

Artigo



Videotoroscopia para metástase pulmonar VATS for Pulmonary Metastases

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Resumo

Os pulmões são locais muito comuns para metástases de malignidades epiteliais e mesenquimais. Embora nenhum ensaio randomizado tenha sido realizado para demonstrar o benefício da cirurgia nesse cenário, muitos estudos mostraram uma melhora na sobrevida dos pacientes submetidos à cirurgia em comparação à terapia sistêmica isolada. A cirurgia é recomendada em pacientes selecionados que atendem às seguintes condições: A) tumor primário tratado e controlado, B) biologia da doença geralmente favorável, C) ressecção completa pode ser alcançada, D) ausência de doença em locais extratorácicos, E) terapia cirúrgica discutida com a equipe multidisciplinar. Embora a ressecção por VATS seja atualmente o padrão ouro no tratamento do câncer de pulmão, existe muita controvérsia sobre se a videotoroscopia deva ser realizada para metástases pulmonares. Embora a videotoroscopia seja menos invasiva e permita uma recuperação mais rápida do paciente, não permite uma palpação completa dos pulmões no momento da cirurgia. Ao avaliar pacientes com metástases pulmonares, o cirurgião torácico deve discutir com o paciente que a cirurgia faz parte de uma abordagem multidisciplinar para controlar a progressão da doença. Além disso, com a rápida evolução de terapias direcionadas e imunoterapia, uma discussão com a oncologia médica pode ser muito útil.

Descritores: metastasectomia pulmonar, videotoroscopia, cirurgia, metástase pulmonar.

Abstract

The lungs are very common site for metastatic disease from epithelial and mesenchymal malignancies. Although no randomized trials have been performed to demonstrate the benefit of surgery in this setting, many studies have shown an improved survival of patients undergoing surgery vs. systemic therapy alone.

Surgery is recommended in selected patients meeting the following conditions: A) primary tumor treated and controlled, B) biology of disease generally favorable, C) complete resection can be achieved, D) absence of disease in extra-thoracic sites, E) Surgical therapy discussed with multi-disciplinary team.

While VATS resection is currently gold standard in the treatment of lung cancer much controversy exists of whether minimal invasive surgery or open surgery should be performed for lung metastases. While VATS procedures are certainly less invasive and allow for more rapid patient recovery, it does not allow for a full palpation of the lungs at the time of surgery.

When evaluating patients with pulmonary metastases, thoracic surgeons should discuss with patient that surgery is part of multi-disciplinary approach in order to control the disease progression. Furthermore, with the rapidly and evolving growth of targeted therapies and immunotherapy, a discussion with medical oncology can be very helpful.

Keywords: pulmonary metastasectomy, videothoracoscopy, surgery, pulmonary metastases.

The lungs are very common site for metastatic disease from epithelial and mesenchymal malignancies and Thoracic surgeons play a very important role in the care of these patients. Typically, prognosis is dependent on several factors. The most important ones are described below:

1) Primary tumor: The type of malignancy can greatly influence prognosis. Germ cell tumors, papillary thyroid cancer and breast cancers have the best 5-year survival (80%), followed by colorectal cancer (40%), sarcomas (30%) and melanoma (20%). Other epithelial malignancies such as esophageal, gastric and pancreatic cancers have dismal long-term survival.

2) Disease free interval: The time from diagnosis of the primary tumor to the development of lung metastases greatly influence prognosis. Patients developing lung disease within 12 months of diagnosis of primary tumor have significantly worse prognosis compared to patients taking more than 2 years to develop metastases

3) Number of lesions: Although no specific cut-offs can be established, patients with more than 3 lesions specially in bilateral location tend to have worse prognosis. However, the "biology" of the disease seem to have a larger influence in prognosis than number of lesions itself. For example, patients with 2 or 3 lesions with a fast growth may have significantly worse prognosis compared to patients with 20 lesions but very indolent behaviour. This is the situation of pulmonary metastases from adenoid cystic carcinomas or some types of sarcomas.

4) Extra-Thoracic or nodal involvement: The involvement of extra-thoracic sites or nodal metastases is invariably a sign of worse prognosis. One exception to that are patients with colorectal cancer lung metastases where liver involvement does not adversely impact 5-year survival as long as this organ can also be treated effectively with surgery or other local modalities such as stereotatic radiation or radio frequency ablation. Nodal metastasis is generally a contra-indications for surgery, although some authors still consider resection and complete lymphadenectomy in patients with colorectal metastases – notably knowing the prognosis is worse in that scenario.

5) Resectability: For some malignancies, the ability to completely resect all lung lesions with clear margins allows for an improved prognosis.

When surgery is recommended?

Surgery when recommended, is part of a multi-disciplinary approach in the care of these patients with systemic disease. Currently, thoracic surgeons may perform surgery for 3 indications in this population:

1) Therapeutic metastasectomy: this is the most common indication for surgery. Although no randomized trials have been performed to demonstrate the benefit of surgery in this setting, many studies have shown

an improved survival of patients undergoing surgery vs. systemic therapy alone. A typical example are studies of colorectal cancer or sarcoma showing 5-year survival of 30-40% in surgical series compared to less than 10% survival in systemic therapy alone. However, a significant selection bias (patients with more favorable disease are the ones generally selected for surgery) prevent us to make strong recommendations in favor of surgery. Nonetheless, with data currently available, surgery is recommended in selected patients meeting the following conditions: A) primary tumor treated and controlled, B) biology of disease generally favorable, C) complete resection can be achieved, D) absence of disease in extra-thoracic sites (some exceptions apply – see above), E) Surgical therapy discussed with multi-disciplinary team.

