Role of Extraretroperitoneal Surgery in Patients with Metastatic Germ Cell Tumors

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KEYWORDS

• Testicular cancer • Extraretroperitoneal • Metastasis • Survival • Surgery • Germ cell tumor

KEY POINTS

- Discordance, in varying degrees, exists between retroperitoneal pathology and histology from extraretroperitoneal sites.
- Surgery for extraretroperitoneal disease (especially pulmonary and hepatic) can be morbid, with a mortality risk as high as 2%.
- In patients with known teratoma or viable germ cell tumor metastasis, all visible extraretroperitoneal disease should be resected.
- In patients with necrosis in the retroperitoneum, extraretroperitoneal disease should be excised if feasible, although surveillance represents an alternative strategy for select patients.
- An individualized surgical approach should be made based on metastatic pattern, prior disorders, patient factors, and institutional considerations.

INTRODUCTION

Approximately half of patients with testicular germ cell tumors (GCTs) present with metastasis. Metastatic spread to the retroperitoneum (RP) is most common, although extraretroperitoneal (ERP) sites are involved in approximately 40% of patients with advanced disease.[1,2] Systemic therapy is efficacious in treating ERP disease, although these masses can persist or recur after initial chemotherapy in up to 35% of patients.[3] In the setting of normal serum tumor markers, resection of ERP masses is favored rather than additional chemotherapy because of its efficacy against teratoma, its side effect profile, and its ability to provide a pathologic diagnosis, which can help guide further therapy. In patients who have residual ERP masses despite salvage chemotherapy, resection can represent the best chance (and sometimes the only chance) for durable survival.

Treating patients with ERP disease can be difficult given the diverse clinical, anatomic, and pathologic spectrum. Although some clinicians advocate removing all residual disease, others think that surgery can be tailored based on available pathology. The morbidity of ERP surgery must also be considered, especially in patients with underlying medical disease. Lung and liver resections carry an operative mortality greater than that seen after postchemotherapy (PC) retroperitoneal lymph node dissection (RPLND), which underscores the high-risk nature of ERP surgery. In addition, the optimal timing of surgery and combining ERP with PC-RPLND can vary widely

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and requires a multidisciplinary team with experience in treating advanced disease. This article reviews the role of ERP surgery in metastatic testicular cancer, including discussions on the patterns of metastasis, pathology at ERP sites, surgical considerations, and outcomes after surgery.

PATTERNS OF DISEASE

When treating patients with metastatic GCT, an understanding of the typical patterns of disease is required. The lymphatic drainage from the RP plays a major role in determining this pattern, with the para-aortic and paracaval lymphatics draining behind the crura of the diaphragm to the middle mediastinum. The middle mediastinum is therefore the most common mediastinal compartment involved with GCT and is divided into 3 regions (Fig. 1A). Spread to the anterior and posterior compartments (see Fig. 1B) likely occurs with lymphatic obstruction and retrograde flow. Kesler and colleagues[4] confirmed this finding by reviewing 268 patients with metastatic mediastinal GCT, in whom the anterior and posterior compartments were only involved if concurrent with middle mediastinal disease. Isolated anterior mediastinal disease should raise suspicion for primary mediastinal GCT. After lymphatics drain from the RP to the middle mediastinum, they flow to the left supraclavicular region, where the thoracic duct enters the left subclavian vein.

Wood and colleagues[5] evaluated the pattern of metastases in 31 patients with testicular GCT, providing clinical validation of this drainage pattern. Neck metastases were more often seen with seminomatous compared with nonseminomatous GCT (NSGCT) (91% vs 65%), and most of these metastases (91%) were on the left side. Mediastinal lymphadenopathy was common in both groups, although it was more often combined with neck disease in patients with seminoma (55% vs 10%). This study confirmed the understanding of more predictable lymphatic spread of seminoma. Hematogenous dissemination of NSGCT was more common and was reflected in the higher rates of lung metastases seen in NSGCT (40% vs 9%). The hematogenous nature of metastases in the lung (and also liver) can manifest as more multifocal disease, which can have implications when planning ERP surgery.

Fizazi and colleagues[6] described the distribution of 126 ERP masses resected in patients who relapsed after cisplatin therapy. The lung (52%) was most commonly involved, followed by the mediastinum (28%), cervical nodes (7%), liver (4%), bone (1.6%), and brain (0.8%). Masterson and colleagues reviewed the sites of disease in 130 patients and found a similar distribution (lung in 68%, mediastinum 29%, liver 13%, neck 12%).[3]

PATHOLOGY

Extraretroperitoneal Disease

After chemotherapy, residual ERP disease is generally in one of 3 pathologic groups, as it is in PC-RPLND specimens: necrosis/fibrosis, teratoma, or viable GCT. Ideally, only patients with

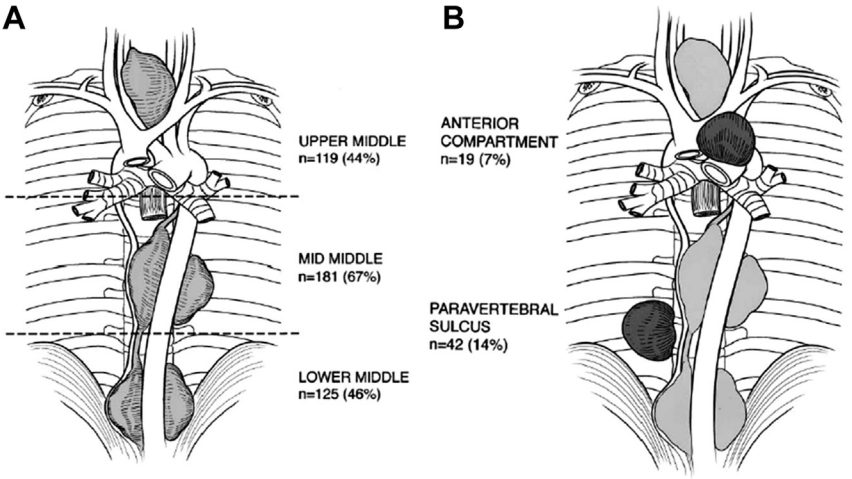

Fig. 1. (*A*) Middle mediastinum divided into 3 compartments: upper, thoracic inlet to carina; mid, carina to dome of the diaphragm; lower, dome of diaphragm to diaphragmatic crura. The distribution of middle mediastinal metastases in a series from Kesler and colleagues[4] including 268 patients is given for each compartment. (*B*) Metastasis in the paravertebral sulcus and anterior mediastinum occurs much less frequently. In the series by Kesler and colleagues,[4] these lesions always occurred in cases in which middle mediastinal metastases were also present. (*From* Kesler KA. Surgical techniques for testicular nonseminomatous germ cell tumors metastatic to the mediastinum. Chest Surg Clin N Am 2002;12(4):751–52; with permission.)

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