

Is Whole Spine Sagittal MR Image Imperative for Reporting of Dorsolumbar MR Spine Examination?

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Introduction

Supernumerary vertebra is not an uncommon finding as reported in multiple anatomic and post-mortem studies [1-4]. They are commonest in dorsal and lumbar region with an estimated prevalence of 10-15%.

Presence of supernumerary vertebra not only alters the numbering of dorsal and lumbar vertebra but also the location of associated abnormalities [2, 3]. This can often lead to clinical as well as legal implications. As magnetic resonance imaging (MRI) of Dorsal and Lumbosacral spine is a common investigation encountered in day-to-day practice for a variety of indications, hence to avoid errors in numbering of vertebrae Sagittal MR image of whole spine is very important. This paper highlights the incidence of supernumerary vertebra encountered during routine imaging.

Aims and Objectives

- To determine incidence of supernumerary vertebra in patients undergoing dorsolumbar MR examination of spine
- To determine abnormalities related to supernumerary vertebra in patients undergoing dorsolumbar MR examination of spine

Material and Methods

The study was performed on Siemens Avanto, a 1.5Tesla MRI scanner with 18 channels. One hundred patients undergoing MR examination of dorsal or lumbosacral or dorsolumbar spine for any clinical indication were randomly recruited in the study.

Sagittal T2 weighted MR images were taken through the cervical, dorsal & lumbosacral spines and stitched together by software to obtain a midsagittal MR image of whole spine [figure 1].

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Figure 1: Sagittal T2W and Coronal STIR stitched images in a normal subject

Counting of vertebra was done from craniovertebral junction to determine the incidence of supernumerary vertebra.

Routine spine imaging protocol including T1 weighted, T2 weighted, T2GRE, STIR and diffusion weighted images of spine was used to determine abnormality in the examined region of spine.

The additional vertebra in dorsolumbar spine was considered as supernumerary dorsal vertebra when rib was seen originating from it on coronal MR images else it was considered as supernumerary lumbar vertebra.

The transitional vertebra whether lumbarized or sacralized was not considered as a supernumerary vertebra when total number of dorsal, lumbar and sacral vertebra was twenty-two (12+5+5).

Observations and Results

Our study revealed:

1. Supernumerary vertebra was noted in 17 out of 100 patients.
2. Supernumerary dorsal vertebra was noted in 5 patients while supernumerary lumbar vertebra was noted in 12 patients.
3. No case of supernumerary cervical vertebrae was noted.

Our study further revealed:

1. Approximately 60% of patients (7 out of 12 patients) with L6 vertebra revealed disk bulge or

protrusion at L6-S1 level.

2. Half of the patients with L6 vertebra revealed pseudoarticulation of transverse process with ala of sacrum (either unilateral – 4 or bilateral – 2)
3. No evidence of any associated abnormality was noted with supernumerary dorsal vertebra i.e. D13.

Discussion

Human spine consists of normal 33 vertebrae: seven cervical, twelve dorsal, five lumbar, five sacral and four coccygeal. Multiple anatomic & post-mortem studies conducted in different parts of world have revealed variable occurrence rate of supernumerary vertebra in human spine with an approximate incidence of 10-15% [1]. However, similar studies related to imaging investigations are not there in medical literature except for few case reports.

Most common supernumerary vertebra is lumbar followed by dorsal while supernumerary vertebra are rare in cervical & sacral region. When ribs are seen arising from supernumerary vertebra, then it is considered as dorsal else lumbar vertebra.

Imaging studies of spine are carried out for a variety of clinical indications; most common being backache and radiating neuralgia. Sagittal T2W MR image of whole spine should form an integral part of the MR spine examination along with coronal images to assess the presence of thirteenth pair of rib.

Presence of supernumerary vertebra not only changes the nomenclature but is also related to increased incidence of disk disease at L6-S1 disk probably due to increased incidence of associated rudimentary joint with ala of sacrum causing alterations in transmission lines of weight.

Presence of supernumerary dorsal vertebra affects the decision of selecting site of epidural injection or subarachnoid puncture due to altered position of conus medullaris.

Presence of supernumerary vertebra is also significant for deciding the level of disease when endoscopic procedures of the spine especially in planning for resection of spinal tumors as there is limited scope for movement of endoscope within the spinal canal.

When supernumerary vertebra is missed abnormal nomenclature by two different experts may lead to confusion causing issues with insurance claims and other related legal problems.

Supernumerary vertebra may be associated with variations in lumbosacral nerve plexus [2].

Supernumerary vertebra may be associated with sternal anomalies as long manubrium sterni and focal defect in body of sternum [3].

Supernumerary vertebra may be associated with multiple nipples, a condition known as polythelia [4].

Conclusion

Since the occurrence of supernumerary vertebra in dorsal and lumbar spine regions is not uncommon hence it makes whole spine sagittal MR image very imperative as many orthopedic, neurosurgical & anaesthetic procedures are now performed under fluoroscopic & endoscopic guidance which require accurate determination of the level of the lesion or disease not only for optimal management but also to avoid legal issues.

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References

1. Luboga S. Supernumerary lumbar vertebrae in human skeletons at the Galloway Osteological Collection of Makerere University, Kampala. *East Afr Med J* 2000;16-9.
2. Kottlors M, Glocker FX. Dermatome supply in patients with variations in the number of lumbar vertebrae. *Journal of Neurosurgery Spine* 2010; 12(3):314-319
3. Ochieng J, Ibingira CBR. Sternal anomalies with supernumerary and subnumerary vertebrae and ribs – Case Reports. *Global Journal of Radiology and Therapeutics Radiation* 2014; 2 (2): 018-020.
4. Van AS AB, Naidoo S. Polythelia and supernumerary cervical and thoracic vertebrae. *SAJCH* 2008; 2(3): 130-131.

