Surgical Treatment Options at the Sacroiliac Joint

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17.1 Introduction

This case will address the possible treatment options of sacroiliac joint pain (SIP) including conservative treatment with intraarticular injections and radiofrequency denervation as well as operative fusion. SIP is a frequent cause for low back pain (LBP) with association of poor quality of life. Inflammation, pregnancy, trauma and especially previous spine surgeries are important triggers for SIP. Therefore Spine surgeons are frequently confronted with patients suffering from SIP. Making the diagnosis of SIJ dysfunction in the physical examination is difficult. It includes provocative maneuvers as FABER, distraction test, Oestgaard test, Gaenslen test and thigh thrust test. Even the diagnostic sensitivity of x-Ray, CT scans and MRI for SIP is low, but radiological diagnostics are essential to rule out other sources of LBP. Conservative treatment of LBP includes physical therapy, manual therapy and NSAID administration. Injections with steroids and local anesthetics or cryo and radiofrequency neurotomy may support the conservative treatment. However, in some cases the treatment of SIP is very difficult and even interventional approaches lead to a temporary pain relief only. In these cases fusion surgery of the SIJ can be offered. This case report describes a patient, who underwent all types of SIP treatment with physiotherapy, pain medication, intraarticular injections and radiofrequency neurotomy and finally minimally invasive fusion of the SIJ.

17.2 Case Description

A 78 y/o male patient presented himself to the outpatient department with chronic LBP localized in in the lower lumbar spine and the right gluteal region. Two years ago, a dorsal instrumentation with a dynamic pedicle screw-based system and additional microsurgical decompression for a L4/5 spinal canal stenosis was performed in an external hospital 2 years ago. The patient had experienced a pain relief for several months. In the further course a differently localized pain syndrome occurred, distinct from the initial pain. He reported on severe LBP (NRS 8/10) for several months with irradiation to the gluteal region and dorsal thigh on the right side. The neurological examination revealed mild dorsal flexor paresis, which had not changed for years. The Lasègue's sign was negative. The Oestgaard test was positive for the right SIJ. A CT myelogram showed no sign of spinal or foraminal stenosis with proper implant placement (Fig. 17.1a–c). Physiotherapy and pain medication resulted in insufficient pain relief.

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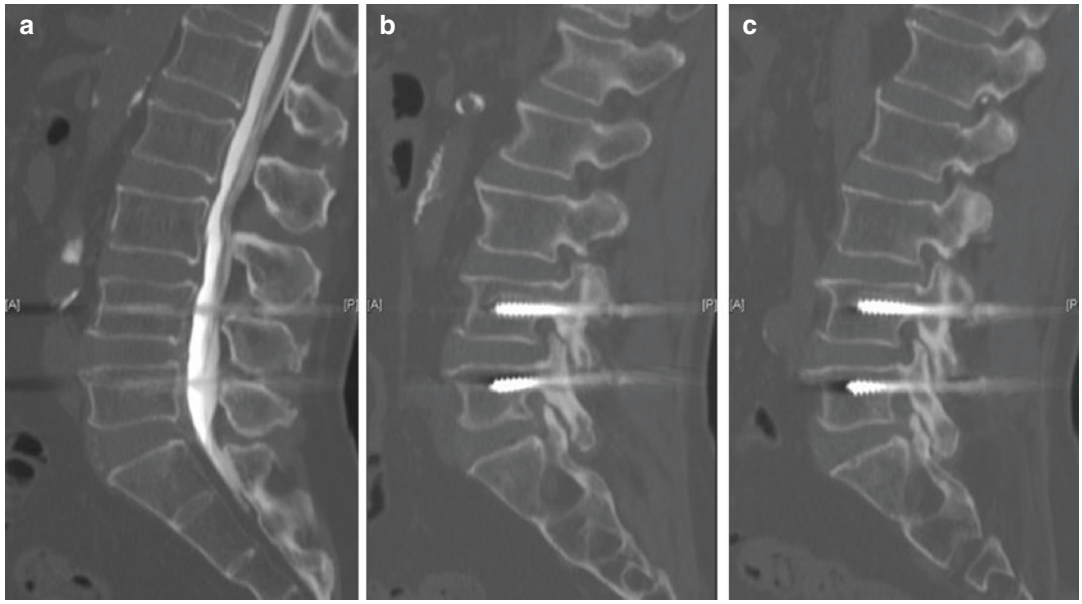

Fig. 17.1 CT myelogram. The CT myelogram (Sagittal view) shows proper implant placement with no signs of foraminal or spinal stenosis. (**a**) sagittal midline view, (**b**) sagittal right lateral view, (**c**) sagittal left lateral view. Confirmation of lack of spinal canal stenosis, radicular compression, or implant failure

The patient received infiltrations of the lumbosacral facet joints and the SIJ to detect the pain trigger. Repeated SIJ infiltrations under fluoroscopy resulted in a pain relief of 75% for several days, but he experienced an early pain recurrence. A right SIJ radiofrequency neurotomy was performed (bipolar and monopolar single-strip; Simplicity III probe®).

