The effects of CT guided Sacroiliac joint injection on chronic low back pain

Mina Youssef 1 and Sherif Meleka 2 *

1 Medical Graduate, Alexandria University Faculty of Medicine, USA
2 Department of Neurosurgery, Johns Hopkins Hospital, USA

Abstract

Sacro-iliac joints (SIJ) disease is rarely considered as a potential source of low back pain (LBP) either because it’s difficult to localize SIJ pain, or more commonly SIJ degenerative changes are a part of a more complex degenerative arthropathy, affecting multiple targets in the lumbar region causing LBP. Diagnostic tools aimed at localizing the SIJ as the pain generator are generally limited due to similarities in symptoms and signs between SIJ pain and other LBP etiologies. CT guided SIJ block became popular and more effective measure to control the low back pain immediately and for more prolonged period of time due to its safety, accuracy, efficacy and good patient tolerability for the procedure without significant complications or side effects. In our study we attempted to analyze data subsequent to SIJ injections to examine their efficacy. We collected data from 30 consecutive patients, who presented to the clinic complaining of prolonged lower back pain, explored the effects of the CT guided SIJ injections with steroids on the severity of the pain, and the outcome of the procedures on LBP. 29 patients (96.6%) reported complete relief from their pain immediately post block, and only 1 patient had no changes between pre and post block. 18 out of 30 patients returned 1-3 months later and were found to have similar VAS pain scores as those prior to the block. We conclude that CT guided SIJ injection is a highly precise and effective tool for the diagnosis and short term relief of low back pain, due to the accuracy of the needle placement into the SIJ and the local anesthetic effect, however steroidal anti-inflammatory effects failed to demonstrate long-term benefit for those patients who suffer chronic low back pain.

Introduction

Low back pain (LBP) is a very common condition, which has a major impact on the life of a large population in the United States. Different measures are traditionally used to manage low back pain including conservative treatment; with rest or physical therapy, pharmaceutical treatment by pain medications; e.g. non-steroidal anti-inflammatory drugs, serotonergic agents or opioids. Finally, surgery is indicated for a treatment by pain medications; e.g. non-steroidal anti-inflammatory drugs, serotonergic agents or opioids. Finally, surgery is indicated for a

Low back pain could be the expression for mechanical SIJ arthralgia; it is usually described as a dull unilateral mild to moderate aching pain around the posterior superior iliac spine region. It is usually a debilitating pain which affects the patient’s daily activity, aggravated by prolonged standing and walking. The pain is usually referred into the hip, groin, and to the lower extremities [5]. Sacroiliac joints are two paired L-shaped synovial joints formed between the articular surface of the sacrum and the ilium bones. Those two condylar joints allow minimal motility (2-18 degrees) [3], moving together in correlation. Intrinsc and extrinsic ligaments stabilize the SIJ [6]. As we grow older, SIJ surface develops angular orientation instead of the flat or planar orientation usually found in younger age [2].

Diagnostic tools aimed at localizing the SIJ as the pain generator, either by history or examination of LBP patients are generally limited due to similarities in symptoms and signs between SIJ pain and other LBP etiologies. Traditionally, fluoroscopy guided injections of the SIJ have been used both to provoke and to treat SIJ pain with limited success because of limitations due to the technique [4]. CT imaging guided technique is currently the best imaging tool for percutaneous injections to guide the injecting needle to a precise and localized anatomical structure without affecting or damaging surrounding structures such as vessels, nerves or soft tissue [7].

*Correspondence to: Sherif Meleka, Department of Neurological Surgery, Johns Hopkins Hospital, 7220, Bloomberg Building, 1800 Orleans Street, Baltimore, MD 21287, USA, E-mail: smeleka1@jhmi.edu

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In our study we attempted to analyze data subsequent to SIJ injections to examine their efficacy. We collected data from 30 consecutive patients aged between 43 and 91 years, who presented to the clinic complaining of prolonged lower back pain, despite long history of different treatment measures, including surgery, usually targeted towards structures other than the SIJ. We explored the effects of the CT guided SIJ injections with steroids on the severity of the pain, and the outcome of the procedures on LBP. We will also discuss the technique used for those injections. Finally, we scrutinized the commonly accepted conclusion that CT guided injections into the SIJ is currently the best and safest diagnostic and therapeutic tool on those patients who had long period of suffering from LBP.

