

# AMSER Case of the Month

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68-year-old male presenting with chest pain

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# Patient Presentation

- 68-year-old male with a history of hypertension, hyperlipidemia, type II diabetes, paroxysmal atrial fibrillation who presented to the emergency room with chest pain.
- He endorsed left chest pain radiating down the arm. He denied nausea, vomiting, shortness of breath, fevers, chills, sweats, headache, palpitations, difficulty swallowing or speaking.
- Physical examination revealed tachycardia and irregular heart rhythm.

# Pertinent Labs

- CBC:
  - WBC:  $12.6 \times 10^3/\mu\text{L}$
  - HGB: 13.4 g/dL
- BMP:
  - Glucose: 334 mg/dL
- Troponin: 220 ng/L
- EKG was significant for ST elevations in the inferior leads

# Clinical Course

- Patient went for cardiac catheterization and was found to have multi-vessel coronary artery disease.
- Patient was worked up for CABG and received a carotid ultrasound.

# Carotid Ultrasound

- Incidentally detected 1.2 x 1.8 x 1.2 cm circumscribed hypoechoic mass at the right carotid bifurcation.



RIGHT BIFURCATION SAG

# What Additional Imaging Should We Order To Better Characterize Ultrasound Finding?

# ACR Appropriateness Criteria

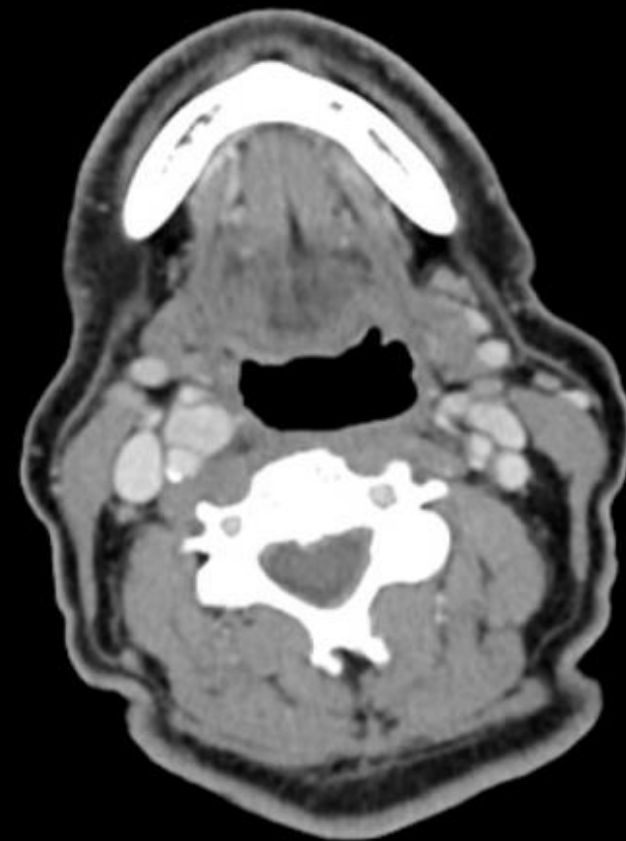
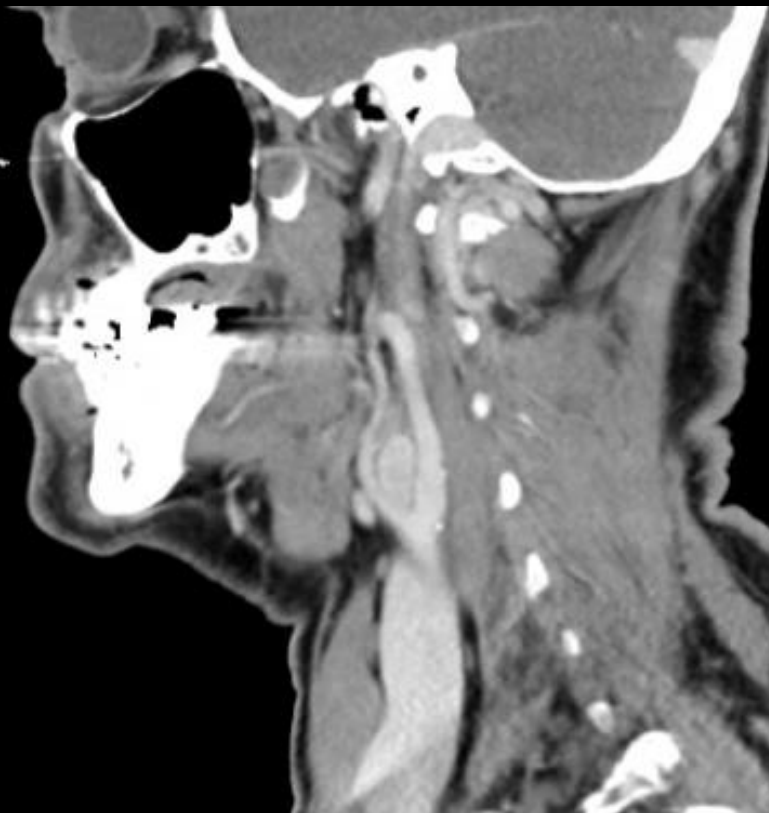
**Variant: 1** Nonpulsatile neck mass(es). Not parotid region or thyroid. Initial imaging.

