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Rare and overlooked two diagnoses in low back pain: Osteitis condensans ilii and lumbosacral transitional vertebrae

Bel ağrısında nadir ve gözden kaçan iki tanı: Osteitis kondensans ilii ve lumbosakral transizyonel vertebra

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Abstract

Aim: In this study, we investigated the prevelance of osteitis condensans ilii (OCI) and lumbosacral transitional vertebra (LSTV), relationship of these diseases with age and gender, and whether there was a relationship between these two conditions.

Methods: The computed tomography (CT) scans of 599 patients who underwent lumbar CT between January 2016 and March 2016 due to lumbar pain were evaluated retrospectively. All of the CT scans were performed with a 16-slice CT scanner. For each patient; age, gender, LSTV anomaly presence and type (lumbalisation, sacralization), and presence and side information of OCI were recorded.

Results: OCI was not detected in 577 patients (96.3%) and was detected in 22 patients (3.7%). LSTV was not detected in 522 patients (87.2%) and was present in 77 patients (12.8%). The mean age of the patients who detected OCI was 30.7 years (+/- 9.5) while without OCI was 43.1 years (+/- 16.6) . 18 (81.8%) of the 22 OCI detected cases were female while 4 (18.2%) cases were male. OCI was more common in young people and female. LSTV was observed in 41 (16.2%) of the female patients while in 36 of the male patients (10.3%). LSTV was observed more frequently in female patients. There was no statistically significant difference between groups with and without OCI disease in terms of presence of LSVT.

Conclusion: Both OCI and LSVT are situations that cause back pain. These two diagnoses must be taken into account in examinations made with lumbar pain cause.

Keywords: Osteitis condensans ilii, Lumbosacral transitional vertebra, Computed tomography

Öz

Amaç: Bu çalışmada osteitis kondensans ilii (OKİ) ve lumbosakral transizyonel vertebranın (LSTV) sıklığı, bu iki durum arasında ilişki olup olmadığı ve bu durumların yaş ve cinsiyetler arasındaki değişkenliklerinin tespitini amaçladık.

Yöntemler: Ocak 2016 -Mart 2016 tarihleri arasında lomber bel ağrısı nedeni ile lomber bilgisayarlı tomografi (BT) çekilmiş 599 hastanın incelemeleri retrospektif olarak değerlendirildi. Bütün BT çekimleri 16 kesitli BT cihazında gerçekleştirildi. Her hasta için yaş, cinsiyet, LSTV anomalisi olup olmadığı bilgisi ve tipi (lumbalizasyon ve sakralizasyon) ile OKİ varlığı ile taraf bilgisi kaydedildi.

Bulgular: Değerlendirilen hastaların 577'sinde (%96.3) OKİ saptanmazken 22'sinde (%3.7) saptandı. Değerlendirilen hastaların 522'sinde (%87.2) LSTV saptanmazken 77'sinde (%12.8) saptandı. OKİ saptanan hastaların ortalama yaşı 30.7 (+/- 9.5), saptanmayanlarınki 43.1 (+/- 16.6) yıl idi. OKİ saptanan hastaların 18'i (%81.8) kadın, 4'ü (%18.2) erkekti. OKİ kadın hastalarda ve genç yaş grubunda daha sıktı. LSTV kadın hastaların 41'inde (16.2%) erkek hastaların ise 36 'sında (10.3%) gözlendi. LSTV kadın hastalarda daha sık gözlendi. OKİ olan ve olmayan hasta grupları arasında LSTV varlığı ve yokluğu arasında istatiksel fark yoktu.

Sonuç: Hem OKI hem de LSTV bel ağrısına neden olan durumlardır. Lomber bel ağrısı ile tetkik edilen hastalarda bu iki tanı dikkate alınmalı, akılda tutulmalıdır.

