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Editorial

Conservative management of Primary Spontaneous Pneumothorax: a failed revolution?

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A spontaneous pneumothorax can be primary (PSP) or secondary (SSP) (1). PSP is defined as a spontaneous pneumothorax occurring in a patient who has no known underlying lung disease; it is a frequent, benign condition in tall young male smokers (2). PSP management is designed to cure the current episode and prevent/reduce recurrence, which can reach 29% in the first year (3).

The guidelines for PSP management are conflicting, with several different strategies (1, 2, 4). All the guidelines for small PSP without significant breathlessness agree: patients should be observed and discharged if stable (1, 2, 4).

The lack of consistency among guidelines for treating large PSPs is probably due to wide variations among centres (5, 6). Some physicians advocate surgery as first-line treatment despite the fact that most patients (70%) will never have a recurrence (3). This includes 15% of the American College of Chest Physicians (ACCP) guideline panel (4). The management of most large PSPs around the world is invasive, with chest-tube drainage (CTD) or manual aspiration (MA) (1, 2, 4).

A randomised controlled trial on Australian and New Zealand PSP patients published recently in the New England Journal of Medicine raises questions about these practices (7). Brown et al. demonstrated that a conservative strategy was in non-inferior to a standard CTD for treating a first episode of large PSP (7). The conservative management consisted of a 4-hour observation period, followed by discharge home with ambulatory follow-up. These interesting findings are consistent with those reported by Stradling and Poole (8) more than half a century ago. Surprisingly, these results did not trigger a revolution in PSP management; conservative management has not gained support – it has actually lost some influence in various guidelines (9).

However, it is wise to examine the details of the study before using conservative management for all patients with a first episode of PSP, whatever its size.

First, some statistical facts are troubling. As stressed by the authors, 60/316 of the conservative-management patients had no chest X-ray at week 8. A sensitivity analysis was therefore performed: all data missing at 56 days were considered to be treatment failures. As a result, the risk difference was outside the specified non-inferiority margin, making the trial negative. Furthermore, only 316 of the 2637 patients screened (12%) were included, suggesting inclusion bias.

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Second, the symptoms persisted for longer than usual, around 40 hours, and patients were almost asymptomatic (mean Borg dyspnea around 1.5). This is consistent with the inclusion bias: the patients for this trial were selected from among the general PSP population.

Third, the primary endpoint, success at 8 weeks, is remarkably late and long after the PSP event. Most trials on large PSP use an immediate success rate; any delayed success is still assessed only a few days to a week post-PSP (10-18).

Moreover, we not at all sure that French PSP patients treated conservatively, without complete lung re-expansion, would be back at work as fast in these Australian and New Zealand men. The median time to radiographic resolution was 30 days (interquartile range, 25 - 54 days) for the conservatively-managed group and their median number of days off work was 6.0 (2 - 14). This trial design would not be applicable in real life in France.

There is yet another suggestion of an inclusion bias in the study of Brown *et al*.. The published recurrence rate in the conservative arm (8.8%) was significantly lower than that of the interventional arm (16.8%) (8). These rates seem very low, especially when compared to the 29% pooled one-year rate reported in a recent meta-analysis (3).

Our final, and perhaps most important point, concerns patient discharge. If the protocol is strictly followed, a PSP patient admitted to Emergency with a respiratory rate of 28/min, pulsed oxygen saturation of 91% in room air, and a mediastinal shift on chest X-ray, could be discharged and treated conservatively if he is stable after 4 hours! We would not feel very comfortable with such management.

We believe the main finding of this trial is that PSP is a benign condition, with a spontaneously favorable evolution. Any invasive strategy should therefore be subjected to a strict risk-benefit analysis.

A conservative management strategy could therefore be used for a very stable patient with slight dyspnea, provided the distance between the chest wall and lung margin is 3 or 4 cm at the hilum, or maybe slightly more. This should lead to revision of the definition of "small" PSP in the next few years.

The simple, easy-to-use material presently available should allow a minimally invasive strategy to be used for patients with a large PSP. Patients who can undergo rigorous surveillance could be eligible for ambulatory management after successful MA (10, 18) or with the small-size CTD connected to a one-way valve (14, 19-21), provided that the patient's safety is assured.

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French guidelines coordinated by the French-Speaking Respiratory Society (SPLF) in collaboration with the Emergency Medicine (SFMU), French Intensive Care (SRLF), Thoracic Surgery (SFCTCV), and Anesthesiology (SFAR) Societies are in preparation, and should be available in 2021.

Further studies are still needed to define the optimal management of first-episode PSP patients. Each of the four therapeutic options has its target population. Invasive management should be now prohibited for such a benign, frequent disease, as Brown et al. point out. Conservative management should be restricted to patients with perfect tolerance, whose PSP evolves favourably and rapidly, and for the moment, these patients are the one suffering from "small" PSP. A minimally invasive ambulatory strategy (i.e. MA or small-size CTD with one way valve) should be proposed for patients requiring prolonged lung re-expansion. And finally, surgery should be proposed to patients with high-risk recurrence PSP. We still need to improve our knowledge of the phenotypes / genotypes / endotypes of these patients so that we can choose wisely the best management for each individual patient. This is still science fiction but "May the Force be with us"!

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