Prevalence of Lumbosacral Transitional Vertebrae Among Patients Presented to Hayatabad Medical Complex, Peshawar

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ABSTRACT

Objectives: To find out the prevalence of lumbosacral transitional vertebrae (LSTV) among patients presented to Hayatabad medical complex, Peshawar.

Methods: This prospective observational study was conducted at Hayatabad Medical Complex Peshawar by Department of Orthopaedic & Spine Surgery. Study duration was one and half year from Jan 2015 to Jun 2016. In this prospective study, all those patients were included in whom lumbosacral spine x-rays were done regardless of the pathology. LSTV was identified and classified according to Castellvi classification.

Results: In a total of 4939 patients, x-rays were examined with 574(11.6%) having LSTV. Mean age of the group with LSTV was 32.89 years + 10.12SD with minimum of 13 and maximum of 64 years. The overall prevalence of lumbarization was 2.1% and of Sacralization was 9.55%. According to Castellvi classification, distribution of various types of LSTV in the group was: type I (22.6%), type II (44.9%), type III (25.1%) and type IV (7.3%).

Conclusion: LSTV is very common condition with prevalence of 11.6 % in our study and reported as high as 30% in other studies. It should be take into account while doing spine surgery.

Key Words: Transitional vertebra, Sacralization, Lumbarization.

INTRODUCTION

Transitional congenital anomaly or variation of the lumbosacral junction is not an uncommon condition [1]. This junctional variation may be in the form of Lumbarization of S1 vertebra or Sacralization of the L5 vertebra and termed as Lumbosacral transitional vertebra (LSTV). Lumbarization of S1 is when there is presence of fully developed disc between the S1 and S2 and lumbar like facet joint with squared vertebral body. Sacralization is when the L5 is fused to the Sacrum up to various degrees [2]. This variable anatomy was first noted by Mario Bertolotti in 1917 and he first described its association with back pain [3]. The reported incidence varies a lot from 5% to 30 % in the literature [4]. The distribution of various types of lumbarization and Sacralization is also variable. LSTV is commonly an incidental finding on AP view of the lumbosacral spine or on CT scan done for urological or some other purposes [5].

Depending on the morphological characteristics of the lumbosacral junction Castellvi 1984 described four different classes of LSTV [6]. According to this system type I, dysplastic transverse process with diameter of more than 19 mm; type II, incomplete Lumbarization /Sacralization with a unilateral or bilateral pseudoarthrosis; type III, complete Lumbarization /Sacralization; and type IV, mixed.

The relevance of the topic is due to importance in identification of levels during spine surgery, its relation with back pain and local prevalence. The importance of correct level cannot be overemphasized in spine surgery. The whole outcome of the surgery depends on the correct level identification. Since its first description in 1917 there are numerous studies supporting its relation to chronic low back pain due to faulty joints, pseudoarthrosis and adjacent segment degeneration [7,8,9].

There are very few studies in the local literature on this very common variation. One study done in Pakistan on morphometry of lumbar vertebrae but even they did not focus on LSTV [10]. This study is

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focused on the prevalence of LSTV among patients presented to Hayatabad medical complex, Peshawar.

METHODS

This prospective observational study was performed by the department of Orthopaedic and spine surgery Khyber girls medical college/ Hayatabad Medical complex Peshawar. Study duration was one and half year from Jan 2015 to June 2016. All the patients in whom x-rays of lumbosacral spine were performed with any pathology were examined. Both indoor and outdoor patients were included from Orthopaedics, general surgery and urology departments. Patients with poor quality x-rays were excluded.

One of the senior authors examined the x-rays carefully and classified the anomaly according to Castellvi classification. On AP view the last thoracic vertebra was identified and then the counting was done. In case 4 lumbar vertebra were counted then L5 sacralization was documented. If 6 lumbar vertebrae were counted then S1 lumbarization was diagnosed. However careful assessment was made for last thoracic vertebra and presence of any rudimentary rib. After this the morphology of the junction was noted and classified according to the Castellvi classification. Data was collected on a Performa. Details of all cases with LSTV were recorded. If no anomaly found the case was added to the count.

