



ISSN NO. 2320-5407

Journal homepage: <http://www.journalijar.com>

INTERNATIONAL JOURNAL
OF ADVANCED RESEARCH

RESEARCH ARTICLE

Morphology of Sacral Hiatus In Dogra Region of India

Dr Simriti^{1*}, Dr Bias Dev², Dr Deepa Hans³, Dr Sunanda Raina⁴

1. MBBS, MD. Medical officer, J&K health services

2. MBBS MS, Assistant professor, department of orthopaedics, GMC, Jammu

3. MBBS, MD, Assistant professor, department of Forensic Medicine, GMC, Jammu

4. MBBS, MD, Head of department, Department of Anatomy, GMC Jammu

Manuscript Info**Manuscript History:**

Received: 23 August 2015

Final Accepted: 26 September 2015

Published Online: October 2015

Key words:

sacrum, sacral hiatus

Corresponding Author*Dr Simriti****Abstract**

Sacral hiatus is accessed for various reasons by the clinicians. The present morphological study was carried out on 50 dry human sacra collected from Dogra region of India, which comprises of the population with average height ranging from 160- 165 cm to ascertain the anatomical variations of sacral hiatus. The sizes of the sacral hiatus varied greatly and so did the shapes. The most common shape was inverted U in 32 %, followed by inverted V in 20% and irregular shapes. There were spina bifida in 4 % sacra. A "Dumb-bell" shaped sacral hiatus was observed in 10% cases with a nodular bony growth projecting medially from both margins and irregular shape in 10 %. A rare phenomenon, absent of sacral hiatus seen in 2% sacra. In the current study we have demonstrated M shaped variation of sacral hiatus in 8 % of sacra.

Copy Right, IJAR, 2015,. All rights reserved

INTRODUCTION

The opening present at the caudal end of sacral canal is known as sacral hiatus. It is formed due to the failure of fusion of laminae of the fifth and occasionally 4th sacral vertebra. It is located inferior to the 4th or 3rd fused sacral spines or lower end of median sacral crest (**Gangrade KC, 1968 and Misra SR et al., 2003**).

Sacral hiatus has been utilized for administration of epidural anaesthesia in obstetrics as well as in orthopaedic practice for treatment and diagnosis. The reliability and success of caudal epidural anaesthesia depends upon morphological variations of sacral hiatus as observed by various authors (**Aggarwal A et al., 2009**). The Dogra region comprises of part of Jammu and Kashmir and Himachal Pradesh and natives are shorter with average height ranging from 150- 165 cm.

The present study was conducted at Govt. Medical College Jammu to ascertain the sacral hiatus in the Dogra region of India.

Material and methods

50 sacra were collected from two Medical colleges of Dogra region (Govt. medical college Jammu and Govt. Medical College Tanda) and subjected to morphological study.

The shape similar to English alphabets was categorized as V, U, M, others not corresponding to alphabets was categorized with their similarity to the articles.

Observations and results.

Shapes of sacral hiatus(Graph No. 1)

There were many variations in the shape of sacral hiatus. In 16 (32%), the shape of sacra was Inverted-U (Fig.1) and in 10 (20%) sacra were Inverted-V shaped (Fig.2). Both these types were considered as normal. A “Dumb-bell” shaped sacral hiatus was observed in 5 (10%) cases with a nodular bony growth projecting medially from both margins (Fig.3) and irregular shape in 5 (10 %) (Fig.4). Bifid sacra, was observed in 1 (2%) specimens only (Fig.5). Very low sacral hiatus was seen in 2 (4%) specimens (Fig. 6). There were 4 (8%) M shaped sacral hiatus (Fig.7). In 4 (8%) cases long sacral hiatus was observed (Fig.8). The dorsal wall of sacral canal was entirely incomplete in 2 (4%) cases spina bifida (Fig.9). A rare phenomenon, absent of sacral hiatus seen in 1 (2%) sacra (Fig.10).



