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Incidence of Aortic Arch Anomalies in Patients with Thoracic Aortic Disease

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BACKGROUND

- Diseases of thoracic aorta (TAD) - aortic dissection or aneurism, are often asymptomatic and are associated with high mortality. Once diagnosed a dissection, it is a life threatening surgical emergency.
- Aortic dissection is a tear in the wall of the aorta. Aortic aneurism is a dilatation of the aorta.
- Anatomical aortic arch variants (most common - bovine arch) are more common in patients with TAD as compared with the healthy general population.
- Bovine arch refers to origin of the right common carotid artery from the left brachiocephalic artery rather than the arch itself.
- Anomalies when reported by radiology would allow for preventative management of this high risk group.

Objective: This study aims to identify patients with TAD and aortic arch anomalies at LVHN.



Figure 1: A horizontal cross-section CT scan of a patient with an aortic dissection.

METHODS

- Charts of patients from a six month period (February 2018 – August 2018) who presented to the LVHN with TAD were retrospectively reviewed.
- All files were systematically reviewed as part of the retrospective case review.
- Relevant demographic and radiographic data was collected and analyzed.
- Informed consent was not required for this retrospective review.
- IRB approved this quality improvement project.

RESULTS

- Out of the 18 total patients admitted with TAD within the last six months, it was found that 6/18 (30%) had an anatomically abnormal aortic arch, specifically a bovine arch.
- In our sample no other anomalies were identified.
- On average, patients who had a bovine arch were older at the time of their TAD incident (66.00 to 58.59 years old) and had a lower BMI (27.78 to 31.57).

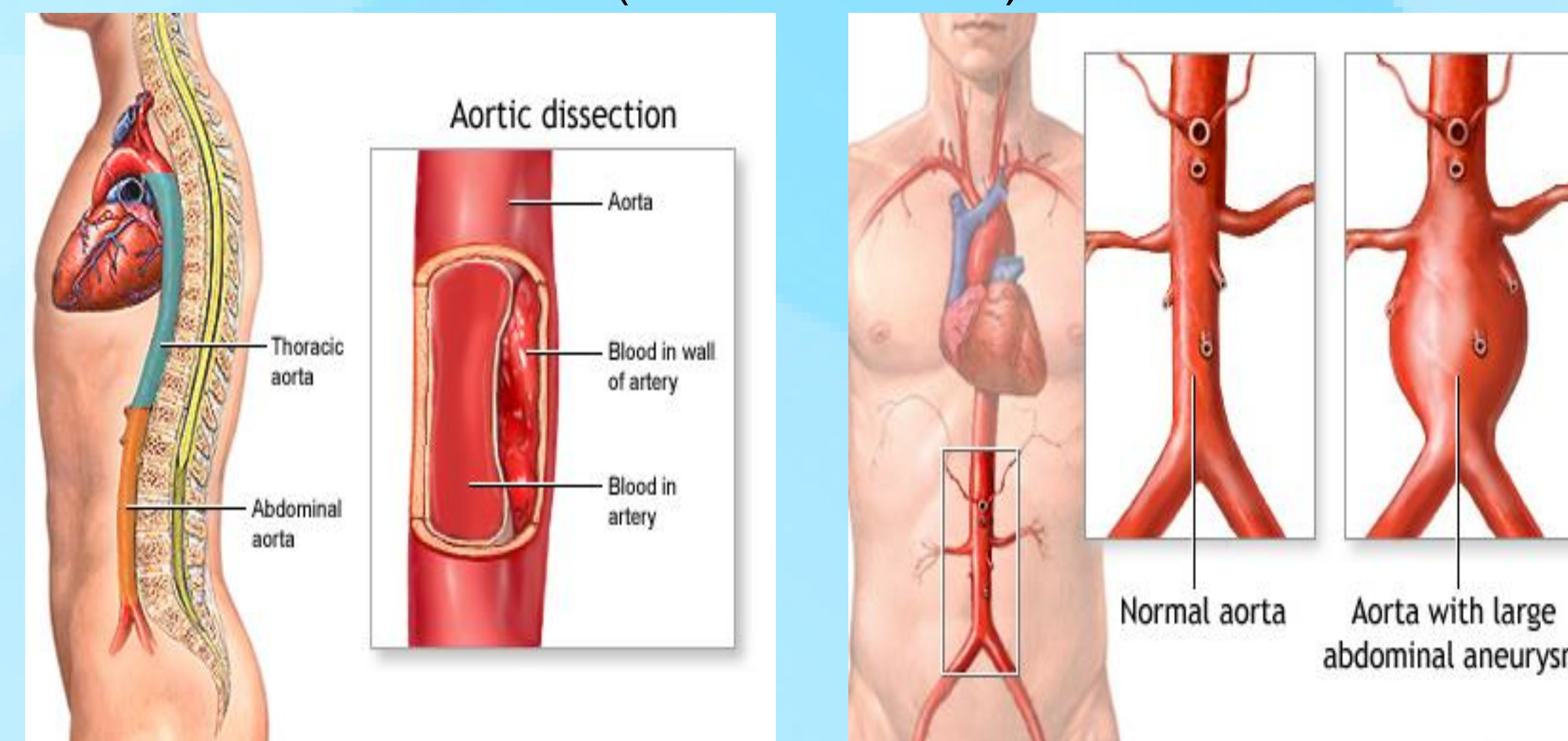


Figure 2: An aortic dissection featured on the left and an aortic aneurysm featured on the right, both on normal aortic arches.

