

The role of sacroiliac joint dysfunction in the genesis of low back pain: the obvious is not always right

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Abstract

Background context It is a common practice to link low back pain with protruding disc even when neurological signs are absent. Because pain caused by sacroiliac joint dysfunction can mimic discogenic or radicular low back pain, we assumed that the diagnosis of sacroiliac joint dysfunction is frequently overlooked.

Purpose To assess the incidence of sacroiliac joint dysfunction in patients with low back pain and positive disc findings on CT scan or MRI, but without claudication or objective neurological deficits.

Methods Fifty patients with low back pain and disc herniation, without claudication or neurological abnormalities such as decreased motor strength, sensory alterations or sphincter incontinence and with positive pain provocation tests for sacroiliac joint dysfunction were submitted to fluoroscopic diagnostic sacroiliac joint infiltration.

Results The mean baseline VAS pain score was 7.8 ± 1.77 (range 5–10). Thirty minutes after infiltration, the mean VAS score was 1.3 ± 1.76 (median 0.000E+00 with an average deviation from median = 1.30) ($P = 0.0002$). Forty-six patients had a VAS score ranging from 0 to 3, 8 weeks after the fluoroscopic guided infiltration. There

were no serious complications after treatment. An unanticipated motor block that required hospitalization was seen in four patients, lasting from 12 to 36 h.

Conclusions Sacroiliac joint dysfunction should be considered strongly in the differential diagnosis of low back pain in this group of patients.

Keywords Low back pain · Sacroiliac joint · Fluoroscopic guided infiltration

Introduction

Low back pain is second only to common cold as a cause of primary care office visits in the USA. Approximately 90% of adults have experienced back pain at some point of time in their lives [13]. Although low back pain is a benign medical problem, it is responsible for direct care expenditures ranging from \$5 billion [9] to more than \$20 billion annually and as much as \$50 billion per year if indirect costs are included [8]. In any 12-month period, 7% of adults will consult for this complaint [22].

Orthopedic surgeons commonly relate chronic low back pain, i.e. more than 4 weeks of duration [1], to disc findings on CT or MRI, even in the absence of clear neurological findings.

While sacroiliac joint dysfunction is well documented in Manual Medicine Literature [23], very little has been written about sacroiliac joint (SIJ) problems in medical books on backache. Therefore, medical residents are not usually taught to consider sacroiliac joint dysfunction as a cause for low back pain, and this problem can be easily overlooked [29].

In this study, we investigated the effect of sacroiliac infiltration on chronic low back pain in patients with disk

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pathology on CT or MRI, but without claudication or neurological deficits and with positive pain provocation tests for SIJ dysfunction.

Methods

During January–July 2003, 200 patients were referred for the first time for epidural steroid injection due to low back pain. Fifty had disc herniation without claudication or neurological abnormalities such as decreased motor strength, sensory alterations or sphincter incontinence. The patients had previously undergone unsuccessful treatment under the referring doctor with NSAID drugs, physical therapy and intramuscular injections with a combination of 3 mg betamethasone disodium phosphate and 3 mg of betamethasone acetate (Celestone ChronodoseR).

The attending pain physician evaluated the patients. If at least three of the tests, Yeoman's test, Gaenslen's sign, the FABER test (Patrick's sign), the compression test, resisted hip abduction or a positive posterior pelvic pain provocation test (thigh thrust), were positive and after obtaining written informed consent, the patient was scheduled for a fluoroscopic guided diagnostic/therapeutic block with 25 mg of bupivacaine and an admixture of 5 mg of betamethasone diprionate and betamethasone sodium phosphate 2 mg (Diprosan^R) on each side, as required.

The intensity of pain was evaluated before and 30 min after the injection by means of a standard 100 mm visual analogue scale ranging from 0 (no pain) to 10 (excruciating pain). The patients were re-examined at 4 weeks, 2 months and 3 months, at which time their pain was reassessed using the same scale. The therapeutic goal was to achieve a VAS ≤ 3 . If the VAS score was higher than 3 at any of these visits, an additional identical injection was performed.

