USG Guided Combined Spinal Epidural: A Boon in an Achondroplasic Dwarf undergoing an Orthopaedic Procedure

Divyadarshni Vadivel* and Deepa Kane
Department of Anesthesiology, King Edward Memorial Hospital, Mumbai, Maharashtra, India

Abstract

Achondroplasia is one of the commonest forms of dwarfism. A 26-year-old achondroplasic dwarf with vitamin D deficiency was posted for an elective shaft of femur fixation. Owing to her difficult airway and past history of tuberculosis, it was decided upon to operate her under combined spinal and epidural anaesthesia. This case report highlights on the need for real time ultrasound guidance in locating the epidural space and hence aiding in successful placement of the Quincke’s needle and the epidural catheter. The ultrasound is an effective and reliable tool to ascertain the most feasible inter-vertebral space in cases of a difficult spine anatomy.

Keywords: Achondroplasia; Ultrasound; Difficult spinal

Introduction

Achondroplasia is an autosomal dominant disorder caused by sporadic mutation of the FGFR 3 gene leading to abnormal enchorial ossification. It is characterized by disproportionate dwarfism, a relatively large head, midfacial hypoplasia, deformations of the spine, leg axis deviation, spinal canal stenosis, kyphoscoliosis, reduced epidural space and vertebral body deformities posing a challenge to both region and general anaesthesia [1]. Anaesthetic management of achondroplastic patients undergoing a variety of elective and emergency surgical procedures have been reported, the most common include limb lengthening surgeries [2], Caesarean section [3], bariatric surgery [4], laparotomy for bilateral oophorectomy [5], vascular repairs [6] and middle ear surgeries [7]. Neuraxial block can be a challenge and hence the use of real time ultrasound could mitigate unsuccessful epidural insertions.

Case Report

A 26-year-old female presented with a fracture of the right femur for which a femur fixation was planned. She was a known case of achondroplasia and vitamin D deficiency, chronically immobile with a history of fall leading to pain and swelling of her hip. She was an old case of pulmonary tuberculosis for which she was adequately treated. On physical examination she was measured to be 118 cm with a weight of 40 kg. She had a large head disproportionate to her body with short neck, mandibular protrusion and a kyphoscoliotic spine. Airway examination showed an MPCIII, restricted neck movements, a thyromental distance of 5 cm and adequate mouth opening. Cardiovascular system examination was normal with a heart rate of 68/min and a blood pressure of 110/70 mm of Hg. Respiratory system examination revealed a depressed chest wall with a protuberant abdomen and thoracic kyphosis, auscultation of the chest was unremarkable. An endocrine opinion was taken in view of anticipated difficult intubation and previous history of pulmonary tuberculosis. The patient was explained the procedure spinal level was L1 and the patient was comfortable and pain free. Central neuraxial block was planned to prolong the duration of anaesthesia (Figure 1). Intravenous access was obtained on the right upper limb using a 20G IV cannula. The patient was preloaded with 250 mL of ringer’s lactate. The epidural was only to prolong the duration of anaesthesia (Figure 1).

Epidural space was obtained at L1 L2 intervertebral space and the catheter was fixed at 6 cm. Spinal was given at the L3 L4 intervertebral space. 2 cc of 0.5% bupivacaine heavy was injected using a 25G Quincke’s needle. Post subarachnoid block the patient was given head high to prevent high spinal levels. Despite head high a pre-operative spinal level of T6 was obtained. The procedure lasted for 3½ hours. Epidural was activated using 2 mL of 2% preservative free lignocaine and thereafter an infusion of 3 cc of 0.375% bupivacaine was started. Patient was hemodynamically stable throughout the procedure. Blood loss of around 350 mL occurred during the procedure and was replaced. Post procedure spinal level was L1 and the patient was comfortable and pain free.

Discussion

Achondroplasia also known as short limb dwarfism has an incidence of 1 to 1.5/10000 live births [8]. It is inherited in an autosomal dominant fashion with the incidence being higher amongst females. Spontaneous mutation of the FGFR 3 gene leads to enchondral ossification of the epiphyseal growth plate [8,9]. An achondroplasic patient can pose significant challenges to the anaesthesiologist. Hence preoperative assessment and planning of anaesthesia are of foremost concerns. Routine biochemical profile, lung functions, echocardiograph and ABG analysis have to be sought for in relevant cases [10]. It is prudent to ask for a neurological consult in cases with cervicomедullary stenosis and noninvasive blood pressure were used to monitor the patient. Intravenous access was obtained on the right upper limb using a 20G IV cannula. The patient was preloaded with 250 mL of ringer’s lactate. The patient was given a left lateral position. Ultrasound was used to identify the intervertebral space and hence the spaces for epidural catheter placement and subarachnoid block. The best space for epidural and the distance to reach the epidural space was calculated.

*Corresponding author: Divyadarshni Vadivel, Department of Anesthesiology, King Edward Memorial Hospital, Mumbai, Maharashtra, India, Tel: 022 2410 7000; E-mail: divyadarshniv@kem.org
Received September 14, 2017; Accepted January 18, 2018; Published January 23, 2018
Citation: Vadivel D, Kane D (2018) USG Guided Combined Spinal Epidural: A Boon in an Achondroplasic Dwarf undergoing an Orthopaedic Procedure. J Clin Case Rep 8: 1077. doi: 10.4172/2165-7920.10001077
Copyright: © 2018 Vadivel D, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
achondroplasic dwarf using ultrasonography to identify the space followed by loss of resistance technique to reach the epidural space for an orthopedic procedure has been described. The use of real time ultrasonography in attempting central neuraxial block in cases wherein difficulty arises with the use of the traditional landmark technique is highly recommended.

