Published in final edited form as:

Cardiovasc Intervent Radiol. 2005 ; 28(5): 681–682. doi:10.1007/s00270-005-0018-z.

Radiofrequency Cauterization: An Alternative to Reduce Post-biopsy Hemorrhage

Sergio A. Dromi, Julie Locklin, and Bradford J. Wood

Diagnostic Radiology Department, National Institutes of Health, Building 10, Room 1C662, 10 Center Drive, Bethesda, MD 20892, USA

As recently described in animals [1], we applied radiofrequency ablation (RFA) to clinical practice as a technique to reduce the risk of bleeding after biopsy of a highly vascular tumor. A 26-year-old man was admitted for renal core biopsy. Prior fine-needle biopsy of a left kidney mass and a supraclavicular lymph node showed renal cell carcinoma of unknown subtype. Repeat biopsy was performed to diagnose histologic subtype, which can affect experimental treatment options. The patient had first presented 6 months previously with a 6 cm palpable cervical lymph node, weight loss of 9 kg, and fatigue with no hematuria. The CT scan revealed extensive lymphadenopathy throughout his mediastinum and left periaortic region, and a 6 cm left kidney mass with three liver metastases. Laboratory values were normal. A bone scan did not show evidence of metastatic disease.

Prior to biopsy, color Doppler ultrasound revealed a very vascular tumor with many large and small vessels throughout the tumor, suggesting increased risk of biopsy-related bleeding [3]. The patient underwent an ultrasound-guided coaxial core biopsy with a 17 gauge 10 cm outer needle and an 18 gauge 15 cm inner needle. Brisk bright red pulsatile blood was seen in the outer needle following removal of the inner core biopsy gun. The stylet was replaced as soon as the pulsatile bleeding was seen. Two grounding pads were rapidly applied to the patient's thighs and the tissue ablation system was set up. Just prior to removal of the outer biopsy needle, a Radionics (Valleylab, Boulder, CO) RFA probe (20 cm with a 3 cm uninsulated tip) was placed, using tandem technique, immediately adjacent to the biopsy needle and to the same insertion depth, under direct ultrasound guidance. The outer needle was then removed from the patient and the RFA Cool Tip generator (Valleylab, Boulder, CO) was turned on. Tissue was heated to 95°C for about 90 sec during slow withdrawal of the RFA probe, without chilled saline perfusion. The generator was stopped as the uninsulated portion of the needle was withdrawn from the tumor capsule, but prior to crossing dermis. No sign of bleeding was evident by ultrasound 15 min following the procedure or by clinical criteria the day following the procedure. The patient remained clinically stable during and after the application of this technique. The patient did not complain of pain after the procedure.

The pathology results showed clear cell carcinoma with papillary features. Five days later an excisional biopsy of a right arm tumor was performed. Results showed leiomyoma. Given the patient's extensive family history of malignancy (the father had a rare eye adenocarcinoma; 5 of 9 of the father's siblings had cancer, 2 of them renal cell carcinoma; and the mother's siblings had renal cell carcinoma, uterine, and esophageal cancers) the diagnosis of hereditary leiomyomatosis renal cell carcinoma syndrome (HLRCC) was made.

RFA may be a helpful therapeutic option to avoid the bleeding that may be seen in up to 90% of patients by CT [5] after a percutaneous renal biopsy, depending upon how one defines

bleeding. Less than 3% of renal biopsies require transfusion or an intervention to stop the bleeding [6].

Other therapeutic options available are transarterial embolization with polyvinyl alcohol or acrylic particles, collagen pledgets, autologous blood, or metal coils [3]. These techniques, however, do not address the possibility of needle tract seeding with tumor cells, in contrast to RFA in which the tract is treated [4].

Also, treatment with embolization may result in an undesirable infarct in a patient with already compromised renal function. While RFA has been emerging as a viable therapeutic option for certain renal cell carcinomas and has a definitive success rate over 90% with few complications in selected patients [2,4], it may be a low-risk, nephron-sparing method to facilitate hemostasis in the post-biopsy setting, especially when there is brisk pulsatile flow.

A modified biopsy device could easily be manufactured to facilitate use of post-biopsy cauterization to minimize risk of bleeding and needle-tract seeding for high-risk patients. Such a simple maneuver could be performed following any biopsy where needle tract seeding or bleeding were thought to be a higher risk, as might occur when brisk backbleeding is seen from the outer needle, or with uncorrectable coagulopathies, anticoagulation, hypervascular tumors, vascular organ biopsies (i.e., spleen), or with the larger core samples often required for genomic or proteomic analysis. Such a biopsy might be a safer alternative to transjugular liver biopsy as well, although this remains speculative.

References

1. Pritchard WF, Wray-Cahen D, Karanian JW, Hilbert S, Wood BJ. Radiofrequency cauterization with biopsy introducer needle. *J Vasc Interv Radiol* 2004;15:183–187. [PubMed: 14963187]
2. Tacke, Mahnken JAH. Percutaneous radiofrequency ablation of renal cell cancer. *Radiologe* 2004;44:358–363. [PubMed: 15048557]
3. Hall WH, McGahan JP, Link DP, deVere White RW. Combined embolization and percutaneous radiofrequency ablation of a solid renal tumor. *AJR Am J Roentgenol* 2000;174:1592–1594. [PubMed: 10845488]
4. Schaefer O, Lohrmann C, Harder J, Veelken H, Langer M. Treatment of renal cell carcinoma-associated dermatomyositis with renal arterial embolization and percutaneous radiofrequency heat ablation. *J Vasc Interv Radiol* 2004;15:97–99. [PubMed: 14709696]
5. Ralls PW, Barakos JA, Kaptein EM, Friedman PE, Fouladian G, Boswe WD, Halls J, Massry SG. Renal biopsy related hemorrhage: Frequency and comparison of CT and sonography. *J Comput Assist Technol* 1987;11:1031–1034.
6. Gonzales-Michaca L, Chew-Wong A, Soltero L, Gamba G, Correa-Rotter R. Percutaneous kidney biopsy, analysis of 26 years: Complication rate and risk factors. *Rev Invest Clin* 2000;52:125–131. [PubMed: 10846435][comment]

Fig. 1.
A Contrast-enhanced post-biopsy CT scan demonstrates highly vascular kidney tumor (arrow).