Anesthetic Management of Invasive Retroperitoneal Leiomyosarcoma: A Case Report

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Introduction: Surgical resection of invasive retroperitoneal tumors can be associated with significant morbidity and mortality. Extension of tumor into the right atrium often necessitates the initiation of extra-corporeal hemodynamic support for resection, while intrahepatic inferior vena cava (IVC) involvement is associated with mobilization of the liver and the need for vascular cross clamping and/or an alternate method of diverting blood flow. Significant blood loss can be expected along with major shifts in volume status. Tumor related cardiac complications including right ventricular dysfunction, tachyarrhythmia, and thromboembolic events contribute to patient risk. Similarly, physiologic changes associated with hepatic cross clamping, including decreased venous return and cardiac output, can cause significant hypotension and predispose the patient to ischemic injury. While veno-venous bypass (VVB) may avoid these complications, cannula placement comes with its own set of risks. Given the dynamic nature of these cases, anesthetic management requires not only a firm understanding of complex physiology, but the skillful interpretation of transesophageal echocardiogram (TEE) to help guide surgical decision making.

Case Report: A 50-year-old female with biopsy proven retroperitoneal leiomyosarcoma with involvement of the right hemi-liver, kidney, and inferior vena cava presented for radical resection. Her past medical history was notable for recurrent deep vein thrombosis and multiple pulmonary emboli, as well as previous neoadjuvant chemotherapy to reduce her tumor burden. Her preoperative examination was negative for active cardiac history, while preoperative transthoracic echocardiogram was normal. A multidisciplinary surgical team coordinated her operative procedure, while her anesthetic management was led by fellowship trained cardiothoracic and solid organ transplant anesthesiologists. As the nature and location of her tumor was expected to require a complete inferior vena cava cross-clamp at the level of the right atrium, extra-corporeal hemodynamic support with VVB via the internal jugular vein and femoral vein was planned. During the procedure, TEE helped guide the surgical course, confirming a lack of right atrial involvement, allowing for avoidance of bypass. An en bloc resection of suprarenal IVC and with graft reconstruction was performed, along with a right hemihepatectomy and resection of the caudate lobe. Despite significant blood loss, the patient tolerated the procedure well. She was weaned off all vasopressors immediately upon arrival to the ICU and was extubated that same evening without any complications.

Discussion: Retroperitoneal tumors carry a high risk of extension to the major vasculature and solid organs of the abdomen, as well as the possible invasion of the right heart. Although preoperative imaging can provide the basis for surgical planning, intraoperative TEE has the ability to confirm previous studies or alternatively alter the surgical course. In the case of our patient, both CT and MRI made no mention of IVC involvement, while TTE could not reliably confirm avoidance of the
right atrium, leading to preparations for VVB. Once intraoperative verification was obtained, the case could proceed avoiding the cost and physiologic effects of VVB. Similar to the multidisciplinary surgical team, the combined skill set employed by TEE trained cardiothoracic anesthesiologist, along with the extensive understanding of vascular physiology possessed by liver transplant anesthesiologist significantly contributed to delivery of safe and successful patient care.