

## “Thrombosis of Aberrant Right Subclavian Artery Presenting As Myocardial Infarction.”

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### Abstract

Aberrant right subclavian artery (ARSA) is a rare anomaly, in which the right subclavian artery arises directly from the aortic arch instead of originating from the brachiocephalic artery. This anomaly should be taken into consideration during surgical procedures around the esophagus, such as esophagectomy. Any unintentional injury of this artery during surgical procedures could be extremely life-threatening.

The patient was an 88-year-old male, known case of hypertension, CAD, COPD, presented with the chief complaint of chest pain for 2 days associated with the history of right-hand weakness and numbness for 1 week.

ECG has done suggestive of Sinus Rhythm with LBBB

Trop I - 6.1 ng/ml

Coronary Angiography

LMCA- Normal

LAD- Mid LAD 80% stenosis

LCX- Proximal 99-100% occluded

RCA- normal

CT ANGIO right upper limb done findings revealed anomalous retro esophageal course of right subclavian artery with narrowing at its origin and a small thrombus in juxta osteal segment. Thrombus of 6.7 cm long segment of the distal third of right brachial artery with the reformation of brachial artery at the level of elbow joint along with thrombosis of right ulnar artery at a short distance from its origin.

**Keywords:** Aberrant right subclavian artery; Thrombosis; Myocardial infarction.

### Introduction

#### *Aberrant Right Subclavian Artery*

Aberrant right subclavian artery (ARSA) is a rare anomaly, in which the right subclavian artery arises directly from the aortic arch instead of originating

from the brachiocephalic artery. In 0.4-1.8% of the general population, it may arise directly from the aortic arch distal to the left subclavian artery<sup>1,2,3</sup>. ARSA on its way to the right arm crosses the midline posterior to the esophagus.

The anomaly may be associated with some

clinical manifestations such as dyspnea, stridor, dysphagia (which is called dysphagia lusoria), chest pain, or fever<sup>4,5,6</sup> but the majority of cases with ARSA are asymptomatic.

Even if it is asymptomatic, this anomaly should be taken into consideration during surgical procedures around the esophagus, such as esophagectomy. Any unintentional injury of this artery during surgical procedures could be extremely life-threatening.

Usually, three large arteries arise from the arch of the aorta: the brachiocephalic trunk (divided into the right common carotid artery and the right subclavian artery), the left common carotid artery, and the left subclavian artery<sup>7</sup> (Figure 1). However, when an aberrant right subclavian artery variant is present, the brachiocephalic trunk is absent and four large arteries arise from the arch of the aorta: the right common carotid artery, the left common carotid artery, the left subclavian artery, and the final one with the most distal left-sided origin, the right subclavian artery, also called the arteria lusoria (Figure 2).

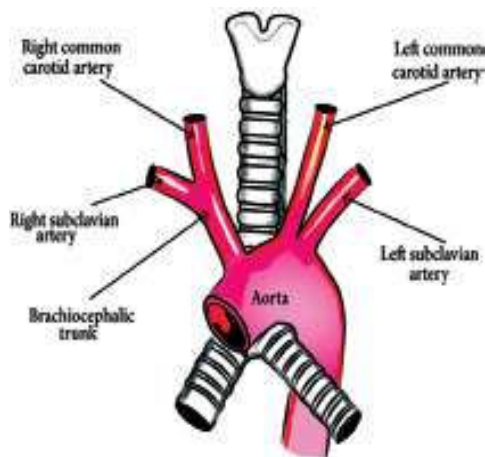


Fig. 1:

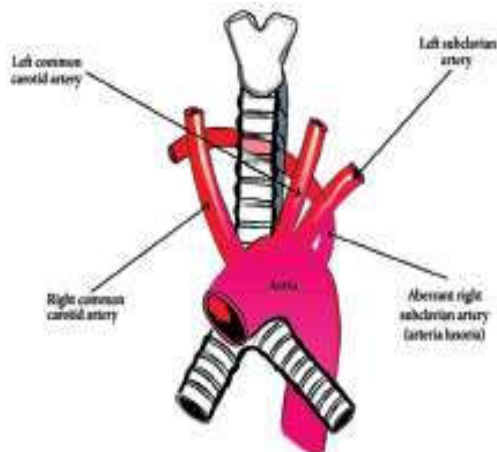


Fig. 2:

## Case Study

The patient was an 88-year-old male, a known case of hypertension, CAD, COPD, presented with the chief complaint of chest pain for 2 days associated with the history of right-hand weakness and numbness for 1 week.

ECG has done suggestive of Sinus Rhythm with LBBB

Trop I - 6.1 ng/ml

Physical examination revealed the stable, conscious, oriented, vitally stable: Pulse: 62/min, BP: 140/80 MMHG, RR: 16/min, Temperature: afebrile

Spo2: Right Hand- 76% on room air

Left Hand- 100% on room air.

Extremities -

Right hand- Radial and Ulnar pulse not felt

Right-hand fingers- Cyanosis present

No edema

Peripheral pulses present

P/A - Soft, Non-tender, No organomegaly/guarding/rigidity.

Neurological, Cardiovascular, Respiratory examinations were insignificant.

The patient was immediately shifted to Cath lab for coronary angiography.