| Procedure                             | Appropriateness Category |
|---------------------------------------|--------------------------|
| MRI neck without and with IV contrast | Usually Appropriate      |
| CT neck with IV contrast              | Usually Appropriate      |
| US neck                               | May Be Appropriate       |
| MRI neck without IV contrast          | May Be Appropriate       |
| CT neck without IV contrast           | May Be Appropriate       |
| Arteriography cervicocerebral         | Usually Not Appropriate  |
| MRA neck without and with IV contrast | Usually Not Appropriate  |
| MRA neck without IV contrast          | Usually Not Appropriate  |
| CT neck without and with IV contrast  | Usually Not Appropriate  |
| CTA neck with IV contrast             | Usually Not Appropriate  |
| FDG-PET/MRI skull base to mid-thigh   | Usually Not Appropriate  |
| FDG-PET/CT skull base to mid-thigh    | Usually Not Appropriate  |

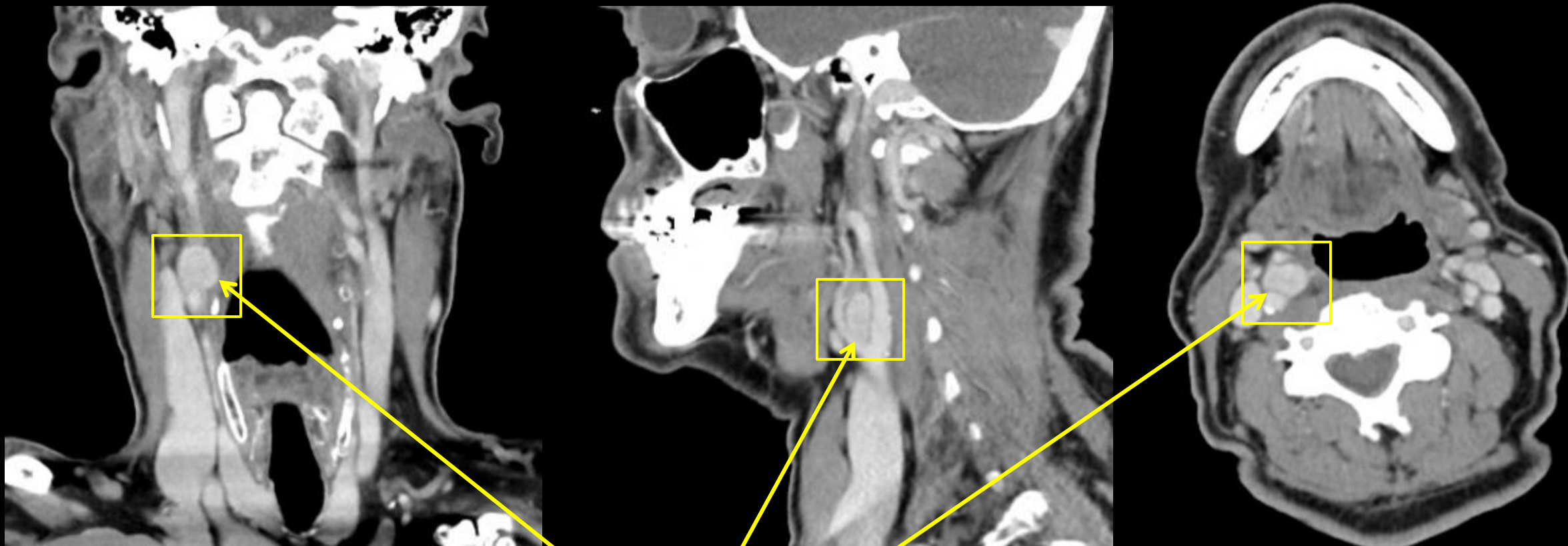
This imaging modality was ordered by the ER physician

<https://acsearch.acr.org/docs/69504/Narrative/>

# Findings: (unlabeled)



# Findings: (labeled)



An enhancing 1.7 cm x 0.8 cm x 1.5 cm mass in the right carotid bifurcation displaces the proximal internal and external carotid arteries ('lyre sign').

Final Dx:

Carotid body paraganglioma

# Case Discussion

- Paragangliomas are rare neuroendocrine tumors which can be sympathetic (usually functional, secreting catecholamines) or parasympathetic, like this carotid body tumor (usually nonfunctional).<sup>1</sup>
- Carotid body tumors typically present as painless, gradually enlarging neck masses.<sup>2</sup> Mass effect in later stages can compress the cranial nerves (IX, X, XI and XII), or the sympathetic nerves, which can lead to dysphagia, hoarseness, or Horner's syndrome.<sup>3</sup>
- There are approximately 500-1600 paraganglioma cases in the US per year and the majority are benign.<sup>4</sup>
- Most paragangliomas are sporadic, particularly among patients who are older, although 1/3-1/2 of cases are associated with inherited syndromes.<sup>1, 5, 6</sup>

# Case Discussion

- The 'lyre sign' (splaying of the carotid bifurcation) and tumor hypervascularity are highly specific imaging findings for carotid body tumors and paragangliomas.<sup>7</sup>
- Carotid body paragangliomas can be classified according to the Shamblin criteria:
  - Class I tumors: localized with splaying of the carotid bifurcation, little attachment to the carotid vessels
  - Class II tumors: partially surround the carotid vessels
  - Class III tumors: surround the carotids<sup>8</sup>
- Options for management include observation, surgical resection, or radiation therapy.<sup>9</sup> This patient was referred to vascular surgery and ultimately underwent surgical resection of his class I-II carotid body tumor.
- All patients with paragangliomas should be tested for hypersecretion of catecholamines prior to surgery.<sup>10</sup>

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