Methods

In our study, 30 consecutive patients (cohort Table 1), who presented with chronic debilitating low back pain, despite of long-term usage of pain medications, surgeries or other procedures, were targeted. Detailed history and complete physical examination were performed, and laboratory workup and imaging studies (X rays, CT or MRI) of the lower back were ordered. CT guided SIJ steroid injections was elected to be the optimal choice to manage those patients’ complaints. We confirmed the absence of contraindications to the injections such as steroid allergy, hemorrhagic diathesis, or localized skin infection. Patients were asked to record their pain ratings based on theVAS (Visual Analogue Scale). Possible complications to the injections were also discussed with the patients and an informed consent was obtained prior to the procedure. The patients were taken to the CT room where she/he was put in the prone position, and radiographic markers were placed medial to the SIJ as demonstrated in the images. The skin on the lower back was cleaned and draped in a sterile fashion, and skin wheals were raised overlying the SIJ bilaterally or unilaterally. Under CT-Fluoroscopy guidance, 3.5 inch (10 cm) 22-gauge spinal needles were then inserted and advanced laterally towards the SIJ, until CT-Fluoroscopy imaging confirmed intra articular position (Figure 1). At this point, a 1.5 ml of 0.5% bupivacaine and 20 mg of methyl prednisolone were injected to the SIJ unilaterally or bilaterally. The needle(s) were then removed and the skin was cleansed. The patients were then escorted out to the recovery area, where they were asked to record their pain levels, its location, and their activities then, and every thirty minutes thereafter in a pain diary for the following six hours, to check the efficacy and the potency of the injected medication, and to assess the pain severity during the recovery period. Patients came back after one to three months subsequently for a follow up visit, and their pain level was reassessed.

Results

SIJ injection under CT guidance is generally indicated for patients who had long history of low back pain that is not relieved by non-steroidal anti-inflammatory or other medications [8]. Amongst patients who might benefit from this procedure are those who had multileveled spondylotic changes of the lumbosacral spine, also patients who had disc space narrowing compatible with degenerative disc disease, and patients with history of failed lumbar spine surgical operations, either posterior fusions and/or laminectomies.

Our patients’ age group range did not make a difference, and 96.66% of the patients experienced immediate post procedural relief from their pain. This was presumably due to local anesthetic effect, as well as the accuracy and precision of the CT guidance in directing the injecting needle into the SIJs. The VAS pain scale was used to assess the severity of the pain before and after the SIJ blocks. Charts with the results were constructed to show the immediate change in the patients complaints (Chart 1). Patients were asked to return in one month, and three months, for follow up to reassess their pain, and evaluate the potential long term effect of the steroids used in the SIJ injection, in order to discern between the local anesthetic and the steroid effects.

Data were gathered from two different groups of patients. The first group was those who returned for a follow-up in 1-3 months after the procedure (18 patients), and the second group comprised those who returned after 3 months or more (9 patients) for a follow up. Three patients did not return for follow up, and we failed to trace them. Data were plotted (Chart 2) to compare the VAS pre block and VAS 1-3 months post block, and (Chart 3) for the second group who returned after 3 months or more. Data were analyzed using the Z test and the P value to see the correlation between the Pre Block, one to three months post block, and > 3 months post block VAS (Table 2).

29 patients (96.6%) reported complete relief from their pain immediately post block, and only 1 patient had no changes between pre and post block (Chart 1). Patients were asked to come back for a follow up visit after one month. 18 out of 30 patients returned 1-3 months later and were found to have similar VAS pain scores as those prior to the block (Charts 2 and 4). The other group of patients (9 out of 30 patients) came after 3 months reporting similar VAS rating of their low back pain (Chart 3). 3 patients never returned for a follow up visit. Comparative analysis of the VAS values demonstrated no significant difference between those two groups (Chart 4 and 5), and P values were the same between them (Table 2).

No side effects or complications were reported following the procedure or during the follow up visits.

