Editorial

Air leaks: leave well enough alone

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Air leakage during and after surgery is a frequent problem encountered by the thoracic surgeon. The incidence of such a complication depends in part on the surgery performed. The incidence of prolonged air leaks is higher following lung volume reduction surgery (24–46% incidence) when compared with lobectomies (8.3%) and wedge resections (3.3%) (1,2). As it is associated with prolonged hospital stay and increased morbidity (3), many solutions have been developed.

Intra operative air leaks reflecting the duration of post-operative air leak (4), it is important to be able to minimize the leakage during the same intra operative time. Precisely, Suzuki *et al.* (5) have described a novel intraoperative closure method. The authors conducted an interesting *in vitro* experiment, maybe a preamble to a larger *in vivo* study. The double stapling method seems to be effective in *ex vivo* porcine lungs in terms of intra operative leakage. However, concerns that emerge from this technique are the following. First, additional stapling may, in itself, aggravates the air leaks by multiplying the risks of visceral pleura tears beyond the second stapling line, which will be subjected to greater tension. Moreover, Pan *et al.* have shown that postoperative air leaks were directly correlated to the stapling length (6). Secondly, this experiment only studied intraoperative air leakage. So, long-term results are not available. It would be interesting to know if this method, already increasing the local tension, is resistant to coughing efforts asked to the patients during postoperative period. Ishibashi *et al.* showed that just with extubation-related cough, about 67% of patients developed air leaks (7). Larger scale *in vivo* study would be needed to clarify this point. Third, the use of stapling has long been criticized as it can plicate lung parenchyma, resulting in loss of functional parenchyma and preventing lung re-expansion. This has been an issue particularly in segmentectomies. Several studies have compared the division of the intersegmental plane with the electrocautery versus stapling. The two methods seem similar in terms of postoperative complications and respiratory function (8,9), but if stapling allows a reduction in the hospital length of stay, it generates a defect of pulmonary re-expansion in 2.5% of cases at 1 month (10). At last, the method described by Suzuki *et al.* (5) is not applicable to pleural defect related to dissection or made outside the stapling area. It is therefore not a unique method but a useful complement to methods already described.

Several techniques have been developed in recent years, but none of them can completely eliminate all air leaks. Unfortunately, no solution is miraculous. Perhaps the best-known solution, Tachosil®, allows a reduction in intraoperative air leaks with a tendency to a reduction in postoperative leaks and a reduction in chest drainage time (11). This solution seems particularly suitable for minimally invasive surgery, which is not the case for the double stapling method. Another technique using Tachosil® has also been described. This is a technique where a Tachosil® patch is sutured in a different way depending on the type of air leaks observed intraoperatively (12). This technique would allow an arrest of air leaks in the worst case on the third day post operatively but with a hospital length of stay that remains important to reach a median of 6.5 days. Moreover, the use of sealant remains controversial with two prospective randomized studies concluding the opposite of each other

(13,14). One study concluded that there was a significant reduction in postoperative air leaks and in the mean length of hospital stay, while the other study concluded in an increase of post-operative air leaks and did not recommend this technique. At last, benefits of buttressing staplers with different materials remain controversial. Recently, a prospective randomized controlled study showed that bioabsorbable reinforcement sleeves were ineffective in reducing air leak duration after lobectomy for malignancy (15). To summarize, there are many techniques in the hands of the thoracic surgeon but all with limited success. The thoracic surgeon must therefore know all these techniques and choose the one best adapted to his patient, keeping in mind not to do worse.

To conclude, the authors should be thanked for adding a new method to our resources when intraoperative leakage along the staple line is observed. Though we agree with the authors that effective methods fighting per operative air leaks are needed, these techniques are to be used cautiously and conservative attitude should also be considered in order to preserve lung expansion.

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