

# Case Review: Coarctation Diagnosis from a Renal Ultrasound

## Introduction

Coarctation is a narrowing of the thoracic aorta just beyond the branches that supply blood to the upper limbs. The main branch of the aorta supplies blood flow to the abdomen and lower limbs.

Associated abnormalities of Coarctation included: Ventricular septal defect (VSD) and narrowed aortic valve. The most common chromosomal abnormalities include turners syndrome (particularly in females).

The VSD allows blood to flow to the lower limbs, so Coarctation is not always evident in early life and can take years to become noticeable, sometimes not until adulthood.

Radiographic features of Coarctation include: Rib notching and the 3 sign/reversed 3 sign. These are as a result of narrowing of the thoracic aortic arch and compensatory dilatation of the intercostal arteries to increase blood flow to the lower body <sup>(1,2)</sup>.



## Conclusion

Abnormally dampened Spectral Doppler traces within the renal arteries does not necessarily imply renal artery stenosis, especially in the appearance of normal renal morphology.

Demonstrating dampened waveforms in the abdomen and lower limbs, compared to the upper limbs helped to narrow down the potential cause of the patients underlying condition.

A combination of good patient history, coupled with previous vascular experience and anatomy knowledge can diagnose potential, severe underlying conditions, which in this case lead to a correct diagnosis of Coarctation of the aorta.

## Case Report

An 8 year old girl presented as an inpatient with persistent hypertension, diabetes and a heart murmur.

This patient was referred for an ultrasound to assess to assess for any possible renal artery stenosis or structural renal / adrenal abnormalities as per protocol.

Both kidneys appeared structurally normal in size and appearances. However, the spectral Doppler signals of the renal arteries were dampened bilaterally, demonstrating a monophasic waveform.

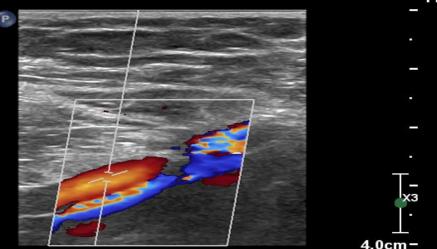
Given the normal structural appearances and size of both kidneys, this led me to look for any further changes with the distal arteries, namely the iliac / common femoral and posterior tibial arteries. These too demonstrated a similarly dampened spectral waveform.

To complete the assessment I scanned both radial arteries bilaterally, which showed relatively normal, waveforms. Given the patients history of heart murmur and normal upper limb spectral signals. These collective findings, led to suspicion of a narrowing/abnormality of the aorta. Differentials included Coarctation and upper abdominal syndrome.

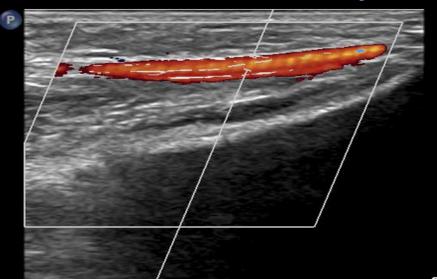
Following discussion with a vascular radiologist, it was advised the patient have an x-ray to evaluate for any signs of Coarctation. Radiographic findings included, mild cardiomegaly, probable reversed 3 sign left mediastinum and subtle rib notching.

Given the culmination of these findings the patient was referred to a specialist centre where findings of Coarctation and VSD were confirmed.

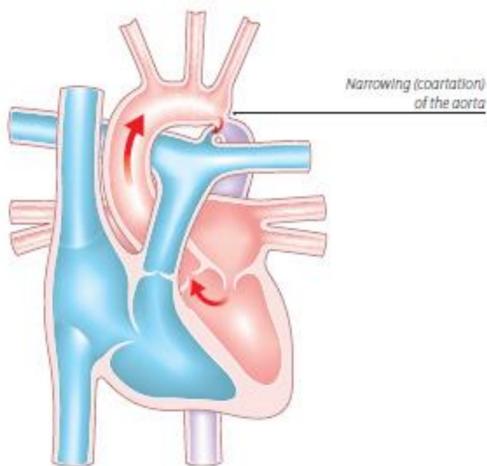
## Dampened iliac artery



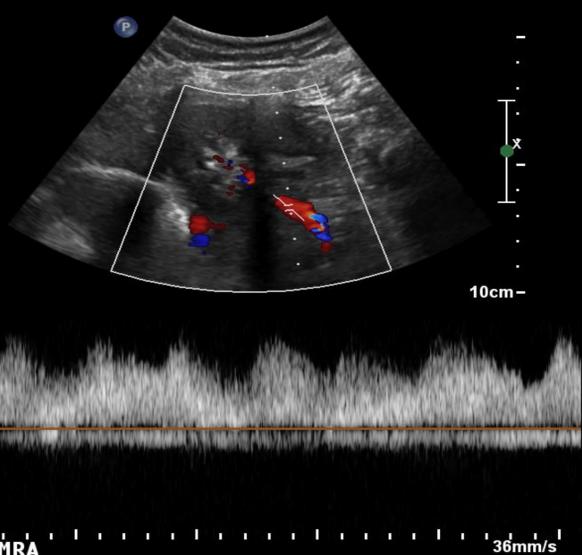
## Normal Radial artery



## Coarctation



## Dampened renal artery waveform



## References

1. British Heart Foundation. Understanding your child's heart – Coarctation of the aorta. 2016. [Accessed 15 September 2018] Available from: <https://www.bhf.org.uk/informationsupport/publications/children-and-young-people/understanding-your-childs-heart--coarctation-of-the-aorta>.
2. Sharma. R & Gaillard. F. 2018. Coarctation of the Aorta [Accessed 15 September 2018] Available from: <https://radiopaedia.org/articles/coarctation-of-the-aorta>.

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