



Extrapleural pneumonectomy for malignant pleural mesothelioma: a steep climb

Maurizio V. Infante¹, Riccardo Giovannetti¹, Cristiano Benato¹, Cinzia Bonadiman¹, Barbara Canneto¹, Giovanni Falezza¹, Alessandro Lonardoni¹, Paola Gandini¹, Sara Pilotto², Antonio Santo³

¹Department of Thoracic Surgery, University and Hospital Trust - Ospedale Borgo Trento, P.le A. Stefani, 1 - 37126 Verona, Italy; ²Medical Oncology Department, University of Verona, Verona, Italy; ³Medical Oncology Department, University and Hospital Trust, Verona, Italy

Correspondence to: Maurizio V. Infante, MD. Head of Thoracic Surgery Department, University and Hospital Trust - Ospedale Borgo Trento, P.le A. Stefani, 1 - 37126 Verona, Italy. Email: maurizio.infante@aovr.veneto.it.

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This brief how-to-do-it article by Galetta *et al.* (1) from a high volume center with great expertise underscores several key technical and strategic factors about the surgical management of malignant pleural mesothelioma in a multidisciplinary environment. The authors focus on their surgical technique for extrapleural pneumonectomy (EPP) as a means of achieving maximal cytoreduction as part of a trimodality treatment strategy.

The steps they describe are in part original in that a lateral approach with a muscle sparing incision is advocated rather than the classic posterolateral thoracotomy to perform EPP, with the potential of reducing surgical trauma. Proper exposure of the insertions of the diaphragm requires a second thoracotomy in the 7th intercostal space to facilitate the dissection of the parietal pleura off the unaffected parts of the diaphragm, and resection of its central portion. Adding a second thoracotomy in the 7th interspace will, however, add to surgical trauma. Possible alternative surgical routes may be median sternotomy or a hemi-clamshell incision that are however also quite traumatic and seldom used.

It is generally possible to preserve the peripheral portion of the diaphragm thereby reducing the size of the defect to be reconstructed. A good diaphragmatic reconstruction is important, especially on the left side where there is no liver to form a barrier, and abdominal organ herniation may be a threat. There is no data available about whether removing the diaphragmatic insertions will reduce the risk of local

recurrence, and vice-versa. The central portion of the diaphragm needs to be routinely resected as sparing it may leave macroscopic residual disease behind in approximately 70% of the cases and nullify the effort of such an extensive procedure as EPP. Opening of the peritoneal space does not seem to be associated with a higher risk of peritoneal recurrence (2).

Resection of the pericardial sac will always require a prosthetic patch reconstruction on the right side to avoid the risk of cardiac herniation with torsion of the venae cavae, while on the left side pericardial reconstruction may be omitted as cardiac herniation has little consequences if the pericardium has been left wide open.

Many materials have been proposed for diaphragmatic and pericardial reconstruction. As the Authors suggest, bovine pericardium is most convenient as it is easily handled, thin and robust; because it is a biological patch, it is widely accepted that it will be less prone to infection. However even bovine pericardium is not immune from becoming contaminated and infected, as it is for any non-viable tissue reconstruction.

Infection of the pleural space is a significant and relatively frequent complication after EPP and can occur with or without bronchial stump dehiscence up to 24 months after surgery (3-6).

Postoperative radiotherapy and extensive dissection around the main stem bronchus with consequent loss of microvasculature may be contributing factors, but this issue

has not been thoroughly investigated. The only factor that was statistically associated with pleural sepsis after EPP in our series was right-sided procedure (5).

The authors rightly underline that EPP should be performed in specialized centers only as you need high-level expertise to monitor the postoperative course of these patients and handle deviations appropriately in a timely fashion.

Surgeon's expertise and case volume will obviously contribute to reducing risks, nonetheless surgical trauma, postoperative complications and long-term sequelae of EPP have been significant for a high percentage of patients as only about 50% of them could complete a full trimodality therapy course with EPP in several prospective and retrospective studies (5-9).

Whether any form of maximal cytoreduction for MPM is beneficial will need to be confirmed in randomized trials. Pleurectomy-decortication may be a better alternative procedure as part of multimodality regimens as it seems to be associated with similar oncological results and less impact on the quality of life of these patients (10-12).

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References

1. Galetta D, Spaggiari L. Extrapleural Pneumonectomy. *Shanghai Chest* 2017;1:32.
2. Sharkey AJ, Bilancia R, Tenconi S, et al. The management of the diaphragm during radical surgery for malignant pleural mesothelioma. *Eur J Cardiothorac Surg* 2016;50:311-6.
3. Lang-Lazdunski L, Bille A, Lal R, et al. Pleurectomy/decortication is superior to extrapleural pneumonectomy in the multimodality management of patients with malignant pleural mesothelioma. *J Thorac Oncol* 2012;7:737-43.
4. Schipper PH, Nichols FC, Thomse KM, et al. Malignant pleural mesothelioma: surgical management in 285 patients. *Ann Thorac Surg* 2008;85:257-64; discussion 264.
5. Infante M, Morengi E, Bottoni E, et al. Comorbidity, postoperative morbidity and survival in patients undergoing radical surgery for malignant pleural mesothelioma. *Eur J Cardiothorac Surg* 2016;50:1077-82.
6. Casiraghi M, Maisonneuve P, Brambilla D, et al. Induction chemotherapy, extrapleural pneumonectomy and adjuvant radiotherapy for malignant pleural mesothelioma. *Eur J Cardiothorac Surg* 2017;52:975-81.
7. de Perrot M, Feld R, Cho BC, et al. Trimodality therapy with induction chemotherapy followed by extrapleural pneumonectomy and adjuvant high-dose hemithoracic radiation for malignant pleural mesothelioma. *J Clin Oncol* 2009;27:1413-8.
8. Van Schil PE, Baas P, Gaafar R, et al. Trimodality therapy for malignant pleural mesothelioma: results from an EORTC phase II multicentre trial. *Eur Respir J* 2010;36:1362-9.
9. Weder W, Stahel RA, Bernhard J, et al. Multicenter trial of neo-adjuvant chemotherapy followed by extrapleural pneumonectomy in malignant pleural mesothelioma. *Ann Oncol* 2007;18:1196-202.
10. Taioli E, Wolf AS, Flores RM. Meta-analysis of survival after pleurectomy decortication versus extrapleural pneumonectomy in mesothelioma. *Ann Thorac Surg* 2015;99:472-80.

11. Cao C, Tian D, Park J, et al. A systematic review and meta-analysis of surgical treatments for malignant pleural mesothelioma. *Lung Cancer* 2014;83:240-5.
12. Rena O, Casadio C. Extrapleural pneumonectomy for early stage malignant pleural mesothelioma: a harmful procedure. *Lung Cancer* 2012;77:151-5.

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