Thirty-five patients reported that low back pain began after a trauma (in 28 a road accident and in seven a work accident) and ten after lifting a load. In the remaining patients the cause was unknown.

All patients had organic low back pain as expressed by a Wandell's score equal or less than 2 [30].

The study was designed to evaluate the incidence of sacroiliac joint dysfunction in patients referred to our pain clinic with low back pain and positive disc findings on CT or MRI, but without a neurological deficit, so we excluded patients with a facet joint syndrome score ≥ 60 , with degenerative findings on CT or MRI [16], or with clinical signs of fibromyalgia as defined by American College of Rheumatology [31].

The site of pain irradiation was regularly assessed and the most distal site recorded.

The SPSS 7.0 software (SPSS Inc., Chicago, IL) was used for statistical analyses. Student's *t* test was used for

comparison of continuous variables, expressed as mean \pm standard deviation (SD). Fisher's exact test was used for comparison of non-continuous variables. A *p* value < 0.05 was considered statistically significant.

Results

The mean age of the 50 participating patients was 49.5 ± 17.7 . Fourteen patients were males and 36 were females. Table 1 shows the distribution pattern of pain radiation among our patients.

The mean baseline VAS pain score was 7.8 ± 1.77 (range 5–10). Thirty minutes after the infiltration the mean VAS score was 1.3 ± 1.76 (median 0.000E+00 with an average deviation from median = 1.30) ($P = 0.0002$). Table 2 shows the distribution of VAS scores at 4-, 8-, and 12-week follow-ups.

Table 3 presents the results of pain provocation tests in the study patients.

Table 1 Pattern of distribution of radiated pain

Area affected	N (%)
Buttock	18 (36)
Thigh	13 (26)
Knee	7 (14)
Calf	7 (14)
Foot	5 (10)

Table 2 VAS scores at 4-, 8-, and 12-week follow-ups

Follow-up	VAS score	N
4 weeks	0–3	18
	4–6	22
	7–10	10
8 weeks	0–3	25
	4–6	20
	7–10	5
12 weeks	0–3	46
	4–6	2
	7–10	2

Table 3 Frequency of positive pain provocation tests

Test	N (%)
FABER	40 (80)
Compression test	47 (94)
Thigh thrust test	45 (90)
Gillet's test	32 (64)
Yeoman's test	44 (88)
Resisted hip abduction test	30 (60)

There were no serious complications after treatment. An unanticipated motor block that required hospitalization was seen in four patients, lasting from 12 to 36 h.

Discussion

The Soroka Medical Center is a 1,100-bed tertiary university hospital, which serves as the referral center for southern Israel. Its pain clinic has a turnover of about 200 patients per month, nearly 40% coming for the first time. Low back pain, the indication for referral in about 55% of the patients, is the most common problem that brings patients to the clinic. Many patients are referred for an epidural injection of steroids before a final decision is reached concerning surgery for chronic low back pain. Their chief complaint is pain over the sacroiliac or gluteal region that radiates down the legs to the knee or toes. Some have positive disc findings on CT or MRI, without claudication or neurological deficits.

Chronic persistent low back pain is commonly linked with positive disc findings on CT or MRI imaging. However, these imaging techniques are not always helpful, because they have a poor degree of correlation with clinical signs [24]. It is not rare to have positive disc findings in asymptomatic patients. Nearly 25% of asymptomatic individuals below the age of 60 years and 33% of older patients have evidence of disc herniation on MRI scans [17]. In addition, the diagnosis accuracy of the tissue origin of chronic low back pain and referred lower extremity symptoms based on clinical criteria are about 19–24% and slightly above chance agreement [19].

The prevalence of SIJ dysfunction is unclear. Estimation of prevalence rates, in studies that used fluoroscopically guided sacroiliac infiltration as the basis for diagnosis, ranges from 13 to 30% [21, 26]. The prevalence is even higher after failed back surgery, reaching about 63% [15].

At the beginning of the twentieth century, the SIJ was considered the most important source of low back pain. Over the past three decades, with the increased tendency to diagnose lumbar disc herniation as a cause of low back pain, the role of SIJ in the genesis of this complaint has decreased in importance [11].

