

Definitive Diagnosis of Breast Implant Rupture Using Magnetic Resonance Imaging

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Breast implant rupture is an important complication of augmented and reconstructed breasts. Although several techniques such as mammography, xeromammography, ultrasound, thermography, and computed tomographic (CT) scanning have been proven to be useful to detect implant rupture, they have several disadvantages and lack specificity. In the current study, we have established magnetic resonance imaging (MRI) as a definitive, reliable, and reproducible technique to diagnose both intracapsular and extracapsular ruptures. The study was conducted in 100 symptomatic patients. Our imaging parameters were able to identify ruptures in implants with silicone shells. All the ruptures showed the presence of wavy lines, free-floating silicone shell within the gel ("free-floating loose-thread sign" or "linguine sign"). We had a 3.75 percent incidence of false-positive and false-negative results. The sensitivity for detection of silicone implant rupture was 76 percent, with a specificity of 97 percent. In addition, we also were able to identify the artifacts that may interfere with the definitive diagnosis of implant rupture. (*Plast. Reconstr. Surg.* 92: 681, 1993.)

At the present time, considerable controversy exists over the safety of breast implants. In addition, there is also a great concern about implant integrity. Rupture of the implant and leakage of free silicone are regarded as major side effects of implantation.¹⁻³ There are over 1 million women with breast implants at the present time (FDA data), and many of them have concerns about the safety and integrity of their implants, as well as other problems associated with the implants.⁴ The manufacturers of implants cannot provide any guarantee regarding implant

integrity, nor do they have any technique by which they can help the surgeon follow up his or her patients in relation to implant integrity.

Confusing this issue further is the fact that there is evidence for leakage of free silicone from intact implants ("bleed").⁵ Whether the leaked silicone causes systemic symptoms, rheumatologic symptoms, or connective-tissue disorders still remains to be resolved.⁶ However, it is imperative that a technique be available to follow the implanted patient so that any doubts regarding implant integrity can be cleared. Most patients are very anxious at the present time, and some of them want to know if their implants are (1) leaking, (2) ruptured, etc., particularly after aggressive management of capsular contracture (i.e., closed capsulotomy), which can cause implant rupture.^{7,8} Even when they ask their surgeons about this fact, the surgeons can only speculate about implant integrity. In most cases, clinical examination may not reveal confirmatory signs of rupture. Although previous authors have tried techniques such as ultrasound,^{9,10} subtle discontinuities on the implant surface potentially could be missed with these techniques because of limitation in their resolution capacities. In addition, capsular contracture may interfere with mammography.

The search for a technique that offers noninvasiveness with high resolution still continues. During the last 2 years, the UCLA Division of Plastic Surgery has seen over 200 patients with

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