

Research Article

Prevalence of chronic facet arthropathy: a retrospective study

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ABSTRACT

Background: To assess prevalence facet-joint arthropathy in chronic low back pain using computed tomography.

Methods: A retrospective study profiled and analysed objective data from patients CT scans and previous records.

Results: Facetal arthropathy was graded by Pathria's criteria. 102 joints (33.12%) were grade 1, 113 (36.69%) grade 2, 63 (20.45%) grade 3, and 30 (9.74. %) grade 4. Final result showed that females were affected more than the male in Grade II, III and IV. Age group more affected was between 46-85 years.

Conclusions: Our study on chronic low back pain revealed prevalence of facet-joint involvement 66.88% (206 patients) in rural population with age group involved more than 46 years.

Keywords: Facet arthropathy, Prevalence, Computed tomography

INTRODUCTION

Low back pain (LBP) remains a common musculoskeletal complaint, with a reported lifetime incidence of 60-90%. Various structures have been incriminated as possible sources of chronic LBP, including the posterior longitudinal ligament, dorsal root ganglia, dura, annular fibers, muscles of the lumbar spine, and facet joints.

In 1911, Goldwaith first implicated the facet joints as a source of LBP. In 1933, Ghormley described the facet syndrome, and in 1941, Badgley endorsed the idea of the facets as the cause of LBP, based on pathomorphologic studies of the joint.^{1,2} Rees in 1972 and Shealy in 1974 accepted the notion and developed techniques in which the joint allegedly could be denervated to stop pain stemming from the facet joints.^{3,4}

The facet or zygapophysial joints of the spine are well innervated by the medial branches of the dorsal rami.⁵⁻⁹

Facet joints have been shown capable of causing pain in the neck, upper and mid back, and low back with pain referred to the head or upper extremity, chest wall, and lower extremity in Normal volunteers.¹⁰⁻²² They also have been shown to be a source of pain in patients with chronic Spinal pain using diagnostic techniques of known reliability and validity.²³

Previous studies have demonstrated that both the capsule⁴⁹⁻⁵⁰ and synovial folds⁵¹⁻⁵² of facet joints possess nociceptive nerve endings. Pain sensation from the capsule and synovium are transmitted through the medial branches of the dorsal ramus of spinal nerves.

The orientation of lumbar facet joints has important functional and clinical consequences. For example, facet joints oriented relatively more parallel to the sagittal plane, such as at L2-L3 and L3-L4, allow limited rotational movements and anatomically favour flexion and extension movements. In contrast, the L4-L5 facet joints, with increased coronal angulations, facilitate

greater rotational movements.⁵³⁻⁵⁵ Both facet joint orientation and facet joint tropism (an asymmetry in the angles of two facet joints at the same level) have been implicated as important variables leading to facet joint-mediated pain.

Based on evaluations utilizing controlled diagnostic blocks, the prevalence of zygapophysial or facet joint involvement has been estimated to be between 15% to 45% in heterogeneous groups of patients with chronic low back pain²⁴⁻²⁸ and 36% to 67% in patients with chronic neck pain.²⁹⁻³¹ However, false-positive rates varying from 27% to 63% in the cervical spine and 17% to 50% in the lumbar spine have also been described.^{30,31} Facet arthrosis, a common radiographic finding, has long been suggested to be a potential cause of low back pain.³² The exact pain generator within the facet joint remains poorly defined.³²

MRI may not evaluate facet joint osteoarthritis as accurately as CT.³³ There has been only one report that examined the accuracy of routine MRI in assessing facet joint osteoarthritis of the lumbar spine.³⁴

To date the prevalence of facet joint arthropathy has not been studied for chronic low back pain in rural population. So this retrospective study was undertaken to evaluate the prevalence of facet joint arthropathy in rural population.

METHODS

This was retrospective study of CT images of 308 patients. Records of patients presenting with chronic LBP as primary symptom (with and without radiation) at the Department of Orthopaedics and Physiotherapy Department, PDVVPF, Ahmednagar from Dec. 2012 to Sept. 2013 were screened. Ethical clearance was obtained from PDVVPF's Institutional Ethics committee (PDVVPF's MCH/IEC/Pharmac 27/16/08/2013).

All patients included were investigated in radiology with spine CT. The average age of the patients was 52.7 years (range, 22–75 years). CT images were obtained parallel to disc spaces at L3-4, L4-5, and L5-S1 levels, with 5-mm consecutive slice thickness. The degrees of osteoarthritis on CT were scored on the same four-point scale according to the Pathria's criteria for grading of facet joint osteoarthritis on CT,³⁵ in which grade 1 (Figure 1A) = normal, grade 2 (Figure 1B) =mild (joint space narrowing or mild osteophyte), grade 3 (Figure 1C) =moderate (sclerosis or moderate osteophyte), grade 4 (Figure 1D) =severe (marked osteophyte). For the image quality standard, one experienced musculoskeletal radiologist reviewed the CT images and scored them according to the scale. When different grades were assigned to right and left facet joints in the same segment, the grade for the most severe OA was used for data analysis.

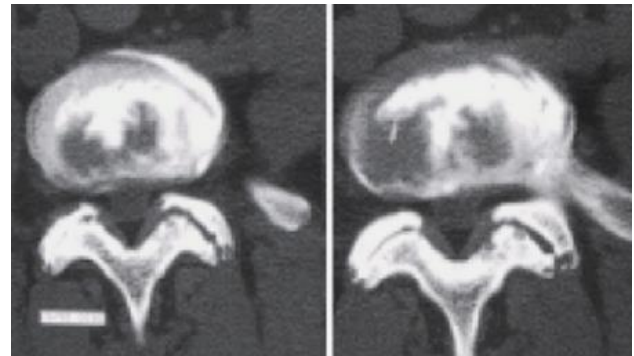


Figure 1: Showing facet arthropathy.

