthesia was given at L3-L4 space with 7.5 mg of Hyperbaric Bupivacaine. Sensory level was obtained at T4 level. There was no drop in Blood pressure and no requirement of vasopressor was there. Surgery went uneventful and post-surgery stay was also uneventful.



Discussion

Short stature (dwarfism) with pregnancy was an indication for caesarian section. Dwarfism is defined as height 145 cm in male and 135 cm in female¹. There can be extreme global growth failure along with low fertility rate². Caesarian sections are indicated for two reasons viz. Cephalo-pelvic disproportion or contracted pelvis.

Management of such patients for LSCS is a clinical challenge for us not just physiology and anatomy of dwarf but also due to the impact of selection of anesthetic technique^{3,4}. There can be challenges like difficult airway (Broad head, large tongue, large mandible and nasopharyngeal stenosis), cardiorespiratory pathology (cor-pulmonale, pulmonary hypertension, restrictive lung disease, cardiomyopathy and valvular diseases), neurological compromise due to spinal canal deformities^{3,4}.

Difficulties encounter during General anesthesia can be difficult airway, medication overdose, risk of intra operative and post-operative pulmonary complications, risk of neck injury and cardiovascular compromise like pulmonary hypertensive crisis, acute Heart failure and perioperative MI^{3,4}.

For neuraxial anesthesia there can be difficulty in positioning and identifications of anatomical landmarks, unpredicted use of diffusion of local anesthetic drug (high spinal or total spinal), failure of block^{3,4}.

There are no evidences about superiority of any kind of anesthetic technique over other⁵. The choice depends upon patient's characteristics, availability of resources, mastery over techniques and most important is choice of patient.

Among the all neuraxial techniques single shot spinal is the preferred choice of anesthesia for managing LSCS⁶. This can be technically challenging due to difficult approach and risk of neurological injury⁷. But it should be noted that currently there is no reported injury till date. There are recommendations of strict neurological monitoring post-surgery as well in recovery to check for sensory and motor functions⁷. For use of neuraxial technique, drug and dose, there is no consensus yet^{8,9}.

In our case the factor we considered for dose calculation is height as most important determinant. The minimum effective dose for intrathecal bupivacaine for effective block in 95 % women undergoing LSCS is 0.06 mg/cm of height¹⁰. Based on this we gave doses rounded off

to next number to all the three patients in our case series. In our cases as there was no spinal deformities or no neurological symptoms, so drug dose in not reduced which has be done in case of spinal canal stenosis (which need to be reduced by 30 %)¹¹. There are studies which used fentanyl 10 mcg along with Bupivacaine⁵ but no rationale has been discussed for the same.

Conclusion

In conclusion, the risk of both GA and spinal anesthesia are known. A complete pre-anesthetic evaluation, anticipation of physiological and anatomical challenges and knowledge of changes during anesthesia is must. More over spinal technique is satisfactory but there are higher chances of failure so difficult airway team should be ready. The dose of intrathecal bupivacaine must be based upon the height of patient and correction should be made accordingly.

Declaration of patient consent

The authors certify that they have obtained all appropriate consent forms, in which the patients have given their consent for her images and other clinical information to be reported in journal. The patients understand the name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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