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Comparison of three new wireless non-radiation techniques for localisation of non-palpable breast cancer - an updated systematic review and pooled meta-analysis

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Timma Subramanian, K¹; Elnour, A².

Corresponding author:

Kumaresh Timma Subramanian

drkumarts@gmail.com

Author Affiliation:

Warrington and Halton hospitals
NHS trust.

ADMINISTRATIVE INFORMATION

Support - No funding sought / no need.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 December 2023 and was last updated on 30 December 2023.

INTRODUCTION

Review question / Objective Although there are few systematic reviews of observational studies available to compare innovative techniques with wire-guided positioning, there is no consensus regarding the suitability of one over another. The lack of comparative evidence for these innovative techniques also complicates the life of the surgeon when choosing the ideal technique for breast conservation in non-palpable lesions. This study is simply an updated review to compare the safety and effectiveness of Magseed, RFID/TAG, Savi-scout along with WGL from published evidence between 2020 and 2022. The main goal is to assess margin and reoperation rates for breast conservation surgery using three novel non-radiation localising techniques.

Secondary goals include evaluating insertion and retrieval success rates of each technique and the average insertion time before surgery.

Condition being studied The method for finding non-palpable breast cancers has evolved due to technological advancements. New wire-free techniques have made implantation and retrieval easier with improved oncological outcomes. Although some evidences are available as to reduced requirement for re-operation with wireless techniques when compared to wire, in current clinical practice, the choice of selection amongst wireless technique depends on clinician preference and there is a lack of consensus. The objective of current systematic review and meta-analysis is to assess the clinical effectiveness between three new wireless non radiation localisation techniques,

such as Magseed (Magnetic seed), Radiofrequency identification tag (RFID) and Savi-scout reflector localisation from published literature over the last 3 years. Thorough literature searches as per PRISMA guidelines revealed twenty-six studies from 2020 to 2022 involving 6275 innovative agents analyzing the 3 groups were identified.

METHODS

Search strategy As per PRISMA recommendations.

Participant or population Patients with non palpable breast cancer.

Intervention Wireless non radio-active techniques x 3 (Magseed, Radiofrequency TAG & Savi-scout reflector).

Comparator Wire guided localisation.

Study designs to be included Systematic review and meta-analysis.

Eligibility criteria Population: Breast cancer, tumour, tumor Intervention: Localisation or Localisation, Magnetic marker or Magseed, Radiofrequency identification (RFID) or TAG localisation, Savi-scout reflector localisation Control: Wire guided localisation (WGL) Outcome: Margin positivity, Insertion success, Retrieval success.

Information sources EBSCO; MEDLINE – PubMed; COCHRANE; Gray literature; Abstracts; Google Scholar; Register for clinical trials - Completed.

Main outcome(s) Evaluation of positive margin and reoperation rates following breast conservation surgery using any of the three innovative wireless non-radiation localising techniques.

Additional outcome(s) To estimate the insertion and retrieval success of each innovative wireless technique and the mean time of insertion before scheduled surgery, in essence, the efficiency of these innovative wireless techniques.

Quality assessment / Risk of bias analysis The Robins-I tool was developed to evaluate the possibility of bias in estimates of the relative efficacy (harm or benefit) of therapies in studies where units (individuals or groups of individuals) were not randomly assigned to comparison groups.

Strategy of data synthesis The Medcalc software is a user friendly statistical software package for biomedical research that has integrated spreadsheet for data input. This software was used for statistical analysis for our study. In this review, both fixed and random methods are used to analyses and interpret the odds ratio, based on the character of the variable analyzed. In addition, for binomial outcome variable, average weighted proportion is also calculated using Medcalc software.

Subgroup analysis sub-group analysis with Kruskal-wallis test using SPSS software for each of the intervention studied.

Sensitivity analysis Not applicable.

Language restriction English.

Country(ies) involved United Kingdom.

Keywords Non-palpable breast cancer, localisation, Magseed, Radio frequency tag (RFID), Savi-scout reflector, Wire, systematic review, meta-analysis, margin, re-operation.

Contributions of each author

Author 1 - Kumaresh Timma Subramanian - first author - doing most of the project.

Email: drkumarts@gmail.com

Author 2 - Abdolazeem Elnour - screening, filtering, eligibility of studies with inclusion and exclusion criteria also, helping in proof reading.

Email: abdulazeem.elnour@wales.nhs.uk