



# Prospective Trial of Magnetic Seed Localization of Clipped Nodes after Neoadjuvant Chemotherapy in Node Positive Breast Cancer

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## Introduction

- Clinically node positive patients often receive neoadjuvant chemotherapy (NAC)
- NAC can eradicate nodal disease in 40-80% of clinically node positive patients<sup>1-4</sup>
- There is considerable interest in minimally invasive techniques to identify patients that achieve a nodal pCR with NAC
- The use of sentinel lymph node dissection (SLND) to assess axillary response has a reported false negative rate of 12.6-14.1%<sup>4-6</sup>
- Targeted axillary dissection (TAD), which involves localizing and removing clipped nodes in addition to removing SLNs, has a reported FNR of 2%<sup>7</sup>
- TAD was initially reported using radioactive seeds for localization.<sup>8</sup> However, the use of radioactive seeds has a high regulatory burden which limits widespread use.
- Magnetic seeds may allow for localization of clipped nodes without the use of a radioactive source

## Study Goals

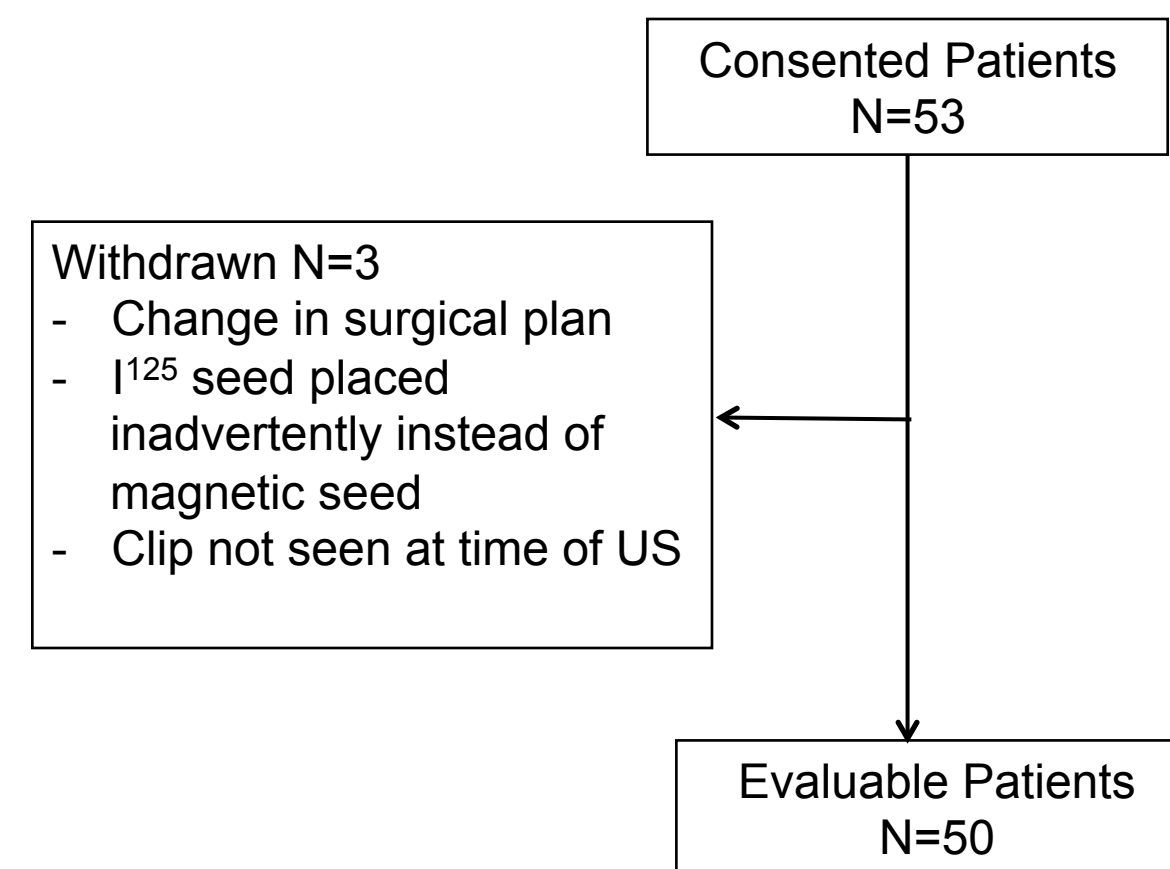
- Determine if magnetic seeds can be safely and effectively used to localize and remove clipped nodes at surgery
- Primary endpoint: Proportion of cases in which the clipped node and magnetic seed are retrieved within the same surgical specimen