After denervation, the patient was free of pain for several months, but again the pain increased to the initial level despite an optimized conservative treatment. An additional intraarticular injection with contrast enhancement under fluoroscopic control resulted in a temporary complete pain relief and verified the diagnosis of Sacroiliac Joint Syndrome. As no alternative therapy was accessible a minimally invasive fusion of the right SIJ was offered. The iFuse Implant System® was used and three triangular titanium implants were placed across the SIJ using a lateral transiliac approach under fluoroscopic guidance. Postoperative x-ray of the pelvis showed proper implant placement (Fig. 17.2). The patient left the hospital 3 days after surgery. Six weeks of partial stress of the operated SIJ were recommended. In the follow-up outpatient visits the patient reported to be most of the time free of LBP for more than 2 years after surgery.

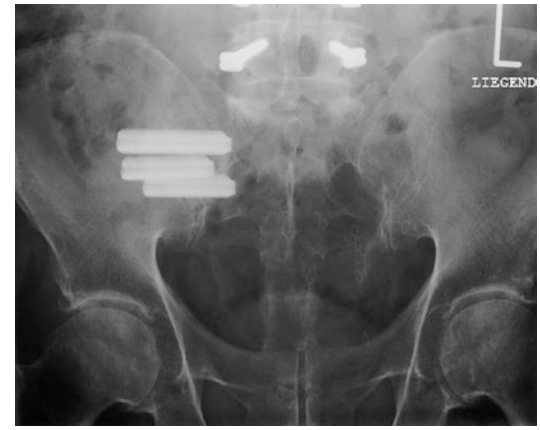

Fig. 17.2 SIJ fusion. Fluoroscopy (A/P) of triangular titanium implants for minimally-invasive SIJ fusion

17.3 Discussion of the Case

The patient suffered from chronic LBP after instrumentation and decompression at L4/L5. The examination with a pain syndrome localized in the lower lumbar spine and irradiation to the

right gluteal region and thigh combined with a positive Oestgaard Test was suspicious for SIP. Repeated infiltrations with dramatic pain relief confirmed the diagnosis. Foraminal or spinal stenosis and implant failure or loosening were ruled out as the cause of LBP by CT myelogram. If a Sacroiliac Joint Syndrome is likely a stepwise escalating local therapy can be performed (Fig. 17.3).

The first line therapy for a SIP is a conservative treatment with physiotherapy and NSAIDs. If a satisfying pain relief cannot be achieved, staged infiltrations of the lumbar facet joints and the SIJ can be performed for diagnostic and therapeutic purpose. When the SIJ is detected as the main cause of LBP by provocative maneuvers and infiltrations, interventional neurotomy can be performed for a prolonged pain relief [1]. There are different denervation techniques for SIJ neurotomy, which can be used. Important is a complete denervation of all nerves arising from the dorsal foramina.

If radiofrequency therapy fails to enable a distinct long-term pain relief, a surgical fusion of the SIJ can be considered. However, it has to be stressed that the indication for surgical fusion of the SIJ must be regarded critically and, thus, should be limited to the few, selected cases that fail conservative therapy – in our experience these are less than 5% of all patients with chronic SIJ pain syndromes.

Before surgical fusion we recommend to perform an SIJ infiltration with contrast enhancement to prove the intraarticular injection of the local anesthetics and demonstrate its effect. Only if this injection leads to a drastic pain relief of at least 50% a SIJ fusion surgery should be performed.

There are many techniques to perform SIJ fusion. Already a century ago and lasting until today open surgeries were performed for SIJ fusion [2]. However, high implant failure rates and perioperative complications resulted in the development of minimal invasive techniques to perform SIJ fusion surgery. There are several techniques