Anahtar kelimeler: Osteitis kondensans ilii, Lumbosakral transizyonel vertebra, Bilgisayarlı tomografi

Introduction

Low back pain is observed at least once throughout life at 60-85% of the general population [1-3]. The vast majority of lumbar pain (97%) is mechanically sourced [3]. Mechanical pain develops as a result of overuse, forcing, trauma, or deformation of structures that form the spine [3]. Osteotitis condensans ili (OCI) and lumbosacral transitional vertebra (LSTV) are two entities that can cause mechanical back pain [1,4-6]. The diagnosis of both can be easily determined with typical radiological findings, and it can be possible to distinguish from the inflammatory pain of the back.

Although the mechanism by which LSTV causes back pain is not clearly known, it has been suggested that early degeneration, spinal- extraforaminal stenosis and changes in load distribution caused by instability. Because OCI is often associated with pregnancy and be seen in young female, it has been reported that changes in the distribution of burden of sacroiliac in pregnancy and ligament laxity caused by hormonal factors may play a role in etiology [5-7].

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In this study, we investigated the prevalence of OCI and LSTV, relationship with age and sex, and the relationship between these two conditions in patients referred to our clinic for lumbar computed tomography (CT) due to low back pain.

Materials and methods

The Medical Faculty of Gaziantep University Ethics Committee approved the study. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Patients Selection

In this cross- sectional study, the CT examinations of patients who were referred to the Department of Radiology on 25 December State Hospital between January and March 2016 due to lumbar pain were evaluated retrospectively. Patients with previous history of lumbar surgical operation and acute trauma patients were excluded from the study. The images that were not evaluated due to technical insufficiency, such as artefacts caused by patient movements or images which did not contain the lumbar region completely were removed from study. A total of 599 lumbar CT examinations in the study group were evaluated. The radiological evaluation was conducted by a single senior radiologist.

CT Imaging

No contrast agent was used in CT scans. All of the CT scans were performed using the 16-slices CT device (Toshiba, Activion 16, Toshiba Medical Systems, Otowara, Japan). No preparation was made prior to the examination. All examinations were conducted in the supine position with the arms of the patients above their heads. Sagittal and axial planar sections were taken at the soft tissue and bone window.

The imaging parameters were tube voltage of 120 kV, tube flow of 100 mA. The width and level for the soft tissue window were 400 HU and 40 HU, respectively. For bone window, these values were 2500 HU and 280 HU. For each patient; age, gender, LSTV anomaly presence and type (lumbalisation, sacralization), and OCI presence and side information were recorded.

The diagnosis of OCI was based on the presence of sclerosis in the triangular shape in the inferior part of the iliac bone adjacent to the both sacroiliac joint. The absence of findings to marking sacroileitis such as bone erosion in sacroiliac joint, narrowing of joint space, irregularity of joint surfaces and presence of sclerosis on sacral side were accepted as supportive findings for OCI diagnosis. LSTV evaluation was based on iliolumbar ligament and the ligament-adherent vertebra was considered L5. The relationship of the OCI with age and gender, the relationship of LSTV with gender, and the relationship between OCI and LSTV anomaly were evaluated.

Statistical analysis

Statistical analysis was performed using SPSS 20.0 (Chicago, IL) software. P <0.05 was considered statistically significant. Chi-square test was used to analyze whether there is a significant relationship between the gender and LSTV or OCI. In addition the test was used to analyze whether there is a significant relationship between the LSTV and OCI. Mann-Whitney U Test was used to assess the relationship between age and OCI.

Results

The lumbar CT scans of 599 patients aged between 14 and 98 were evaluated. The mean age of the patients was 42.73±16.23 years.

OCI was not detected in 577 patients (96.3%) and OCI was detected in 22 patients (3.7%) (Table 1). In 2 of OCI detected cases (9%) the disease was unilateral (Figure 1) and in 20 (90%) the disease was bilateral (Figure 2, 3).

