

SentimagIC: A non-inferiority trial comparing superparamagnetic iron oxide with Tc99 and blue dye in the detection of axillary sentinel nodes in patients with early stage breast cancer

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The SentimagIC trial

Sentinel lymph node biopsy (SLNB) using radioisotope with or without blue dye is a highly accurate method for staging the axilla in clinically node-negative breast cancer patients¹.

However both techniques have drawbacks:

- Short half-life, availability, and handling issues for radioisotope;
- Risk of allergic reactions to blue dye.

There is a need for new agents for lymph node mapping.

The Sentimag system, an investigational device in the US, already trialled in Europe^{2,3}, uses a non-radioactive magnetic tracer and a handheld magnetic probe to identify sentinel nodes.

The Sentimag Intraoperative Comparison (SentimagIC) study compared magnetic lymph node detection with the standard combination of radioisotope and blue dye for breast SLNB.

Study Design

A pivotal, prospective, open label, multicenter, paired comparison of the magnetic technique with radioisotope with blue dye for lymph node localization in patients with breast cancer undergoing SLNB.

SiennaXP contains coated iron oxide nanoparticles. The particles are sized for lymphatic uptake and retention in lymph nodes. Nodes containing SiennaXP are magnetic and have black/brown coloration.

Methods

160 patients were enrolled at 6 centers across the United States between January and December 2015 and 147 were treated.

Clinically node-negative patients with breast cancer or DCIS were included. Exclusions included previous axilla surgery, hypersensitivity to isosulfan blue dye and intolerance or hypersensitivity to iron or dextran compounds.

Subjects received the magnetic tracer by sub-areolar injection at least 20 minutes before surgery, and isosulfan blue dye and technetium sulfur colloid according to local protocol.

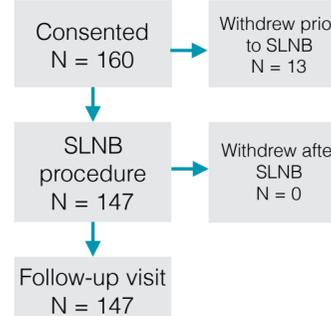
Sentinel lymph nodes were localized first using the Sentimag magnetic probe and then using the gamma probe. All blue, black/brown, radioactive or magnetic nodes were excised. Nodes were confirmed by histopathology and the nodal status determined.

Subject characteristics, n = 147			
Age, Median, years	62 (Range 35 - 88)	Tumor type, n/N (%)	
Weight, Median, lbs	160 (105 - 302)	Invasive	117/147 (79.6)
BMI, Median kg/m²	29 (18 - 52)	Non-Invasive / DCIS	18/147 (12.2)
Tumor status, n/N (%)		Other	12/147 (8.2)
pTis	13/135 (9.6)	ER status, n/N (%)	
pT1a	19/135 (14.1)	Positive	113/126 (89.7)
pT1b	30/135 (22.2)	Negative	13/126 (10.3)
pT1c	33/135 (24.4)	PR status, n/N (%)	
pT2	33/135 (24.4)	Positive	87/126 (69.0)
pT3	7/135 (5.2)	Negative	39/126 (30.9)
		HER2 status, n/N (%)	
		Positive	13/118 (10.3)
		Negative	105/118 (83.3)

Excised lymph node containing SiennaXP



Subject disposition



SiennaXP magnetic tracer



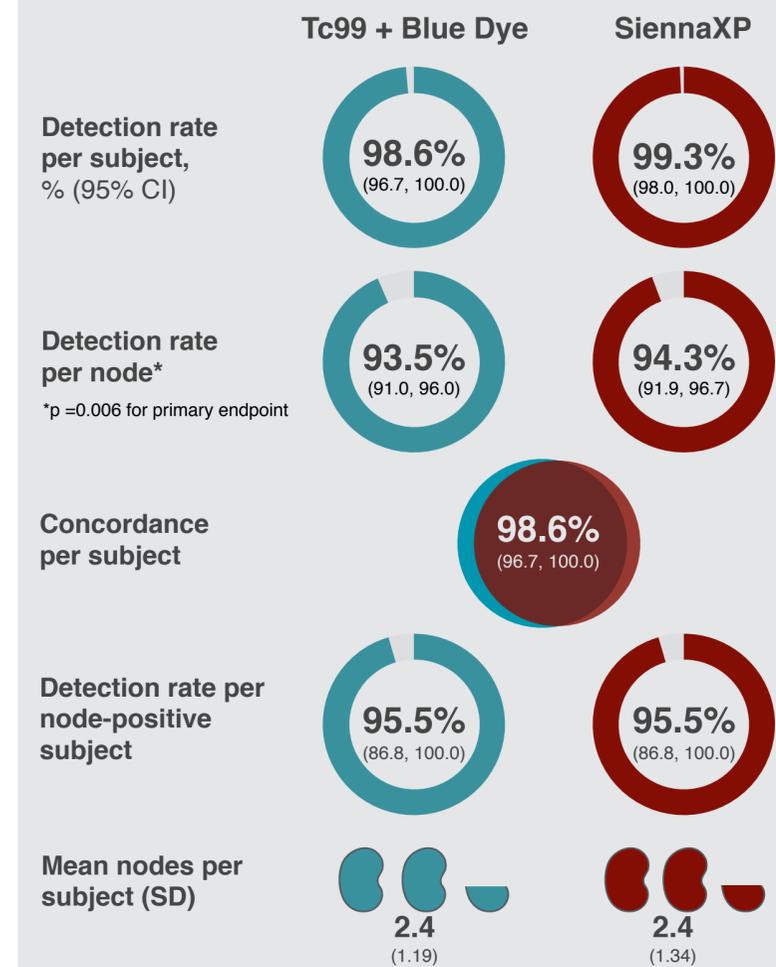
Sentimag probe

Results

Analysis of the primary endpoint showed a per node detection rate for SiennaXP of 94.3% and Control 93.5%. The difference in detection rates (SiennaXP – Control) = 0.8% (95% binomial CI lower bound = -2.1%), resulting in a P-value of 0.0065 for non-inferiority.

SiennaXP is therefore non-inferior to Control for lymph node detection within pre-specified non-inferiority margin of 5% with 85% power.

Results summary



22 subjects (14.%) were node positive (17 macro-metastasis and five micro-metastasis). Both radioisotope/blue dye and SiennaXP identified a node in 21/22 (95.5%) of these subjects. In one subject neither technique detected a malignant node.

A total of 69 adverse events were reported in 56 (38.1%) subjects, and of these, 9 (13.0%) were serious. The most common AEs were breast discoloration (24/69) and bruising/echymosis (10/69).

Conclusions

SiennaXP, a magnetically-detected tracer is non-inferior to the standard dual technique of radioisotope and blue dye for axillary sentinel lymph node detection in early stage breast cancer. This provides a potential alternative tracer for SLNB that avoids the drawbacks of radioisotope and blue dye.



Sentinel node biopsy with the Sentimag magnetic probe (left)

References

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3. Karakatsanis A, et al., The Nordic Sentimag trial. Breast Cancer Res Treat. 2016 Jun;157(2):281-94

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