OPEN ACCESS Freely available online

Journal of Clinical & Experimental Cardiology

Commentary

# Surgical Management Strategies for Primary Aortic Tumors

**Matthew Limongelli***

*Department of Cardiology, University of Sao Paulo, Sao Paulo, Brazil*

## DESCRIPTION

Primary aortic tumors are exceedingly rare and often aggressive malignancies that originate from the cells of the aortic wall. These tumors, most commonly sarcomas, pose a significant diagnostic and therapeutic challenge due to their nonspecific symptoms, aggressive behavior, and the complexity of their anatomical location. The mainstay of treatment remains surgical resection, which is often the only potentially curative option. However, surgical intervention for primary aortic tumors requires careful planning, multidisciplinary coordination, and the integration of both conventional and advanced vascular surgical techniques. This article explains the various surgical management strategies employed in the treatment of primary aortic tumors, focusing on preoperative evaluation, surgical approaches, intraoperative considerations, and postoperative care.

Advanced imaging techniques such as Computed Tomography (CT), Magnetic Resonance Imaging (MRI), and Positron Emission Tomography (PET) play a key role in defining the extent of the tumor, involvement of adjacent structures, and distant metastasis. It is essential to distinguish primary tumors from other aortic pathologies such as aneurysms, thrombi, or metastatic lesions.

Once the diagnosis is suspected or confirmed through imaging and, when possible, biopsy, a multidisciplinary team including vascular surgeons, cardiothoracic surgeons, oncologists, and radiologists must collaborate to plan the surgical intervention. The primary goal of surgery is complete en bloc resection of the tumor with clear margins. Achieving negative margins is critical for improving long-term survival, though it is often difficult due to the tumor's proximity to vital organs and blood vessels.

The surgical approach depends largely on the tumor's location along the aorta. Primary aortic tumors may arise in the thoracic or abdominal segments, and each location presents unique challenges. For thoracic aortic tumors, particularly those involving the ascending aorta or arch, a median sternotomy is typically performed, sometimes in combination with cardiopulmonary bypass and deep hypothermic circulatory arrest. These techniques allow for temporary cessation of blood flow to the brain and upper body, creating a bloodless field for meticulous tumor resection and aortic reconstruction. In cases involving the descending thoracic aorta, a left thoracotomy may be employed.

In abdominal aortic tumors, a transperitoneal or retroperitoneal approach may be utilized depending on tumor size, extent, and surgeon preference. Mobilization of surrounding structures such as the duodenum, inferior vena cava, and renal arteries is often necessary to access and resect the tumor safely. In either case, careful dissection is required to avoid inadvertent injury to adjacent vital organs. Intraoperative management also involves hemodynamic monitoring, blood conservation strategies, and often the use of extracorporeal circulation. Cardiopulmonary bypass may be necessary in thoracic cases, and in select situations, temporary shunts or partial bypass may be used to maintain perfusion during resection. Meticulous attention to hemostasis is crucial, as bleeding complications are common due to the rich vascular supply and friable nature of the tumor tissue.

Postoperative care following aortic tumor resection is intensive and requires close monitoring in a high-dependency or intensive care setting. Common complications include bleeding, graft thrombosis, infection, renal dysfunction, and neurologic deficits. Anticoagulation protocols vary depending on the reconstruction and presence of prosthetic grafts. Infections involving vascular grafts are particularly concerning, as they can be life-threatening and may necessitate additional surgical interventions.

Given the high rate of recurrence, many surgical strategies are paired with adjunctive treatments such as chemotherapy or radiotherapy. However, the evidence for their efficacy is limited due to the rarity of these tumors and the lack of large clinical trials. Some studies suggest that chemotherapy may offer modest benefit, particularly in cases of intimal sarcoma, the most common histological subtype. Radiotherapy may be used in select cases for local control, especially when complete resection is not feasible or margins are positive. In recent years, advances in surgical technology, improved imaging, and a better understanding of tumor biology have contributed to more refined and individualized surgical strategies. The development of hybrid operating rooms, intraoperative navigation systems, and real-time imaging enhances the precision of tumor resection

**Correspondence to:** Matthew Limongelli, Department of Cardiology, University of Sao Paulo, Sao Paulo, Brazil, E-mail: matthew.limongelli08@gmail.com

**Received:** 31-Mar-2025, Manuscript No. JCEC-25-37953; **Editor assigned:** 02-Apr-2025, PreQC No. JCEC-25-37953 (PQ); **Reviewed:** 16-Apr-2025, QC No. JCEC-25-37953; **Revised:** 23-Apr-2025, Manuscript No. JCEC-25-37953 (R); **Published:** 30-Apr-2025, DOI: 10.35248/2155-9880.25.16.948

**Citation:** Limongelli M (2025). Surgical Management Strategies for Primary Aortic Tumors. J Clin Exp Cardiolog. 16:948.

and reconstruction. Additionally, molecular and genetic profiling of tumors may eventually guide personalized surgical and systemic treatment plans.

## CONCLUSION

In conclusion, surgical management remains the cornerstone of treatment for primary aortic tumors. Though technically challenging, aggressive surgical resection offers the best hope for prolonged survival and potential cure. Success depends on early diagnosis, meticulous preoperative planning, advanced surgical expertise, and coordinated multidisciplinary care. As knowledge about these rare tumors continues to evolve, so too will the surgical strategies that offer patients the best possible outcomes.