

Focused Ultrasound Hones Breast Cancer Ablation

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SAN ANTONIO — Magnetic resonance-guided focused ultrasound shows great potential as a noninvasive means of ablating breast cancer, Dr. Yukiko Yasuda reported at a breast cancer symposium sponsored by the Cancer Therapy and Research Center.

Indeed, results of a published phase II 30-patient trial conducted by Dr. Yasuda and her coinvestigators were so favorable that a phase III Japanese trial is ongoing (J. Am. Coll. Surg. 2006;203:54-63). In addition, a 600-patient multinational study to include the Mayo Clinic, Rochester, Minn.; Johns Hopkins University, Baltimore; and Brigham and Women's Hospital, Boston, is on tap, said Dr. Yasuda of Breastopia Namba Hospital, Miyazaki, Japan.

MR-guided focused high-intensity ultrasound is a logical extension of the trend toward using breast-conserving therapy to lessen impact on quality of life.

The treatment achieves thermal tumor ablation by concentration of ultrasound

This approach should result in fewer scars and infections, and a faster recovery compared with conventional surgery. The downsides are the expense and lengthy treatment sessions.

pressure waves inside the breast without physical penetration. When applied properly, there is no clinically significant heating of skin or other tissues along the ultrasound beam's path. Using real-time, closed-loop contrast MR feedback to monitor temperature

changes at the target site, the operator can deliver destructive energy to a given point within 1 mm of accuracy.

In theory, this approach should result in fewer scars and less anesthesia, fewer infections, and faster recovery than with conventional surgical excision. Its disadvantages are the expense of the technology and the lengthy treatment session.

In the phase II study, a single 2-minute sonication destroyed 0.16-0.67 mL of tissue. Complete tumor ablation required an average treatment time of 2 hours, 20 minutes.

However, two major technical advances to be introduced in the near future should speed treatment time and accuracy. One is a boost in the number of focused ultrasound transducer elements from the current 208 to 2,000. The other is upfield high-spatial-resolution MRI. These developments will permit three-dimensional treatment planning and therapy, she said.

Dr. Yasuda reported on 22 breast cancer patients who underwent MR-guided focused ultrasound outside of a clinical trial. No adjuvant radiotherapy was used. The patients were followed with contrast-enhanced MRI and diagnostic ultrasound every 3 months for a median of 15 months.

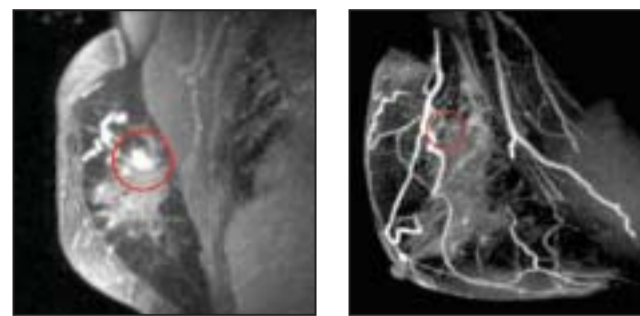
During that time, one patient developed a local recurrence of pure mucinous carcinoma. Playback of stored treatment records revealed the explanation: insufficient temperature rise in the treated primary tumor, probably because of the dampening properties of the mucus.

Operators can now induce a higher temperature spike in pa-

tients with this subtype of carcinoma to avoid repeating the problem.

Treatment was performed using InSightec's ExAblate 2000 ultrasound system integrated into a 1.5-Tesla GE Healthcare MRI scanner.

The ExAblate 2000 is approved by the Food and Drug Administration for treatment of uterine fibroids.



■ A contrast-enhanced MIP image shows a tumor (red circle) before (left) and after ablation (right).

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References:

1. Centers for Disease Control and Prevention (CDC). Preventing tetanus, diphtheria, and pertussis among adults: use of tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine: recommendations of the Advisory Committee on Immunization Practices (ACIP) and recommendation of ACIP, supported by the Healthcare Infection Control Practices Advisory Committee (HICPAC), for use of Tdap among health-care personnel. *MMWR*. 2006;55(RR-17):21-22. 2. CDC. Preventing tetanus, diphtheria, and pertussis among adolescents: use of tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccines: recommendations of the ACIP. *MMWR*. 2006;55(RR-3):22.

* Advisory Committee on Immunization Practices. † Tetanus, diphtheria, and acellular pertussis. ‡ 19-64 years of age. § 11-18 years of age.

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