RESULTS

In this study, lumbosacral spine x-rays of 4939 individuals done for various reasons both outdoor and indoor were reviewed. In 2700 individuals, x-rays were done with history of LBP, while in 2239 individuals for some other indications. Out of these, 574(11.62%) patients were identified as having variation of the L5/S1 junction. Mean age of the group with LSTV was 32.89 years (SD + 10.12) with minimum of 13 and maximum of 64 years. There was male predominance in the group with LSTV. Male were predominant in the LSTV group 322(56.1%) female 252(43.9%).

In 102(17.8%) out of 574 patients, lumbarization was identified while in 472(82.2%) individuals Sacralization was identified. The overall incidence of lumbarization was 2.1% and of Sacralization was 9.55%. (table 1)

Table 1: Lumbarization/Sacralization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lumbarization	102	17.8	17.8	17.8
	Sacralization	472	82.2	82.2	100.0
	Total	574	100.0	100.0	

Table 2: Castellvi Classification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	TYPE I	130	22.6	22.6	22.6
	TYPE II	258	44.9	44.9	67.6
	TYPE III	144	25.1	25.1	92.7
	TYPE IV	42	7.3	7.3	100.0
	Total	574	100.0	100.0	

According to Castellvi classification, distribution of various type of LSTV in the group was as follow: type I 130 individuals (22.6%), type II 258 individuals (44.9%), type III 144 individuals (25.1%) and type IV 42 individuals (7.3%). (table 2) (table 3).

All 102 patients with lumbarization were having type II (60) and type III LSTV (42). Out of 472 patients with Sacralization, 130 were with type I, 198 were with type II, 102 with type III and 42 were with type IV LSTV.

DISCUSSION

There are numerous studies in the literature done on every aspect of the LSTV. Its incidence, types, relation to back pain and different symptoms it may cause. Missing this variation can lead to wrong level surgery in

spine surgery, which is a clinical disaster [11]. There is lack of local studies on incidence of this condition. So, the primary aim is to see how the incidence compares to studies done in other regions.

One of the recent studies on the prevalence of LSTV was done by Heath et al in Australia. Similar to our study they used AP and lateral radiographs of the lumbosacral spine for identification of LSTV and categorized it according to Castellvi classification [12]. Their sample size was 5941, the largest reported sample on this topic. They reported 9.9% incidence of LSTV with 5.8% Lumbarisation and 4.1 % Sacralization. Their overall prevalence is similar to our prevalence, which is 10.6%. In their study Lumbarisation was common than Sacralization unlike our study. In present study, we have only 1.88% individuals with Lumbarisation against 5.8%, which they reported. This may be due to observer error as some time it is very difficult to identify rudimentary rib on AP view. Though the difference is striking or this may be the true picture in our area. Hopefully this study will generate local literature on this topic and will clear the picture.

Sekharappa V 2014 in India did a study on the prevalence of LSTV and its relation to disc degeneration [13]. Their sample size was 3000 and they divided it into three groups, patients with urological disorders, discectomy patients and spine outdoor patients. They reported the overall prevalence of 13% compares to our 10.6%. Like our study, Sacralization was common 11% against 2% l Lumbarisation. Type II was most common followed by type III like in our study.

Taskaynata MA 2005 reported 5.7% prevalence in a group of 881 young patients with back pain [14]. Tini 1977 reported 6.7% prevalence in a study of 4000 radiographs [15]. 12 % prevalence of LSTV was reported by Bron JL 2007 [16] in a comparatively small sample of 500. Ekinci S 2015 reported 17.6% prevalence of LSTV in turkey [17].

All these studies with somewhat variable prevalence clearly signify that LSTV is quit a common entity. This study shows that it is quite common in our local population. We hope that this study will lead to local research on this topic and will clarify the picture.

CONCLUSION

We concluded that the lumbosacral transitional vertebrae is very common condition with prevalence of 11.6 % and reported as high as 30% in other studies, and can lead to wrong level identification during spine surgery.

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