Discussion

The current best diagnostic tool to confirm the source for chronic LBP to be of SIJ etiology is SIJ injection under CT guidance using steroids and local anesthetic solution [9]. The diagnosis is confirmed when there is significant improvement in patients’ complaints of low back pain.
| Age | Sex | Duration of Pain | Location of the Pain | PMH if relevant to pain | Meds Tried | PSH | site of the Block |
|-----|-----|------------------|----------------------|------------------------|------------|-----|------------------|
| 64  | F   | 9 Days           | Right side Paraspinal LBP | Grade 1 Spondyloolisthesis of L4, L5 | Anti-inflammatory (Ibuprofen) | Foraminal stenosis on Ri Side. | Oral Steroid | None | Left |
| 60  | F   | 4 years          | RT LBP                | Divertriculosis         | Tramadol, Neurontin | not relevant | RT |
| 55  | F   | Since she was 19 | LBP Bilaterally       | Scoliosis at age of 19 | Spondylosis L1, S1 | Degenerative disc disease L4, L5, S1 | Tramadol, Mobic, Lyrica | none | Bilateral |
| 60  | F   | 4 months         | Bil LBP               | Spondyloolisthesis, Lumbar stenosis | Tramadol, acetaminophen, Norvasc | Lumbar decompression | Laminctomy and Fusion | Bilateral |
| 62  | F   | 32 Years Chronic LBP | Bilateral            | Fibromyalgia, osteoarthritis | Atenolol, Allegra, Celexa, Nexium | Lumbar surgery L5 Disc. | Bilateral |
| 65  | F   | 3 Yrs            | Right LBP             | Osteoarthritis, | Lyrica, TYLENOL | Not Relevant | Right |
| 57  | F   | 1yr              | Right Buttock Region  | Lumbar Degenerative disease | Ambien, multivitamin | Excision of Mole at the Buttock | Bilateral |
| 76  | F   | 2 yrs            | Right LBP             | Multilevel Cervical spondylosis mostly at C5, 6 | Not relevant | Right |
| 75  | M   | 5 months         | Bilateral LBP         | Posterior Fusion L-S1  | Sacrum, L4 laminectomy, L2-L5 instrumental | Norvasc Disc L2,3,4 | She also Had 4 Left Hip Surgery, Lumbar surgery and Laminctomy | Bilateral |
| 56  | F   | 1 yr             | Left side LBP         | Not relevant | Ibuprofen | T4-S1 Post Spinal Fusion | Lt |
| 57  | F   | 3 months         | Left LBP              | Chronic Kyphoscoliosis | Ibuprofen, Norvasc | Thoracolumbar Surgery | Lt |
| 43  | M   | 3 yrs            | Right LBP             | Not relevant | TYLENOL, LYRICA | None | Bilateral |
| 67  | M   | 9 yrs            | Low Back Pain and Both Legs | Not Relevant | Roxicodone, Celebrex | L4,5 fusion, 5 hip revision on left side | Right |
| 79  | F   | 5 months         | LBP                   | Not significant | Lyrica. | Spinal Fusion L4, L4,5 | Laminctomy | Bilateral |
| 79  | F   | 3 years          | Right lower back      | Colon Cancer, Hepatitis | NEXIUM, TYLENOL | Lumbar Foraminectomy, Fusion L2-L5 | Right S1 Block |
| 79  | M   | 9 months         | Right LBP, Right Leg pain | L4-5 radiculopathy, ventral Hernia | Ibuprofen | Prostatectomy | Right |
| 91  | F   | 1yr              | Buttock Pain          | Kyphoscoliosis, and spondylosis. | hydrocodone, Darvocet, codeine | Verteceplasty | Bilateral |
| 53  | F   | 9 Months         | Bilateral LBP         | Osteoporosis          | oxycodone, | None | Bilateral S1 Block |
| 82  | F   | 7 months         | Right and L Hip       | Osteoarthritis Right hip, Lt Knee, | Naproxen | Hernia surgery | Bilateral |
| 79  | F   | 5 months         | LBP                   | Not significant | Lyrica. | Spinal Fusion L4, L4,5 | Laminctomy | Bilateral |
| 74  | M   | 1 year           | Low back              | Advanced degenerative disc disease of the spine | Ice packs for the pain | Fusion at L4-5, L5 S1 | Lt S1 Block |
| 54  | F   | 6 yrs            | Lt side LB, hip and thigh | Fractured sacrum, Disc hernia on L4-5 | Percocet, Valium, Motrin | Lumbar fusion surgery | Left |
| 53  | M   | 3 yrs            | Bilateral LBP         | Lumbar and cervical spondylosis | Percocet, Oxycontin | L5-S1 Disc replacement | Bilateral |
| 50  | M   | 9 months         | Low Back, Thigh and leg | Osteoarthritis | NEXIUM, Multivitamins | Not relevant | Bilateral |
| 74  | M   | 1 yr             | Low back              | Not relevant | Lyrica, Savilla | Lumbar decompression | Left |
| 69  | M   | chronic for 40 yrs | Low back              | Degenerative joint disease and lumbar spine | Neurontin, oxycodone | Not relevant | Right |
| 71  | F   | 1 yr             | Right Lower Back      | Multileveled Spondylosis | oxycodone | Lumbar instrumentation post Posterior | Right |
| 77  | F   | 1 month          | Lower Back bilaterally | Scoliosis, L4-5, L5 S1 | Spondyloolisthesis | Entocort, and tylenol | Lumbar decompression, Foraminotomy lumbar seg | Bilateral |
| 70  | F   | 3 Months         | LBP                   | History of lumbar fusion | L3 L4 laminectomy, L2-L5 instrumental | Norvasc | She also Had 4 Left Hip Surgery, Lumbar surgery and Laminctomy | Bilateral |
| 77  | F   | 1 month          | Lower Back bilaterally | Spondylosis L4-5, S5 | Laminection and fusion | L4-L5 Radiculopathy | Facetectomy, foraminotomy lumbar seg | Bilateral |
| 76  | F   | 9 months         | LBP                   | Not relevant | Ibuprofen | T4-S1 Post Spinal Fusion | Lt |
| 75  | F   | 1 yr             | Right LBP             | Chronic Kyphoscoliosis | Ibuprofen, Norvasc | Thoracolumbar Surgery | Lt |
| 70  | F   | 3 Months         | LBP                   | History of lumbar fusion | L3 L4 laminectomy, L2-L5 instrumental | Norvasc | She also Had 4 Left Hip Surgery, Lumbar surgery and Laminctomy | Bilateral |
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| 76  | F   | 2 yrs            | Right LBP             | Multilevel Cervical spondylosis mostly at C5, 6 | Not relevant | Right |
| 75  | M   | 5 months         | Bilateral LBP         | Posterior Fusion L-S1  | Sacrum, L4 laminectomy, L2-L5 instrumental | Norvasc Disc L2,3,4 | She also Had 4 Left Hip Surgery, Lumbar surgery and Laminctomy | Bilateral |
Chart 1. Pre Block and Immediate Post Block VAS

