
CASE REPORT**Total spina bifida of sacrum: A case study***Gyanaranjan Nayak^{1*}, Niranjana Sahoo²*

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Abstract

Spina bifida is a congenital anomaly due to improper closure of embryonic neural tube leading to split or bifid spinal column. Spina bifida of sacrum may result in back pain, failure of epidural anaesthesia and defective trans-pedicular as well as lateral mass screw placement in sacrum. The authors chanced upon an adult female sacrum presenting with total spina bifida and sacralization of coccyx during routine osteology classes of a medical college of Odisha. The present case may be of considerable interest for anatomists, orthopaedicians, radiologists and anaesthesiologists.

Keywords: Sacrum, Spina Bifida, Epidural Anaesthesia, Low Backache

Introduction

Spina bifida encompasses defects of neural tube formation and vertebral column embryogenesis. The spectrum of this congenital anomaly includes craniorachischisis, anencephaly and myelocoele [1]. The total non-fusion of laminae of all the sacral vertebrae results in a midline hiatus. This anomaly of the sacrum may be the cause behind low back pain, failure of caudal epidural block and trans-pedicular or lateral mass screw placement failure [2]. Total spina bifida of sacrum has been poorly reported in anatomy literature till date (incidence of 0.04-0.15%) [1]. So we have endeavored to present such a case in all possible details in the current study.

Case Report

The authors chanced upon a sacrum with total spina bifida during routine osteology classes of 1st phase MBBS students of a medical college of Odisha. The lone sacrum had a dorsal midline defect involving unfused laminae of all five sacral vertebrae. The sacrum was studied in detail and

the requisite dimensions were noted with slide callipers. It was noted that, the coccyx was fused to the sacrum (sacralization of coccygeal vertebrae). The sacrum measured 10.5 cm in maximum width. The length of the sacrum was 9.5 cm. The sacrum and coccyx together measured 11.5 cm in total length. The sacrum was found to be of female sex (short and wide sacrum with abruptly concave sacral curvature and auricular surface up to second sacral segment) [3]. The sacrum belonged to an adult supposedly more than 25 years of age as all the sacral segments were completely fused [3]. The dorsal midline defect in sacrum (Figure 1) had the following dimensions-

1. Length- 9.2 cm.
2. Maximum width- 2.9 cm and minimum width- 0.6 cm.
3. Width at the top of the defect- 2.4 cm, width in the middle of the defect- 0.7 cm and width at the bottom of the defect- 1.6 cm.



Figure 1: Dorsal midline defect (D) in a sacrum affected by total spina bifida

Discussion

Total spina bifida of sacrum is considered to be a failure of induction of the roof of the neural tube. This is attributed to the defect in Pax-9, Msx-1 and Msx-2 genes [4]. Failure of fusion of the two halves of neural arch leads to spina bifida. This midline vertebral defect has an incidence ranging between 0.04% to 0.15% and affects females more commonly than males. Eighty percent of spina bifida cases are open and covered by a thin membrane. A closed spina bifida (spina bifida occulta) is covered by thick membrane and sometimes intact skin. Spina bifida occulta is usually asymptomatic. It may be incidentally detected in radiographs of spine. It may be diagnosed in the foetus during routine antenatal ultrasonography. The spinal cord is usually normal and no neurological symptoms are observed in spina bifida occulta. Protrusion of spinal cord and meninges through the midline defect is termed as spina bifida cystica. Spina bifida cystica presents with neurological symptoms [5]. Presence of sacral spina bifida may cause difficulty in caudal epidural block, and lateral mass and trans-pedicular screw placement. Complete spina bifida

of sacrum results in failure of caudal epidural block in 7% cases [6]. Total sacral spina bifida has been reported by various authors. A frequency of 2% was observed by Patel *et al.* [7] and Sekiguchi *et al.* [8] have reported a frequency of 1% in their study. Total spina bifida was also reported in 1% cases in a study by Shewale *et al.* [9]. Kubavat *et al.* [1] have reported total sacral spina bifida in 1.65% cases in their study. Saluja *et al.* [10] have reported total sacral spina bifida in 2% cases in their study.

Conclusion

Total spina bifida of sacrum can result in defective spread of anaesthetic solution while performing caudal epidural block. This may result in failure of the caudal epidural block altogether. Lateral mass and trans-pedicular screw fixation may also be problematic in sacrum affected by total spina bifida. So, it is imperative for anaesthesiologists and orthopaedic surgeons to keep this defect in mind while performing caudal epidural block and lateral or trans-pedicular screw fixation in sacrum respectively.

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