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New procedure

Lumbar facet joint injections and medial branch blocks

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Abstract

Lumbar zygapophyseal joints have been considered a significant source of chronic low back. The zygapophyseal (facet) joints are true synovial joints, which connect adjancet vertebrae posteriorly. The medial branch of the posterior primary ramus is responsible for joint sensation.

Symptoms of facet arthropathy include: hip and buttock pain,cramping lower extremity pain, usually not lower than the knee, low back stiffness, especially in the morning, pain commonly aggravated by prolonged sitting or stending. Signs of lumbar facet arthropathy are: paraspinal tenderness, worse over the affected joint, pain with movements that stresses the joints, i.e., hyperextension, lateral rotation and side bending, hip, buttock, or back pain on straight leg raising, absence of signs of nerve root irritation. Lumbar facet joint injection are performed for theurapeutic and diagnostic reason. Most studies have found that facet injection provide temporary pain relief. The current recommendations suggest the primary role of facet injection (intra-articular or medial branch block) to be diagnostic. These procedures may facilitate the diagnostic of facet syndrome and help predict if patient would benefit from more permanent measures, such as facet rhizotomy.

INTRODUCTION

The exact diagnosis of low back pain can be difficult. Contemporarary surgical practice focused on intervertebral disk herniation as a cause for low back pain and sciatica (1). As laminectomy and nerve root decompression did not always relieve symptoms, interest was directed toward other causes for spinal pain.In over 85% of patients with lumbar and cervical pain no specific spinal pathology can be identified as the cause *(2)*. Lumbar zygapophyseal joints have been considered a significant source of chronic low back. The term facet joint syndrome (lumbar spine) was first attributed to Ghormley in 1933, when he described this pain syndrome as usually occurring after a sudden twisting injury to the lumbar spine, producing low back pain, usually without sciatica *(3)*.

The zygapophyseal (facet) joints are true synovial joints, which connect adjancet vertebrae posteriorly. Any two consecutive vertebrae articulate to form three joints: the large joint between the two vertebral bodies and the two paired (right and left) zygapophyseal joints, which are formed between the superior articular process of one vertebra and the inferior articular process of the vertebra above. The term "facet joint" is used in clinical practice to describe these paired synovial joints, which are also referred to as the posterior intervertebral joints. The fatty

tissue around the exiting spinal nerve is continuous with that in the superior recess of the joint. The zygapophyseal joints help to resist the associated shearing movements with forward flexion and the compressive forces with rotational spinal movements. The nerve supply of the zygopophyseal joints is derived from the posterior primary ramus of the nerve root. The spinal nerve divides into anterior (ventral) and posterior (dorsal) rami as it emerges through the intervertebral foramen *(4)*.

The medial branch of the posterior primary ramus is responsible for joint sensation. Innervation from the medial branch divides to supply the lower pole at its own level, and also the upper pole of the joint below. Successive medial branches from above and below supply each joint. This dual segmental innervations has important implication for zygopophyseal nerve block and denervation procedures, as both branches need to be blocked to completely denervate a single joint. The course of the medial branch of the posterior ramus is fixed anatomically at two points: at its origin near the superior aspect of the base of the transverse process and distally where it emerges from the canal formed by the mammilloaccessory ligament *(5)*.

INDICATIONS AND CONTRAINDICATIONS

The zygapophyseal facet joints are regarded as a common source of spinal pain *(4, 5, 6–8)*. Clinical diagnosis of zygapophyseal joint pain is poorly defined and nonspecific. The correlation of physical examination to facet-related pain is not clear but most accept certain signs and symptoms to diagnose facet syndrome. Symptoms of facet arthropathy include: hip and buttock pain, cramping lower extremity pain, usually not lower than the knee, low back stiffness, especially in the morning, pain commonly aggravated by prolonged sitting or stending. Signs of lumbar facet arthropathy are: paraspinal tenderness, worse over the affected joint, pain with movements that stresses the joints, i.e., hyperextension, lateral rotation and side bending, hip, buttock, or back pain on straight leg raising, absence of signs of nerve root irritation. In pure facet syndromes there are no signs and symptoms of nerve root irritation. There are no paresthesias, no radicular leg pain, no sensory deficit, no leg muscle weakness, no pain on flexion of the back *(9)*. Valsalva maneuver and straight-leg raising do not affect pain intensity, segmental referral pattern in relation to the joint origin.

Lumbal zygapophyseal joint pain occurs in the fallowing region: groint T12/L1, hips L1/L2, buttocks L2/L3, thights L3/L4, usually above the knee. Clinical history and examination, including radiologic investigation are not particularly useful in its accurate diagnosis (10, 11). Relief of pain rather than provocation of pain is considered the more reliable test *(12)*.

The same contraindications apply to zygapophyseal blocks as for any other block used in pain management. These include: coagulopathies, infection either systemically or at the injection site, pregnancy (X-rays), allergy to contrast media or local anesthetics.

Informed consent for the procedure should be obtained and the patient advised that the procedure is primarily diagnostic rather than therapeutic. It is important not to built up expectations or introduce bias before carrying out the procedure. The aim of any zygapophyseal joint block is either to anesthetize the target joint by intra-articular injection of small dose of local anestethic or to block the medial branch that innervates the joint.

Most patients will experience significant muscular pain for several days after the procedure, buth the following problems have been reported: motor block from spinal anesthesia, meningitis due to chemical irritation, hematoma, particularly in cervical spine procedures, postdenervation pain and dysesthesia, local anesthetic reactions, superficial skin infections, skin burns from faulty electrodes. If it is particularly distressing, a short (2 month) trial of a membrane-stabilizing drug such as gabapentine or pregabaline can be helpful *(9)*.