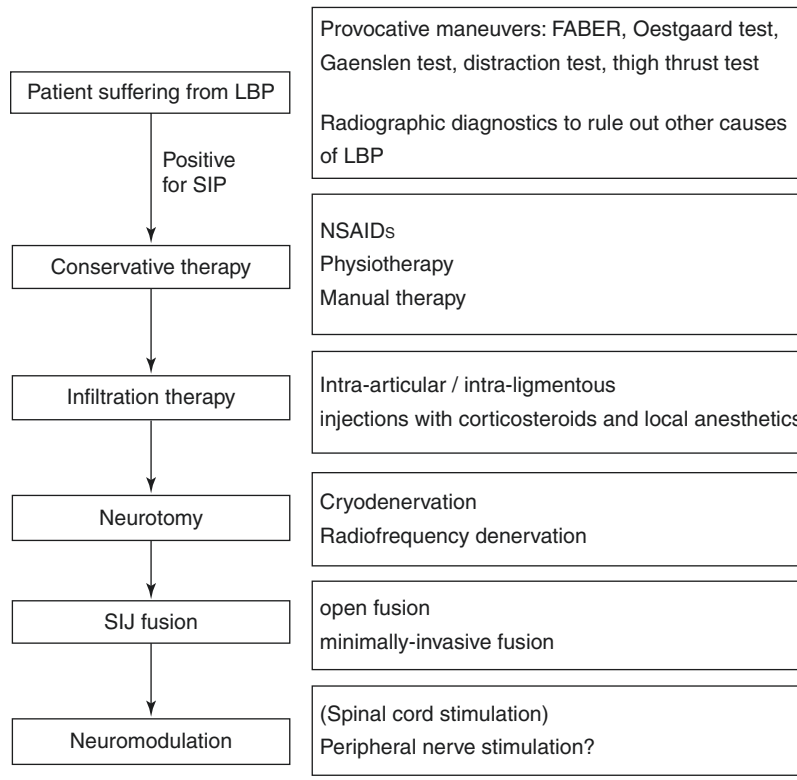

Fig. 17.3 Management of SIP

available. The most frequently used devices with the best clinical evidence are the distraction interference arthrodesis with neurovascular anticipation (DIANA®, SIGNUS Medizintechnik GmbH, Germany) and the triangular titanium implants (iFuse Implant System®, SI-Bone, Inc., San Jose, CA, USA). Results of an prospective observational study with inclusion of 171 patients with a 2 year follow-up could illustrate that the implantation of the DIANA®-device resulted in an improvement in pain and disability scores as well as in Quality of Life scores in [3]. However, there are no RCTs available. The highest amount of studies are available for the iFuse implant System®. Multicentre randomized controlled trials from a US and a European study group illustrated the effectiveness in minimally invasive SIJ fusion with this device concerning pain function and quality of life [4, 5]. The main complications of the surgical procedure are implant-related impingements on the S1 root, fractures, implant loosenings and hematomas. However, only in 2–3% of patients a revision surgery is required.

Another possible therapy for treatment of SIP is a neuromodulation approach. There is no evidence that Spinal Cord Stimulation is a good approach to address pain in the gluteal region. However, in a small case series peripheral nerve stimulation was shown be a promising therapy for SIP [6].

17.4 Conclusions and Take Home Message

Patients suffering from LBP due to SIJ dysfunction are frequently seen after fusion or decompression surgery of the lumbar spine. They report LBP and pain in the gluteal region and possibly pseudoradicular pain radiating into the lower extremities. Some patients report only temporary relief from conservative therapy, LA and steroid injections. To preserve the effect of injections a cryo or radiofrequency neurotomy of the dorsal rami innervating the SIJ is frequently used. Surgical options such as minimally-invasive SIJ fusion can be performed, if conservative treatment fails and the diagnosis of an SIP is confirmed clinically and via intraarticular infiltration. Peripheral Nerve Stimulation could become future therapy option, if randomized controlled trials confirm its effectivity.

Pearls and Pitfalls

- Conservative treatment for LBP from SIJ dysfunction is the gold standard
- Provocative maneuvers and LA injections to reveal the source of LBP are mandatory
- When discussing SIJ fusion intraarticular (not intraligamentous) injection for diagnostic reasons
- Surgical treatment only if all above measures fail and test results are unambigous
- Minimally-invasive SIJ fusion surgery is technically well established
- Peripheral nerve stimulation may be an option in the future

Editorial Comment

While we will not discuss probable shortcomings of the RCTs for MIS SIJ fusion and instead assume integrity of data, we strongly feel that a word of caution is necessary here. The results for efficacy and safety have been produced in the highly controlled environment of a RCT, where foremost indication, but also technique etc. are closely monitored. We are convinced, that efficacy rates will drop and safety issues increase dramatically when this device is used in an uncontrolled fashion outside a trial. SIJ pain is a diffuse and ill-defined yet ubiquitous “syndrom” and the surgical MIS technique is rather undemanding, both of which will set a very low threshold to use this device. Apart from the immediate increase of direct complications, we fear that a significant number of late low-grade-infection related implant loosenings will occur in the longer run. We therefore would only accept the use of this device under controlled conditions with rigid and complete post-market surveillance measures, such as mandatory data input into monitored registries including pre-, peri and postoperative as well as longterm data.

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