Case Report

Lumbar radiculopathy after zygapophyseal joint injection

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We report a case of lumbar radiculopathy after zygapophyseal joint injections for chronic low back pain. The management of the patient and potential causes for the radiculopathy are discussed. The case acts as a reminder that the spinal nerve roots should be considered when performing intra-articular facet joint injections and demonstrates the importance of including nerve injury in the patient consent process as a rare, but significant complication.

Keywords: injections, spinal; low back pain, therapy; radiculopathy; zygapophyseal joint

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The lumbar zygapophyseal joints (facet joints) are commonly considered to be a significant source of low back pain by interventional pain physicians. The diagnostic and therapeutic injection of local anaesthetic and often steroid into and around the lumbar zygapophyseal joints remains a common theatre-based procedure in interventional pain management. These injections are generally considered to be safe and associated with a low risk of morbidity. We report a case of a radiculopathy affecting the fourth lumbar nerve root that developed immediately after routine zygapophyseal joint injection. To the best of our knowledge, this has not previously been reported in the medical literature.

Case report

A 69-yr-old lady had a long history of isolated low back pain that was primarily paraspinal and of moderate severity. This had very successfully been managed for more than 4 yr with L3/L4, L4/L5, and L5/S1 zygapophyseal joint injections performed at intervals of about 6–9 months. On each occasion, she underwent bilateral injections using a mixture of bupivacaine 0.5% (7 ml) and depomedrone (methylprednisolone) 80 mg (2 ml). A 1.5 ml aliquot of solution was injected into and around each joint. The procedures were all carried out under sedation with midazolam and the patient was monitored with pulse oximetry, non-invasive blood pressure measurement, and verbal contact with a nurse or operative department practitioner. A full aseptic technique with gown and gloves was used. An image intensifier was used to provide antero-posterior and oblique views of the lumbar spine. On this occasion, i.v. midazolam 5 mg was used for sedation and the patient reported no recall of the procedure. The procedure appeared technically uneventful. After the procedure, the patient reported an awareness of right leg weakness while in bed on the ward. She described more profound leg weakness on standing, but was happy to go home with assistance and was discharged by nursing staff (as per protocol). Pain was not immediately present. At home, while she remained systemically well, her leg weakness appeared to get worse. She began to suffer from ‘terrible pain’ together with ‘no feeling’ in the leg. She reported falling on several occasions stating that she seemed to have ‘no control’ over her leg.

Clinical examination by a senior pain physician the next day revealed reduced sensation to pinprick in the distribution of the L4 dermatome. Muscle power in the right hip flexors was reduced to grade 3 and in the right quadriceps to grade 4. The right knee reflex was significantly reduced. Ankle reflexes were not obtained and planter responses were downward. The radiculopathy was explained to the patient and, as the possibility of a local anaesthetic effect remained it was agreed to observe the situation. She was travelling abroad the next day and did not wish to cancel her holiday. A magnetic resonance imaging (MRI) scan of the lumbar spine was therefore performed immediately after her return 11 weeks later. This showed multilevel spinal stenosis, most pronounced at the L2/L3 level. There was no compromise of the spinal nerve roots.

A consultant neurologist examined the patient 21 weeks after the injections. Muscle power in the right hip flexors had improved, but knee extension remained significantly reduced at grade 3 to grade 4. The right knee jerk was noted to be absent. Nerve conduction studies
demonstrated no evidence of a major peripheral neuropathy. Needle EMG of the right quadriceps demonstrated 2–3+ reduction in recruitment with occasional features of active denervation. A similar, though less marked 1–2+ reduction in recruitment was obtained in the right tibialis anterior muscle. The left tibialis anterior and right gastrocnemius responses were reported as normal. Biochemical investigations to rule out an inflammatory process were negative.

