11 Management of Renal and Visceral Arterial Stenoses

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11.2 Renal Artery Stenosis

The two main aetiologies of RAS are quite distinct in their clinical manifestations and tend to present at different times of life. FMD is rare, but its importance lies in the fact that with suitable treatment it represents a potentially curable cause of hypertension in young patients. FMD causes web-like stenoses which narrow the renal artery lumen (Fig. 11.1). The consequent reduction in renal perfusion activates the angiotensin system, causing hypertension which may be very difficult to control pharmacologically. Although it may progress, it rarely causes renal artery occlusion or renal dysfunction. The nature of the pathology makes it eminently suitable for treatment by angioplasty, with good and sustained long term clinical results (Surowiec et al. 2003).

Atheromatous renal artery stenosis is rather more complex. ARAS occurs in an older patient group than FMD, and as such its role in causing hypertension is much less clear cut. Most of these patients will have essential hypertension, which may even be a contributory cause of the atheroma which has lead to RAS. Despite this, however, it is clear that there is a group of patients in whom there is a renovascular component to their hypertension. This is usually apparent where blood pressure has become impossible to control adequately with drug therapy. Although cure of hypertension will not be possible, renal revascularisation may make pharmacological control easier.

Renal impairment may also be associated with ARAS, and in the author’s experience this is the most common reason for consideration of renal revascularisation. The most straightforward patient group are those who present with a rise in serum creatinine after commencing an angiotensin converting enzyme inhibitor (ACEI). If the patient requires treatment with this class of drug, and most with cardiovascular disease will benefit from such treatment, there is a strong case to perform renal revascularisation. Impaired renal function alone is not necessarily an indication for treatment. The trend in renal function is very
important in this setting. Patients with a stable serum creatinine may well be best left untreated, as that situation could persist for many years without progression to dialysis. In that setting, the risk of renal revascularisation is considered by most workers not to be justified. However, in the case of deteriorating renal function, there is a strong case for revascularisation, as without it the likely outcome is end stage renal failure and dialysis. This is especially true in cases of bilateral renal artery stenosis, or where there is a single kidney. It is probably not worth treating where the serum creatinine has risen above 300–350 μmol/l. Similarly, patients who are already receiving dialysis therapy are unlikely to benefit from renal revascularisation. The exception in both of these cases is where there has been a very rapid deterioration in renal function. In this instance long chronic renal damage may not yet have occurred, and if revascularisation can be performed within a few hours or days the results can be striking.

Finally so-called flash pulmonary oedema represents an infrequent but strong indication for intervention. The pathophysiology of this condition is not well understood, but it tends to occur in patients with coronary artery disease and either bilateral ARAS or ARAS affecting a single functioning kidney.

11.3 Investigation of RAS

Having identified a patient who is clinically suspected of having RAS, it then becomes necessary to investigate them. Several imaging techniques are available including conventional angiography, CT angiography (CTA), MR angiography (MRA) and finally captopril renal scintigraphy.

Conventional angiography is regarded by many as the “gold standard” technique. It has the disadvantages of being invasive, with the attendant complications, as well as requiring iodinated contrast media and ionising radiation. However, in the case of FMD, it is the only one of the techniques named above that has the spatial resolution sufficient to confidently exclude the diagnosis.

CTA also has the disadvantages of using ionising radiation and requiring iodinated contrast. The latter is a particular disadvantage in patients with diabetes and/or renal impairment, who are at higher risk of contrast induced nephropathy. For this reason CTA has become our second line for the non-invasive investigation of RAS. Nonetheless, particularly with the advent of multislice technology, CTA is capable of producing very high quality renal arteriograms. It provides a useful second line where MRA is not possible, for example in patients with cardiac pacemakers. CTA has a high sensitivity and specificity (90%–98%), and being a cross sectional technique provides information about the best projection angles to use when planning renal artery intervention (Fleischmann 2003). CTA is also of value in the assessment of restenosis within renal artery stents (Raza et al. 2004).

MRA is non-invasive and does not involve the use of iodinated contrast media. Non-contrast enhanced renal MRA using time-of-flight or phase contrast