

Resection of a Dopamine Secreting Paraganglioma Overlying the Left Main Coronary Artery

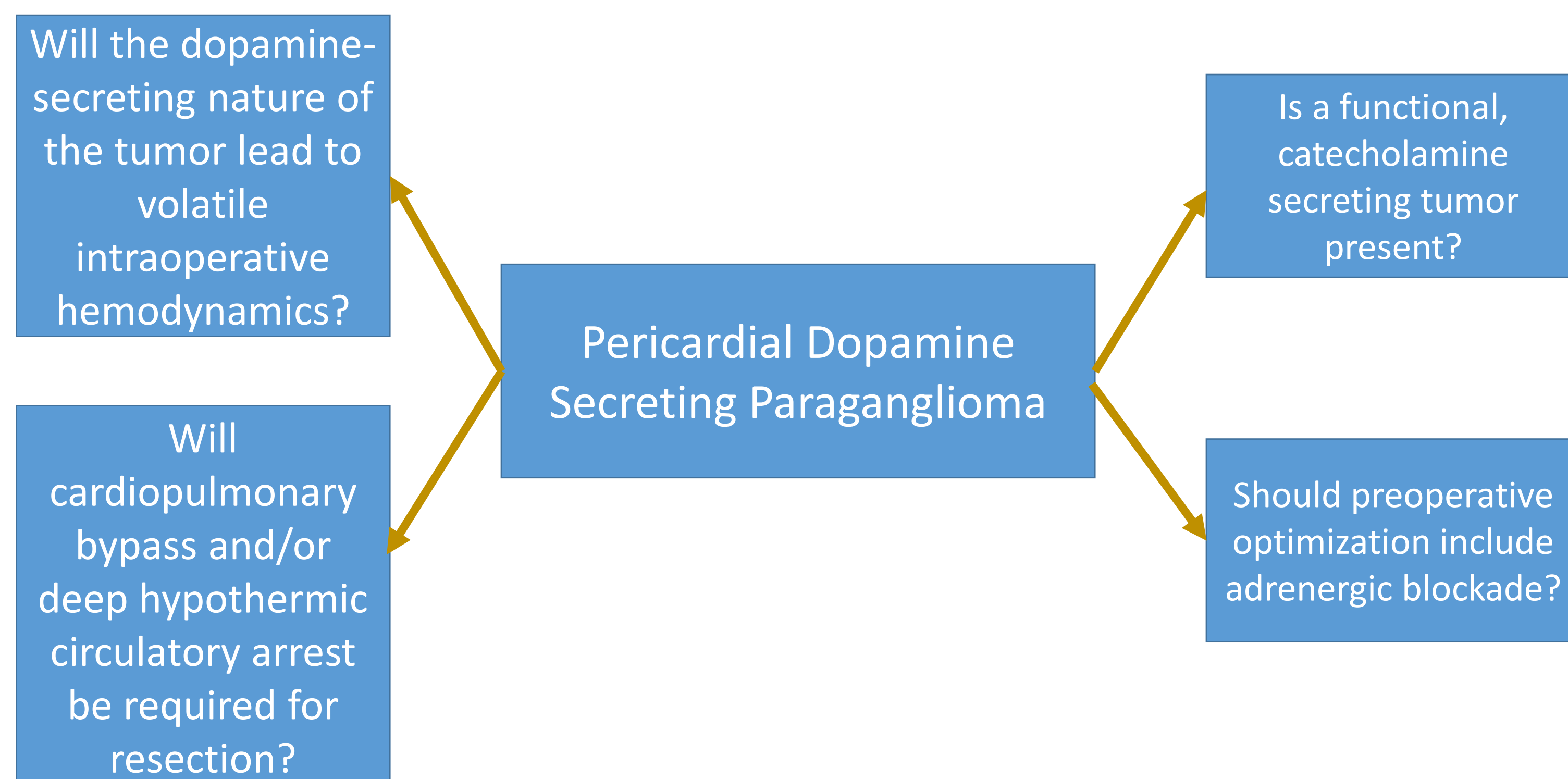
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Case History

