Pneumothorax as a complication of dry needling technique

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To the Editor:

Dry needling involves the insertion of a solid needle into palpably taut muscle bands or muscle knots known as "myofascial trigger points". After insertion, the needle may be redirected in several planes or electrically stimulated to cause muscle contraction, which has been proposed to relieve pain and improve range of motion. The technique is referred to as "dry" because no medication is injected. The underlying mechanism of action is subject to debate, as is the exact pathogenesis of myofascial trigger points [1]. Dry needling is used in the treatment of a variety of musculoskeletal disorders, such as tendinopathy, shoulder impingement, nonradicular neck pain and chronic lower back pain. Being considered as its Western counterpart, dry needling is similar to acupuncture, which originates from traditional Chinese medicine. The latter technique, however, focuses on "flows of life force" (chi) and aims to treat conditions in multiple organ systems, whereas the former is used mainly in the musculoskeletal field.

Evidence regarding the effectiveness of dry needling is conflicting [2–6]. While not robust, the literature suggest dry needling may be a useful addition to the management of muscle pain. The technique requires training to perform properly and results may vary depending on clinician skill. In Belgium, procedures are usually performed by physiotherapists who have completed additional training at private academies. The duration of these courses ranges from 14 h to 2 years, with some requiring no medical background at all. The lack of regulation may lead to great variety in quality of care.

High-quality data regarding adverse events associated with dry needling are lacking. Most literature on this topic is based on patient or physician surveys and case reports. Being practiced for centuries and thus more widespread, acupuncture is the topic of a vast body of literature, including publications regarding safety. Dry needling being considered a low-risk intervention is partly due to extrapolation of the presumed safety of acupuncture. The most common adverse events after small-diameter needle insertion are mild bleeding, bruising and post-needling soreness [7]. Albeit rare, more serious adverse events like nerve injury, haematoma, infection and cardiac tamponade have been described [8, 9]. In a prospective study, Witt *et al.* [10] found that two out of nearly 230 000 patients reported pneumothorax after acupuncture treatment. A systematic review of the Chinese literature found that pneumothorax was the most frequent serious acupuncture-associated adverse event with a total of 201 cases, four of which were fatal [11]. To our knowledge, only two cases of pneumothorax after dry needling have been described [1, 12]. We present a series of four cases in one Belgian university hospital over a period of 15 months.

Four patients were seen at the emergency department with post-dry needling pneumothorax between September 2022 and December 2023. All were women aged 28–35 years. One patient was a smoker. None of the patients had any relevant medical history. All had been treated for pain located in the left shoulder, trapezius muscle or neck region in outpatient physiotherapist practices. At least three different physiotherapists were involved; one could not be identified. One patient presented to the emergency department on the same day as the dry needling procedure; the others presented the day after. All mentioned thoracic pain and dyspnoea (four out of four patients). Clinical examination in all of these patients was unremarkable, as were their vital signs. Diagnosis was confirmed with ultrasound and chest radiography in all patients. The latter examination showed left-sided apical pleural detachment with a median of 3.65 cm in expiration.

Two patients were managed conservatively. One patient (initial pneumothorax 2.5 cm) was discharged from the emergency department and ultrasound 2 days later displayed a normally expanded lung.

Shareable abstract (@ERSpublications)
Post-dry needling pneumothorax is not extremely rare. Patients and referring doctors should be aware of this. Informed consent should mention pneumothorax as a considerable risk of dry needling procedures in the neck, shoulder or chest region. https://bit.ly/49YYNR8

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One patient with an initial apical size of 2.8 cm was admitted with 2 $L \cdot min^{-1}$ oxygen through a nasal canula and discharged from the hospital the next day after ultrasound had shown no increase in size. Her control chest radiograph 4 days later showed only minimal pleural detachment measuring 6 mm. The two other patients were treated with ultrasound-guided needle aspiration in the emergency department. One patient with detachment initially being 4.5 cm showed decreased size of the pneumothorax immediately after aspiration. She was admitted to the respiratory medicine ward and discharged the next day. Control ultrasound and chest radiography after 1 week showed no more signs of pneumothorax. In the other patient, with detachment initially being 5.5 cm, needle aspiration resulted in complete deployment on ultrasound immediately after the procedure, but control chest radiography showed a totally collapsed lung 3 h later. A small-bore chest drain was placed but persistent air leakage was seen. Several trials of clamping the drain resulted in recurrent collapsing of the lung. After a computed tomography scan had shown no structural deformities of the lung, suction was gradually reduced and the drain was successfully removed on the sixth day after placement. The patient was discharged home. A control chest radiography 3 weeks later was normal.

This case series describes four young women suffering a pneumothorax after dry needling of the shoulder and neck region. In July 2023, the British Thoracic Society (BTS) published updated guidelines for the management of spontaneous pneumothorax [13]. Although it does not deal with traumatic pneumothoraxes, the BTS treatment algorithm guided our approach to these four patients. Since all were symptomatic but none exhibited high-risk characteristics (*e.g.* haemodynamic compromise or significant hypoxia), size of the pneumothorax and patient preference were decisive for treatment choice. This led to conservative treatment in two, needle aspiration in two and hospital admission in three out of four cases, with a mean length of stay of 2.7 days (range 1–6 days) and chest drain placement in one patient. Besides the psychological and financial burden, all patients dealt with incapacity for work.

Our series suggests post-dry needling pneumothorax is, contrary to numbers cited in literature, not extremely rare. With rising popularity of the technique, we expect complications to occur more often. Patients and referring doctors should be aware of this. In their informed consent, practitioners should mention pneumothorax as a considerable risk of dry needling procedures in the neck, shoulder or chest region.

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