A simple technique to avoid postoperative air leakages after right upper lobectomy

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Abstract

A simple technique to complete interlobar fissures during right upper lobectomy is described. After closing and sectioning the vein, the arteries and the bronchus, the residual lung is gently inflated to visualize the border with the upper lobe. The parenchyma is stapled (GIA 75) at the level of the first non-ventilated part of the upper lobe. This method allows placing the parenchymal stapler line in a fully non-ventilated zone. Since at this level there should be no air, no air leakages are expected during the postoperative course. This technique was performed in 15 patients undergoing right upper lobectomy and no postoperative air leakage was observed.

Keywords: Right upper lobectomy • Air leakages • Collateral ventilation • Pulmonary resection

Prolonged air leakages remain a frequent problem after major lung resections being experienced by 8–15% of the patients [1]. Although chronic obstructive pulmonary disease (COPD) is the leading risk factor, there are other preoperative and intraoperative predictive variables that might contribute to the development of persistent air leakages: age, infections, associated interstitial lung disease, diabetes mellitus, administration of induction therapy, malnutrition, tissue hypoxia, pleural adhesions, incomplete fissures, upper lobectomy and bilobectomy [2]. In particular, right upper lobectomy is at an increased risk of developing this complication, probably due to the high frequency of an incomplete minor fissure and the posterior aspect of the major one [3].

Several intraoperative measures have been attempted to reduce the incidence of this complication [4–6]: however, they have all been able to reduce, but not completely avoid, it. A meticulous surgical technique with a limited parenchymal dissection is certainly a key factor.

The use of an anterior fissureless technique that strongly reduces parenchymal dissection contributes to reduce the incidence of postoperative air leakages after right upper lobectomy [7, 8].

We describe a simple technique to complete fissures during right upper lobectomy to avoid postoperative parenchymal air leakages.

SURGICAL TECHNIQUE

Fissureless right upper lobectomies have been performed according to the technique previously described by other authors [7]: the chest cavity is approached through an anterior thoracotomy. After division of the upper branches of the pulmonary vein and the Boyden trunk, the upper lobe is retracted posteriorly to expose the ascending artery; when present, this artery is clipped, ligated or divided using vascular staplers. The bronchus is divided using a stapling device. At this point, in case the interlobar fissures are complete, the lobe can be easily removed. In case of an incomplete interlobar fissure, GIA staplers are usually employed approximately on the border of the lung to be removed. Instead of firing the stapler blindly on the borderline between the lobes, we prefer to gently manually inflate the residual lung parenchyma until the limit of the upper lobe is clearly evident. It is extremely important to avoid high airway pressures to prevent excessive opening of collateral channels, especially in COPD patients. "The parenchyma is stapled (GIA 75) at the level of the non-ventilated lung parenchyma". This usually happens within the first centimetre of the right upper lobe from the anatomical fissure line. This method allows placing the parenchymal stapler line in a fully non-ventilated zone. Since, at this level, no air should arrive from the residual lobe, no air leakages are expected during the postoperative course. The inferior pulmonary ligament is sectioned to avoid postoperative pleural spaces. A fluctuating middle lobe can be fixed to the lower lobe to avoid torsion. At the end of the procedure, the presence of air on submerging the lung under warm saline and inflating it to a pressure of 25–30 cm-H2O tests leaks. In case bubbles are present, every attempt is made to reduce the leakage. Two chest tubes are left and placed under suction for at least 24 h. The chest wall is closed as usual.

This technique was used in 15 consecutive patients with absent fissures between the upper lobe and the middle lobe (minor fissure) and lower lobe (posterior aspect of the major fissure) undergoing right upper lobectomy; in all cases at least 2 GIA 75 staple cartridges were required to complete the fissures. No air leakages were observed both intra- and postoperatively. Also, we did not observe any complication at the level of the parenchymal suture line (infection or ventilation problems).
COMMENT

The anterior fissureless approach has been repeatedly demonstrated to be superior to intrafissural dissection to reduce postoperative air leakages, shorten hospital stay and lower hospital costs [7, 8]. Our easy technique allows further improvement of outcomes, completely avoiding postoperative air leakages in this relatively small series of patients. Placing the suture line in a completely non-ventilated zone allows avoiding this complication. The small amount of upper lobe parenchyma left in place at the level of the suture line does not compromise the oncological value of the surgical procedure; this is certainly true for stage I or II lesions located within the right upper lobe. It could be more difficult in case of huge tumours growing close to the interlobar fissure. The operative time is usually not increased. The possibility of performing it also for lower and middle lobectomy as well as during thoracoscopic lobectomy should be investigated.

Conflict of interest: none declared.

REFERENCES