

Bertolotti's Syndrome - Diagnosis and Management

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Abstract:

Introduction: Lumbosacral transitional vertebrae (LSTV) with back pain known as Bertolotti's syndrome is a relatively common skeletal anomaly with a debated role in low back pain. The aim of our study is to characterize the clinical presentation of patients with Bertolotti's syndrome, and to describe the results of treatment offered.

Methods: Patients coming in our orthopaedic OPD with back pain were examined, investigated and patients with Bertolotti syndrome were diagnosed. Study group of 35 patients were treated with NSAIDs, physiotherapy, life style modification and follow up was taken. Patients who were symptomatically better were continued with conservative measurement. Patient with no or little pain relief were advised for local steroid and lignocaine injection.

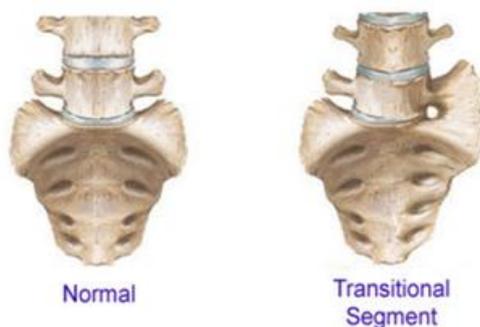
Results: All 35 patients were initially treated by NSAIDs & Physiotherapy, out of them 20 improved symptomatically. But 15 patients were having persistent symptoms. They were treated by local infiltration. There was a rapid onset of pain relief in 15 patients and improved symptoms at follow up, and significant difference in the pre and post procedure VAS score ($p < 0.05$).

Conclusions: The rapid onset of pain relief and improved symptoms at follow up, strongly suggests that the site of origin of their chronic pain was the anomalous articulation. The sustained benefit observed in our patients suggests that infiltration of these articulations is a worthwhile procedure.

Keywords: Bertolotti's Syndrome, Infiltration of lumbosacral articulations, low back pain, Lumbosacral transitional vertebrae (LSTV)

I. Introduction

Chronic lumbosacral pain is a common and challenging clinical entity in a pain management center. The association of lumbosacral transitional vertebrae and low back pain, commonly referred to as Bertolotti's syndrome (Bertolotti, 1917) [1], has a controversial history. [2][3][4][5][6]



Developmental defects occurring at the lumbosacral junction can result in transitional vertebrae. The resulting combination of characteristics produces a variety of morphological configurations collectively referred to as lumbosacral transitional vertebrae (LSTV). This congenital abnormality occurs in 4% –30% of the general population[7]. The majority of LSTV cases are asymptomatic and are identified incidentally.

The developmental defects that result in LSTV are thought to be caused by a delay in the timing of threshold events occurring at the lumbosacral junction. Disruption of developmental timing, with resultant defects, can only occur during the vulnerable time when developmental thresholds are reached.

Bertolotti's syndrome (BS) is characterized by anomalous enlargement of the transverse processes of the most caudal lumbar vertebra, which may articulate or fuse with the sacrum or ilium and cause back pain. The causes of back pain in BS are multifactorial. The abnormal mechanical stress leads to facet joint arthropathy, as well as iliopsoas and quadratus lumborum strain. A transitional vertebra that reduces the mobility in the inferior motion segment stabilizes the inferior intervertebral joint and protects the disc, but

results in fewer motion segments to accommodate movement, causing each of the other lumbar discs to receive excess mobility, which stresses the discs. [8], [9] cause degeneration in the disc immediately superior to it [10][11] [12][13]. The excess mobility could also potentially cause the disc to bulge or prolapse, putting pressure on the spinal nerves. While the degeneration of intervertebral discs may or may not be the source of the pain, the reduced disc height may reduce the size of the intervertebral foramen, pinching exiting spinal nerves,[14][15] or lead to a listhesis, a subluxation of the associated vertebrae. An increased prevalence of disc protrusion or extrusion in the disc above the transitional L5 vertebra has been found in patients with low back pain (LBP). Degeneration at anomalous articulation between L5TV and the sacrum may also produce pain. Diagnosis of BS is based on radiological findings and their correlation with the clinical presentation. Plain X-rays of the lumbosacral spine in anteroposterior view are usually sufficient [16]. Radicular features may necessitate an MRI for evaluation of prolapsed intervertebral disc (PIVD), which may co-occur. .

While there is little consensus on the clinical significance of L5TV, even less is known about useful treatment strategies. Unfortunately, only scarce reports with small case series are available in the literature, describing specific treatment options in symptomatic L5TV. [17][18][19][20]

II. Methods and materials

Patients coming in our orthopaedic OPD with back pain between August 2013 to November 2014 were examined and investigated by plain X-ray. Patient with Bertolotti syndrome were diagnosed on the basis of history, clinical examination and x-ray findings. The patient further investigated by MRI to know the cause of pain. Patients were categorized on the basis of cause of pain into the following groups.

Group 1. Patients with an anomalous lumbosacral articulation with low back pain localized in the area approximately overlying the anomaly, with or without referred pain, but without radicular pain or positive neurologic signs with normal intervertebral disc. This group was included for further study.

Group2. Patients with an anomalous lumbosacral articulation with radicular pain or positive neurologic signs or abnormal intervertebral disc. This group was excluded from our study.

Study group of 35 patients were treated with NSAIDs, physiotherapy, life style modification and follow up was taken after 4 week.