Favorable biology can often be determined by the absence of new lung lesions in a 3-month interval CT and absence of fast growth of previously identified lesions.

2) Diagnostic metastasectomy: In some instances, patients with indeterminate pulmonary nodules in the context of another malignancy may need confirmation of metastatic disease to guide further treatments. When CT guided biopsy is not possible or unlikely to provide sufficient material for pathology tests, surgical resection of lung lesions may be required. Additionally, with the broader use of targeted therapies and immunotherapy, we are often seeing patients with excellent response to multiple lung nodules but the presence of residual disease in one or two nodules. Removal of those can provide important information of tumor mutations or resistant clones which may further guide proper therapies.

3) Metastasectomy for tissue collection for tumor-infiltrating lymphocytes treatments: Adoptive cell therapy using tumor-infiltrating lymphocytes is one of the most effective treatment for patients with metastatic melanoma. In vitro, therapeutic tumor-infiltrating lymphocytes are isolated from tumor tissue and cultured with lymphokines such as interleukin-2; the therapeutic lymphocytes are then infused into the patient, where, after re-infiltration of the tumor, they may induce lysis of tumor cells and prevent tumor progression.

Type of surgery: VATS vs. Thoracotomy?

While VATS resection is currently gold standard in the treatment of lung cancer much controversy still exists of whether minimal invasive surgery or open surgery should be performed in the context of lung metastases. The main reason being the fact that while VATS procedures are certainly less invasive and allow for more rapid patient recovery, it does not allow for a full palpation of the lungs at the time of surgery. It is well known that CT scans can miss about 20% of pulmonary nodules discovered during thoracotomy examination of the lungs. However, this is less likely to occur in the new generation

CT scans with high resolution and smaller cuts. In our experience, is extremely important to review images together with a thoracic radiologist prior to surgery. We have noted that more lesions are commonly found. Finally, the likelihood of missing nodules during VATS is highly dependent on the number nodules identified on CT scan. Some studies have demonstrated that while patients with only one nodule identified on pre-op CT scan rarely would have additional lesions found in surgery, patients with 3 or more lesions in bilateral location on CT will have almost 100% chance of more lesions being identified during surgery. Thus as general guidance, patients with 3 or less lesions in the periphery of the lungs, VATS is an acceptable approach while patients with multiple lesions, thoracotomy may be of preference to allow full lung palpation and identification and removal of additional lung lesions. When deeper lesions are present, strategies for localization during VATS are recommended. Our institution commonly use micro-coil insertion just prior to surgery with success. Finally, hybrid approaches using non-rib sparing thoracotomies (Figure 1) may allow achieving the benefit of both techniques.



Figure 1. Hibrid VATS approach allowing palpation of lung parenchyma and search for non-imaged pulmonary nodules.

Surgery vs. Stereotatic Radiation for Treatment of Pulmonary Metastases

Whereas surgery is still the more practiced approach as a local therapy for pulmonary metastases, stereotatic therapy or SBRT has emerged as a powerful non-surgical approach treating these patients. The initial experience with SBRT was with the treatment of early stage lung cancer, however this method has rapidly expanded in lung metastases arena. Most studies have demonstrated ~80% local control in the treated nodule, although demonstration of local recurrence sometimes can be a challenge with some changes on CT being attributed as "radiation fibrosis". In general terms, surgery is still considered the gold standard treatment. The following clinical scenarios represent situations when SBRT should be considered:

- 1) Patients with significant medical comorbidities leading to high risk of complications after surgery
- 2) Lesions located deeply in the lung parenchyma where a lobectomy is required for complete resection
- 3) Patients with bilateral disease where bilateral

surgery could be prevented by treating one side solely with SBRT.

Other important considerations:

When evaluating patients with pulmonary metastases, thoracic surgeons should discuss with patient that surgery is part of multi-disciplinary approach in order to control the disease progression. Furthermore, with the rapidly and evolving growth of targeted therapies and immunotherapy, a discussion with medical oncology can be very helpful. As a good representative example, patients with metastatic melanoma are now rarely treated with surgery due to significant improvement in systemic therapies leading to better outcomes compared to metastasectomy alone.

Referências

1. Cerfolio RJ, Bryant AS, McCarty TP, Minnich DJ. A prospective study to determine the incidence of non-imaged malignant pulmonary nodules in patients who undergo metastasectomy by thoracotomy with lung palpation. *Ann Thorac Surg.* 2011 Jun;91(6):1696-700.
2. Chung CC, Hsieh CC, Lee HC, Wu MH, Huang MH, Hsu WH, Hsu HS. Accuracy of helical computed tomography in the detection of pulmonary colorectal metastases. *J Thorac Cardiovasc Surg.* 2011 May;141(5):1207-12.
3. Cheang MY, Herle P, Pradhan N, Antippa P. Video-assisted thoracoscopic surgery versus open thoracotomy for pulmonary metastasectomy: a systematic review. *ANZ J Surg.* 2015 Jun;85(6):408-13
4. Casiraghi M, De Pas T, Maisonneuve P, Brambilla D, Ciprandi B, Galetta D, Borri A, Gasparri R, Petrella F, Tessitore A, Guarize J, Donghi SM, Veronesi G, Solli P, Spaggiari L. A 10-year single-center experience on 708 lung metastasectomies: the evidence of the "international registry of lung metastases". *J Thorac Oncol.* 2011 Aug;6(8):1373-8