- A 66 year old male presented after a snowmobile accident resulting in right sided rib fracture
- Given the extent of trauma, a chest CT was preformed which suggested a left atrial appendage thrombus
- Follow up trans-esophageal echocardiogram, showed an extracardiac nodular echodensity adjacent to the left coronary cusp
- Cardiac MRI demonstrated an enhancing 4.2 cm soft tissue mass interdigitating with the left proximal coronary vessels
- Given the heterogeneity of the lesion, paraganglioma or hemangioma were considered
- Endocrinology studies performed were significant for 24 hour urine dopamine of 1,103 mcg/24 hours (nl 52-480)
- Cardiac catheterization evaluated the patency of the coronary vessels which identified no stenosis or apparent compression
- The patient denied any history of chest pain, palpitations, hot flashes, night sweats, or blood pressure swings
- He decided to pursue elective resection of the Paraganglioma

Clinical Questions and Challenges



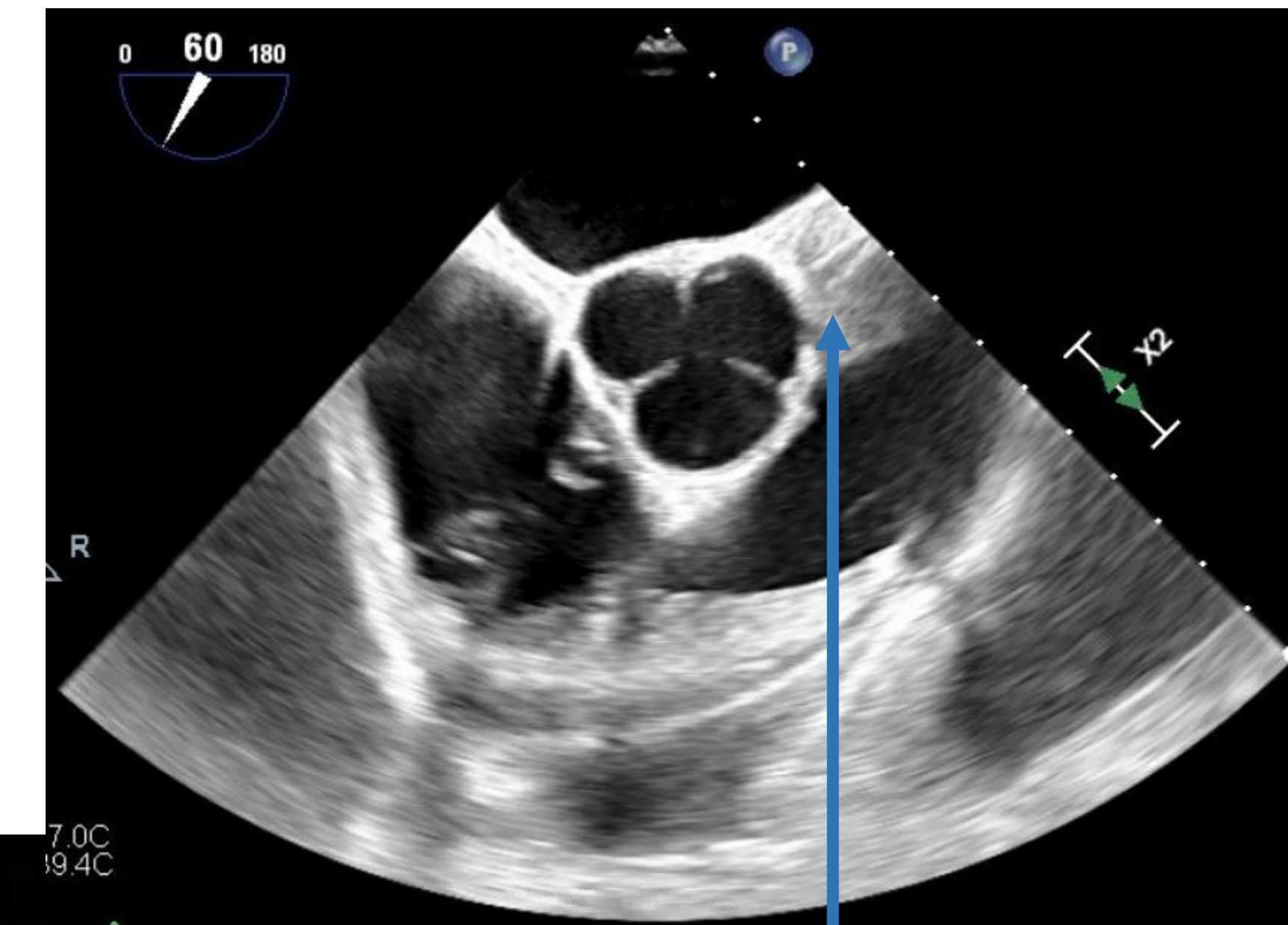
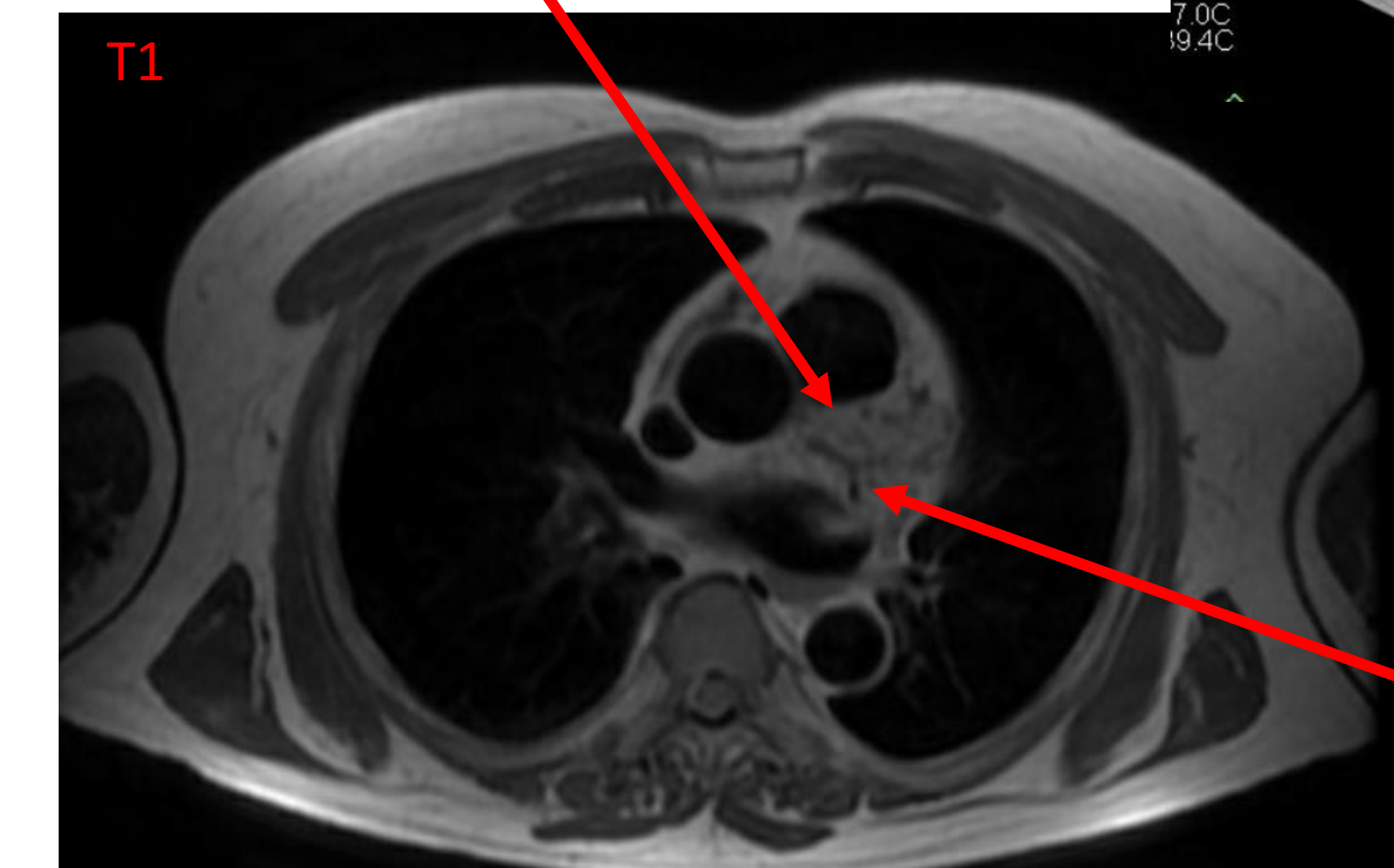
Treatment Plan

