

Author's response: spontaneously breathing patients get tension pneumothorax

In my brief letter¹ I did not mean to imply that Leigh-Smith and Harris² found the case reports they cited as unconvincing, merely that I did not find it convincing that supra-atmospheric pleural pressure was the main explanation for the clinical condition of these patients. The ill patients in the cases cited by Leigh-Smith and Harris and reported by others^{3–10} all have either serious underlying lung disease, significant trauma or other problems. The index case they refer to, for example, had fallen three storeys down a lift shaft and in addition to a large pneumothorax had a ruptured spleen, left pulmonary contusion and lumbar and pelvic fractures.⁵ Patients with such multiple problems are likely to tolerate a large pneumothorax and consequent hypoxaemia badly and drainage of the pneumothorax is of course a vital part of their management.

I think that common usage and understanding takes 'tension' to imply that in tension pneumothorax the adverse physiological consequences are as a result of supra-atmospheric pressures. The BTS guidelines¹¹ reflect this belief. The fact remains that intra-pleural pressure cannot exceed atmospheric pressure during inspiration and always does during expiration (or intercostal drainage of pneumothoraces would not work). There may be merit, as Leigh-Smith and Harris suggest, in retaining the expression tension pneumothorax to signify a large rapidly expanding pneumothorax causing severe physiological consequences but the risk is that retaining the word tension will perpetuate the misunderstanding that high pressures are the cause of this. We could of course retain the expression but use tension with one of its alternative meanings in that a tension pneumothorax would be one that can and should induce feelings of tenseness or anxiety in the medical attendants but this may not be a particularly productive way to approach medical terminology.

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Spontaneously breathing patients get tension pneumothoraces

The recently published correspondence by Simpson is welcomed in so far as it correctly highlights some issues concerning tension pneumothorax.¹ We agree that there are large differences in the pathophysiology and clinical manifestations of spontaneously breathing and mechanically ventilated patients presenting with a tension pneumothorax. It is also well established that hypoxaemia is a consistent finding in this disease and a hiss of air on pleural decompression can be misleading.

However, Simpson's correspondence mis-cites the 2003 review by Leigh-Smith and Harris.² First, we did not state that case reports of tension pneumothorax in spontaneously breathing patients were rare or unconvincing. In fact, we cited 18 case reports of spontaneously breathing patients with a convincing diagnosis of tension pneumothorax of both spontaneous and traumatic aetiology.² Further, the index case which sparked the authors' interest in this subject was a very advanced tension pneumothorax in a spontaneously breathing patient.³ Since that case, over 10 years ago, we have seen (individually or by proxy through our interest in others' cases) multiple other examples of tension physiology in spontaneously breathing patients, unfortunately including a death due to non-treatment. Second, Simpson's referral to definitions of tension pneumothorax employing use of intra-pleural pressure (IPP) should refer to the original animal experiments, which pointed out that 'positive IPP throughout the respiratory cycle' was only a useful definition of tension pneumothorax in the ventilated subject.^{4–5} In awake subjects, the IPP must be less than atmospheric pressure during part of the respiratory cycle if air is going to continue to enter the pleural cavity.^{4,5}

We believe that previous definitions of tension pneumothorax are of limited use because measurement of IPP is impractical, the extent of radiological mediastinal shift is variable⁶ and hypotension occurs uncommonly in spontaneously breathing patients.² We would therefore like to rehighlight a clinical definition for tension pneumothorax as being 'a pneumothorax that results in significant respiratory or haemodynamic compromise (the latter especially in ventilated patients) that reverses on thoracic decompression alone.'²

While acknowledging that ventilated patients usually present at the point of decompensation, in contrast to spontaneously breathing patients who normally present during a variable period of compensation, we believe that the term 'tension pneumothorax' should continue to be used for both conditions. The one word 'tension' immediately alerts the clinician to potential decompensation and the need for expedient investigation (ie, radiography or ultrasound) and/or thoracic decompression.

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