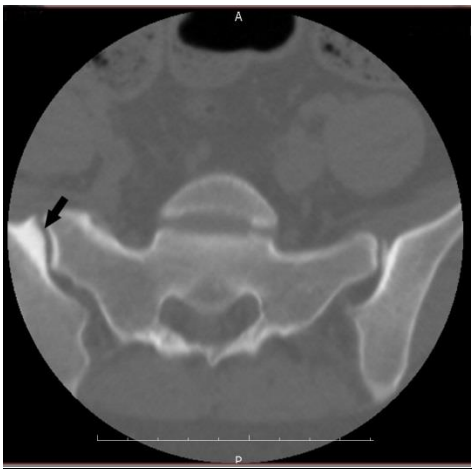

Figure 1: Right sided osteitis condensans ilii in a 18 year old female patient. Computed tomography shows triangular shaped sclerosis around the lower part of the right sacroiliac joint (thick arrow).

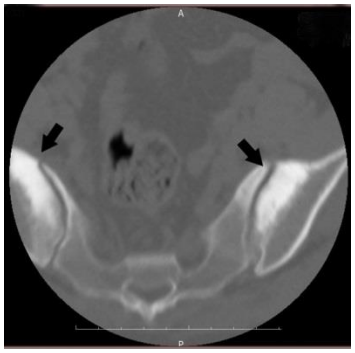

Figure 2: Bilateral osteitis condensans ilii in a 34 year old female patient. Computed tomography shows triangular shaped sclerosis in the inferior part of the bilateral iliac bone adjacent to the both sacroiliac joint (thick arrows).

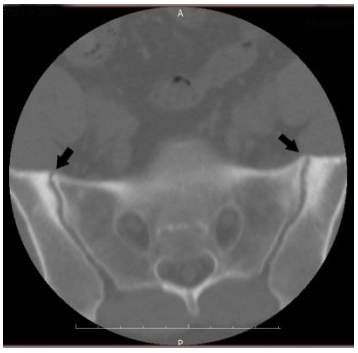

Figure 3: Bilateral osteitis condensans ilii in a 36 year old male patient. Bilateral-symmetrical triangular shaped sclerosis (thick arrows) on the iliac aspect of the sacroiliac joints on the axial computed tomography scan (thick arrow).

LSTV was not detected in 522 patients (87.2%) and LSTV was present in 77 patients (12.8%). 33 (% 5.5) patients had lumbalisation (Figure 4), 44 (% 7.3) patients had sacralisation (Figure 5) (Table 2). The mean age of the patients who detected OCI was 30.7 ± 9.5 years while the mean age of the patients without OCI was 43.1 ± 16.6 years. The age difference between the two groups was statistically significant (Figure 6). OCI was more common in the younger age group (p=0.001).

Table 1: Frequency of osteitis condensans ilii

	Frequency (n)	Percent (%)
OCI +	22	3.7
Bilateral OCI	20	3.3
Unilateral OCI	2	0.3
OCI -	577	96.3
Total	599	100

OCI: Osteitis Condensans Ilii

Table 2: Frequency of lumbosacral transitional vertebra

	Frequency (n)	Percent (%)
LSVT +	77	12.8
Lumbalisation	33	5.5
Sacralisation	44	7.3
LSVT -	522	87.1
Total	599	100

LSVT: Lumbosacral Transitional Vertebra

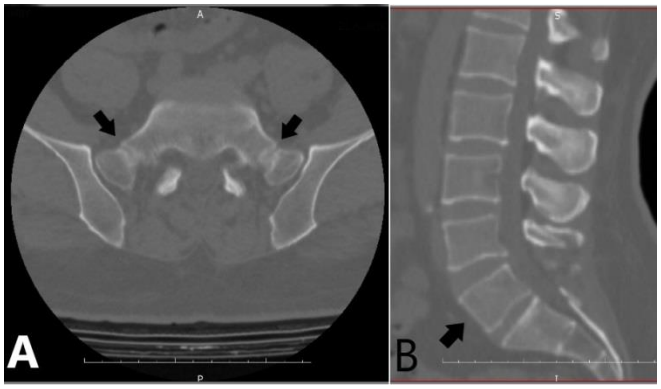

Figure 4: Lumbalisation form of lumbosacral transitional vertebra in a 48 year old male patient on axial (A) and sagittal (B) computed tomography scan (thick arrows).

