LESSON OF THE MONTH

A New Collateral Pathway in a Patient With Renal Artery Occlusion

D. Bergqvist∗1, A. Boström1, S. Karacagil1, C. Ljungman1, R. Nyman2 and H. Pärsson1

1Department of Surgical Sciences and 2Department of Radiology, University Hospital, SE-751 85 Uppsala, Sweden

Introduction

It should be well known that renal artery occlusion, due to a progressive stenosis, does not necessarily mean loss of the kidney. Due to collaterals, the renal artery distal to the occlusion is often normal and can be used as an outflow for reconstructive interventions. This knowledge is especially important in patients with bilateral occlusion or occlusion where there is only one kidney. A successful reconstruction in such patients can mean a life without the need for dialysis. When occlusion of a renal artery is detected at angiography it is important to wait long enough after the injection of contrast media to be able to visualise the collateral filling of the artery distal to the occlusion. There are five ipsilateral collateral pathways: along the ureter, by the suprarenal arteries, from capsular arteries, from lumbar arteries and rarely by mesenteric vessels.1–3 Collaterals are not always visualised but their presence is an indication of a haemodynamic significant stenosis.4

This Lesson of the Month will demonstrate another collateral possibility which so far has not been described.

Case Report

A 74-year-old woman with hyperlipidaemia and hypertension required treatment with four drugs in order to keep her blood pressure at a level around 190/85. She had bilateral flank bruits and a serum creatinine level of around 200 µmol/l. Ultrasonography showed that the right kidney was of normal size (length 12 cm) and that the left kidney was diminished in size (length 8 cm). Duplex showed a peak systolic velocity of the renal artery on the left side of >4 m/s and on the right side of >4 m/s. (Normal value of the laboratory <1.8 m/s.) Angiography 1 month later revealed no renal artery on the right side and a tight ostial stenosis on the left side. About 20 s after the injection of contrast into the left renal artery, only one kidney. A successful reconstruction in such patients can mean a life without the need for dialysis. A branch from the left renal artery passed across the midline and filled the right renal artery about 1 cm distal to the occlusion (Fig. 1). The right kidney was

Fig. 1. Selective contrast injection distal to the stenosis in the left renal artery demonstrated a collateral which crosses the midline and fills the right renal artery distal to the occlusion.
judged nephrosclerotic. Scintigraphy showed less than 20% function on the left side.

In the light of these findings it seemed reasonable to reconstruct the artery to the larger right kidney, the left one being small with poor function. The artery distal to the occlusion was normal at exploration with brisk back bleeding. A reconstruction was made with a 6 mm aortorenal ePTFE-bypass. The patient left hospital after 13 days with a creatinine of 130 μmol/l and a blood pressure of 160/75. Duplex scanning after 2 months demonstrated normal haemodynamic conditions on the right side with a peak systolic velocity of 1 m/s (1.2 m/s after a year). Creatinine remained stable.

Discussion

This patient is a reminder that renal artery occlusion does not mean loss of the kidney and arterial reconstructive surgery can save it and improve the renal function.5–7 This is common knowledge among those interested in renovascular reconstructive interventions, but in our experience this fact tends to be forgotten by other clinicians. Therefore, this patient is an important reminder that diagnostic thoroughness is required to save some kidneys. This is the first message. One finding needing comment is the high right-sided peak systolic velocity in spite of an occlusion. A reasonable interpretation is that at duplex there was a tight stenosis which had occluded at angiography 1 month later, which is not unusual.8

The second message is of a new collateral pathway coming from a stenotic but patent left renal artery and crossing the midline to the right renal artery, which was normal in size distal to the occlusion. It is reasonable to assume that this was a collateral via the lumbar or spinal arteries. This interpretation is further supported by lack of collateral arteries in front of the aorta at surgery. The practical knowledge of this new collateral is, however, not that important. The importance lies in the fact that the arteriosclerotic occlusion of a renal artery may be fairly short with a normal and reconstructible artery distal to it and that the angiographic series should last until there is filling of the venous system (30–40 s) before this possibility can be excluded. What is surprising in this case is that the collateral could perfuse the right kidney in spite of the severe left-sided stenosis.

After 1 year the patient has a creatinine of around 140, a normal duplex on the reconstructed side and feels well.

References


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