## Methods

- Single institution, IRB-approved, prospective registry study
- Breast cancer patients with biopsy-proven axillary metastases with a clip placed in the biopsied node who received NAC were eligible
- Used Magseed®, a non-radioactive, magnetic-based seed that can be placed under ultrasound guidance and detected intra-operatively using the Sentimag® probe for node localization
- Magnetic seed was placed under ultrasound guidance in the clipped node up to 30 days prior to surgery.
- At surgery, all patients underwent TAD with selective removal of the clipped node using magnetic seed localization
- Specimen X-ray performed to confirm removal of clip and magnetic seed

## Results

### All Patients



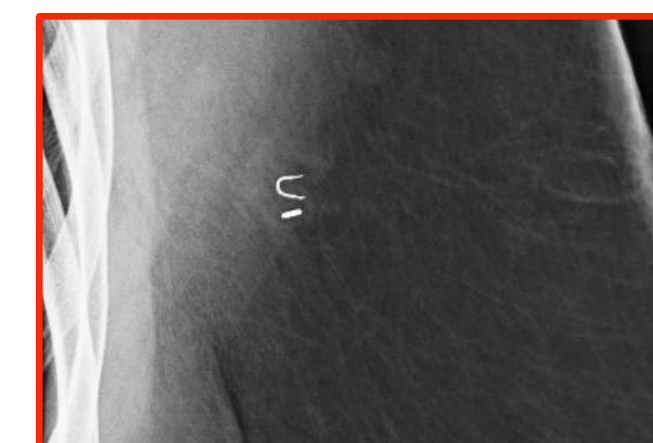
### Clinicopathologic Features

	N=50
<b>Clinical T Category</b>	
T1	13 (26%)
T2	27 (54%)
T3	8 (16%)
T4b	2 (4%)
<b>Number of nodes on US</b>	
1	19 (38%)
2	8 (16%)
3	12 (24%)
≥4	11 (22%)
<b>Histology</b>	
Ductal	47 (94%)
Lobular	3 (6%)
<b>Tumor Subtype</b>	
HR+/HER2-	26 (52%)
HR+/HER2+	10 (20%)
HR-/HER2+	5 (10%)
HR-/HER2-	9 (18%)
<b>Size of clipped node when biopsied</b>	2.2 cm (0.8 - 3.7)

### Magnetic Seed Placement

	N=50
<b>Number of radiologists placing magnetic seeds</b>	17
<b>Time for magnetic seed placement</b>	Mean 6.1 min Median 5 min Range 1-30 min
<b>Size of clipped node on last US</b>	1.5 cm (0.5 - 3 cm)
<b>Distance to skin</b>	Average 1.6 cm Range 0.5- 2.4
<b>Magnetic seed placed on first attempt</b>	50 (100%)
<b>Final position</b>	
Within the node	44 (88%)
In the cortex	3 (6%)
<3 mm from node	2 (4%)
By clip (node not well-visualized)	1 (2%)

Placement of magnetic seed within clipped lymph node



Radiograph of clip and magnetic seed within surgical specimen



### Surgery Features

	N=50
<b>Number of nodes retrieved with the magnetic seed specimen</b>	Mean 1.3 Median 1 Range 1-6
<b>Seed and clip in same specimen</b>	49 (98%)
<b>Seed stayed within the node for retrieval</b>	50 (100%)
<b>Clipped node a SLN</b>	40 (80%)
<b>ALND performed</b>	30 (60%)

### Surgical Localization

	N=50
<b>Number of surgeons</b>	10
<b>Surgeon-rated ease of transcutaneous localization</b>	
1 (easy)	43 (86%)
2	5 (10%)
3	0
4	0
5 (difficult)	2 (4%)
<b>Surgeon-rated ease of intra-op localization</b>	
1 (easy)	43 (86%)
2	3 (6%)
3	2 (4%)
4	1 (2%)
5 (difficult)	1 (2%)

- The magnetic seed was retrieved at surgery in all cases.
- In one case, the seed and clip were found in different nodes. In all other cases, the clip and magnetic seed were retrieved in the same node

## Summary

- Selective removal of clipped nodes can be accomplished safely and effectively with magnetic seed localization using Magseed®
- Magnetic seeds allow for the convenience of seed localization without the regulatory burden associated with radioactive seeds.

## References

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