RESULTS

Table 1: Patient demographic data.

Total Patients (n)	308
Mean Age (years)	52
Age Range (years)	25-85
Sex	
Male	112 (36.37%)
Female	196 (63.63%)
Duration of LBP	4 months – 26 years

Table 2: Prevalence of facet joint arthropathy.

Grade	Male	Female	Total
Grade I	59 (19.15%)	43(13.96%)	102(33.12%)
Grade II	50(16.23)	63(20.45%)	113(36.69%)
Grade III	29(9.41%)	34(11.03%)	63(20.45%)
Grade IV	11(3.57%)	19(6.17%)	30(9.74%)

Table 3: Age group affected.

Affected	25-35	36-45	46 - 55	56- 65	66- 75	76- 85
Number	31	46	56	63	59	53
%	10.06	14.93	18.18	20.45	19.16	17.20

A total of 308 CT of chronic low back pain patients were evaluated. On CT scans, 102 joints (33.12%) were considered to be grade 1, 113 (36.69%) grade 2, 63 (20.45%) grade 3, and 30 (9.74%) grade 4. Final result showed that females were affected more than the male in Grade II, III and IV. Age group more affected was between 46-85 years.

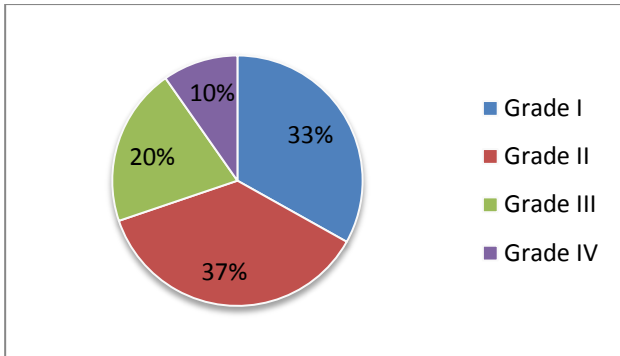


Figure 2: Prevalence of facet joint arthritis.

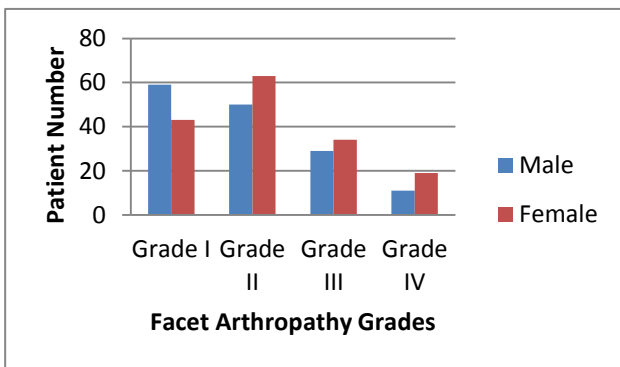


Figure 3: Sex wise prevalence of facet arthropathy.

DISCUSSION

This retrospective evaluation of CT with chronic low back pain involving the lumbar regions demonstrated a prevalence of facet-joint involvement 66.88% (206 patients). Patients with age more than 46 were affected more.

These results are similar to previous studies that showed a significantly higher prevalence of facet joint-related pain in the elderly.³⁶

Lewin,⁴¹ in his comprehensive anatomic review of lumbar synovial joints, stated that facet joints showed only minor chondral changes before the age of 45. After that age, advanced chondral changes, subchondral sclerosis and osteophytes became common phenomena. The present study demonstrated a similar prevalence of facet joint osteoarthritis

Grogan et al. examined 104 cadaveric facet joints for severity of cartilage degeneration and reported that the factors associated with sclerosis and cartilage degeneration of the facet joint were advanced age, spinal level, and increasingly coronal joint angles.⁵⁶ Post-Menopausal hormonal changes and repeated bending and lifting heavy weights in the females may be the contributory factor for more prevalence in females.

Disc degeneration with associated narrowing of the disc space alters the mechanical load distribution and may result in a degenerative cascade with increased mechanical stress on the facet joint and joint capsule.⁵⁷

Despite this, the present study reaffirms that involvement of the facet joint(s) is a major cause of chronic spinal pain. Our study also revealed that facet-joint involvement appears to frequently occur at both the L4/5 and L5/S1 levels. This result is similar to the result of study by Manchikanti et al.

Multiple structures in the spine, including facet joints, intervertebral discs, dorsal root ganglia, muscle and ligaments are capable of causing headaches, neck pain and shoulder pain or low back, hip and lower extremity pain. Lumbar facet joints have been shown to be capable of being a source of pain in the low back and referred pain in the lower extremity in normal volunteers.³⁸⁻⁴¹ Multiple authors also have shown referred pain distribution of cervical facet joints.⁴²⁻⁴⁵ Cervical and lumbar facet joints are innervated by the medial branches of the dorsal rami.⁴⁶⁻⁴⁸ In ankylosing spondylitis facet joint arthropathy was most important cause to limit rotation of the spine. Congenital abnormalities in facet joint can cause backache and limitation of spinal rotations.

CONCLUSION

The results of this study demonstrated prevalence of facet-joint involvement in chronic low back pain patients 113 (36.69%) grade 2, 63 (20.45%) grade 3, and 30 (9.74%) grade 4.

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Conflict of interest: None declared

Ethical approval: Ethical clearance was obtained from PDVVPF's Institutional Ethics committee (PDVVPF's MCH/IEC/Pharmac 27/16/08/2013)

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