Editorial

Surgical management of pneumothorax: still sailing with no compass

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Primary spontaneous pneumothorax is currently one of the most common diseases affecting young adults, with an incidence reported to be up to 22.7 per 1,000,000 people and more than a three time preference for male gender (1). To date, indications for surgical treatment of pneumothorax are quite well established (2,3), but the type of the technique used is still strictly related to surgeons' habits. In affected patients, surgery aims to resect the possible cause of air leak, namely blebs, bullae or any other types of the so-called emphysema-like changing (ECL) of the lung and to create adhesions between the lung and the parietal pleural in order to prevent any further lung collapse.

Dżeljilji and her colleagues (4) reported a prospective observational cohort study of 73 patients affected by primary spontaneous pneumothorax comparing outcomes of those treated with pleurectomy alone and those who received pleurectomy and apical wedge resection. Although authors found a statistically significant higher rate of recurrence in patients who received lung resection, they conclude that the two procedures have no differences in terms of efficacy and safety. It must be said that authors performed apical wedge resection only in patients with ECL [stage II, III or IV according to the Vanderschueren classification (5)], while they did not resect the lung in case no abnormalities were detected (Vanderschueren stage I), which might represent a selection bias.

A similar study was conducted by Czerny and colleagues (6) who retrospectively compared only patients in Vanderschueren stage I undergoing either pleurectomy alone or pleurectomy and apical wedge resection. Among 206 patients enrolled in their study, they found a significant lower recurrence rate for patients who received a wedge resection associated to partial pleurectomy. Concurrently, in 2015 the study protocol of a multicentric randomized trials comparing pleurectomy alone and pleurectomy associated to lung wedge resection was reported (7), but results have never been published so far.

The results of abovementioned studies seem to be inconsistent, but they actually reflect the lack of high-grade evidences on this topic. In particular two issues are still harshly debated: the role of apical resection, especially in case of Vanderschueren stage I patients, and the best pleurodesis technique to be used.

Resection of bullae, when present, seems to have some kind of protective effect on the development of recurrences and it has become a standard approach for all thoracic surgeons around the world, despite no high-grade evidences are currently supporting this procedure. In a retrospective study (8) of over 100 patients, multivariate analysis showed that resection of the apex is a protective factor for recurrences, also in case of non-evident ECLs; also other authors supported these conclusions (9). In our everyday clinical life, apical resection of the lung is often carried out also without the evidence of intraoperative macroscopic ECLs, in case unforeseen small bullae or air leak foci might be let in place; moreover inflammation

around the resection line might also increase the creation of adhesion between the lung and the parietal pleura. Moreover, a recent randomized trial (10) suggested the use of high resolution computed tomography (HRCT) to define the risk of recurrence based on the presence of ECLs after the first episode of pneumothorax; nonetheless some clinicians criticized these results emphasizing the risk related to radiation exposure. In a retrospective series (11), CT scan showed to have a good sensitivity but low specificity in detecting bullae and blebs. Nevertheless, neither clear clinical advantages nor difference in postoperative outcomes and recurrence rate have been found so far in patients who underwent preoperative CT scan; concurrently, all the available guidelines reserve CT scan only in case of complicated cases (2,3).

In addition, pleurodesis techniques are still matter of discussion among thoracic surgeons. To date the most used pleurodesis techniques are chemical pleurodesis, talc poudrage, pleural grattage and pleurectomy. A statement paper issued by ERS suggest talc poudrage as the cheapest and cost-effective procedures in case of surgical indication for pneumothorax owning the lowest recurrence rates among all the techniques, but this approach is still harshly debated due to possible long-term sequelae; nevertheless, Cardillo and his colleagues did not report any complication due to talc pleurodesis for PSP in a large cohort of more than 800 patients (12). On the other hand, a prospective study (13) found a significant impairment of pulmonary function tests after one year after talc poudrage for PSP; authors disclaimed the impossibility to prove the correlation with talc poudrage and the subclinical effects of the functional impairment. Concerning other pleurodesis techniques, in a systematic review of randomized controlled trials, Ling and his colleagues (14) reported that pleural abrasion seems to be safer than apical pleurectomy in terms of postoperative bleeding and postoperative chest pain with the same efficacy in preventing recurrences; nevertheless, a meta-analysis showed different results, finding a lower recurrent rate in patients treated with apical pleurectomy compared to studies investigating outcomes of pleural abrasion.

Despite different consolidated surgical techniques to treat patients affected by primary spontaneous pneumothorax, results of studies are usually inconsistent. The lack of solid, high-grade evidences allows surgeons to use their own traditional technique. Recently, some authors called into question even current indications, suggesting that surgery should be offered at the first episode (10). New randomized control trials are therefore necessary to standardize techniques and surgical approaches. It is very important to remember that PSP is a benign disease that affect young patients with excellent prognosis; treatment should therefore focus to solve the acute problem, reduce possibility of recurrence, but it should also limit as much as possible all the long term sequalae of a surgical procedure. A fundamental future target will be to find possible risk factors for recurrence in order to stratify patients and offering them a standardized, but personalized appropriate treatment (e.g., surgery after first episode for high risk patients). Lastly, VATS has gained the role of standard of care for the treatment of PSP. Recently, some evidences (15) suggested that uniportal VATS might allow a postoperative advantage in terms of chest pain compared to two or three ports VATS.

We do need more data to be used as a compass to safely sail toward our destination: reach a standardized and effective treatment to achieve the best quality of life with the lowest recurrence rate for patients with primary spontaneous pneumothorax.

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Footnote

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