Figure 1:Inverted U



Figure 2:Inverted V



Figure. 3:Dumb bell



Figure. 4:Irregular



Figure 5:Bifid



Figure 6:Very Low



Figure 7:M shaped



Figure 8:Long

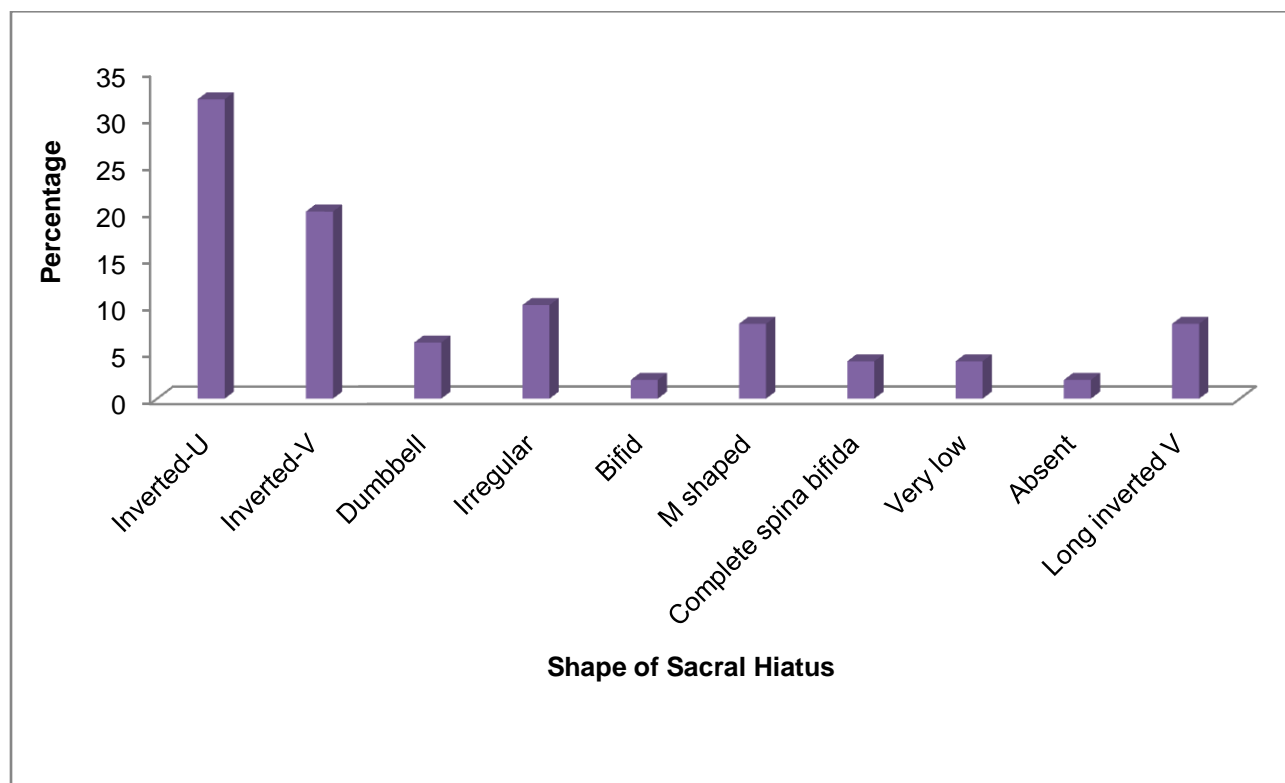


Figure 9:SpinaBifida



Figure 10: Absent

Graph No. 1: Shape of Sacral Hiatus



Discussion

The detailed morphological study of sacral hiatus is of great relevance, since this route is frequently utilized for caudal epidural anesthesia in perineal surgery and caudal analgesia for a painless delivery. Sacral hiatus contains terminal parts of the dural sac and venous vertebral plexus. It is also easily palpable. It is of importance as the extradural space terminates here. Hiatus forms a convenient portal of entry into this compartment. Extent of hiatus may be higher. During life, the sacral hiatus is filled with fibrous tissue through which the anesthetic agents may be introduced into the sacral canal called epidural or caudal anesthesia. The anesthetic agent comes in contact with only the caudal nerve roots.

Edward and Hingson (1941), for the first time took the advantage of this natural gap at the lower end of sacral canal for continuous caudal analgesia during labour. Sacral hiatus has a somewhat triangular outline when seen from the dorsal aspect.

