



Single Shot Spinal Anaesthesia for Emergency Caesarean Section in an Achondroplastic Parturient

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ABSTRACT

BACKGROUND/ AIM: The use of the single shot spinal anaesthesia for Caesarean delivery is now a common practice worldwide. This paper highlights the use of this anaesthetic technique on a parturient with achondroplasia that presented at term with obstructed labour and had a Caesarean delivery.

Method: The patient did not receive any antenatal care prior to presentation. She had moderate to severe dehydration with some oliguria. She was adequately resuscitated and

had an emergency Caesarean section using the single shot spinal technique.

Result: She had a live baby with good Apgar scores. The postoperative period was uneventful and was discharged home on the 8th postoperative day.

Conclusion: This paper highlights a parturient with a unique physiognomy that could challenge the unprepared anaesthetist.

Keywords: Anaesthesia, Obstetrics, single shot spinal technique, achondroplasia.

INTRODUCTION

The associated structural deformities found in achondroplasia make anaesthesia for these patients challenging. Achondroplasia is a genetic disorder of bone growth, a condition that affects the conversion of cartilage into bones especially the proximal long bones thus, causing the most common form of dwarfism. It is an autosomal dominant inherited disorder whose mutation occurs spontaneously in about 80% of cases and in about 20% of the cases, it occurs as inherited autosomal dominant with prevalence of 1: 25,000 live births.¹

The location of the mutation that results in

this skeletal defect has been mapped and found to reside on the short-arm of chromosome 4; p16.3 locus where the transmembrane receptor, the fibroblast Growth Factor Receptor 3 (FGFR3) gene is located. Here, simple mutation involving glycine being replaced with arginine Gly380 Arg² is depicted. The consequences of this change are reflected in the structural deformities found in achondroplasia. Common features that are relevant to anaesthesia include facial hypoplasia, large tongue and mandible, narrow nasal passages, the base of the skull is short and angulated with limited extension. These are risk factors for difficult intubation. Other features





include narrowed and occasionally stenosed spinal and epidural canal with the associated difficulty to access the dura, the free flow of cerebrospinal fluid is often limited, kyphoscoliosis, narrowing of the vertebral canal, and lumbar lordosis³.

Both general and regional anaesthetic techniques with their respective challenges have been reported. In Nigeria, Rukewe et al⁴ used combined spinal epidural technique for an elective Caesarean section, while the three reported cases at the University of Benin Teaching Hospital⁵ utilised general anaesthesia following difficulties to institute spinal anaesthesia. Regional anaesthesia is the routine practice for caesarean section and it is commonly practised. There was no reported case till date of the successful use of the single shot spinal anaesthesia in an emergency situation with very minimal time for preparations for a peculiar circumstance like the achondroplastic parturient. Our paper reports the successful use of a single shot spinal anaesthetic technique for emergency Caesarean section. The challenges during the management of the parturient are also discussed.

CASE REPORT

Our patient was a 33 year-old unbooked (not registered) nulliparous seamstress who presented with obstructed labour at term, and was scheduled for an emergency Caesarean section. She had typical features of achondroplasia: large head, flat nasal bridge, slight thoracolumbar kyphosis, large tongue and with prominent incisors. She was 110 cm in height and weighed 48 kg; body mass index was 39.67 kg/m². There was no obvious comorbidity, her vital signs were stable, baseline blood pressure was 110/70 mmHg,

pulse rate 78 beats/min, and SPO₂ in room air was 98%. There was no previous history of anaesthesia and surgery. No identifiable form of allergy. The cardio-respiratory systems examination was not significant. The Mallampati score was 2.

Bed-side urinalysis was negative for protein and glucose. Laboratory investigation showed haemoglobin – 8.5 g/dL, white blood cell count – 9,000/mm³. Electrolyte and urea were essentially normal, bleeding time and prothrombin time were also normal. Random blood sugar was 10 mmol/L. Blood sample was taken for grouping and cross match.

Intravenous ranitidine 50 mg was administered preoperatively while preparations were being made for the procedure. Informed consent for surgery and written consent for photograph were obtained from the parturient.

The following variables were measured intraoperatively using the multi-parameter monitor (DASH 4000 GE); pulse oximetry (SPO₂), non-invasive blood pressure (NIBP), and body temperature. She was preloaded over 10 minutes with 750 ml of warmed normal saline. Following preloading, she was placed in a sitting position with the lower limbs stretched out on the operating table. Routine cleaning of the lower back, L₄ and L₅ were defined and infiltrated with 2 ml 1% lidocaine. A calculated dose⁶ of 7.0 mg of heavy bupivacaine was administered using 26 G pencil-point spinal needle through a sise needle, a single puncture was achieved. Both needles were withdrawn and light dressing placed over the puncture site. She was immediately returned to supine position while ensuring a 15-20° left lateral

tilt.

Adequacy of the spinal block was demonstrated using methylated spirit gauze, to test for temperature. The maximal level of sensory block was T₆ dermatome. This offered adequate anaesthesia for the duration of the procedure and Bromage score - 3.

The surgery lasted for 34 minutes and a live female baby weighing 2.2 kg was delivered with Apgar scores 9 and 10 at 1 and 5 minutes, respectively.