References

1. Jain A, Jain K, Makkar JK, Mangal K (2010) Case study: Anaesthetic management of an achondroplastic dwarf undergoing radical nephrectomy. Southern Afr J Anaesth Analg 16: 77-79.

2. Brimacombe JR, Goddard JM (1993) Leg lengthening in children—a retrospective review of anaesthetic management in 61 children including 14 with achondroplasia. Pediatr Anesth 3: 89-93.

3. Brimacombe JR, Caunt JA (1990) Anaesthesia in a gravid achondroplastic dwarf. Anaesth 45: 132-134.

4. Nandini MD, Santhosh EM, Sushma W (2006) Combined spinal epidural anaesthesia for removal of bilateral ovarian masses by laparotomy in a patient with proportionate dwarfism. Indian J Anaesth 50: 304-7.

5. Abrão MA, Silveira VGD, Barcellos CFLVD, Cosenza RCM, Carneiro JRI, et al. (2009) Anestesia em anã acondroplásica obesa mórbida para gastroplastia redutora. Rev Bras Anestesiol 59: 79-86.

6. Al-Jughiman M, Yanagawa B, Rondi K, Dalamagas C, Peterson MD, et al. (2014) Acute type A dissection repair in an achondroplastic dwarf: Anesthetic, perfusion, and surgical concerns. AORTA 2: 143.

7. Krishnan BS, Elpe N, Korula G (2003) Anaesthetic management of a patient with achondroplasia. Pediatr Anesth 13: 547-549.

8. Orioli IM, Castilla EE, Barbosa-Neto JG (1986) The birth prevalence rates for the skeletal dysplasias. J Med Genet 23: 328-332.

9. Vajo Z, Franchomano CA, Wilkin DJ (2000) The molecular and genetic basis of fibroblast growth factor receptor 3 disorders: the achondroplasia family of skeletal dysplasias, Muenke craniosynostosis, and Crouzon syndrome with acanthosis nigricans 1. Endocrine Rev 21: 23-39.

10. Berkowitz ID, Raja SN, Bender KS, Kopits SE (1990) Dwarfs: pathophysiology and anesthetic implications. Anesthesiol 73: 739-759.

11. Karmakar MK, Li X, Ho AH, Kwok WH, Chui PT (2009) Real-time ultrasound-guided paramedian epidural access: evaluation of a novel in-plane technique. Brit J Anaesth 102: 845-854.

12. Tran D, Kamani AA, Al-Atlas E, Lessoway VA, Massey S, et al. (2010) Single-operator real-time ultrasound-guidance to aim and insert a lumbar epidural needle. Canadian J Anesth 57: 313-321.

Conclusion

A case of successful spinal and epidural anesthesia in an achondroplasic dwarf using ultrasonography to identify the space followed by loss of resistance technique to reach the epidural space for an orthopedic procedure has been described. The use of real time ultrasonography in attempting central neuraxial block in cases wherein difficulty arises with the use of the traditional landmark technique is highly recommended.

References

1. Jain A, Jain K, Makkar JK, Mangal K (2010) Case study: Anaesthetic management of an achondroplastic dwarf undergoing radical nephrectomy. Southern Afr J Anaesth Analg 16: 77-79.

2. Brimacombe JR, Goddard JM (1993) Leg lengthening in children—a retrospective review of anaesthetic management in 61 children including 14 with achondroplasia. Pediatr Anesth 3: 89-93.

3. Brimacombe JR, Caunt JA (1990) Anaesthesia in a gravid achondroplastic dwarf. Anaesth 45: 132-134.

4. Nandini MD, Santhosh EM, Sushma W (2006) Combined spinal epidural anaesthesia for removal of bilateral ovarian masses by laparotomy in a patient with proportionate dwarfism. Indian J Anaesth 50: 304-7.

5. Abrão MA, Silveira VGD, Barcellos CFLVD, Cosenza RCM, Carneiro JRI, et al. (2009) Anestesia em anã acondroplásica obesa mórbida para gastroplastia redutora. Rev Bras Anestesiol 59: 79-86.

6. Al-Jughiman M, Yanagawa B, Rondi K, Dalamagas C, Peterson MD, et al. (2014) Acute type A dissection repair in an achondroplastic dwarf: Anesthetic, perfusion, and surgical concerns. AORTA 2: 143.

7. Krishnan BS, Elpe N, Korula G (2003) Anaesthetic management of a patient with achondroplasia. Pediatr Anesth 13: 547-549.

8. Orioli IM, Castilla EE, Barbosa-Neto JG (1986) The birth prevalence rates for the skeletal dysplasias. J Med Genet 23: 328-332.

9. Vajo Z, Franchomano CA, Wilkin DJ (2000) The molecular and genetic basis of fibroblast growth factor receptor 3 disorders: the achondroplasia family of skeletal dysplasias, Muenke craniosynostosis, and Crouzon syndrome with acanthosis nigricans 1. Endocrine Rev 21: 23-39.

10. Berkowitz ID, Raja SN, Bender KS, Kopits SE (1990) Dwarfs: pathophysiology and anesthetic implications. Anesthesiol 73: 739-759.

11. Karmakar MK, Li X, Ho AH, Kwok WH, Chui PT (2009) Real-time ultrasound-guided paramedian epidural access: evaluation of a novel in-plane technique. Brit J Anaesth 102: 845-854.

12. Tran D, Kamani AA, Al-Atlas E, Lessoway VA, Massey S, et al. (2010) Single-operator real-time ultrasound-guidance to aim and insert a lumbar epidural needle. Canadian J Anesth 57: 313-321.