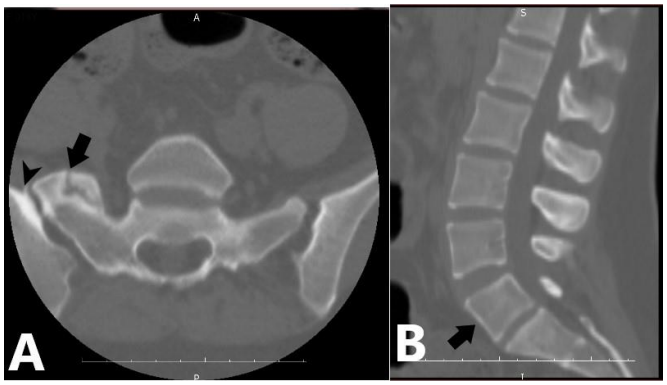

Figure 5: Sacralisation form of lumbosacral transitional vertebra in a 25 year old female patient on axial (A) and sagittal (B) computed tomography scan (thick arrows). Right sided osteitis condensans ilii is also seen on axial (A) computed tomography scan (arrow head).

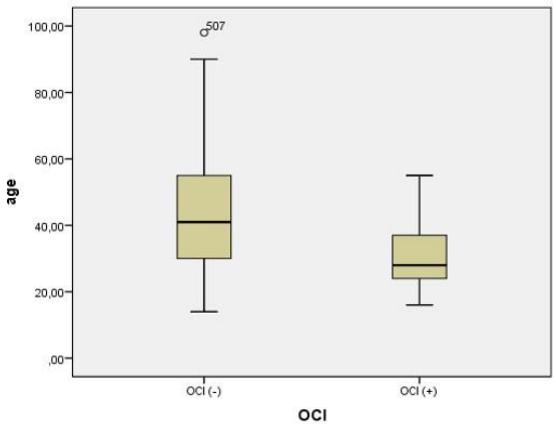

Figure 6: The age difference between the two groups osteitis condensans ilii (OCI) (-) and OCI (+).

18 (81.8%) of the 22 OCI detected cases were female while 4 (18.2%) cases were male. Of the 577 patients without OCI, 329 (57%) were female and 248 (43%) were male (Table 3). The difference was significant for gender in groups which has OCI or not, while OCI was more common in female (p=0.036).

Of the 599 patients, 347 (57.9%) were female while 252 (42.1%) were male. LSTV was observed in 41 (16.2%) of the male patients while LSTV was detected in 36 of the female patients (10.3%). LSTV was observed more frequently in male patients and the difference was statistically significant (p=0.033).

The relationship between LSTV and OCI was investigated. LSTV was observed in 75 (13%) of 577 patients without OCI, while LSTV was observed in 2 (9%) of 22 patients detected OCI (Table 4). There was no statistically significant difference between groups with and without OCI disease in terms of presence of LSTV (p=0.59).

Table 3: Frequency and Distribution of OCI (-) and OCI (+) patients according to the gender

		Frequency (n)	Percent (%)
OCI(-)	Female	329	57.0
	Male	248	43.0
	Total	577	100.0
OCI (+)	Female	18	81.8
	Male	4	18.2
	Total	22	100.0

OCI: Osteitis Condensans Ilii

Table 4: Frequency and Distribution of patients according to the presence or absence of the lumbosacral transitional vertebra

		Frequency (n)	Percent (%)
OCI (-)	LSVT (-)	502	87.0
	LSVT (+)	75	13.0
	Total	577	100.0
OCI (+)	LSVT (-)	20	90.9
	LSVT (+)	2	9.1
	Total	22	100.0

OCI: Osteitis Condensans Ilii LSVT: Lumbosacral Transitional Vertebra

Discussion

OCI is one of the rare causes of low back pain [5,6,8]. It is more common in young age group and female gender [5,6,8]. In the etiology, it is mentioned that OCI may be due to increases of the load to sacroiliac joint and changing distribution of the load especially during pregnancy [5-8]. However, this etiology is controversial because it is seen in nullipars and in male patients [5,6].