Fig. 1. Patient in Left lateral position before surgery (Lower back exposed to allow photograph)

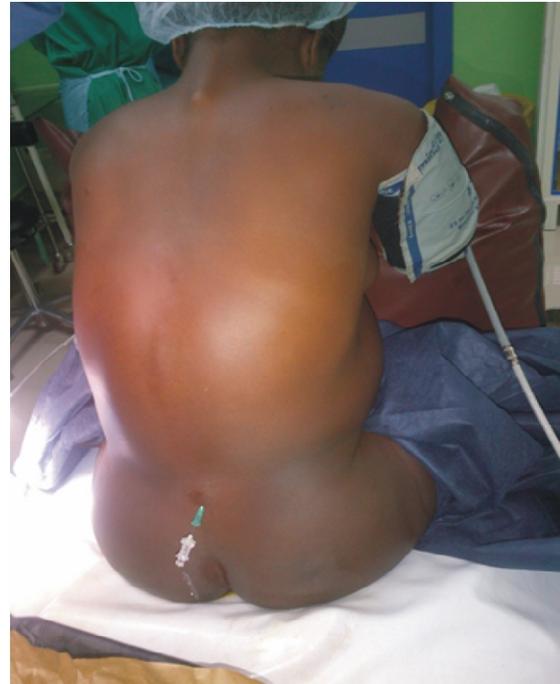


Fig. 2. Patient with spinal needle in-situ

DISCUSSION

Anaesthesia for the achondroplastic parturient has unique challenges which must be evaluated properly as part of preparations for effective anaesthesia. Both general and regional anaesthetic techniques with their respective challenges have been reported in these subset of people.⁶ In Nigeria, there was no documentation of the use of the single shot spinal anaesthesia alone for emergency caesarean section for the achondroplastic parturient. Most of the reports in the literature were essentially on planned anaesthesia While this report highlighted a case presenting in labour and had emergency Caesarean section under single shot spinal anaesthesia without any intra and post-operative complications. We were able to demonstrate the feasibility of instituting



single shot spinal anaesthesia with a single puncture and as a sole anaesthetic technique for the achondroplastic parturient in an emergency. This attempt added to the body of knowledge that supports the popularity of the continued use of spinal anaesthesia in obstetrics and its relevance to reducing perioperative morbidity and mortality.

Although other forms of anaesthesia had been described, such as the combined spinal epidural technique⁴ and general anaesthesia⁵, for both elective and emergency caesarean delivery, respectively and for reasons of difficulties to access the subarachnoid space. The parturient in our case report presented as an emergency and had features that were consistent with the structural deformities that would pose an increased risk for difficult intubation at an odd hour and with little preparation in anticipation for a possible difficult airway. The near absence of lumbar lordosis in our patient increases the feasibility to successfully institute spinal anaesthesia, this we did and it was successful and became the first successful use of this technique to be reported in Nigeria.

We did not experience any difficulty to access the dura and this supports the observation of other workers who were successful in instituting single shot spinal anaesthesia as the sole anaesthetic technique.

The structural deformities associated with the achondroplastic define the relative difficulties to effectively deliver anaesthesia especially for the parturients. This is the cause of the so called controversies involved in the anaesthetic management of these patients. It has been observed that the "bony changes in patients with achondroplasia are

similar to those in the elderly"¹⁷, thus similar challenges are expected.

General anaesthesia was preferred by some authors for the ease of access to the airway.^{5,8} Sukanya et al⁷ reported the sparse use of spinal anaesthesia with only 4 published case reports even though in his case report, 5mg of heavy bupivacaine with 10µg of fentanyl was successfully used for spinal anaesthesia for an emergency caesarean section.

The reported drawbacks to the use of spinal anaesthesia except for obvious absolute contra-indications included; the dry taps observed by Saxena et al⁹ and difficulty to access free flow of cerebrospinal fluid, as reported by Ekwere et al⁵ which necessitated the use of general anaesthesia, and the risk of high block due to spinal stenosis and finally to the absence of clear dosage guidelines for single shot spinal block.

For the few documented cases of the successful use of the single shot spinal technique, varying drug dosages had been used; De Renzo et al¹⁰ reported inadequate spinal anaesthesia for caesarean delivery that lasted for 82minutes using 10mg of heavy bupivacaine with 0.2mg of morphine. Visceral pain might have been implicated at this time of the procedure. Crawford et al¹¹ observed inadequate block for caesarean section using 5mg of heavy bupivacaine with 10µg of fentanyl and had to resort to intrathecal microcatheter to extend the level of sensory block to T6.

Sunanda et al¹² administered 2.5mg of heavy bupivacaine and 20µg fentanyl for the spinal component of CSE, but had to utilise the epidural volume expansion(EVE) to extend

the maximum sensory block to T6 for abdominal myomectomy. These were varying doses with different results. In our experience, 7.5mg of heavy bupivacaine was used and it was adequate for caesarean section. Clinical and radiological variations exist in the achondroplastic and these could be responsible for varying outcomes most authors experienced and this requires a careful preoperative assessment of the parturient to guarantee the adequacy of the procedure.

There was no intraoperative adverse event in the course of the procedure and the post-operative period was smooth. The neonatal outcome in our patient was good using the Apgar scores alone in the absence of the umbilical cord blood pH which may be due to the absence of maternal co-morbidities. Conducting anaesthesia on achondroplastic patients ever remains an anaesthetic challenge. It requires a proper preoperative evaluation with adequate preparation for both airway access and neuraxial block difficulties.

CONCLUSIONS

Several reports on anaesthesia for the achondroplastic for caesarean section were mainly for planned (elective) cases and this was the first reported case of an achondroplastic presenting in obstructed labour and was offered emergency caesarean section under single shot spinal anaesthesia without any intra and post-operative complications.

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