In the present study the shapes of sacral hiatus (table no.13) were variable; most commonly inverted-U in 16 (32%) sacra and inverted-V in 10 (20%) sacra. Both the above types were considered as normal. In 5 (10%) its outline was like a Dumb-bell which was very low when compared to previous workers namely **Nagar SK (2004)** in 36 (13.3%) sacra and **Kumar V et al (1992)** in 15 (7.43%) sacra. Bifid sacral hiatus was seen in 1 (2%) sacra which was similar to that reported by **Nagar SK (2004)** in 4 (1.5%) sacra. There was complete agenesis of sacral hiatus reported by previous workers namely **Trotter M (1947)** in 1.8%, **Kumar V et al (1992)** in 3 (1.49%) sacra and **Nagar SK (2004)** in 4 (1.5%) sacra. In the present study absence of sacral hiatus due to bony over growth which is a rare phenomenon was observed in 1 (2%) sacra which were unlike to other authors like **Nagar SK (2004)** in 2 (1%) sacra and **Kumar V et al (1992)** in 2 (0.99%) sacra only. But in a study conducted by **Sekiguchi M et al (2004)**, **Kothapalli J et al (2012)**, sacral hiatus was absent in 3% cases which was high. **Nagar SK (2004)** also noted

various shapes of sacral hiatus most common being inverted-U in 112 (41.5%) sacra and inverted-V in 73 (27%) sacra. **Kumar V et al (1992)** also noted various shapes of sacral hiatus, most common being inverted-V in 94(46.53%) and inverted-U in 60 (29.70%). The shape of the sacral hiatus was irregular in 5(10%) sacra in the present study which was again similar when compared to **Nagar SK (2004)** in 38 (14.1%) sacra. Long sacral hiatus in present study was seen in 4(8%) which was similar to that of **Shewale SN et al (2013)** who observed it as 19 (9.31%) but the reading was unlike when compared with **Patel ZK et al (2011)** who observed it in 41(21.1%) sacra.

Table No. 13: The comparison Sacral Hiatus shapes of current study with other reported studies.

Shape of Sacral Hiatus	Vinod Kumar 1992	Nagar SK 2004	Patel ZK 2011	Shewale SN 2013	Current Study
Inverted-U	29.70%	41.5%	49.33%	40.69%	32%
Inverted-V	46.53%	27.0%	20%	32.35%	20%
Irregular	-	14.1%	-	9.31%	10%
Dumb-Bell	7.43%	13.3%	4%	5.89%	10%
Bifid	-	1.5%	-	0.49%	2%
Complete Spina Bifida	1.49%	1.5%	2%	0.98%	4%
Absence of Sacral Hiatus	0.99%	1.1%	1%	0.98%	2%
Long	-		21.1%	9.31%	8%
M Shaped	-			-	8%

Conclusion

The present study conducted in department of anatomy, Government medical College , Jammu over 50 dry sacra of unknown sex. The sacra were studied for its morphometric characters.

Bibilography

1. **Aggarwal A, Gupta RN and Singh PJ.** Anatomic consideration of caudal epidural space: a cadaver study. *Clinical Anatomy*, 2009 Sep; 22 (6):730-31.
2. **Edwards WB, Hingson RA.** Continuous caudal anaesthesia in obstetrics. *American journal of surgery*, 1942; 57: 459 – 464.
3. **Kothapalli J, Devi VS, Varalakshmi D, Roshan ZM.** Morphometric study of sexual dimorphism in adult sacra of South Indian Population. *Int J Biol Med Res*, 2012; 3(3): 2076-2081.
4. **Kumar V, Pandey SN, Vajpai RN, Jain PN, Longia GS.** Morphometrical study of sacral hiatus. *Journal of Anatomical society of India*, 1992; 41(1): 7 – 13.
5. **Nagar SK.** A Study of Sacral Hiatus in Dry Human Sacra. *Journal of Anatomical Society of India*, 2004; 53 (2): 18-21.
6. **Patel ZK, Thummar B, Rathod SP, Single TC, Patel S, Zalawadia A.** Multicentric Morphometric Study of Dry Human Sacrum of Indian Population in Gujarat Region. *NJIRM*, 2011; Vol. 2(2): 31-35.
7. **Sekiguchi M, Yabuki S, Satoh K, Kikuchi S.** An anatomical study of sacral hiatus: a basis for successful caudal epidural block. *Clin J Pain*, 2004 Jan-Feb; 20 (1): 51-54

8. **ShewaleSN, Lanquee M, Kulakarni PR, Diwan CV.** Morphological and Morphometrical study of Sacral Hiatus. *International Journal of Recent Trends in Science and Technology*, 2013; 6 (1): 48-52.
9. **Standring S.** Gray's anatomy. The anatomical basis of clinical practice (39th edition). *Elsevier, Churchill Livingstone, Edinburgh*, 2005; 749 - 754.
10. **Trotter M.** Variations of the sacral canal: Their significance in the administration of caudal analgesia. *Anaesthesia Analg*, 1947; 26(5): 192–202.