

## Original Article

Influence of previous breast surgery in sentinel lymph node biopsy in patients with breast cancer<sup>☆</sup>

V. López-Prior\*, R. Díaz-Expósito, I. Casáns Tormo

Servicio de Medicina Nuclear, Hospital Clínico Universitario de Valencia, Valencia, Spain

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## ABSTRACT

**Aim:** The aim of this study was to review the feasibility of selective sentinel lymph node biopsy in patients with previous surgery for breast cancer, as well as to examine the factors that may interfere with sentinel node detection.

**Material and methods:** A retrospective review was performed on 91 patients with breast cancer and previous breast surgery, and who underwent sentinel lymph node biopsy. Patients were divided into two groups according to their previous treatment: esthetic breast surgery in 30 patients (group I) and breast-conserving surgery in 61 (group II). Lymphoscintigraphy was performed after an intra-tumor injection in 21 cases and a peri-areolar injection in 70 cases. An analysis was made of lymphatic drainage patterns and overall sentinel node detection according to clinical, pathological and surgical variables.

**Results:** The overall detection of the sentinel lymph node in the lymphoscintigraphy was 92.3%, with 7.7% of extra-axillary drainages. The identification rate was similar after esthetic breast surgery (93.3%) and breast-conserving surgery (91.8%). Sentinel lymph nodes were found in the contralateral axilla in two patients (2.2%), and they were included in the histopathology study. The non-identification rate in the lymphoscintigraphy was 7.7%. There was a significantly higher non-detection rate in the highest histological grade tumors (28.6% grade III, 4.5% grade I and 3.6% grade II).

**Conclusion:** Sentinel lymph node biopsy in patients with previous breast surgery is feasible and deserves further studies to assess the influence of different aspects in sentinel node detection in this clinical scenario. A high histological grade was significantly associated with a lower detection.

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**Influencia de la cirugía mamaria previa en la biopsia selectiva del ganglio centinela en pacientes con cáncer de mama**

## RESUMEN

**Objetivo:** Revisar la aplicabilidad de la biopsia selectiva del ganglio centinela en pacientes con cáncer de mama y antecedente de cirugía mamaria previa, y examinar los factores que podrían influir en la detección del ganglio centinela.

**Material y métodos:** Revisamos retrospectivamente la biopsia selectiva del ganglio centinela en 91 pacientes con cáncer de mama dividiéndolas en 2 grupos según el antecedente quirúrgico de la mama: cirugía estética en 30 (grupo I) y conservadora en 61 (grupo II). Se realizó linfogammagrafía prequirúrgica tras inyección intratumoral en 21 casos y periareolar en 70. Se analizaron los patrones de drenaje linfático y la detección global del ganglio centinela según características clínicas, patológicas y quirúrgicas.

**Resultados:** La detección global del ganglio centinela en la linfogammagrafía fue del 92,3%, con un 7,7% de drenajes extraaxilares. La detección fue similar en el grupo I (93,3%) y grupo II (91,8%). En 2 pacientes (2,2%) detectamos ganglios centinelas en la axila contralateral, estando afectados en el estudio anatomopatológico. El porcentaje de no detección del ganglio centinela en

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\* Corresponding author.

E-mail address: [lopriive@hotmail.com](mailto:lopriive@hotmail.com) (V. López-Prior).

la gammagrafía fue del 7,7%. Se encontró una proporción de no detección significativamente mayor en tumores con mayor grado histológico (28,6% grado III, 4,5% grado I y 3,6% grado II).

**Conclusión:** Se puede realizar la biopsia selectiva del ganglio centinela en pacientes con antecedente de cirugía mamaria previa, pero serían necesarios más estudios para valorar la influencia en la detección del ganglio centinela de diferentes aspectos en este escenario clínico. Un elevado grado histológico se relaciona significativamente con una menor detección.

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## Introduction

Selective sentinel lymph node biopsy (SSLNB) is the standard procedure for axillary staging in patients with operable primary breast cancer without clinical involvement of the axilla.<sup>1</sup> The number of patients with stages I and II breast cancer who are candidates for breast-conserving surgery (tumorectomy, quadrantectomy) is on the rise. The increasingly more frequent use of neoadjuvant chemotherapy has contributed to this rise since it allows breast-conserving procedures to be used instead of mastectomies, and this approach reduces the resection volume, thereby improving esthetic results. On one hand this leads to the performance of a greater number of breast-conserving interventions while, on the other hand, the conserved breast tissue may be a source of second primary breast tumors or local recurrence.<sup>2</sup>

Independently of the surgical procedure performed, approximately 10–15% of patients undergoing breast-conserving surgery develop local recurrence within the following 10 years. Likewise, the risk of recurrence among patients undergoing mastectomy is from 5 to 10%.<sup>3–5</sup>

With the improvements and advances in breast-conserving treatment techniques, in the last years breast augmentation has become one of the interventions most frequently performed.<sup>6</sup> In general, the number of esthetic procedures performed has risen in the last decade, with the prevalence of breast augmentation and reduction, mainly for esthetic reasons, being the greatest. In Spain, breast augmentation represents 25% of all esthetic procedures carried out.

