

Objectives: Artery-only occlusion (AO) has been used during nephron-sparing surgery to reduce ischemic damage. However, this has not been demonstrated in laparoscopic partial nephrectomy (LPN). We compared our experience with AO and both artery and vein occlusion (AV) in LPN to optimize the method of ischemia.

Methods: This retrospective case-control study identified 25 patients who underwent AO during LPN and matched them to a cohort of 53 patients who underwent LPN with AV. The groups were compared for ischemia time, blood loss, transfusion rate, and renal function.

Results: The 2 cohorts were comparable on demographic data. Blood loss was similar, with AO and AV demonstrating equivalent transfusion rates. The 2 cohorts had similar warm ischemia times. Positive margin rate was not affected by venous backflow in the AO cohort (0% AO vs 1.9% AV, $P = .679$). No significant postoperative change in creatinine (Cr) or creatinine clearance (CrCl) was seen for AO; however, a significant change in Cr and CrCl was seen in AV.

Conclusions: AO during LPN does not lead to a greater blood loss or an increased warm ischemia time. The benefit of AO on renal function is significant and requires further investigation.

Editorial Comment

Laparoscopic partial nephrectomy has evolved due to better laparoscopic instruments, high volume surgeons and institutions. Renal warm-Ischemia reperfusion injury remains a very controversial and complex issue without many answers. From optimal ischemia time to ameliorate injury to ideal temperature for renal cooling to preserve renal function are still big question marks. The idea of arterial clamping only allowing venous back flow leakage may cause less visualization and more bleeding but protective mechanism for warm-Ischemia reperfusion injury may be related to the possibility of leakage of adhesion molecules or oxygen radical scavengers that may cause protection but these issues need future investigation.

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IMAGING

Utility of PET/CT in differentiating benign from malignant adrenal nodules in patients with cancer

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Objective: The purpose of this retrospective study was to determine the sensitivity and specificity of combined PET/CT in differentiating benign from malignant adrenal nodules measuring at least 1 cm in diameter in patients with cancer.

Materials and Methods: We reviewed the radiology reports and images of patients with known malignant disease who had undergone PET/CT for cancer staging or surveillance and who had adrenal nodules at least 1 cm in diameter. We identified 112 adrenal nodules in 96 patients. Two-dimensional PET had been performed 1 hour after administration of (18)F-FDG. Unenhanced CT was performed for attenuation correction, to determine lesion size, and for coregistration with PET data. Adrenal nodules were considered to have a positive PET result if the average standardized uptake value was greater than that of the liver. Follow-up data and biopsy reports were used to determine the pathologic status of the adrenal nodules.

Results: Thirty adrenal lesions were malignant. Twenty-five of the 30 malignant nodules had positive PET results. Twelve of 82 benign nodules were PET positive with a sensitivity of 83.3% and specificity of 85.4%. Patients with four of five malignant nodules with negative PET results had received previous therapy. The positive predictive value for detection of malignant lesions was 67%, and the negative predictive value was 93%.

Conclusion: Adrenal masses that are not FDG avid are likely to be benign with a high negative predictive value. Especially in patients undergoing therapy, however, there is a small but statistically significant false-negative rate. A considerable proportion of benign nodules have increased FDG activity.

Editorial Comment

Accurate characterization of most adrenal lesions is usually obtained with either CT or MRI. The use of standard CT techniques (unenhanced CT attenuation and CT washouts-absolute percentage) isolated or combined with MRI techniques (“chemical shift imaging”, diffusion-weighted images and 3D-spectroscopy) are usually sufficient for the differentiation between benign and malignant lesion in the vast majority of adrenal nodules. Nuclear medicine studies prove to be useful adjuncts. Controversial reports have been published on the role of PET/CT in this clinical and radiologic setting because some adrenal adenomas and inflammatory / infectious lesions demonstrate slight increased radiotracer uptake. Similarly, necrotic or hemorrhagic malignant adrenal lesions occasionally may cause false-negative results.

