



Dynamic renal artery stenosis: An incidental angiographic diagnosis or is there more to it than meets the eye?

Renal artery stenosis is a major cause of secondary hypertension. Bilateral non-atherosclerotic non-dysplastic renal artery stenosis can be seen following compression of the renal arteries by diaphragmatic crura/median arcuate ligament or external masses or fibrous bands. Never before, dynamic bilateral proximal stenosis, a new entity has been reported. The treatment is unknown. The learning point is that the patients undergoing angiographic screening for renovascular hypertension should undergo 'breath in breath out' test in order to visualize renal artery motion.

KEYWORDS: renal angiography, renal artery, renovascular hypertension, dynamic stenosis

Bilateral external compression of the renal arteries by the lower insertion of diaphragmatic crura/median arcuate ligament, fibrous bands, renal, ovarian or other masses could result in bilateral renal artery stenosis [1]. In such a scenario, the compression of renal arteries in relation to the respiration is not dynamic in nature. We describe a condition resulting in secondary hypertension with negative results found on computed tomography angiography (CTA) and duplex renal ultrasound (DRU) and presenting as a dynamic compression of the renal arteries on arteriography on normal respiration.

Renal artery stenosis accounts for 30% cases of refractory hypertension [2]. The two most common causes of renal vascular hypertension are atherosclerosis and fibromuscular dysplasia. Although, there are various other causes, there exists a large consensus about possible role of respiration impacting renal artery stenosis. This is mostly in the form of external compression of unilateral and, rarely, bilateral renal arteries [3]. We describe a scenario where dynamic renal artery stenosis related to respiration is seen in the absence of any external compression.

The relationship between respiratory cycle and its influence on renal artery motion has been studied in a small group of patients with abdominal aortic aneurysm. The study demonstrated the proximal renal arterial motion during breath, with a median magnitude of 3 mm [4]. The authors concluded renal motion is an important indicator which could have clinical consequences including possible stenosis. Another study suggested both bending and change in angulation of renal arteries due to positional change of kidneys during normal respiration [5].

We describe a condition resulting in secondary hypertension with negative results found on computed tomography angiography (CTA) and duplex renal ultrasound (DRU) and presenting as a dynamic compression of the renal arteries on arteriography on normal respiration. Pressure measurements were obtained across the renal artery during inspiration and expiration. In our experience, excessive motion of the proximal renal arteries was noted during expiration due to diaphragmatic motion. There was no arterial compression or upward migration of the kidney towards the diaphragm. Blood velocity across the proximal renal arteries during normal breathing measured by DRU may be insignificant in this situation. We continued to follow up our patients on long term basis showing no change in refractory hypertension.

Chronic respiratory disorders might also have a contributing role in worsening of dynamic renal artery stenosis. DRU and CTA may play a minimal role in detecting dynamic renal artery stenosis. Renal arteriography with inclusion of "breath in and breath out" test during the procedure shall be the most useful tool to help physicians diagnose this condition [6]. It is very important to correlate the kinetics in tandem with both inspiration and expiration and appreciate the fluctuating stenosis. Larger investigative studies could help in detecting more patients with resistant hypertension who could have dynamic renal artery stenosis. Surgeries will unlikely help. Long term implications of dynamic stenosis will have to be studied in detail.

Dynamic renal artery stenosis may be labelled as an undetected and unreported condition

Puneeth Shridhar*¹,
Gustav Eles², David
Lasorda², YoungJae
Chun^{1,3,4}

¹Department of Bioengineering,
University of Pittsburgh, Pittsburgh,
USA

²Department of Cardiology, Allegheny
General Hospital, Pittsburgh, USA

³Department of Industrial Engineering,
University of Pittsburgh, Pittsburgh,
USA

⁴McGowan Institute for Regenerative
Medicine, Pittsburgh, USA

*Author for correspondence:
pus8@pitt.edu

which could play a role in renovascular hypertension. This phenomenon might possibly help physicians, in future; explain resistant hypertension in a small number of patients. Conservative approach would be mostly recommended.

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