Case Report

Systemic thrombolysis for bilateral atherosclerotic renal artery occlusion resulting in prolonged recovery of renal function

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Key words: atherosclerotic renovascular disease; renal artery occlusion; thrombolysis

Introduction

Atherosclerotic disease of the renal arteries is an important cause of renal failure. Percutaneous transluminal angioplasty (PTA) is an effective and established treatment [1] with stent placement an option in ostial stenosis and recurrent stenosis following PTA. In the following case, which presented with the onset of end-stage renal failure, neither of the renal artery ostia could be identified at angiography. Systemic thrombolysis resulted in recanalization of the right renal artery, and subsequent PTA restored renal function.

Case

A 62-year-old female was admitted to her local hospital complaining of breathlessness on exertion and increasing lethargy. There had been recent worsening of long-standing hypertension. Her only other past history was of hypercholesterolaemia. Serum creatinine was 600 μmol/l on admission. An intravenous urogram revealed a small poorly functioning left kidney with an apparently normal right kidney.

The patient was transferred to our renal unit the following day after the onset of anuria and right loin pain. On clinical examination blood pressure was 160/90, chest clear, and there was no loin tenderness. Blood urea was 24 mmol/l and serum creatinine 750 μmol/l. Urinalysis revealed numerous red blood cells and leukocytes and ++++ protein. A presumptive diagnosis of occlusion of the right renal artery was made and a renal arteriogram performed. No renal artery could be identified (Figure 1). There was no nephrogram and no discernible collateral flow on either side. A small infrarenal aortic aneurysm was present.

Because the origins of the renal arteries could not be visualized PTA was not possible. The patient was haemodialysed, then systemic thrombolysis was administered using recombinant tissue plasminogen activator (r-tPA) followed by heparin infusion, with the aim of restoring patency to a recently occluded right renal artery. r-tPA was commenced approximately 48 h after the onset of loin pain and anuria in a standard myocardial infarction regimen (15 mg bolus followed by infusions of 50 mg over 30 min and 35 mg over 1 h). The patient passed small volumes of urine within 48 h of this but remained dialysis dependent.

Five days later she became ill during an outpatient attendance for haemodialysis. An electrocardiogram indicated an acute anterior myocardial infarction. Aspirin and streptokinase (1.5 million units) were...
Prolonged recovery of renal function administered, resulting in resolution of the electrocardiogram changes. Within 5 days she began passing substantial volumes of urine (over 500 ml daily). Repeat renal arteriography revealed recanalization of the right renal artery which had not been identifiable previously. There was a significant ostial stenosis, probably atherosclerotic in origin, with a beaded appearance to the main renal artery, suggesting possible underlying fibromuscular dysplasia (Figure 2a). PTA of the ostial stenosis and of the FMD was performed resulting in marked improvement in the appearance of the FMD with less than 30% residual stenosis at the ostium (Figure 2b).

Urine output increased to approximately 1500 ml daily and dialysis dose was reduced in line with falling predialysis serum creatinine levels. Dialysis was withdrawn after 12 weeks, and 11 months later the patient remained independent of dialysis, with a stable serum creatinine of 695 μmol/l at an outpatient attendance. Two days later she died suddenly at home.

Discussion

This case illustrates certain important aspects of atherosclerotic renovascular disease. Some cases are detected by investigation of associated hypertension or flash pulmonary oedema, but many patients present only when occlusion or critical stenosis of renal arterial supply results in severe renal failure.

We believe this patient developed acute occlusion of the right renal artery, right loin pain representing the consequent right renal ischaemia. We have elicited similar histories from other patients presenting with anuric renal failure and renovascular disease.

PTA with or without stenting has been successfully used to restore renal function in patients requiring dialysis [1] but in cases of bilateral renal artery occlusion the procedure is usually impossible if neither of the renal artery ostia can be identified. Thrombolysis may offer a therapeutic option in this situation. Local intra-arterial thrombolysis has been reported with variable results [2–6]. Systemic thrombolysis is of potential benefit in seriously ill patients initially intolerant of prolonged invasive radiological procedures.

Systemic thrombolysis was administered to this patient on two occasions, 14 days apart. In the first instance the objective was to restore patency of the right renal artery. r-tPA resulted in small volumes of urine and may have restored flow in the right renal artery. The patient remained dialysis dependent. On the second occasion streptokinase was administered for myocardial infarction, inadvertently restoring urine output. Restoration of flow in the right renal artery was demonstrated angiographically, allowing PTA with ensuing recovery of independent renal function.

Prior to recanalization of the right renal artery, perfusion must have been maintained by a collateral circulation. (The kidney is able to tolerate ischaemia for only about 90 min.) Establishment of a collateral circulation has been described following acute renal artery occlusion [7] and has been shown to be capable of providing independent renal function [8].

Successful thrombolysis has been reported for renal-artery embolization and thrombosis occurring as an
acute or procedure-related event both after local [4,6] and systemic [9] infusion. There are reports of recovery of renal function following thrombolysis in patients who have become dialysis dependent [4,10]. This case together with previous reports [1,5,8,9,10] demonstrates the potential for prolonged independence from dialysis in various forms of bilateral occlusive renovascular disease. Systemic thrombolysis may be an important adjunct in the management of selected patients with occlusive atherosclerotic renovascular disease.

References


Received for publication: 10.6.98
Accepted: 20.6.98