

# Utilization of Radiofrequency Identification Tags for Localization of Nonpalpable Breast Lesions.

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## Introduction

The standard lesion localization method for nonpalpable breast lesions is hookwire; however, wire migration and same-day radiology-surgery department coordination can be problematic. With a radiofrequency identification (RFID) localization system, lesion localization can be scheduled days or weeks in advance of surgical excision, by eliminating the external component. This feasibility study compares surgical excision of nonpalpable breast lesions using RFID localization versus conventional wire localization in turkey and cadaver breasts.

**Objective: To assess the feasibility of using RFID technology to localize nonpalpable breast lesions.**

## Methods

- Endpoints to assess comparative performance of these two methods for both turkey and cadaver breasts comprised: 1) localization accuracy; 2) time to complete surgical excision; and 3) ability to achieve a margin.
- Three surgical residents performed lumpectomies in turkey breasts using both the RFID and hookwire localization methods.
- Two surgeons performed lumpectomies in cadaver breasts (for each, 6 lumpectomies guided by RFID and 6 lumpectomies guided by hookwire)

## Results

Key Findings - Turkey Breasts	Key Findings - Cadaver Breasts
<ul style="list-style-type: none"> <li>• Universal technical success was achieved with both methods</li> <li>• For surface localization, the horizontal offset was superior with hookwires</li> <li>• Excision times and volume of tissue removed were similar for both the RFID system and hookwires</li> <li>• Resident evaluations suggest that RFID-guided surgical excision is a user-friendly and accurate method for lesion localization that should be seen as a viable alternative to hookwires</li> </ul>	<ul style="list-style-type: none"> <li>• Excision time was slightly lessened with hookwires compared to RFID (4.23 ± 0.85 minutes versus 4.57 ± 1.92 minutes, respectively)</li> <li>• The RFID reader achieved localization accuracy within 1 cm (on average, 0.83 ± 0.10 cm)</li> <li>• RFID reader margin measurement was accurate within 0.29 ± 0.20 cm</li> <li>• With hook localization, 3 of 12 wires were observed to be exposed at hook portion</li> <li>• During tissue dissection, 1 of 12 wires dislodged completely</li> <li>• No RFID tags were exposed or dislodged</li> </ul>

## Conclusions

The RFID system is advantageous for its easy tag visualization, ability to reduce intraoperative imaging, and ability to indicate tissue volume around the marker, thus indicating a margin. Use of the RFID system for nonpalpable lesion localization is comparable in performance to wire localization. Participating surgeons highly rate the RFID system as easy to use and with potential clinical benefit. Clinical studies in human subjects are now needed to prove efficacy.