Patients who were symptomatically better were continued with conservative measurement.

Study group patients with no pain relief were advised for local steroid and lignocaine injection. After getting consent from the patient local steroid and lignocaine infiltrations were performed in a standardized manner as described below. Injection was given with following technique:

Technique of infiltration

- The patient lies prone on a radiolucent table. A C- arm image intensifier is used to verify needle placement.
- A 22-gauge spinal needle is introduced in the line of the x-ray beam and is advanced down to bone; then, the needle is adjusted until its tip is seen to be centrally aligned over the target. With gentle pressure and rotation, the needle enters into the “cavity” of the joint.
- In all the infiltrations, we used Triamcinolone, 1 mL (containing 20 mg), followed by lignocaine (lidocaine) 1 percent 5 ml. The patients were asked to report the nature and site of any discomfort experienced during the needle’s placement and infiltration, patients with bilateral anomalous lumbosacral articulations, with bilateral pain pattern, were infiltrated bilaterally.
- Patients were reviewed at 3 weeks and 8weeks,after infiltration, and thereafter according to clinical needs.

The Visual Analogue Scale (VAS) pain scale was used in clinical settings to determine the initial degree and change in intensity of pain.

III. Observation And Result

Total 35 patients presented with chronic low-back pain lasting an average of 5 months. We had the following observations and results.

Table 1: Distribution of the study group according Age group

Age group	Number of patients (n)	Percentage (%)
0- 20 years	4	11.4%
21-25 years	9	25.7%
25-30 years	10	28.6%
30-35 years	7	20%
Above 35 years	5	14.3%
Total	35	100%

Maximum number of patients were in the age group of **25 to 30 years (28.6%)**. Mean age of our study is 28.65 years.

Table 2: Distribution of the study group according to Sex

Sex	Number of patients (n)	Percentage (%)
Male	18	51%
Female	17	49%
Total	35	100%

In this study, total **51 %** were male and **49 %** were female so, male to female ratio is almost **1:1**.

Table 3: Vas In Over All Groups At The End Of Study

		BEFORE STARTING TREATMENT(N=35)	AFTER 12 WEEK OF FOLLOW UP(N=35)	P VALUE	INTERPRETATION
VAS SCORE	MEAN	7.51	0.74	0.001	SIGNIFICANT
	SD	0.80	0.69		

Table 6: Vas Score In Infiltration Group

		BEFORE INFILTRATION (n=15)	AFTER 8 WEEK OF INFILTRATION (n=15)	P VALUE	INTERPRETATION
VAS SCORE	MEAN	7.53	0.53	0.001	SIGNIFICANT
	SD	0.49	0.49		

Here, there is a significant difference in pre and post procedure VAS score ($p < 0.05$).

One patient developed parasthesia for 6 hour in right lower limb after local infiltration. It recovered without any long term complication. There were no other complications in our study.

IV. Discussion

Despite the existence of a significant number of asymptomatic patients, transitional vertebrae associated with abnormal transverse mega-apophysis may be the cause of low back pain in others. It becomes essential to differentiate between low back pain due to transverse mega-apophysis in contact with the sacrum from other sources of back pain in patients with Bertolotti's syndrome

This symptom may be related to progressive modifications in the biomechanics of the spine, generating abnormal weight overload in articular facets and adjacent intervertebral disc degeneration. Abnormal lateral contact of transverse mega-apophysis with sacrum or iliac bone can also be the source of local pain. In our study we observed that there is no significant difference in incidence of bertolotti syndrome amongst males and females. Though bertolotti syndrome is a congenital abnormality, symptoms started to appear in 2nd decade of life, and the mean age of presentation is 28.65years. All 35 patients were initially treated by NSAIDs and Physiotherapy, out of which 20 improved symptomatically. Pain relived by NSAIDs may be due to anti-inflammatory action in conjugation with physiotherapy which may alter the biomechanics at abnormal articulation to relive strain there. But 15 patients were having persistent symptoms. They were treated by local infiltration.

The rapid onset of pain relief in 15 patients and improved symptoms after follow up of 2 months, together with the relatively small volumes of infiltrate used and the precise control of needle placement under IITV strongly suggests that the site of origin of their chronic pain was the anomalous articulation. Injected steroid in this situation might act as an anti-inflammatory agent, as a sclerosant, or even as a mechanical agent producing a micromanipulation of the joint by local pressure effects. If the "joint" is simply a fibrous ankylosis, it could perhaps be the site of a chronic connective tissue strain. This concept provides the most rational explanation of the benefit of local steroid injections. The sustained benefit observed in 15 patients suggests that infiltration of these articulations is a worthwhile procedure in its own right, quite apart from any value as a diagnostic test.

Few case reports have advocated removal of the abnormal transverse mega-apophysis.

V. Conclusion

While investigating back pain patients, after excluding common cause of back pain, Bertolotti's syndrome should be consider as one of the cause of back pain in young adults. Our findings suggest that the source of pain is from an abnormal articulation. Conservative measures should be tried first and if there is no improvement in symptoms after conservative measures, injection with local anaesthetic and steroid within the abnormal articulation should be performed. We suggest this as a simple, safe and cost effective treatment on OPD basis in symptomatic patients with anomalous lumbosacral articulations. Infiltration of these articulations may be therapeutic, as well as diagnostic. Further studies are required about the results of excision of enlarged transverse processes and the effect of such surgery on adjacent level disc and facet joints.

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