

## Pneumothorax complication of deep dry needling demonstration

### INTRODUCTION

Pneumothorax is a well-recognised but rare adverse event related to acupuncture or deep dry needling (DDN) over the thorax.<sup>1 2</sup> This report of a pneumothorax resulting from DDN is unusual for a number of reasons: both the practitioner and the subject were doctors and both have contributed to this report; the practitioner was very experienced in DDN and had not knowingly caused such an event in the previous 45 years of practice and teaching DDN; the incident was captured on video and is presented online with this report (see online supplementary video). We hope that by reporting this event and review of the video recording we can suggest ways to reduce the risk of reoccurrence of such adverse events of DDN.

### REPORT OF NEEDLING DEMONSTRATION BY PRACTITIONER

The setting was a hands-on workshop teaching the technique of DDN for the treatment of myofascial pain syndromes. The workshop used the format of lecture, demonstration on a volunteer, and then practice by the group in groups of two or three individuals at an examination couch. Safety procedures were emphasised for each muscle considered. The safety precautions included identification of landmarks each time one prepared to needle the subject and an awareness of the local anatomy and of possible complications. During the introduction to the demonstrations the complication of pneumothorax was discussed. Symptoms were described and the advice to go to the emergency department for a chest X-ray was given.

The muscle to be demonstrated was the iliocostalis muscle, one of the erector spinae muscles. RR-M

volunteered to be the subject. The lecturer emphasised the danger of pneumothorax and spoke of the technique of 'blocking' the rib by placing a finger in the intercostal space on either side of it. RR-M was a lean individual, so there was no trouble identifying the rib as he lay down. A 0.3×50 mm Seirin acupuncture needle was used to demonstrate the technique of needling the iliocostalis muscle at approximately the level of the eighth rib. A taut band in the muscle was identified by palpation against the rib. The needle was prepared and held in the right hand. The muscle was again palpated, this time with the left hand. Landmarks were identified—namely, the angle of the ribs and the intercostal spaces on either side of the rib. The taut band was identified. The intercostal spaces were blocked with the index and long fingers of the left hand, the fingers lying flat in the intercostal space so that the rib was blocked for the length of the fingers. The rib between was identified and the needle tapped through the skin using the right index finger. The intercostal space-blocking left hand fingers remained in position. The needle was advanced towards the rib with the right hand. The needle continued to advance to a depth that was deeper than expected. RR-M gave an exclamation indicating that he felt pain. The needle was withdrawn back towards the skin and RR-M was asked what the pain felt like. He said that it was an aching pain. The needle was redirected within the area blocked by the fingers of the left hand. This time, when the needle was advanced, it touched the rib at about 10–15 mm depth, indicating that the needle had slid off the rib the first time. After touching the rib with the needle and needling the iliocostalis muscle against the rib, the needle was removed.

### RELEVANT BACKGROUND

#### MEDICAL HISTORY OF SUBJECT

The subject was a 55-year-old male medical doctor of 1.86 m height

and 68 kg weight (body mass index 20). He had a history of asthma since childhood and, at the time of the event, was well controlled on daily fluticasone/salmeterol (Seretide) and salbutamol as required. There had been no hospital admissions with asthma. He had no prior spontaneous or traumatic pneumothoraces and no history of other significant acute or chronic lung disease.

### DESCRIPTION OF SYMPTOMS BY THE SUBJECT

The needling was mid-morning and by mid-day I had a deep ache and stiffness in my left chest posteriorly. It was fairly diffuse, but was centred on the scapula. This continued the rest of the day and into the next day. By the morning I was also aware of a feeling of constriction on breathing, and pain on taking or trying to take a deep breath, which I felt I couldn't actually perform fully. I also developed a dry cough, the breathlessness felt like an exacerbation of asthma symptoms (albeit more lateralised to the left) and was more noticeable on walking. I was also aware of a dull ache in the shoulder tip in the region of the acromioclavicular joint. At 2 weeks the breathlessness on exertion was lessened, but not completely gone. At 6–8 weeks I was symptom-free, but still with a pre-existing dull ache in the region of the ipsilateral acromioclavicular joint.

### DESCRIPTION OF SUPPLEMENTARY VIDEO

The practitioner describes the precautions related to needling over the thorax and demonstrates identification of a taut band and how the interspaces between the ribs are 'blocked' by the fingers. A 50 mm (0.3 mm diameter) Seirin acupuncture needle is initially inserted over the identified rib, towards the taut band. The needle is inserted about 20 mm, then the practitioner pauses and the needle is inserted a further 20 mm. The latter insertion is most

likely responsible for the needle penetrating the left lung. The needle is withdrawn and re-angled slightly inferolaterally to the original angulation. The subsequent insertion results in contact with the rib at a depth of about 20 mm. It should be noted that the slightly more oblique angulation of this insertion means that the perpendicular depth of soft tissue over the rib was slightly less than 20 mm.

## OUTCOME

The subject presented for his afternoon clinic at a hospital in central London the following day at approximately 13.30. He appeared well but had a dry cough and described a feeling of being unable to take a deep breath and a sense of breathlessness on the left side. We organised a chest X-ray immediately, which demonstrated a 20% left-sided pneumothorax (see figure 1). He proceeded to see the patients who had already arrived for his medical acupuncture clinic before attending our local accident and emergency unit. He was advised to manage the pneumothorax conservatively and a repeat chest X-ray at 14 weeks after the incident demonstrated a fully inflated left lung.

## DISCUSSION AND ANALYSIS

Pneumothorax is a recognised complication of acupuncture and DDN.<sup>1</sup> The largest prospective survey of adverse events of acupuncture found two cases of pneumothorax related to 2.2 million acupuncture sessions in 0.22 million patients,<sup>2</sup> but we do not know what proportion of the 2.2 million treatments surveyed involved needling over the thorax. DDN over the thorax is very likely to be associated with a higher incidence of pneumothorax.<sup>3</sup> A variety of techniques are used to avoid puncturing the lungs and pleura when performing needling over the thorax: superficial needling (insertion a few millimetres into the first



**Figure 1** Chest X-ray of the patient taken approximately 24 h after the needling demonstration featured in the linked video.

muscle layer or subcutaneous insertion); needle insertion at a tangent to the ribcage; needling over or onto a rib (the method used in this case).<sup>4</sup> The latter is arguably the most risky, but also the most reliable way of reaching a target trigger point and, indeed, the only way of performing DDN to the target muscle layer (iliocostalis lumborum pars thoracis) in this case. It seems clear from the video that the mistake was to continue insertion beyond the first 20 mm rather than rechecking the rib position or re-angling the needle.

We suggest that, when needling over the ribcage and targeting a rib, practitioners should estimate how far they are prepared to insert the needle before rechecking the rib position. This will vary with the constitution of the subject and the position on the thorax, but in some slim individuals it may be as little as 10 mm. In this case, over the mid to lower posterior thorax we estimate that the distance to the rib was just under 20 mm.

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