Renal angiomyolipoma (AML) is a benign tumour in the kidney. It can occur sporadically, or it can be part of the tuberous sclerosis complex (TSC). It is identified increasingly due to increased use of medical imaging and advances in imaging technology. It contains fat and vascular components, occasionally small aneurysms are present. The fatty component is characteristic of AML and if fat is identified, its benignity can be established (fig 1a). In ultrasound, it appears as a well-defined echogenic lesion. The diagnosis can be more firmly established when fatty tissue is seen in CT, which appears as hypodense tissue with negative CT number. If fatty tissue is scanty, in-phase and out-phase T1-weighted sequences in MRI can be used to identify the fatty tissue1.

In sporadic AML, the number of AML is scanty. The lesion size usually remains static for a long time or it can grow slowly. In AML of TSC, it may grow faster, it is usually identified in adolescents and young adults. It has also been found in a child as young as 5 years old2,3.

The lesion usually remains asymptomatic and is usually identified incidentally, when medical imaging is performed for other causes. Another major mode of presentation is spontaneous rupture of the tumour (fig 2). The patient will have severe loin pain or back pain, drop in haematocrit and even hypovolaemic shock. The rupture is related to the aneurysms and vascular components. It can occur spontaneously, in patients on antiocoagulants, or in patients with trauma to the loin. Rupture has also been reported during pregnancy or in the post-partum period4-8.

Due to its benign nature, the treatment is usually conservative, especially when it is small and asymptomatic. 4cm is chosen in several series as the size to initiate treatment.

The treatment can be surgical treatment, interventional radiological (IR) treatment or a combination of these.

IR treatment is usually chosen when there is spontaneous rupture. Transarterial embolisation with particulate agents is usually used. Polyvinyl alcohol (PVA) particles or tris-acryl gelatin spherical particles are usually used. The bleeding segmental artery or arteries are identified with a CT angiogram before the procedure. CT is usually performed to indentify the bleeding cause and source of bleeding. Arterial phase is usually included in the study and the data can be used to construct a set of CT angiogram.9 Catheter angiogram is then performed before IR to identify the more distal branches and to confirm the bleeding segmental artery. The bleeding artery is then selectively catheterised with a 4Fr or 5Fr catheter, a smaller coaxial catheter may be used to reach the most distal arteries. Particles are then injected to block the bleeding artery.

Besides particles, liquid agents can also be used. The commonest agent is a mixture of absolute alcohol mixed with an only contrast, lipiodol, usually in the ratio of 2:1. This agent serves as an embolic agent as well as a sclerosing agent. The artery is sclerosed and further bleeding is prevented. The tumour can then be shrunken down by two-thirds to 40%10.

Transarterial embolisation is not only used during rupture, it can also be used in elective situation. It is usually performed when the tumour is bigger than 4cm, or when enlarged vessels or aneurysms are identified, which can be the source of bleeding11.
The effect of transarterial embolisation with particles is good and it preserves renal functions. Different series have shown that it will prevent further bleeding.\textsuperscript{12,13} Similar results are shown in transarterial sclerotherapy of the tumour.

Complications of transarterial embolisation and sclerotherapy are rare; non-target embolisation to other renal substance can damage some normal nephrons. Sometimes, this cannot be avoided as the supplying artery to the renal AML may be too small and superselective embolisation is not possible. Other rarer complications include renal abscess formation, tumour necrosis leading to lipiduria, pulmonary oedema after alcohol/lipiodol sclerotherapy.\textsuperscript{11,14-16} In a case report, embolisation with PVA particles alone may predispose to acute haemorrhage during or after embolisation.\textsuperscript{17}

After embolisation, the tumour does not disappear. The tumour size usually decreases by two-thirds to 40%. Recurrence of the tumour has been reported and repeated embolisations are occasionally needed, especially in patients with TSC.\textsuperscript{18,19} Thus, more aggressive IR treatments are occasionally used. Radiofrequency ablation of renal tumours has been proven as a useful nonsurgical treatment for small renal tumours. A radiofrequency probe or needle is inserted into the tumour and thermal energy is used to ablate the tumour.\textsuperscript{20} The most worrisome complication is thermal injury to the pelvicalyceal system and ureter. This complication can be severe for treatment of a benign tumour.

More recently, cryoablation has been used for ablation of renal tumours.\textsuperscript{21} The needles are small and they can be inserted safely into the tumour. Compressed helium and argon gas are used to include deep cooling surrounding the needle. The cells die when the temperature is below -40°C. The merit of this treatment is that it is less painful and the iceball can be monitored under CT or even MR. The size of ablation can be maintained accurately and injury to the collecting system is avoided.

In conclusion, IR plays a major role in the treatment of renal AML. Treatment is not always needed in small tumours. In tumour ruptures, urgent transarterial embolisation can save the life of patients.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig3a.png}
\caption{Catheter angiogram shows the supplying artery to the AML in the upper pole of the right kidney. This is the patient of fig 1a.}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig3b.png}
\caption{Absolute alcohol/lipiodol mixture is injected into one of the supplying arteries via a coaxial catheter through the original catheter.}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig3c.png}
\caption{Completion angiogram shows decreased tumour blood supply to the AML.}
\end{figure}

\section*{References}
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