This patient was therefore confirmed on EMG to have developed a right L4 radiculopathy with some L5 dysfunction. The possible causes for the radiculopathy were considered to be direct neural trauma at the time of zygapophyseal joint injection, neural compromise secondary to spinal stenosis (exacerbated by the injections), acute prolapsed intravertebral disc or a drug-related neurotoxicity.

Discussion

Zygapophyseal joint injections are widely considered to be a safe injection-based procedure that might help in the management of chronic low back pain. Despite the perceived low risk, significant complications have been described in the literature including septic arthritis of the zygapophyseal joint, infective discitis, paraspinal abscess, and epidural abscesses.1–4 The procedure reported was considered entirely uneventful, but the clinical picture soon after the procedure indicated the development of a significant lumbar radiculopathy. Specialist investigation by a neurologist confirmed the clinical diagnosis of an L4 radiculopathy.

Several causes for radiculopathy immediately after zygapophyseal joint injections might be considered. Direct trauma to the nerve root by the needle and injection of anaesthetic and steroid into the nerve root are clear possibilities. The nerve roots lie immediately anterior to the zygapophyseal joints and are therefore vulnerable to a spinal needle advanced beyond the joint. The needle might traverse a joint particularly if it is large and ‘open’, or it might slip off the articular process and pass to one side of the joint. We believe that in this case, it is most likely that the spinal needle traversed the L4/5 joint and made contact with the L4 nerve root. Fluoroscopically guided spinal injections are reported to be less likely to cause inadvertent neural injury and provide improved precision of needle placement. A lateral view is not routinely used for this procedure, but might have provided information as to the depth of the needle and its proximity to the neural foramen and exiting nerve root.5 6

It is probable that the patient would have complained of paraesthesia or pain down the leg if the needle had entered the nerve root during the injection.

There was no sign of this observed during the procedure, but the patient was sedated with enough midazolam to suppress the recall of the procedure and this might have affected her response. Midazolam 5 mg was given to relax her enough to have the procedure performed comfortably. The relative merits of performing spinal injections awake or under sedation continue to generate debate, and a full discussion lies outside the scope of this case report.

There are published case reports of serious neurological complications occurring in both sedated and awake patients having spinal injections.7–9 It might be possible to contact a nerve without eliciting any paraesthesia and there is a need to be cautious in relying solely on patient response during spinal procedures.10

Other causes of spinal nerve root compression after spinal injections include infective processes, haematoma, acute prolapsed disc, and acute deterioration of spinal stenosis. The patient had no risk factors for deranged clotting and the procedure was performed without multiple attempts. She remained systemically well, afebrile with no acute low back pain, and the development of symptoms immediately after procedure made an infective process very unlikely.1 11 The MRI scan of the lumbar spine did not show evidence of nerve root compromise. Pre-existing spinal stenosis is considered a risk factor for developing neurological complications such as cauda equina syndrome after central neuraxial block especially epidural anaesthesia in the elderly. Spinal haematoma and rise in epidural pressure on injecting local anaesthetic into the epidural space worsening the stenosis are unlikely but possible mechanisms.12 Facet joint cysts are most common at the L4–L5 level and can cause nerve root or spinal cord compression.13 There was no evidence of a cyst on the MRI scan in this case.

While acute long-acting steroid-related neurotoxicity seems highly improbable, the possibility of injection of the wrong drug always needs to be considered. There is no evidence that this has been the case in our patient.

There has been some improvement in the radiculopathy in the 12-month period since the injections. In the meantime, the patient developed recurrence of her low back pain and requested further lumbar zygapophyseal joint injections. While she understandably had some concerns, she went ahead with the procedure without further complication.

In conclusion, this study illustrates an unusual complication of zygapophyseal joint injections. The proximity of the spinal nerve roots should be considered whenever intra-articular zygapophyseal joint injections are performed and patients should be warned that serious nerve injury is a rare complication.

References


13 Shaw M, Birch N. Facet joint cysts causing cauda equina compression. *J Spinal Disord Tech* 2004; 17: 442–45