Technical note: the swimmer's view for cervical facet joint injections

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Abstract Image intensifier (C-arm) guided facet infiltration of a mixture of long acting local anaesthetic and corticosteroid is a safe and effective office procedure for cervical spondylosis. Visualisation of lower cervical anatomy using C-arm may not always be possible due to the shadow cast by the shoulders. We describe the successful adaptation of swimmer's view in such cases to carry out the injections.

Keywords Facet injections · Cervical spine · Swimmer's view · C-arm · Fluoroscopy

Introduction

Chronic zygapophyseal joint arthropathy is a known cause of neck pain [1, 9, 10] the common causes being degenerative and post-traumatic. The phenomenon of degenerative facet joint osteoarthritis is considered to be a secondary effect of disc degeneration (cervical spondylosis). Disc degeneration results in inability of

the intervertebral disc to transfer loads and loss of disc height. Eventually, this leads to transfer of loads to the facet joints as well as settling and approximation of the articular surfaces of the facet joints. This results in facet arthrosis and neck pain, especially on extension. The most commonly involved levels in cervical spondylosis are C5-C6 and C6-C7 [2, 8]. One proposed method of treating facet joint pathology secondary to degenerative and post-traumatic cervical disorders non-surgically is facet joint infiltration [1, 5, 7, 9–11]. Radiologists under computer tomography (CT) guidance or physiatrists, pain management specialists and surgeons using fluoroscopy (C-arm) usually perform facet joint injections. Under C-arm guidance, adequate visualisation of lower cervical and C7-T1 facet joints in the cross table lateral view may not always be possible due to the shadow cast by the shoulders, in spite of applying longitudinal traction to the arms by the assistant. In obese, muscular and short necked patients, even the upper cervical facet joints (C3-4, C4-5) may not be visualised adequately. In such situations, the patients may need to be referred for the injections to be done under CT guidance.

The use of swimmer's view in diagnosing pathologies in the lower cervical and cervicothoracic regions is well established [3, 4]. We have adapted the swimmer's view for localising the hidden upper cervical as well as the lower cervical and C7-T1 facet joints while performing injections at these levels.

The description of indications, contra-indications, complications and controversies in relation to cervical facet joint injections is discussed elsewhere [1, 9–11] and is not the objective of this paper.

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Technique

We perform these injections as outpatient procedures. The patient is positioned prone with arms held together at the back and placed over the buttock on a specially designed radiolucent table. The patient's head is supported in a custom-made horseshoe shaped silicone gel-filled cushion, similar to the one used during posterior cervical surgery. An ordinary cross-table lateral image is initially captured on the C-arm screen to check whether the region of interest for facet injection is visible. In case it is concealed in the shadow cast by the shoulders (Fig. 1), the patient's arms are positioned for the swimmer's view and a cross-table lateral view is obtained (Fig. 2). The skin and subcutaneous tissue is cleaned with povidone-iodine solution and the point of entry is anaesthetised with 2 ml of 1% Lignocaine (Xylocaine). The point of entry is about a fingerbreadth lateral to the mid-line and can be confirmed with the postero-anterior image on the C-arm. Once the skin and subcutaneous tissue is anaesthetised, the facet joint needle (22 G x 3.5 in.spinal needle) is introduced, directing towards the facet joint. Using the swimmer's view projection, the trajectory of the needle can be traced adequately and precisely till its tip reaches the facet joint (Fig. 3). Once the bone is felt, the needle is withdrawn a few millimetres and the perifacetal area, followed by the facet joint is infiltrated with a mixture of 0.5 ml of 0.5% Bupivacaine (Marcain) and 0.5 ml of Betamethasone (Celestone). The dose is divided if bilateral injection is performed. We have used this

Fig. 2 Patient positioning for the Swimmer's view using C-arm for facet injection

technique in patients in whom the affected levels could not be visualised with ordinary cross-table lateral views.

Fig. 1 Fluoroscopy image showing the ordinary cross-table lateral view of the cervical spine. The facet joint needle tip (targeting C6-C7 facet joint) is hidden in the shadow cast by the shoulders

Fig. 3 Fluoroscopy image showing the Swimmer's view of the cervical spine. The facet joint needle tip can be seen touching the C6-C7 facet joint

Discussion

Research into the role of facet joints in spinal pain has shown that cervical facet joints are the cause of chronic neck pain in 54–60% of patients [9, 10]. A success rate of up to 91% has been noted in temporarily relieving cervical axial pain following intra-articular and perifacetal injections [11]. The importance of performing these injections under imaging control for accurate localisation needs no emphasis [6]. The most common levels involved in cervical spondylosis and hence indicated for facet infiltrations are the lower cervical levels. Ironically, these are the levels that cannot be visualised adequately in the ordinary lateral C-arm images. We have been successful with the adaptation of swimmer's positioning while performing cervical facet joint injections at these and other levels that cannot be visualised with ordinary lateral C-arm images. The procedure is simple and can be performed without any additional effort, training or cost, whilst achieving an excellent lateral image of the cervical spine and cervicothoracic junction. Prior to implementing this technique, we would refer such patients for injections to be performed under CT guidance. There is a potential scope for precision of this technique to selectively block the medial bundle branch to get optimum results.

Conclusion

Cervical facet infiltration, with the aid of swimmer's view under image control is an alternative to CT guided infiltration in cases where soft tissue shadow cast

by the shoulders interferes with appropriate localisation of lower cervical levels.

References

1. Bogduk N (1997) International spinal injection society guidelines for the performance of spinal injection procedures. Part 1: zygapophysial joint blocks. *Clin J Pain* 13:285–302
2. Clements, O'Leary (1999) Anterior cervical discectomy and fusion for the treatment of cervical radiculopathy. In: An H, Cotler J (eds) *Spinal instrumentation*, 8th edn. Lippincott Williams & Wilkins, Philadelphia, 111–122
3. Daffner SD, Vaccaro AR (2002) Managing disorders of the cervicothoracic junction. *Am J Orthop* 31:323–327
4. Gisbert VL, Hollerman JJ, Ney AL, Rockswold GL, Ruiz E, Jacobs DM, Bubrick MP (1989) Incidence and diagnosis of C7-T1 fractures and subluxations in multiple-trauma patients: evaluation of the advanced trauma life support guidelines. *Surgery* 106:702–708
5. Grifka J (1996) Injektionstherapie bei Zervikalsyndrom, German. *Orthopäde* 25:524–532
6. Heckmann JG, Maihofner C, Lanz S, Rauch C, Neundorfer B (2005) Transient tetraplegia after cervical facet joint injection for chronic neck pain administered without imaging guidance. *Clin Neurol Neurosurg* (E-pub ahead of print)
7. Krämer J (1996) Orthopädische Schmerztherapie, German. *Dt Ärztebl* 93:A1961–A1965
8. Malcolm GP (2002) Surgical disorders of the cervical spine: presentation and management of common disorders. *J Neurol Neurosurg Psychiatry* 73:34–41
9. Manchikanti L (1999) Facet joint pain and the role of neural blockade in its management. *Curr Rev Pain* 3:348–358
10. Manchikanti L, Boswell MV, Singh V, Pampati V, Damron KS, Beyer CD (2004) Prevalence of facet joint pain in chronic spinal pain of cervical, thoracic, and lumbar regions. *BMC Musculoskelet Disord* 5:15
11. Roy DF, Fleury J, Fontaine SB, Dussault RG (1988) Clinical evaluation of cervical facet joint infiltration. *Can Assoc Radiol J* 39:118–120