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Guidelines for the Active Surveillance of Angiomyolipoma

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Background

Angiomyolipoma is the most common benign solid renal neoplasm observed in clinical practice. Once thought to be a hamartoma and almost always diagnosed by the imaged-based detection of fat, angiomyolipomas are now known to consist of a heterogeneous group of neoplasms (Jinzaki et al 2014).

Although all are considered perivascular epithelioid cell tumours, many display different pathology, imaging features, and clinical behaviour. The importance of under-standing this group of neoplasms is emphasized by the fact that many types of angiomyolipoma contain little to no fat, and despite being benign, sometimes escape a pre-operative diagnosis. These types of angiomyolipomas can all be considered when encountering a renal mass that is both hyper attenuating relative to renal parenchyma on unenhanced CT and T2-hypointense, features that reflect their predominant smooth muscle component. 5% of all AMLs have insufficient fat to allow characterization by conventional cross-sectional imaging, mimicking a renal-cell carcinoma (Kothary 2016).

There have been no prospective randomized trials comparing surveillance and treatment for AML. Most series including cases of renal AML managed by active surveillance have been relatively small, the majority of which have sporadic non-TSC[1] associated AMLs. These sporadic AMLs tend to exhibit a much slower growth rate through time compared to AMLs in patients with TSC.

In comparing growth rates between sporadic and TSC associated lesions Seyam et al found an interval growth rate of 0.19 cm yearly for sporadic AMLs and 1.25 cm yearly for AMLs in patients with TSC at a mean follow up of more than 3 years ($p < 0.05$).

There are no criteria currently for how frequently cases should be imaged when managed by surveillance. In the absence of guidelines the individual

[1] TSC = Tuberous Sclerosis

clinical scenario, including size of the lesion and whether the patient has TSC, should guide surveillance imaging protocols.

The recommendation historically has been that patients with AMLs larger than 4 cm undergo intervention, especially in the setting of TSC. This size threshold is based on retrospective series showing that patients with tumours larger than 4 cm more often experienced haemorrhage and other symptoms, had interval growth and required intervention more often than those with AMLs smaller than 4 cm.

The commonly used size threshold of 4 cm for intervention was first proposed by Oesterling et al (4), but a more recent study by Yamakado et al (5) showed that intratumoral aneurysms larger than 5 mm were more strongly associated with the likelihood of haemorrhage than was overall size. In fact, in this study, although the sensitivity for the 4-cm threshold rule was high, the specificity for predicting haemorrhage was only 38%, compared with sensitivity and specificity rates of 100% and 86%, respectively, for the presence of intratumoral aneurysm(s)

The management of classic angiomyolipoma is conservative; most do not grow and remain asymptomatic. However, some grow slowly, typically at a rate of 5% per year or 0.19 cm per year. Some angiomyolipomas, particularly those larger than 4 cm, may bleed spontaneously. Thus, although all classic angiomyolipomas are benign, some form of radiological follow-up may be indicated, even when they are asymptomatic. Oesterling et al. proposed an angiomyolipoma management algorithm based on tumour size and symptoms.

- **For small (<4 cm) asymptomatic tumours, observation with US every 12 months is suggested**
- **If the tumour is small and the patient symptomatic, treatment with arterial embolization or partial nephrectomy can be considered but observation is often favoured in clinical practice**

- **For symptomatic patients with large tumours, particularly those whose tumours have bled, treatment is generally recommended**.

For large tumours in asymptomatic patients, observation with CT or US is recommended. However, despite these recommendations, there is no consensus as to which asymptomatic angiomyolipomas, if any, need imaging surveillance.

To aid in which approach is best, and to better distinguish those patients at risk for haemorrhage, an **aneurysm size of 5 mm or larger has been found to predict bleeding** with a 100% sensitivity and 86% specificity, whereas a tumour size of 4 cm or larger resulted in sensitivity and specificity of 100 and 38%, respectively.

The main indications for treatment of an AML, be it minimally invasive or surgical, are haemorrhage, pain, or reduction of mass effect (Halpenny et al 2010). Treatment can be elective or emergent.

Several centres have suggested 4 cm as the limit above which elective treatment of an AML should be considered. In lesions greater than 4 cm, 82-94% are symptomatic and 50-60% bleed spontaneously at some stage. Significantly, when AMLs of this size bleed, as many as one-third of patients present in shock. It has been estimated that with tumours over 4 cm there is one bleeding episode every 3.4 patient years. Other predictors of future haemorrhage include multifocal tumours and significant vascular abnormalities within the AML.

Bibliography

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