Coronary Angiography

LMCA- Normal

LAD- Mid LAD 80% stenosis

LCX- Proximal 99-100% occluded

RCA- normal

Impression- Double vessel disease- Non-ST elevation Myocardial Infarction

Further, PAG did:

PAG suggestive of Right subclavian artery is arising anomalously from descending thoracic aorta having 90% ostial stenosis with thrombus +; right brachial artery at level of distal humerus 100% thrombotic occlusion.

CT ANGIO right upper limb done findings revealed anomalous retro esophageal course of right subclavian artery with narrowing at its origin and a small thrombus in juxta osteal segment. Thrombus of 6.7 cm long segment of the distal third of right brachial artery with the reformation of brachial artery at the level of elbow joint along with thrombosis of right ulnar artery at a short distance

from its origin.

### Course in the Hospital and Outcome

After arrival in the emergency department, an initial assessment was done and 12 lead ECG was taken.

ECG suggestive of Sinus Rhythm with LBBB

Trop I - 6.1 ng/ml

The patient was immediately shifted to Cath lab for coronary angiography.

Coronary Angiography

LMCA- Normal

LAD- Mid LAD 80% stenosis

LCX- Proximal 99-100% occluded

RCA- normal

Impression- Double vessel disease- Non-ST elevation Myocardial Infarction

Stenting is done to the Lateral circumflex artery

The left main coronary artery was hooked with extra backup 3.5 6F whisper wire.



Fig. 3: Peripheral Angiography showing Right subclavian artery arising from descending thoracic aorta.

Further PAG ( Peripheral Angiography) done:( Fig 3)

PAG suggestive of Right subclavian artery is arising anomalously from descending thoracic aorta having 90% ostial stenosis with thrombus +; right brachial artery at level of distal humerus 100% thrombotic occlusion.



Fig. 4: Peripheral Angiography showing stenting done to the right subclavian artery at the level of the ostium.

Right subclavian angioplasty is done. Stenting is done to the right subclavian artery at the level of the ostium.

CT ANGIO right upper limb done findings revealed anomalous retro esophageal course of right subclavian artery with narrowing at its origin and a small thrombus in juxta osteal segment. Thrombus of 6.7 cm long segment of the distal third of right brachial artery with the reformation of brachial artery at the level of elbow joint along with thrombosis of right ulnar artery at a short distance from its origin.



Fig. 5:PAG showing Thrombus at long segment distal third of right brachial artery.

The patient was taken up for surgery after PAC clearance. The patient underwent a Right Brachial artery Embolectomy with vascular repair (brachial artery). Postoperative brachial, radial and ulnar pulses were palpable. The patient was shifted to CTVS ICU. For further management ECHO was done which showed LA, LV is normal-sized, RWMA apical LAD territory with LVEF-45%. After stabilization patient was shifted toward and discharged home in stable condition.

### Discussion and Therapeutic considerations

A morphologic description of an aberrant right subclavian artery was provided by Hunauldin as early as 1735.<sup>8</sup> In 1794, Bayford observed that an aberrant right subclavian artery could produce symptoms of dysphagia by compression of the esophagus and named the entity dysphagia lusuriae, also referred to as dysphagia lusoria.<sup>9</sup>

In adults, however, reestablishment of subclavian inflow is necessary to prevent threatening upper extremity ischemia.<sup>10</sup>

Several groups have described subclavian revascularization for the symptomatic disease of the aberrant subclavian artery (e.g., aneurysm, dysphagia lusoria, upper extremity claudication, subclavian steal) through a thoracotomy, median sternotomy, and cervical approaches with the use of prosthetic bypass, interposition grafting, or direct transposition with inflow from the common carotid or ascending aorta.<sup>11,12,13,14</sup>

Kieffer et al described the surgical management of a series of 33 patients with aberrant subclavian arteries. In all five of their patients with symptomatic occlusion of nonaneurysmal aberrant subclavian arteries, the repair was achieved by transposition of the aberrant subclavian to the ipsilateral common carotid artery through a cervical approach for exposure and reconstruction.<sup>12</sup> Transposition or carotid-subclavian bypass grafting has been the approach of choice in most other reports of this condition.<sup>11, 14</sup>

Proximal occlusions of normally originating subclavian arteries have been successfully managed by percutaneous transluminal angioplasty and stenting.<sup>15</sup> Brachiocephalic stenotic lesions of the innominate and carotid arteries have also been successfully treated with percutaneous techniques, with initial success in 92% of cases and an 85% patency rate at a mean follow-up of 27 months.<sup>15</sup>

The location of the stenosis may have implications for treatment as well. When the stenotic segment occurs along the retro esophageal course of the artery, it may be especially amenable to endovascular therapy, because there is little potential for iatrogenic ostial or vertebral artery occlusion. However, stenting may lead to symptomatic esophageal compression, because the artery may be increased in diameter as a result of the intraluminal stent.

We used percutaneous transluminal angioplasty and stenting for the treatment of high-grade stenosis in an aberrant subclavian artery proximal to the vertebral origin that produced neurologic and upper extremity symptoms.

This approach provides an attractive alternative to conventional surgical strategies, particularly in high-risk patients. The procedure was uncomplicated, and the patient was discharged with a resolution of symptoms.

### Conclusion

It is important to remember that common conditions such as shortness of breath, retrosternal pain, cough, and weight loss may be symptoms of the compression of adjacent structures by the arteria lusoria. The presence of the ARSA, especially, should be taken into consideration to distinguish it from other causes of dysphagia. The hypothesis that clinically overt arteria lusoria is due to atherosclerotic wall and vessel stiffness is supported by the older age of symptomatic patients.

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