DISCUSSION

- Our findings parallel known association of bovine arch with TAD (30% to 24.6%).
- It is clinically important that aortic arch anomalies are noted in radiological reports reflecting high risk of TAD in this population.
- Risk factors for TAD are hypertension, atherosclerosis, family history, and connective tissue disease. Anomalies of the aortic arch is an important risk factor as well.
- Mechanisms of TAD in patients with an anatomically abnormal arch are weakened branches from altered neural stem cell migration and vessel origin that is increased in size with higher velocity blood flow.

NEXT STEPS

- Expanding the study to a larger patient population will assist in adding statistical significance.
- Exploring additional risk factors for TAD family history, HL, smoking, race, DM and BMI.

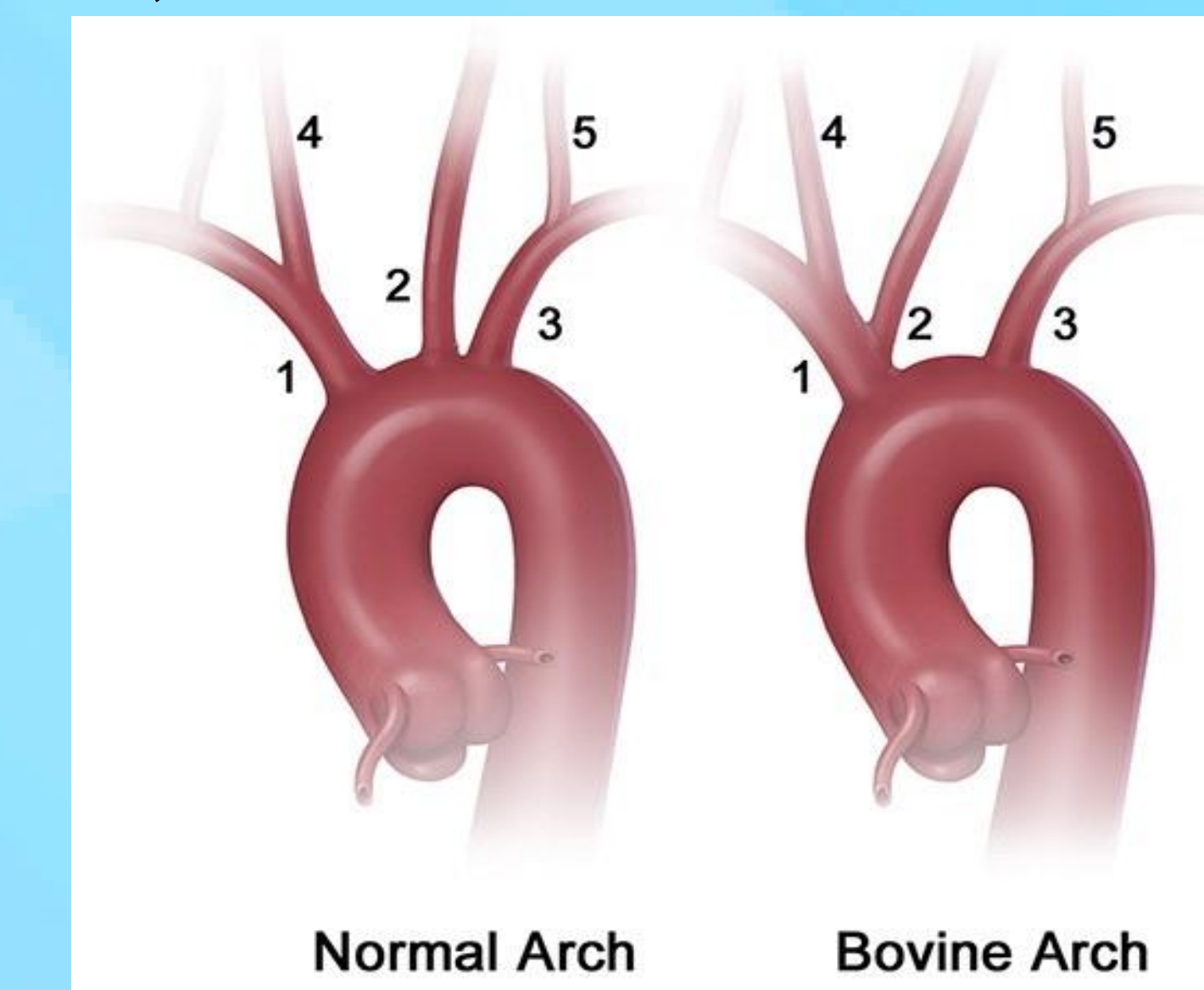


Figure 3: Normal aortic arch presentation versus bovine aortic arch. 1 = Brachiocephalic artery. 2 = Left common carotid artery. 3 = Left subclavian artery. 4 = Right common carotid artery. 5 = Left vertebral artery.

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