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Primary spontaneous pneumothorax: French guidelines are ready for launching!

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In his « Traité du diagnostic des maladies des poumons et du cœur » [1], Laënnec described in 1819 the clinical findings of pneumothorax. Since then, more than 30 000 references have been indexed in PubMed with “pneumothorax” as a keyword [2]. Concurrently, the classification of pneumothorax, according to its mechanisms, has been refined, distinguishing spontaneous and traumatic pneumothoraces in the one hand, primary and secondary pneumothoraces in the other hand; the evolution of diagnostic methods, therapeutic strategies, and surgical approaches have led to the development of multiple guidelines.

Among these, those from the British Thoracic Society (BTS), issued in 1993 [3], provided a simple and easy to follow protocol for junior doctors and non-specialized physicians. Nearly ten years after, the American College of Chest Physicians (ACCP) Guidelines were developed [4]. The ACCP led a consensus conference based on a Delphi process supported by a rigorous and exhaustive literature search, and issued pragmatic guidelines, exploring definitions, diagnosis and therapeutic strategies according to the pneumothorax' abundance and tolerance. Meanwhile, the BTS updated and enriched its own documents in 2010 [5]. This version underlines the importance of a minimally invasive strategy (needle exsufflation) for primary spontaneous pneumothorax (PSP). Lastly, the European Respiratory Society gathered pulmonologists and surgeons to draft its guidelines in 2015 [6], after a thorough review of the literature. Altogether, these guidelines are heterogeneous regarding many aspects of pneumothorax' management.

In parallel, they are far from been followed by the medical community and care for pneumothoraces remains highly variable among centers. Contou et al. reported the responses of 178 European intensivists to 3 clinical scenarios [7]. Strikingly, needle aspiration was seldom used as first-line treatment for large PSP, by only 7% of the respondents. Habits regarding pleural drainage and suction, ultrasonography use, indication for, and timing of surgeon referral varied widely among respondents. In a multicenter retrospective study, performed in 14 French emergency departments (ED) [8], Kepka et al. described the management of 1868 spontaneous pneumothorax episodes. In this study, low rates of outpatient management or needle aspiration were observed (respectively in 10% and 1% of PSP).

Considering the low adherence to international guidelines in French settings, the French Language Respiratory Society (Société de Pneumologie de Langue Française – SPLF) invited

scientific societies involved in the care for PSP to develop French language guidelines: French Intensive Care Society (Société de Réanimation de Langue Française – SRLF), French Society of Thoracic and Cardiovascular Surgery (Société Française de Chirurgie Cardio-Thoracique et Vasculaire – SFCTCV), French Society of Emergency Medicine (Société Française de Médecine d’Urgence – SFMU), and French Society of Anesthesia and Intensive Care (Société Française d’Anesthésie et de Réanimation – SFAR).

The organizing committee gathered experts from these 5 Societies and 2 patients with a history of PSP. The experts first defined the questions with a PICO Methodology (Patients/Population, Intervention, Comparison, Outcomes) [9], and allocated each question to a group of experts. Then a rigorous literature search was performed according to the PICO questions. The bibliography was explored following the GRADE (Grading of Recommendation Assessment, Development and Evaluation) methodology [10], and a level of evidence was assigned to each study. Members of each group drafted recommendations, assigning them a strength based on the level of evidence. Each recommendation was submitted to the whole expert panel, to be rated on a numeric scale ranging from 1 (entirely disagree) to 9 (entirely agree), according to the GRADE AGREE methodology [10,11]. To be validated, a recommendation often has to collect 50% of experts’ agreements, and less than 20% of disagreement. For the present project, the recommendations meeting less than 70% of agreement were rephrased until reaching this threshold, thus defining a strong agreement.

These SPLF-led guidelines are now out (REFERENCE). They are unique for several reasons:

- The experts were gathered from 5 different scientific societies. To date, no other guideline led by the SPLF had gathered experts from so many disciplines. Members from different medical or surgical specialties worked together with the same aim: to improve patients’ care, and to disseminate evidence-based practices.
- Two patients provided their own input into the guidelines. In addition to their medical background, they also knew “from the inside” what the debates were about.
- Allied health professionals (ED and pre-hospital nurses) originating from the scientific societies were also associated and contributed to the different phases of the elaboration of these guidelines.
- The robust methodology used is also a strength. The experts relied on evidence-based data and high-quality literature to draft their proposals, and all the guidelines ultimately obtained a strong agreement.

Among these recommendations, some require a special attention as they diverge from the habits of many physicians [7,8], even though some are in line with former guidelines [5,6].

Regarding **diagnostic techniques**, the experts acknowledge the superiority of chest CT-scan over chest X-ray (CXR) to diagnose the PSP. Nevertheless, CXR remains, to date, the recommended technique, as it is both available 24/7 in all EDs across France, is less expensive and exposes to less radiations than CT-scans. The guidelines point the lack of data on the use of ultrasonography for PSP diagnosis, although it has been widely studied in traumatic pneumothorax.

The **therapeutic strategies** have been examined in light of the most recent international trials [12,13]. The experts have retained the indication of pleural evacuation for all symptomatic or large abundance PSPs (being an immediate needle aspiration in case of respiratory failure). Indeed, the recent data on conservative management [12] did not convince the experts. The conservative strategy actually reduced the number of procedures performed, the hospital length of stay, and the recurrence rates. Moreover, the rates of resolution of the PSP at 8 weeks was not inferior in the conservative management strategy. However, some raised some concerns about these results [14]: the inclusion rate was extremely low, suggesting an inclusion bias; the sensitivity analysis performed to handle the missing data rendered the trial negative; the median length of evolution, and the reduced intensity of the PSP symptoms were surprising. With regard to the evacuation technique, needle aspiration or chest tube drainage were considered as effective (in terms of recurrence, need for surgery or global satisfaction). The main difference relied on the costs and hospitalization rates reported with each strategy. Nevertheless, considering the recent data on ambulatory management of PSP [13,15–17], the experts considered that ambulatory management had to be encouraged, provided the patient's clinical status is stable, the outpatient care pathway is clearly identified and organized, and a reassessment of the patient is planned 24 to 48hrs after patient's discharge.

In case of chest tube drainage, the experts emphasized the need to comply with analgesia standards of care at its insertion and its removal; moreover, particular importance is placed on using small chest-tubes (≤ 14 French) to reduce complication rates. Before chest drain removal, the experts also stated on the relevance and usefulness of a 6 to 8hrs period of

free-flow, after the suction phase, in order to reduce the risks of pneumothorax recurrence after the removal.

Other relevant stages of PSP treatment are discussed, such as surgical approaches, analgesia strategies, and pre-hospital management. But a special attention is paid to the associated measures pulmonologists could use after a first episode of PSP. The experts suggest that every patient should consult a pulmonologist after a first pneumothorax, in order to screen for a risk factors of recurrence, or for an underlying respiratory disease. Smoking cessation must be highly encouraged, as it allows to reduce by 400% the risk of recurrence [18]. Despite of its high sensitivity, the experts did not advocate for a systematic chest CT-scan, with regard to its costs and irradiation, in the absence of clinical implication for the therapeutic or preventive strategy. Conversely, the clinical suspicion of an underlying respiratory disease dictates a chest CT-scan.

To summarize, these pragmatic guidelines are expected to be disseminated to all physicians involved in the PSP patients' care, from the pre-hospital settings to the long-term follow-up. The experts should be commended for their hard work, their strong clinical focus and their exhaustive consideration of published evidences.

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