Conflict of interest: none declared.

References


eComment. Could we further prevent bronchopleural fistulas after pneumonectomy?

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We read with great interest the article by Toufektzian et al. regarding the relationship between postoperative mechanical ventilation and bronchopleural fistula (BPF) formation after pneumonectomy [1]. We congratulate the authors for their work and agree that every effort should be made to achieve the earliest possible extubation of the patient and that bronchial stump reinforcement is advisable in patients with a high risk for BPF. We would like only to add some comments which we think will be useful.

Apart from the role of pre-existing infection, we must not neglect the possible role of some other factors in fistula formation. One of them is the cancer invasion of the bronchial stump. There are reports which suggest that residual carcinoma may impair healing of the stump [2]. So we strongly recommend the fresh frozen section of the stump. There is also a risk after preoperative irradiation of the mediastinum and the hilar area [3] and/or induction chemotherapy [4]. If we are required to proceed to mechanical ventilation, we must not also neglect that, apart from bronchial stump reinforcement, we have some other options that may reduce the risk of BPF. Firstly, we can use a low volume-low pressure model on ventilator settings. Respiratory rates must also be set at less 20 breaths/min. These settings can limit shear forces on the bronchial stump and prevent the generation of auto-positive end-expiratory pressure. A tidal volume of 5 ml/kg maintains the peak inspiratory pressure (PIP) below the threshold for injury which is approximately 35–40 cmH2O [5]. We can also use a jet ventilation mode after ventilation instead of conventional ventilation. This mode has reduced tidal volumes and PIPs are less than PIPs of conventional mode of ventilation. Randomized studies have suggested a lower incidence of postoperative barotrauma during jet ventilation [5]. During the abovementioned options, one must be very gentle in the bronchial toilet in order to prevent the application of high pressure on the stump by the tip of the catheter. We have anecdotally used one lung ventilation in patients at high risk for BPF formation, with very good results. This can be applied: (a) by a double lumen endotracheal tube at the remnant main bronchus, under continuous supervision or (b) by a single lumen endotracheal tube which is inserted into the main bronchus of the remnant lung with broncho-volume low-pressure model on ventilator settings. We have previously highlighted this approach in the unique situation of a lung transplantation (LTx) [2, 3]. An important aspect unique to LTx is that the size of the transplanted lungs can differ significantly from the size of the recipient’s thoracic cavity. In a study of bilateral LTx recipients, tidal volumes during MV were substantially higher if the allograft was undersized compared to oversized allografts, when tidal volumes were indexed to donor predicted body weight (as an estimate of the actual size of the allograft) [2–4]. We recommend that the setting of the tidal volume in LTx should be based on donor characteristics (as a parameter of actual allograft size) [2–5].

Similarly, we would recommend utilizing a lung protective MV strategy that is based on the size of the remaining lung after a pneumonectomy. We believe that a lung protective strategy based on the physiology unique to a pneumonectomy minimizes the risk for ventilator induced lung injury of the remaining lung, minimizes barotrauma and the duration of MV.

Conflict of interest: none declared.

eComment. Postoperative mechanical ventilation for patients undergoing pneumonectomy

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We read with great interest the best evidence topic by Toufektzian et al. on postoperative mechanical ventilation (MV) predisposing to bronchopleural fistula (BPF) formation in patients undergoing pneumonectomy [1].

The authors concluded that the majority of the reported studies showed a significant relationship between MV after pneumonectomy and the occurrence of BPF and that every effort should be made to achieve extubation at the earliest possible time to withdraw the effects of the continuous barotrauma on the bronchial stump.

With this comment, we want to extend the discussion by highlighting that, if MV is needed after a pneumonectomy, a lung protective strategy that takes the unique physiology after pneumonectomy into account should be utilized.

We have previously highlighted this approach in the unique situation of a lung transplantation (LTx) [2, 3]. An important aspect unique to LTx is that the size of the transplanted lungs can differ significantly from the size of the recipient’s thoracic cavity. In a study of bilateral LTx recipients, tidal volumes during MV were substantially higher if the allograft was undersized compared to oversized allografts, when tidal volumes were indexed to donor predicted body weight (as an estimate of the actual size of the allograft) [2–4]. We recommend that the setting of the tidal volume in LTx should be based on donor characteristics (as a parameter of actual allograft size) [2–5].

Similarly, we would recommend utilizing a lung protective MV strategy that is based on the size of the remaining lung after a pneumonectomy. We believe that a lung protective strategy based on the physiology unique to a pneumonectomy minimizes the risk for ventilator induced lung injury of the remaining lung, minimizes barotrauma and the duration of MV.

Conflict of interest: none declared.

References