Monitors	Pre-induction Arterial Line Blood pressure	Pulse Oximetry	5 Lead EKG	Transesophageal Echocardiogram	Bladder Temperature Probe	Continuous CVP
General Anesthesia	<ul style="list-style-type: none"> • Induction: 2% Propofol, Fentanyl, Midazolam, Rocuronium • Maintenance: 1.5-2% Sevoflurane 		Anticoagulation and Antifibrinolytic Therapy	<ul style="list-style-type: none"> • Tranexamic acid infusion for the entirety of the case • Heparinization prior to bypass followed by protamine reversal 		
Hemodynamic Management	<ul style="list-style-type: none"> • The anesthesia team elected to not perform preoperative alpha blockade • Prepared infusions: Nitroglycerin, Nicardipine, Esmolol, Norepinephrine, Epinephrine, Dopamine • Pt required Norepinephrine intermittently throughout the case, otherwise no other vasopressors or inotropes were used 			Pathology	<ul style="list-style-type: none"> • Neoplastic cells are positive for chromogranin, synaptophysin, CD56, and S100 supporting diagnosis of pheochromocytoma. • Grading of adrenal pheochromocytoma and Paraganglioma score of 2 equating to metastatic rate of 3.6%. 	
			Postoperative Course	<ul style="list-style-type: none"> • The patient recovered uneventfully. 		

Conduit Harvesting and Cardiac Bypass Onset	Tumor Resection, CABG, Distal Aorta and PA Reconstruction	Transition off Bypass
<ul style="list-style-type: none"> • Saphenous Vein harvesting for potential conduit • Heparinization • Distal Aorta, SVC, and IVC cannulated • Cardioplegia cannula in coronary sinus via right atrium • Transition to bypass • Aortic cross-clamping 	<ul style="list-style-type: none"> • Tumor mobilized from PA and roof of right atrium • For complete tumor mobilization, the PA and aorta distal to the sinotubular junction were transected • In order to remove the tumor, the left main coronary artery was sacrificed • Reconstruction of PA and Aorta • CABG performed to LAD and left circumflex artery 	<ul style="list-style-type: none"> • After rewarming and reperfusion, pt was weaned gradually off • TEE confirmed return of biventricular function and filling status • Heparin was reversed with protamine & coagulation function assessed with TEG • Sternotomy was closed • Patient remained intubated and transferred to cardiac ICU for recovery

Cardiac MRI and Echocardiogram

Heterogeneously hyperintense on T1. Voiding throughout mass could be intratumoral vessels or encasement of nearby vessels.



Midesophageal aortic valve short axis view, with extracardiac mass encasing left main coronary artery

Likely left coronary artery coming off the aorta as it becomes encased in mass

Conclusion

- Paragangliomas have a frequency of 500-1600 cases in the US per year and of those cases, purely dopamine secreting lesions are exceedingly rare. [1]
- Given the unique pericardial location of this lesion, the following were required: aortic root reconstruction, pulmonary artery reconstruction, and coronary artery bypass grafting.
- Due to the catecholamine secreting nature of these lesions, anesthesia and surgical teams should anticipate labile hemodynamics and consider preoperative alpha blockade.

[1]: Chen, H., Sippel, R. S., O'Dorisio, M. S., Vinik, A. I., Lloyd, R. V., Pacak, K., & North American Neuroendocrine Tumor Society (NANETS) (2010). The North American Neuroendocrine Tumor Society consensus guideline for the diagnosis and management of neuroendocrine tumors: pheochromocytoma, paraganglioma, and medullary thyroid cancer. *Pancreas*, 39(6), 775–783. <https://doi.org/10.1097/MPA.0b013e3181eb4f0>