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Anatomy

DORSAL WALL DEFECT OF DRY HUMAN SACRUM WITH SACRALISATION OF FIFTH LUMBAR VERTEBRA AND ITS CLINICAL IMPORTANCE - A CASE REPORT

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ABSTRACT In modern life backache is common complaint. One of the most common cause of low back pain is sacralisation of 5th lumbar vertebra. Sacralisation of 5th lumbar vertebra is congenital anomaly. Sacralisation means addition of sacral element by 5th lumbar vertebra with the sacrum. It may be partial or complete fusion of 5th lumbar vertebra. Anatomical variations frequently occur around the dorsal wall of the sacral canal especially in relation to sacral hiatus. The variations may be attributed to the dependency of the sacrum to the load related fusion of the bone structure. The understanding of variations in terms of morphology and dorsal wall defects of sacrum may improve the reliability and successful administration of caudal epidural anesthesia which is used for painless delivery, orthopedic surgery and surgical procedures such as hernia repair, lower limb surgery, skin grafting, surgical procedures of anal canal and rectum. The orthopedic surgeon and physiotherapists should also keep in mind sacralisation of fifth lumbar vertebra presenting commonly as lower backache.

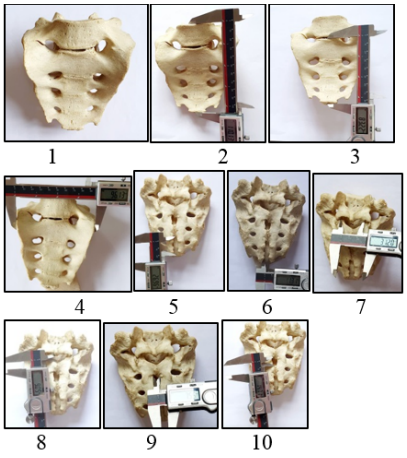
KEYWORDS : Sacralisation, Caudal Epidural Anaesthesia, Painless Delivery, Orthopedic Surgery

INTRODUCTION

Sacralisation of 5th lumbar vertebra is congenital anomaly, Bertoliti is the first researcher reported sacralisation.[1] Low back pain (LBP) is a common compliant occurs about 80 percent of population in their life time[2]. The human sacrum is a wedge shaped bone its base is uppermost lies in between two innominate/illiac bones at sacroiliac joints, forming posterior wall of pelvis. Sacrum superiorly articulates with fifth lumbar vertebra and form lumbosacral angle & its blunt caudal apex articulates with coccyx bone. Normally sacrum has five sacral vertebrae between fifth lumbar vertebra cranially and first coccyx vertebra caudally, forming four pair of sacral foramina. In sacralisation of fifth lumbar vertebra, the lumbar vertebrae acquire sacral characteristics and articulate with first sacral vertebra[3]. Various degree of sacralisation has been reported in earlier studies such as complete sacralisation made up of complete bony union between abnormal transverse process and the sacrum. Incomplete/partial sacralisation shows a distinct joint line between the processes and sacrum. We report a case of dry human undamaged human sacrum with sacralisation of fifth lumbar vertebra along with partial fusion and dorsal wall defect.

MATERIAL & METHODS:

During routine osteology demonstration for first MBBS students at Department of Anatomy MAMC New Delhi, we found dry human undamaged sacrum with sacralisation of 5th lumbar vertebra with partial fusion and dorsal wall defect. We studied for its morphology & dorsal wall defects and the measurements of same were taken with the help of calibrated digital vernier caliper.



PHOTOGRAPHS

1. Ventral surface of sacrum
2. Maximum height of sacrum
3. Height of sacrum from upper border of L 5 vertebra to apex of sacrum
4. Maximum breadth of sacrum (Ventral Surface)
5. Length of sacral hiatus
6. Breadth of sacral hiatus
7. Breadth of dorsal wall nonfusion defect at level L5 & S1
8. Height of dorsal wall nonfusion defect at level L5 & S1
9. Breadth of dorsal wall nonfusion defect at level S2
10. Height of dorsal wall nonfusion defect at level S2

RESULT:

Sacralisations of the 5th lumbar vertebra associated with the non-fusion of laminae of sacral vertebrae at two sites were observed. Following measurements were taken and photographed maximum Height of sacrum: 8.32 cm (photograph no. 2), Breadth of sacrum: 9.61 cm (photograph no. 4), Length of sacral hiatus: 2.69 cm (photograph no. 5), Breadth of sacral hiatus at base: 1.13 cm (photograph no. 6), Height of sacrum from upper border of L5 vertebra to apex of sacrum: 11.01 cm (photograph no. 3).

