CASE REPORT

Atlanto-axial infection after acupuncture

A Robinson,¹ C R P Lind,^{2,3} R J Smith,¹ V Kodali^{1,2}¹Department of Medicine, Geraldton Regional Hospital, Geraldton, Western Australia, Australia²University of Western Australia, Perth, Australia³Neurosurgical Service of Western Australia, Sir Charles Gairdner Hospital, Perth, Australia

Correspondence to

Dr V Kodali,
venkatkodali@hotmail.com

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SUMMARY

A 67-year-old man presented with neck cellulitis following acupuncture for cervical spondylosis. Blood cultures were positive for methicillin-sensitive *Staphylococcus aureus*. Increased neck pain and bacteraemia prompted MRI, which showed atlanto-axial septic arthritis without signs of infection of the tissues between the superficial cellulitic area and the atlanto-axial joint, thus making direct extension of infection unlikely. It is more likely that haematogenous spread of infection resulted in seeding in the atlanto-axial joint, with the proximity of the arthritis and acupuncture site being coincidental. Acupuncture is a treatment option for some indolent pain conditions. As such, acupuncture services are likely to be more frequently utilised. A history of acupuncture is rarely requested by the admitting doctor and seldom offered voluntarily by the patient, especially where the site of infection due to haematogenous spread is distant from the needling location. Awareness of infectious complications following acupuncture can reduce morbidity through early intervention.

BACKGROUND

Neck pain is a common symptom with a point prevalence of about 10%.¹ Most often, this is due to degenerative disease (cervical spondylosis), for which patients may undergo non-conventional modalities of treatment, such as chiropractic manipulation and acupuncture, with variable response. As of 2009, the National Institute for Health and Care Excellence (NICE) clinical guidelines include acupuncture as a treatment option for conditions such as chronic low back pain and migraine. It is recommended that clinicians should “offer one of the following treatment options, taking into account patient preference: an exercise programme, a course of manual therapy or a course of acupuncture.”² Never before has NICE so explicitly recommended that acupuncture be considered. As such, acupuncture services are likely to be more frequently utilised. Infections of varying severity secondary to acupuncture are well known, however, there are no published reports of cervical septic arthritis associated with acupuncture. A history of recent acupuncture is rarely requested by the admitting doctor and seldom offered voluntarily by the patient, especially where infection due to haematogenous spread is distant from the original acupuncture site. We wish to raise awareness of septic arthritis as a particular complication of acupuncture with potential for significant morbidity.

CASE PRESENTATION

A 67-year-old man presented to the emergency department, feeling feverish and generally unwell with a several day history of worsening neck pain. He had recently completed a 5-week acupuncture course, which had provided some temporary relief from pain due to his significant cervical spondylosis.

In addition to his cervical spondylosis, the patient's medical history included chronic obstructive pulmonary disease (despite which he continued to smoke), osteoarthritis, post-traumatic stress disorder and possible angio-oedema on past exposure to penicillin. The patient had a chronic mild wheeze and shortness of breath on moderate exertion. There was no recent history to indicate a respiratory infection and no history of recent or frequent steroid courses for chronic obstructive pulmonary disease (COPD). There was no other history or medication use that would have rendered the patient immunocompromised. The patient did not have any history of illicit drug use.

On examination, he was febrile and tachycardic with a normal blood pressure. Examination of the respiratory system and X-ray imaging of the chest was consistent with COPD without any current evidence of an infective exacerbation of COPD or of pneumonia. On the posterior aspect of his neck, there was an area of cellulitis measuring approximately 30×40 mm with an associated decreased range of motion of the neck. This was difficult to objectively assess for a change from baseline because the patient had a premorbid limited range of motion. There was no Kernigism and no photophobia. Neurological examination was normal. The rest of the examination was unremarkable.

INVESTIGATIONS

Laboratory tests showed a white cell count of $14.10 \times 10^9/L$ (4.00–11.00) with a neutrophilia of 85.5%, absolute value $12.1 \times 10^9/L$ (2.00–7.50). C reactive protein was raised at 258 mg/L (<10). Blood cultures grew methicillin-sensitive *Staphylococcus aureus*. Transthoracic echocardiogram did not reveal endocarditis.

In light of the patient's increased neck pain and bacteraemia, MRI of the cervical spine with gadolinium contrast was performed. Results confirmed septic arthritis of the atlanto-axial joint (figure 1A). There was normal alignment. Flexion-extension cervical spine X-rays showed no dynamic instability. The findings were discussed with the neurosurgical team, who advised that no specific immobilisation or surgical procedure would be required.