The SIJ has a rich nociceptive innervation [3, 12]. The anterior portion receives innervation from the posterior rami of the L2–S2 roots. Additional fibers come from the obturator nerve, the superior gluteal nerve and the lumbosacral trunk [32]. The posterior aspect is innervated by the posterior rami of L4–S3 [2].

Another important aspect is the connection between the piriformis muscle, ligaments bound to the SIJ and the sciatic nerve. The piriformis muscle is situated close to the SIJ. It begins in the ventrolateral aspect of the sacrum and inserts

into the greater trochanter of the femur. Any process in the SIJ that induces piriformis spasm may provoke sciatic irritation [10]. This abundant innervation can cause a broad spectrum of symptoms. Pain can radiate to the buttock [7], the posterior calf [25], and to the anterior and lateral calf and foot [28] mimicking radiculopathy [5]. In fact, a large variation in pain radiation patterns was observed in our patients. In 22.5%, there was radiation towards the calf and foot, which could be interpreted as radicular or discogenic pain.

The diagnosis of sacroiliac joint dysfunction can be very difficult. The medical history does not contribute much [26]. Since the clinical manifestations of the sacroiliac syndrome are diverse, the diagnosis cannot rely solely on patient's description of symptoms [20]. CT scanning [14] and radionuclide imaging [27] play a limited role in the diagnosis of SIJ dysfunction because of their low sensitivity and specificity.

The value of pain provocation tests in the diagnosis of sacroiliac is controversial. While Maigne and colleagues [21] challenged the accuracy of the common pain provocation test, Broadhurst and Bond [4] showed a high sensitivity and specificity for the FABER, posterior shear and resisted abduction pain provocation tests. The current gold standard for the diagnosis of the SIJ syndrome is fluoroscopically guided infiltration of local anesthesia leading to at least an 80% reduction in VAS scores [6].

The results of this study demonstrate a good correlation between at least three positive pain provocation tests and the diagnosis of SIJ dysfunction, as determined by a significant decrease in VAS rating after diagnostic/therapeutic fluoroscopically guided sacroiliac infiltration, confirming Laslett's findings [18].

The role of physical therapy or manipulation in the management of SIJ dysfunction was stressed by Zelle and collaborators [33] in a recently published review article. They reported conflicting results, varying from excellent results to worsening of pain in most patients within the first 2 weeks after treatment. They concluded that manipulations appear to be successful in many patients suffering from SIJ dysfunction but failed in many others and remain uncertain on the recurrence of pain due to sacroiliac problems. Sacroiliac joint infiltration with local anesthetic/steroid is indicated when physical therapy fails. As cited above, the patients included in our study had failed physical therapy and did not respond to administration of NSAID and intramuscular injection of 3 mg betamethasone disodium phosphate and 3 mg of betamethasone acetate (Celestone Chronodose^R).

The unexpected and prolonged motor block that occurred in some of our patients may be due to extravasations of local anesthetic towards the ventral aspect of the SIJ, reaching nearby neural structures [21].

Our study has several limitations. It is an open study in which the same doctor determined the indication, carried

out the treatment and assessed it, incurring a potential bias in the recording and interpretation of study findings [6]. No a priori power analysis was done to determine the adequate sample size and validation of results. The patients were followed for 3 months only, whereas a longer follow-up period may have affected the study results. Finally the role of SIJ dysfunction in the development of low back pain was studied in a small group of patients referred to our pain clinic. Therefore, these data cannot be extrapolated to other groups of patients complaining of low back pain.

Despite these limitations, some conclusions can be drawn from our findings: (1) the incidence of SIJ dysfunction in patients with low back pain and discopathy on CT or MRI scans and without neurological deficits appears to be higher than previously described. (2) Pain in SIJ dysfunction can radiate towards the calf and foot mimicking radicular pain. (3) Fluoroscopy guided SIJ infiltration leads to significant pain reduction.

Physicians seeing patients with low back pain should have a high index of suspicion for SIJ dysfunction, especially in the absence of neurological deficits.

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