Walker, S., & Maskell, N. (2017). Pneumothorax management—chest drain or needle aspiration? *Journal of Thoracic Disease*, *23*(4), 339-345. https://doi.org/10.21037/jtd.2017.08.155

Despite pneumothoraces being described in medical literature as far back as 15th century(1), the optimal way the remove air from the pleural cavity has not yet been ascertained, nor indeed have we determine whether it is necessary to do so at all. The well conducted randomised control trial by Thelle et al(2) has added to the evidence base concerning one of the fundamental questions: whether needle aspiration (NA) or chest tube drainages (CTD) is superior in evacuating a pneumothorax.

It is an important question, particularly as expert consensus remains divided, with differing advice from national advisory bodies. The American College of Chest Physicians Delphi consensus (2001) (3) does not advise NA, instead supporting proceeding directly with CTD insertion, whilst the BTS guidelines (2010)(4) suggests NA as 1st line in primary spontaneous pneumothorax (PSP), and as a option in small sub-centimetre secondary spontaneous pneumothorax (SSP). There have been several studies(5-10) over the last 25 years which have attempted to address the issue, although interpretation has been made difficult with heterogeneous inclusions criteria, methodologies and definitions of success. However, taken together, they suggest that whilst hospital duration is typically shorter for patients treated with NA(5-7, 9, 10), whilst immediate success rates is generally higher with CTD insertion (5, 7, 8).

Thelle et al study randomised 127 patients presenting with a spontaneous pneumothorax, both primary and secondary, to either NA or CTD. The primary outcome was length of stay, with secondary outcomes including immediate and one-week success rates. Patients were allowed two aspirations in the NA cohort, before proceeding to CTD insertion if these failed. The study demonstrated hospital length of stay which were significantly shorter in all patients treated with NA pathway, including each sub-group (PSP and SSP). Immediate success with NA was almost twice that of CTD. Whilst with rates in NA arm not dissimilar to preceding studies, for CTD is was much lower (32% vs 64-93%) (5, 7, 8). It is also important the note that is high immediate success rate (73.8%) with needle aspiration in SP represents a management pathway consisting of a subsequent second aspiration and then chest drain if required. The success of the initial NA was a less encouraging at 50%. The low incidence of adverse event in NA in this study also supported previous literature.

The success of NA in both PSP and SSP patients provides interesting insight into pneumothorax research. CTD has been favoured in patients where persistent air leak is suspected, as it is felt that NA would be more likely to fail in these circumstances. This reasoning is also why CTD is preferred in SSP, with the reasonable supposition that these patients will be more likely to have ongoing air-leak due to bullae rupture. With NA associated with twice the immediate success rates of CTD in both PSP and SSP, this suggest either that persistent air leak is uncommon in both these cohorts, or less likely a chest tube is not required to manage the persistent air leak. Additionally, there has been supposition, with increasing evidence that the underlying lung in PSP is abnormal, that PSP and SSP are not two distinct entities, but differing ends of the same spectrum(11). If this study's findings are correct, and the initial treatment pathway should be the same, then there is less reason to differentiate between them.

There may have missed an opportunity with the study in helping us predict which patients will develop pneumothorax recurrence. Results from 6 and 12 months would have helped clarified some uncertainties about the long-term recurrence in SP, and more whether particularly the method of treatment influences recurrence rates.

If the findings or this study are verified by further studies, particularly on SSP patients, needle aspiration, with its associated fewer bed-days and adverse events is an attractive first line option and should be offered to patients with a PSP or SSP. However, patients must be counselled that there have a 50:50 chance of their initial NA failing, and requiring further intervention. The study authors should be congratulated on a well-designed study which, by including both PSP and SSP, progresses the understanding of pneumothoraces and its management further.

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