OCI is a benign form of low back pain and it is important to distinguish from inflammatory low back pain because of typical radiological findings [5-7]. The sacroiliac joint is usually affected by the inferior segment [5,6,8]. Triangular-shaped sclerosis of the iliac bone adjacent to sacroiliac joint is apparent [5,6,8]. The sacral region is usually protected. The absence of narrowing of the sacroiliac joint space and no irregularity and erosion in adjacent bony structures and also usually be seen bilateral allowing sclerosis to be identified in favor of OCI [5,6,8].

It is estimated that the OCI is seen between 0.9% -2.5% in the general population [5,7]. It is usually reported as a rare disease in the literature and reported as case reports. According to our knowledge, there is no study on prevalence. The OCI prevalence in our patient group was found to be 3.7%. The reason for our finding more frequently than the literature is may be that the patient group we have examined consists of the patients evaluated for lumbar pain etiology. In addition, patient presentations in the literature were mostly evaluated by X-ray findings. In our study, MDCT images of the patients were evaluated. In detecting sclerosis, especially in cases with mild findings, CT is more sensitive than x-ray, which may be reason of finding higher prevalence.

OCI is more frequent in female patients, younger age group and bilaterally [5-8]. However, unilateral cases have been reported rarely [5]. Consistent with the literature, was found a higher prevalence in female patients of our study group. Patients who were diagnosed with OCI were lower mean age than without OCI. The disease was bilateral in 90% of the OCI-detected patients.

LSTV may cause early degenerative changes and back pain by altering the load distribution in the vertebral column [1,4,9]. It was classified by Castvelli in four groups based on radiological findings [1,4,9-11]. However, for correct numbering only the evaluation of the lumbar graphs does not always give the correct results. The most accurate numbering and

classification is achieved by inclusion of the entire vertebral column from C2 to sacral region imaging field [11]. In routinely practice, however, this is usually not possible, and usually only lumbar region images can be obtained. Another method for correct classification is to use other anatomical structures to identify the lumbosacral transitional vertebrae [11,12].

One of the anatomic structures that can be used for this purpose is ililumbal ligament [11,12]. This ligament originates from the transverse process of the L5 vertebrae in 95-100% and adheres to the posterior aspect of the iliac wing [12]. When classifying, accepting the vertebrae L5 attached to this ligament allows enumeration and naming with high accuracy [12]. In our study, was classified LSTV by evaluating the vertebrae attached to the iliolumbar ligament as L5.

Ratios varying from 4 to 35% for the frequency of LSTV in the population were reported according to the number of samples and the diversity of the study population [1,9,12,13].

In our study, the rate was found to be 12.8% similar to the literature. Some studies have found that sacralization is more frequent while lumbalisation is more common in some studies [4, 10-13]. In our case group, the sacralization rate was higher. Again, many studies have found different conclusions about in which gender is more common. In our study group, was higher the prevelance of male cases [11-13].

LSTV is one of the condition that changes the load distribution by causing instability in the lumbosacral region [1,2]. One of the alleged assertions in the etiology of the OCI is the mechanical stress caused by the change of load distribution in the lumbosacral region.

Because of this claim, it is thought that LSTV may be a predisposing factor to OCI, and it is investigated whether there is a relationship between LSTV and OCI. In our study, no statistically significant difference was found between groups of patients with and without OCI in terms of the presence of LSTV. Mechanical stress may be an effective factor in OCI etiology, but it is not a sufficient factor alone. It may contribute to OCI formation when present with other predisposing factors of the patient. According to our knowledge there is no study in the literature about relationship between LSTV and OCI. According to our study, there was no relationship between these two conditions. The result we have obtained should be supported by studies with larger patient groups.

The limitations of this study were due to retrospective nature. Magnetic resonance imaging must be first choice for low back pain due to most common etiology, disc herniation. And also x-ray could be used for bone pathology. We evaluated CT scans for both of them.

Conclusion

OCI and LSTV, which are among the rare causes of mechanical back pain, must be considered in radiologic imaging carried out for this purpose. Radiologically, it is easy and important to distinguish both conditions from inflammatory low back pain. The correct diagnosis avoids aggressive treatments.

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