Editorial

Is it time to reconsider the need for bullectomy in the surgical management of primary spontaneous pneumothorax?

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Primary spontaneous pneumothorax (PSP) is defined as pneumothorax in the absence of any identifiable underlying pulmonary or pleural disease. However, many of the patients who develop PSP are found to have blebs or bullae at the apex of the lung—so-called 'emphysema like changes' (ELC). Whilst there are clear guidelines defining when surgery is appropriate in the management of patients who develop PSP, the guidelines do not go so far as to define which procedure should be performed (1).

It is now generally the case that such surgery will be performed by a video-assisted thoracoscopic approach (VATS). There are two components to consider when managing patients with PSP: (I) wedge resection (bullectomy) of any ELC; (II) a procedure to promote obliteration of the pleural space and achieve pleurodesis—including pleurectomy, pleural abrasion or chemical pleurodesis.

The majority of studies in the literature describe patients who have undergone wedge resection, together with a procedure to achieve pleurodesis—commonly a pleurectomy. Through appraising the literature, you would infer that this is the standard approach to the management of patients with PSP (2,3).

The rationale for performing a bullectomy comes from the assumption that the blebs/bullae are the source of the air leak causing the original pneumothorax and will continue to expand and lead to further ruptures and pneumothorax in the future. In fact, there is some evidence that puts this assertion into question. Notably, the incidence of air leakage at ruptured blebs/bullae at the time of surgery varies from 3.6% to 73% suggesting that they may not always be the source of ongoing air leak (3).

Noppen has proposed an alternative explanation: 'pleural porosity' (4). In this hypothesis, ELC are suggested to a sign of background, diffuse, macroscopically occult pleuropulmonary changes, but there is an associated porosity of the apparently normal pleura through which air leaks. In support of this, air leak is seen in areas where there are no bullae/blebs on occasion. In support of this theory, Noppen *et al.* performed fluorescein-enhanced autofluorescence thoracoscopy and were able to identify areas of parenchymal abnormality independent of blebs/bullae (5). Interestingly, these abnormalities were not seen in control patients having not experienced pneumothorax.

Data that may provide some clinical evidence of this phenomenon comes from studies examining outcomes from pleurodesis and bullectomy alone. Tschopp *et al.* demonstrated that very good outcomes could be achieved with talc pleurodesis without any bullectomy—even in patients with bullae (6). However, patients with bullae >2 cm had a greater risk of recurrence suggesting that bullectomy may be important in the context of larger bullae.

The other angle towards the argument is data showing that bullectomy alone is inferior to addition of pleurodesis. Nakanishi *et al.* reviewed a series of patients who had undergone isolated bullectomy (7). The 10-year recurrence

rate was surprisingly high—27% in patients who had undergone isolated VATS bullectomy. Horio *et al.* (8) went further and compared patients who underwent bullectomy alone to those who additionally underwent pleurodesis. The recurrence rate was 16% for those undergoing bullectomy alone compared to 1.9% for those with additional pleurodesis. These studies raise the question as to the clinical efficacy of bullectomy alone for the management of PSP and therefore question whether bullae are the true source of the air leak. It is worth also commenting though, that there are recent studies reporting that neo-bullae develop at the staple line in patients following bullectomy for PSP (9,10). It may be that the increased recurrence rate of recurrence observed in the above studies reflects generation of neo-bullae that rupture.

If we follow the position of 'pleural porosity' being the cause of PSP, then the question that arises is: should bullectomy be performed at all? In a recent study Bilancia *et al.* suggest that this may not be required (unless there are bullae >2 cm seen) (11). In their study, they examined the histology and intraoperative findings of patients undergoing operation for PSP presenting either electively, or with ongoing air leak. There was no correlation between the presentation type and the presence of bullae/blebs, and a source of air leak was only found in 17% of patients presenting with ongoing air leak. Patients were seen with no blebs/bullae even in the group presenting with ongoing air leak. The authors propose that their data support the 'pleural porosity' theory and put into question the value or need for routine bullectomy—even in patients with blebs and small bullae.

In the current study in this issue by Dżeljilji *et al.* the optimal surgical management of patients with PSP is considered. In their series they compared patients who underwent pleurectomy ± wedge resection. The results were similar between the groups, although interestingly there was a significantly higher incidence of recurrence in the patients who additionally underwent wedge resection. Patients selectively underwent wedge resection if blebs/bullae were seen intraoperatively. The authors interpret their results to suggest that the efficacy of pleurectomy alone is equal to that of additional wedge resection.

Considering the literature, there does appear to be compelling evidence that the presence of blebs and bullae are not correlated with a presentation of PSP, and not performing a bullectomy is supported, when bullae <2 cm are seen. However, considering that bullectomy and pleurectomy has essentially become the standard operation for PSP, it would take a brave surgeon to ignore 1.5 cm apical bullae in a patient with recurrent pneumothoraces and just perform a pleurectomy.

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Footnote

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