The authors of this manuscript show that although with these few limitations PET/CT is useful for characterizing adrenal nodules. In our opinion, PET/CT should be used whenever CT and / or MRI techniques are not diagnostic. One important point to consider is that all these imaging techniques are complimentary and thus can be associated since they use fundamentally different biologic principles. Following this simplified algorithm, the use of image-guided adrenal biopsy will be in the near future used only in those rare patients where adrenal lesions remain indeterminate after CT, MRI and PET/CT techniques.

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Follow-up after percutaneous radiofrequency ablation of renal cell carcinoma: contrast-enhanced sonography versus contrast-enhanced CT or MRI

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Objective: The purpose of this study was to assess, with contrast-enhanced CT or MRI as the reference imaging technique, the diagnostic performance of low-mechanical-index contrast-enhanced sonography in detecting local tumor progression after percutaneous radiofrequency ablation of renal tumors.

Materials and Methods: Twenty-nine patients with 30 renal tumors (18 men, 11 women; mean age, 73 years; range, 53-83 years) underwent percutaneous radiofrequency ablation at a single center between March 1998 and January 2007. The imaging follow-up schedule was both contrast-enhanced sonography and CT or MRI 4 months after completion of treatment and every 4 months for the first year. Thereafter, the follow-up schedule was contrast-enhanced sonography every 4 months with CT or MRI every 8 months. The chi-square test with Yates correction was used to evaluate positive and negative predictive values and accuracy.

Results: One patient was scheduled to undergo surgical resection, and another patient was lost to follow-up. Twenty-seven patients with 28 renal tumors participated in follow-up. The concordance between contrast-enhanced sonographic and CT or MRI findings was 100% for 27 of 28 tumors (96.4%) that had a hypervascular pattern before treatment. In the case of the tumor that was hypovascular at imaging performed before percutaneous radiofrequency ablation, local tumor progression was missed at contrast-enhanced sonography. The sensitivity, specificity, positive predictive value, negative predictive value, and overall accuracy of contrast-enhanced sonography were 96.6%, 100%, 100%, 95.8%, and 98.1%.

Conclusion: Contrast-enhanced sonography is an effective alternative to CT and MRI in the follow-up of renal tumors managed with percutaneous radiofrequency ablation.

Editorial Comment

Percutaneous radiofrequency (RF) ablation and cryoablation are increasingly being used as minimally invasive treatments for renal tumors in patients whose condition is inadequate for surgery. Accurate imaging evaluation of ablated tumors is essential in order to detect the adequacy of treatment and to guide patient management. In comparison with normal renal parenchyma, renal tumors treated with RF ablation usually appear as low-attenuation regions at computed tomography (CT). On conventional magnetic resonance imaging (MRI) these treated lesions appear as areas with iso- to hyperintensity at T1-weighted imaging and area of hypointensity at T2-weighted imaging. After intravenous injection of contrast material, successfully treated renal tumors appear in either one method, as focal masses that demonstrate no evidence of contrast enhancement. These focal masses continue to decrease in size during the follow-up examinations. Residual or recurrent tumor is characterized by the presence of abnormal areas of contrast enhancement.

The authors of this manuscript compared the findings at real-time low-mechanical-index contrast-enhanced sonography with those at CT or MRI in the follow-up of patients with renal cell carcinoma treated with RF ablation. They showed that in patients presenting hypervascular tumors before treatment, contrast-enhanced sonography has similar accuracy to that of CT or MRI for the detection of local tumor progression. Hypovascular renal tumors however were not adequately assessed by this technique. Since the evaluation of perfusion patterns with contrast-enhanced ultrasonography using contrast-pulse sequence imaging is useful in the follow-up of cryoablated renal tumors, it seems that this method is an effective alternative to CT and MRI in the follow-up of renal tumors in patients in whom the use of iodinated or paramagnetic contrast agent should be avoided and in those with any other clinical condition that precludes the use of CT or MRI evaluation.

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