Clinical Use of a Three-Dimensional Tissue Marker to Target Post Lumpectomy Radiation

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Abstract:
• Background: A three dimensional bioabsorbable coiled tissue marker has been developed to facilitate targeting for radiation therapy post lumpectomy. Proposed advantages are a) clarified targeting of closest margins to the excised tumor, b) providing a three dimensional structure that allows fibrosis to add volume to contribute to cosmesis, c) aiding in re-excision localization. Our experience has demonstrated the array of clinical findings after placement, the imaging findings over time, and pathologic findings for early and late removal.

• Methods: Consecutive lumpectomy patients who were candidates for targeted radiation therapy were implanted with the 3-D bioabsorbable marker from May 2014 to June 2015. After informed consent, each of 36 patients were followed to gather clinical, imaging and pathologic findings. Standard breast cancer management decisions were made (NCCN). Patients requiring re-excision were examined for pathologic findings related to the device. Routine imaging with mammography and ultrasound were obtained at 6 and 12 months post lumpectomy.

• Results: The use of the spiral tissue marker with the fixed array of six titanium clips provided a predictable target for radiation treatments. As the tissue marker was sewn to the closest tumor bed, inadvertent dissection planes caused by oncoplastic techniques could be avoided. Clinically the lumpectomy site was firm/dense in 94% of patients at 3 months (n = 36), but in only 60% at one year (n = 21). Two patients who underwent re-excision for positive margins were guided by the 3-dimensional device. Two patients had removal at one month and at 12 months for reasons unrelated to the tissue marker. Histologic examination demonstrated typical foreign body reaction and organization. Mammography at one year demonstrated marker clips coalescing as the bioabsorbable device dissolves with maintenance of the volume of the cavity in 50% of patients. Cosmetic outcome has been good to excellent measured at 6 and 12 months.

• Conclusions: Clinical, radiologic and pathologic findings during use of a novel bioabsorbable 3-dimensional tissue marker were presented. A national registry to further define these attributes will soon be started.