LUMBAR FASET BLOCKS

Lumbar facet joint injection are performed for theurapeutic and diagnostic reason. The patients have lumbar facet syndrome, based on the previously described criteria, not controlled b adequate rest, nonsteroidal anti-inflammatora drugs, and physical therap. These patients do not have radiologic evidence of disc herniation, spinal stenosis or foraminal nerve root impingement.

Most studies have found that facet injection provide temporary relief. The current recommendations suggest the primary role of facet injection (intra-articular or medial branch block) to be diagnostic. These procedures may facilitate the diagnostic of facet syndrome and help predict if patient would benefit from more permanent measures, such as facet rhizotomy.

Diagnosis facet joint block, either with intra-articular injection or medial branch block, is reproducible (13). Most accept these blocks as the standard for diagnosis of zygapophyseal joint pain, however, spillover and false positive results may occur *(14)*. Therefore, when diagnosing facet syndrome, some consider the gold standard to be the demonstration of long-term relief of back pain after denervation procedure and prior short-term relief with diagnostic block (either joint injection or medial branch block). Because of the hight false positive results from a single diagnostic block, it is necessary to show positive response from diagnostic block as well as long-term reliefe from therapeutic rhizotomy before facet syndrome can be reliably diagnosed *(15)*.

For lumbar procedures the patient is initially placed prone with a pillow under the upper abdomen and the legs slightly abduced. Patient must be positioned so that an oblique view of the lumbar spine is obtained. This view is necessary to visualize the joint cavity, which must be seen clearly at the target level and can require up to a 45° oblique projection from the sagittal plane. This angle

decrease as one ascends the spine. The joint to be blocked should be identified and marked. If no localizing signs are evident, the recommended sites of injection are the L4–L5 and L5–S1 facet joints (ipsilateral for unilateral back pain or bilateral injections for bilateral pain) as these are most commonly affected *(14, 16)*. The technique is simple and can be done as an outpatient procedure. The procedure is done under fluoroscopic guidance. Following skin preparation, local anesthetic is infiltrated into the skin and deeper tissues over the joint. The fluoroscope beam is rotated obliquely 10° to 40° to get the best image of the joint space. The lumbar facets are situated so that the superior aspect of the the joint is further anterior than the inferior aspect of the joint *(17)*. A 22-gauge spinal needle is inserted into the joint. A small amount of radiocontrast (not more than 0,3 ml) is injected to produce an arthrogram. This is seen as either a slit or dumb-bell shape in outline and confirms intra--articular location of the needle. At this point the C-arm can be rotated in the sagittal plane to confirm that the needle is indeed located in an intraarticular position. Up to 1,5 ml of local anesthetic or a mixture of local anesthetic with steroid is injected. Many authors avoid the use of contrast due to the small volume of the joint and the possibility of rupture of the facet joint. A mixture of local anesthetic agent (to 2 ml), lidocain or bupivacain/ levobupivacain and 20 to 40 mg of methylprednisolone acetate (Depo-Medrol) is injected into each of the designated facet joints, if it is not applied contrast.

LUMBAR MEDIAL BRANCH BLOCKS

For diagnostic and therapeutic purposes there appears to be no significant difference between facet joint injection and medial branch blocks *(18)*. Some authors have proposed lumbar medial branch nerve blocks to be a more accurate tool to diagnose lumbar facet syndrome and to predict the success of denervation of the joints by radiofrequency ablation.

To perform the block, the patient is placed prone on the fluoroscopy table and a slight oblique view obtained. Initially an anteroposterior view is used and the C-arm is rotated obliquely through 15° in order to visualize the target point of medial branch nerves. The "Scottie dog" image is seen with the target point lying on the "eye" of the "dog". The spinal needle is inserted approximately 5 cm from midline and directed obliquely down the X-ray beam. At levels L1–L4 the medial branch block is done by targeting the junction of the upper border of the transverse process and the superior articular process. This is done at two levels for each joint in question (e.g., for L4–L5 joint, the junction of the superior articular process and transverse process of L4 and L5 would be target). The L5 posterior primary ramus is blocked in the groove between the ala of the sacrum and superior articular process of S1 *(17)*. For completeness, if the L5–S1 joint is target, the block should be performed at the transverse process of L5; the junction of the ala of the sacrum and the superior articular process of S1; and the S1 nerve should also be blocked *(17)*. For diagnostic purpose a small amount of local anesthetic is used (0.5 to 1 cm^3) to avoid unwanted spread of the injectate. If the block is being done for therapeutic reasons larger volumes may be used.

Prior to considering ablation, a thorough history and physical examination should be obtained and radiographic studies reviewed. Because of the nonspecific symptoms and lack of radiographic confirmation, diagnostic facet blocks (either medial branch blocks or injection of local anesthetic into the joint) should precede all radiofrequency facet denervation *(19)*.

CONCLUSION

Facet syndrome is a difficult diagnosis to make due to inconsistent signs and symptoms. Presently there are no pathognomonic, radiographic, historical, or physical examination findings that concusively diagnose facet pain. Diagnostic block have been show to be a reliable tool in diagnosis and may help facilitate treatment for this problem. With the use of diagnostic facet blocks to select patients, rhizotomy has been shown to be a safe effective, long-term treatment for facet pain. Therefore, thermal RF continues to be the recommended treatment for zygapophyseal joint pain.

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