SMALL RENAL MASSES

Indocyanine green cannot predict malignancy

Despite being able to differentiate renal tumours from surrounding parenchyma, the use of indocyanine green (ICG) dye during near infrared fluorescence imaging does not provide clinically useful information on the malignancy of renal masses, according to a new study from researchers at Wake Forest University, North Carolina, recently published in the *Journal of Endourology*.

> **❝ …ICG fluorescence could predict malignancy with a sensitivity of 84% and specificity of 57% ❞**

ICG has become a popular addition to the robot-assisted partial nephrectomy procedure owing to its reduced uptake in renal cell carcinoma cells compared with normal kidney tissue and renal vasculature. Near infrared fluorescence imaging can be integrated directly into the robotic surgery system, enabling surgeons to easily identify tumour margins and preserve as much renal parenchyma as possible. Whether or not ICG staining is associated with tumour histology and could be used to predict the malignancy of renal masses, however, remains unclear.

To address this issue, researchers assessed ICG fluorescence in 100 patients who underwent robot-assisted partial nephrectomy for clinically localized disease. A subjective fluorescence grading system was used whereby the renal masses were classified as afluorescent (no visible uptake of dye), hypofluorescent (uptake of dye but to a lesser extent than the parenchyma) or isofluorescent (uptake of dye at intensity indistinguishable from surrounding parenchyma). Fluorescence pattern was then compared with histology, revealing that ICG fluorescence could predict malignancy with a sensitivity of 84% and specificity of 57%.

Of the 86 solid lesions identified in this study, three were isofluorescent and 83 were hypofluorescent on near infrared fluorescence imaging with ICG. Hypofluorescent tumours were a mixture of malignant ($n = 65$) and benign ($n = 18$), corresponding to a positive predictive value of 87% and negative predictive value of 52%.

The authors conclude that although ICG might provide some additional information on renal masses—for example, all angiomyolipomas and cystic lesions were afluorescent—they are unable to recommend the use of ICG for predicting malignancy. CT and MRI are highly accurate for the identification of cystic versus solid masses, and ICG is associated with extra costs.

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All is not lost for ICG though, not only does it provide excellent visual contrast between renal tumours and parenchyma, but its increased uptake in the vasculature can improve the identification of hilar vessels, enabling selective arterial clamping. Indeed, previous studies have shown decreased warm ischaemia times in association with ICG. Further studies and future refinements to fluorescent imaging technology will undoubtedly increase its utility.

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Original article Manny, T. B. *et al.* Indocyanine green cannot predict malignancy in partial nephrectomy: histopathologic correlation with fluorescence pattern in 100 patients. *J. Endourol.* doi:10.1089/end.2012.0756