Therefore, the number of patients with breast cancer with a history of previous breast surgery, whether it be breast-conserving surgery or esthetic surgery, has increased.

Several authors<sup>7</sup> have questioned the feasibility of SSLNB in patients with a previous history of breast surgery. However, this procedure is accepted in the last consensus of the Spanish Society of Senology and Breast Disease as well as in the joint guidelines of the European and American Society of Nuclear Medicine.<sup>1,8</sup> Nonetheless, some studies suggest that previous surgical treatment may alter lymphatic drainage and give false negatives in the procedure.<sup>9,10</sup> Likewise, after breast surgery lymph drainage patterns may be toward non axillary regions or to the contralateral axilla.<sup>11</sup>

We review the applicability of the SSLNB technique in patients with previous breast surgery and evaluate the factors which might influence sentinel lymph node (SLN) detection.

## Material and methods

A total of 91 SSLNBs were performed from June 2008 to May 2016 in 90 women and one man ranging in age from 29 to 86 years (mean:  $55 \pm 11$  years), with breast cancer and a history of previous breast surgery. All the patients underwent a diagnostic study based on physican examination, mammography, ultrasonography and magnetic resonance (MR) of the breast, when considered necessary. The initial histologic diagnosis of the tumor was made in samples obtained by thick needle biopsy (TNB), and a radiologic marker was placed in the lesion.

The patients had the following diagnoses: invasive ductal carcinoma (classically known as infiltrating ductal carcinoma) in 66 cases, ductal carcinoma in situ (DCIS) in 17 and other histological types in 8 patients. The stages were T1, T2 and T3 and in all the cases the axilla was clinically, ultrasonographically and/or pathologically (if necessary, cytological or histological) negative. The mean tumor size was  $13.3 \pm 7.7$  mm ( $13.3 \pm 7.8$  in patients with previous esthetic surgery and  $13.3 \pm 6.3$  in the breast-conserving surgery group). Fourteen patients had received neoadjuvant chemotherapy (6 with a history of breast-conserving surgery and 8 with esthetic surgery). The mean body mass index (BMI) was  $26.2 \pm 8.2$ . The patients were grouped into immunohistochemical (IHC) profiles expressed by the tumor according to similar biological behaviors in luminal (luminal A + B), HER2 (luminal B-HER2 and pure HER2 tumors) and triple negative tumors. Table 1 shows the tumor laterality, distribution by quadrants, histological type and grade, the IHC profile and Ki67 expression.

The patients were divided into 2 groups according to the history of breast surgery. The first group was made up of 30 patients (33%) who had undergone esthetic surgery including: breast augmentation in 22 (73.3%), breast reduction in 6 (20%), oncoplastic surgery in 1 (3.3%) and mammary pexia in 1 (3.3%). The 60 patients (67%) in the second group had undergone breast-conserving surgical treatment (tumorectomy or quadrantectomy) without previous axillary surgery. In the patients who had undergone breast augmentation, the prosthesis was implanted at a retropectoral level in 86.4% (19/22) and at a prepectoral level in 13.6% (3/22). The surgical approach was transaxillary in 4 patients (20%), submammary in 5 (25%) and subareolar in 11 (55%).

The SSLNB was carried out by presurgical lymphoscintigraphy following the administration of 2 to 3.5 mCi (74–130 MBq) (depending on whether the surgery was done on the same day or the day after the injection) of <sup>99m</sup>Tc-albumin nanocolloid (Nanocol<sup>®</sup>, General Electric Healthcare-Bio-Sciences, SAU, USA, and Radiopharmacy Laboratory Ltd., Hungary) at a volume of 0.3 ml. Radiotracer administration was by periareolar injection in 70 patients. Twenty-one patients underwent intratumoral injection. Of these, the radiotracer was administered in the Nuclear Medicine Department in 9 patients with a palpable tumor, and in the remaining 12 patients with unpalpable tumors the radiotracer administration was ultrasonographically or stereotactically guided in the Department of Radiology. In the cases showing no migration after the initial intratumoral injection, another injection of 1 mCi (37 MBq) of the radiotracer was made at a periareolar level.

The images were obtained with a dual head gamma camera (Philips Brightview, Best, the Netherlands) with a low energy high resolution (LEHR) collimator, and energy window of 140 keV ( $\pm 10\%$ ), a matrix of  $256 \times 256$ , with early planar (30 min postinjection) and delayed projections (120 min) and a dynamic study when possible. Lead protection was used on the injection point with breast traction toward the midline in cases with overlapping of the injection point and the probable zone of lymph node drainage.

After SLN identification the skin of the theoretical zone corresponding to the projection of the SLN was marked with a waterproof marker. The patient was then sent to the operating

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