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Abstract Title: The Radioactive Seed Localization And Wire Guided Localization For Impalpable Breast Cancer Surgery: Meta-analysis

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Introduction.

Impalpable breast cancer requires an intraoperative localization to guide the surgical procedure. The radioactive seed localization (RSL) technique uses the radioactive Iodine-125 seed, while wire guided localization (WGL) uses a metallic wire as a marker, implanting at the lesion site. The conservative surgery success depends on the tumor's complete excision with negative surgical margins. The objective of this study is to perform a meta-analysis of the surgical efficiency of both techniques, evaluating the rates of positive surgical margins, reoperation, and recurrence.

Methods.

The systematic research was performed in PubMed, Embase, LILACS, SciELO, and Web of Science. The terms impalpable breast cancer, breast surgery, radioactive seed localization, and wire-guided localization, were used for the search strategy. The selected studies went through a standard form of data extraction. The risk of bias tools, ROBINS-1 and ROB-2, were applied to analyze the bias risk and methodological quality. The Review Manager 5.4 software was used to perform the meta-analysis by the random effects analysis model.

Results.

Six randomized controlled trials and 32 cohort studies were included. The evidence overall quality was high for randomized trials and moderate for cohort studies. The population consists of women with non-palpable breast cancer, aged 22 to 92 years old. The results demonstrated an RSL superiority over WGL for the rates of positive surgical margin (relative risk (RR) 0.78, 95% confidence interval [CI]:0.70,0.88, 15,085 patients), reoperation (RR 0.71, 95% CI:0.61,0.84, 13,884 patients) and recurrence (RR 0.41, 95% CI:0.19,0.86, 1,525 patients, followed up for a period of 13-109 months).

Conclusions.

The RSL technique is a valid and superior localization method for surgical efficiency for patients with non-palpable breast cancer and can be applied in various indications for breast-conserving surgery with intraoperative localization. Furthermore, the longer interval between seed implant and surgery, due to the physical half-life of Iodine-125 is 59.4 days, offers greater organization flexibility to the radiology and surgery sectors, and to providing safety to those who undergo RSL before neoadjuvant chemotherapy and achieve a complete pathological response.