Chart 2. Pre Block and 1-3 months Post Block

Chart 3. Pre Block and > 3 Months Follow Up VAS

P Value calculated from the Z test (Table 2).
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back pain, reported during separate office visits. In our retrospective study we examined VAS pain ratings of 30 consecutive patients thought to have SIJ pain, who received CT guided SIJ injections.

Our results demonstrate that CT guided SIJ block is effective and well-tolerated procedure for LBP patients with excellent effect on instant pain relief that starts immediately and may last for weeks or up to one month after the injection (Chart 1). However, no long term pain relief was demonstrated one month or longer following the injections. No known side effects occurred following the procedure or during the follow up visit. The pain relief is believed to be due to the local anesthetic effect, or the short term anti-inflammatory effect of the injectable steroids into the SIJ, and due to the accuracy of the needle placement under the guidance of the CT fluoroscopy into the targeted inflamed SIJ.

However there is no long term benefit from steroid injections and patients had to come back for another injection after three months. Compared to other studies (2, 3, and 4) our results were tracked for more than 3 months using a larger number of patients (27 patients) and data were plotted into charts, and analyzed data proved the short term effect of the local anesthetic injection (Chart 1), and to show that there is no difference between the mid-term (1-3 months) and the long-term effect (>3 months) of the injection (Charts 4 and 5). Also we concluded that steroid effects –if any- diminished had diminished to non-significant levels one month post injection. There was no difference between the two study groups in the Z test and the P value between the two groups under the investigation (Table 2).

Conclusion

We conclude that CT guided SIJ injection is a highly precise and effective tool for the diagnosis and short term relief of low back pain, due to the accuracy of the needle placement into the SIJ and the local anesthetic effect, however steroidal anti-inflammatory effects failed to demonstrate long-term benefit for those patients who suffer chronic low back pain.

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