Dorsal Wall/Non-fusion Defects measurements at the - Level L5 and S1 vertebra (heart shaped) having - Breadth: 3.12 cm (photograph no. 7) & Height: 0.9 cm (photograph no.8) At the level of S2 were Breadth: 0.7 cm (photograph no. 9), Height: 1.47 cm (photograph no. 10).

DISCUSSION:

To understand the sacralisation, we need to know the embryological origin of lumbar vertebrae. It commences at 3rd week of intrauterine life. All vertebrae originate from somites that form along the cranial-caudal axis, on either side of the notochord, from presomatic mesoderm. These somites differentiate further into dermomyotome (future inner dermis and muscle) and sclerotome. Each sclerotome consists of loosely packed cells cranially and densely packed cells caudally.

During the development some densely packed cells move cranially opposite the center of myotome where they form intervertebral disc. The remaining densely packed cells fuse with the loosely arranged cells of immediately caudal sclerotome to form mesenchymal centrum

of body of the vertebra. The mesenchymal cells surrounding the neural tube form neural arch. Ossification of vertebra begins in 8th week of intrauterine life & ends by 25th year of life. There are 2 primary and 5 secondary centres of ossification for each vertebra[4]. The primary cause for sacralisation of 5th lumbar vertebra is cranial shifts that mean sacralisation of the last lumbar vertebra and partial shifts which mean unilateral fusion of traverse processes. It is likely a product of both genetic predisposition (Hox gene) & developmental influences. Symptoms of sacralisation may have spine radicular pain, degeneration of L4/L5, disc prolapse, lumbar scoliosis and lumbar extradural defects.[5]

Incidence of sacralisation varied with different group of population. It is 11.1% in Gujarati, 4% in Chinese, 8.1% in British, 10% in Arabian, 16% in Indian, 18% Australian, 35.9% in Turkish[6]

Knowledge of sacralisation is important for anesthetic and surgical intervention. It is important to neurosurgeon for operating in lumbosacral region. Its demand vigilance and modification during administration of intradural and epidural anasthesia[7].

CONCLUSIONS:

The understanding of variations in terms of morphology and dorsal wall defects of sacrum may improve the reliability and successful administration of caudal epidural anesthesia which is used for painless delivery, orthopedic surgery and surgical procedures such as hernia repair, lower limb surgery, skin grafting, surgical procedures of anal canal and rectum. The orthopedic surgeon and physiotherapists should also keep in mind sacralisation of 5th lumbar vertebra presenting commonly as lower backache. It is also important to know about sacralisation for radiologist while conducting CT, MRI and X-Ray for accurate diagnosis.

REFERENCES:

1. Betoloti M. contributo dei vecidi differnzarione regionale del rachida con special reguards all asimilazzione sacrale della v. lombare Radilogiue Medica 1917; 4: pp. 113 – 144.
2. Dulleurad R. Diagnostic imaging in lumbago and sciatica. Ugeskr Lager 199; 161 (38): 5299-303.
3. Asha Krishnamurtthy, Mallikarjun Adibatt.: Study on incidence of Sacralisation of Fifth Lumbar Vertebra in South Indian Population, Italian Journal of Anatomy and Embryology; 2016, vol. 121, n. 1:60 – 65.
4. Moore KL, Persaud TVN, Mark G. Torchia: The Developing Human: Clinically Oriented Embryology, skeletal system 11th ed, Saunder, Elsevier, Philadelphia; 2013:pp. 339 - 348
5. Susan Standring, Gray,s Anatomy: The Anatomical Basis of Clinical Practice, 40th ed, New York, Churchill Livingstone, 2008:p. 1989
6. Shetty AS, Jetti R, Sacralisation of Fifth Lumbar Vertebra- A Case Report, Austin J Anat 2017:4(2): 1066.
7. Krishnamurthy A, Adibatti M. Study on incidence of sacralisation of fifth lumbar vertebra in South Indian population. IJAE:2016;121(1):60-65.