The gold standard investigation to confirm a septic arthritis would be joint aspiration and

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Figure 1 (A) T1 spectral presaturation with inversion recovery (SPIR) MRI in the postcontrast phase showing capsular thickening with enhancement and joint effusion at the atlanto-dens articulation, in support of septic arthritis of the atlanto-axial joint. (B) T1 SPIR MRI in the postcontrast phase showing mild sclerosis at the articular surfaces of the atlanto-dens articulation with mild residual hyperintense signals at C2 vertebra representing a healing arthritis.

culture of synovial fluid in peripheral joints. In septic arthritis affecting the spine (septic spondylitis), aspiration is replaced by imaging. MRI is timely and costly, but gives sufficient information about the soft tissues to make the diagnosis, including showing synovial enhancement, peri-synovial oedema and cartilaginous damage.

DIFFERENTIAL DIAGNOSIS

In our patient's case, direct inoculation of the atlanto-axial joint though acupuncture is not possible given the approach adopted. The acupuncturist confirmed a conventional approach into the trapezius muscles posteriorly, which would not have reached the atlanto-axial joint. MRI did not demonstrate infection of the tissues between the cellulitic area on the posterior neck and the atlanto-axial joint, making direct extension of infection also appear unlikely. It is more likely that infection seeded into the atlanto-axial joint following the cellulitis and resultant bacteraemia, with the relative proximity of the arthritis and acupuncture site being coincidental.

TREATMENT

The patient had an 8-day hospital admission. Intravenous vancomycin was given until the sensitivities of the *S. aureus* were available. Intravenous cephazolin was given alongside the vancomycin and continued at a dose of 6 g over 24 h via a peripherally inserted central catheter for a total of 6 weeks. Cephazolin was cautiously initiated in hospital given the history of possible angio-oedema with penicillin. The patient was regularly reviewed to determine clinical and radiological resolution of infection. Following completion of 6 weeks of intravenous antibiotics, the white cell count was $7.80 \times 10^9/L$ (4.00–11.00) and C reactive protein was 10 mg/L (<10); the patient was clinically well. Antibiotics were stopped at this point.

OUTCOME AND FOLLOW-UP

Post-treatment MRI showed mild sclerosis at the articular surfaces of the atlanto-dens articulation, with mild residual hyperintense signals at the C2 vertebra representing a healing arthritis

(figure 1B). There were no epidural or paravertebral collections. Follow-up has revealed no evidence of recurring infection since completing antibiotics, with inflammatory parameters remaining at baseline. The patient continues to have chronic neck pain at his preinfection level and is still taking analgesics.

The local public health department was informed of the case and conducted a review of the practice at the acupuncture clinic concerned. They were satisfied that the skin cleansing technique was sufficient and that disposable needles were used for each client. There were no specific requirements placed on the acupuncturist for continuing registration as all appropriate precautions were in place to prevent the recognised complication of infection.

DISCUSSION

Spinal, vertebral and disc infections are common in intravenous drug users as well as in the immunosuppressed. These are also seen in immunocompetent individuals, where the infection seeds from a source elsewhere. Case reports exist that describe infections of varying severity secondary to acupuncture, including bacterial meningitis,³ epidural abscesses^{4–6} and non-tuberculous mycobacterial skin and soft tissue infections.⁷ A literature search using Medline OvidSP from 1946 to 2015 was performed to identify further cases of septic spondylitis secondary to acupuncture. The search terms *septic arthritis acupuncture*, *spondylitis* acupuncture* and *acupuncture infection* spine* were used. Results were limited to the English language. Reference lists from the resulting papers were used to identify additional relevant publications. A total of five papers pertaining to septic spondylitis associated with acupuncture treatment in five patients were reviewed. Three of these case reports described lumbar septic spondylitis^{8–10} and two described septic sacroiliitis secondary to acupuncture.^{11 12} Four of the patients made a complete recovery. One patient, with lumbar septic spondylitis, epidural abscess and bilateral psoas abscess, was rendered paraplegic with no neurological recovery on completing treatment.⁸ Ours is the only reported case of cervical septic arthritis secondary to acupuncture.

Learning points

- ▶ The National Institute for Health and Care Excellence guidelines for the management of low back pain, migraine and chronic pain syndromes allow the use of acupuncture for certain individuals.
- ▶ Complications following acupuncture are rare. When they do occur there is potential for significant morbidity.
- ▶ Septic arthritis secondary to acupuncture may seed in a joint distant to the site of needling due to haematogenous spread.
- ▶ Awareness of remote infectious complications following acupuncture has the potential to reduce morbidity with early intervention.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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