

# Use of axillary ultrasonography in breast cancer: a useful tool to reduce sentinel node procedures



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## Use of axillary ultrasonography in breast cancer: A useful tool to reduce sentinel node procedures

**AIM OF THE STUDY:** *The lymphnode sentinel method is today used for staging the axillary lymphnode stations. Ultrasonography is widely available and inexpensive method to study axillary status.*

**METHODS:** *One hundred fourteen patients were studied consecutively using axillary ultrasonography and ultrasound guided fine needle aspiration of the lymphnode. We used ATL Ultramark 9 with 5-7,5 MHz multiple frequency linear probe or Aloka SSD-1400 with 7,5 MHz linear probe.*

**RESULTUS:** *One hundred fourteen patients were examined; six were excluded because of definitive histological diagnosis of non-infiltrating carcinoma. 106 had monofocal carcinomas, 2 had bifocal carcinoma. in 104/108 ultrasonography was carried out successfully. The axillary cytological examination was positive in 18 cases (17.3%) who were subjected to axillary examination. 86 patients were subjected to sentinel lymphnode biopsy :positive 13 cases (6 micrometastases). 31 cases/104(29.8%) showed positive axilla. Sensitivity of ultrasonography was 58%, 100% specificity. Predictive positive value 100%, Negative value 84.9% for an accuracy of 87.5%.*

**DISCUSSION:** *Ultrasonography is useful in all cases eligible to sentinel lymphnode examination ; the minimum cost of the procedure and of the human resources is amply rewarded by the direct indication for surgical axillary dissection in case of a positive result (17.3 % in our experience).*

**KEY WORDS:** Axillary ecography, Axillary dissection, Breast cancer, Fine needle aspiration, Sentinel lymphnode.

Lymph node biopsy is the method used today for staging the axillary lymph node stations of patients suffering from breast cancer or in case of a suspected situation. The sentinel lymph node concept envisages removal of the first axillary lymph node which stands "guard" in the mammary parenchyma region affected by the disease, therefore designated to collect the lymphatic flow of the neoplastic nodule or to be examined.

In the last few years, the use of this method, mediated by experiences with other diseases (skin melanoma, tumours of the testicle/vulva) spread rapidly since it is minimally invasive, is encumbered with very few complications, while at the same time representing the patient's axillary status<sup>1-3</sup>. The small amount of lymphatic cell tissue that is removed causes very little surgical trauma at the axillary level with consequent reduction of the incidence of post surgical oedema, irradiated pain and paraesthesia that always accompany radical axillary lymph node dissection.

The initial difficulty in making these data homogenous arose from the search for a method which is common and standardized in its application as well as in the interpretation of the histological specimens. A colloidal albu-

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min tracer and methylene blue or an association of the two was used. If the sentinel lymph node response is negative, the axillary lymph node dissection is avoided, thereby drastically avoiding the morbidity of surgery. If the result is positive, axillary lymph node dissection is carried out.

This technique is, however, quite complex and expensive, especially in terms of human resources engaged; it would, therefore, be desirable to reduce the cases to be subjected to sentinel lymph node biopsy by means of a method which allows pre-operative identification of the axillary lymph nodes by relieving, if positive, the pathological anatomy from unsuitable cryosection procedures, as well as the nuclear medicine of futile lymphoscintigraphy tests, as well as surgery from the time required for carrying out sentinel lymph node biopsy and the response time of the cryosection procedure.

Ultrasonography is a widely available and inexpensive method, and is most of all ideal for guiding needle biopsy, if necessary. A cytological and micro-histological diagnosis is, in fact, indispensable to unequivocally show a positive axilla in order to be able to proceed with axillary node dissection.

The ultrasound aspect of lymph nodes is rarely pathognomonic of benignity or malignity, and in most cases it is difficult to interpret<sup>4-11</sup>. In past experiences, axillary ultrasonography accompanied by ultrasound-guided fine needle aspiration of suspect or positive lymph nodes has been capable of identifying between 1 and 26% of positive cases<sup>12-15</sup>. The cytological examination makes it possible to obtain 100% specificity in case of positiveness. On the basis of these considerations, we tried to increase the sensitivity of the method by applying ultrasound-guided lymph node fine needle aspiration in all cases, independently of the ultrasound aspect.

## Materials and methods

We have studied all patients with cytological or micro-histological diagnosis of breast cancer and eligible for sentinel lymph node biopsy using axillary ultrasonography and ultrasound-guided fine needle aspiration of the lymph node.

The criteria for eligibility to the study included the clinical negativeness of the axilla, monofocal tumours (bifocal tumours were allowed provided they were at a distance of less than 2 cm from one another).

After surgery, patients with histological findings of carcinoma in situ were excluded from the case studies.

All the patients were studied using axillary ultrasonography and fine needle aspiration of the lymph node, except for cases where no axillary lymph node structures were identified.

At least the altered lymph node<sup>16</sup>, or if equally suspect, the one nearest to the mammary nodule was aspirated. Cytological assistance was available to check the adequacy of the specimen after rapid staining of a slide.

In case of a suspicious finding or a positive or negative result following rapid staining, a second lymph node was removed by fine needle aspiration.

Ultrasonography was carried out using ATL Ultramark 9 with a 5-7.5 MHz multiple frequency linear probe or an Aloka SSDD-1400 with a 7.5 MHz linear probe.

Fine needle aspiration was done after obtaining informed consent for the method, using a 21 G needle fitted on a 20 cc syringe or by means of a Cytomat aspirator.

The cytological specimens were stained using the May-Grunwald-Giemsa method.

Where the cytological technique revealed lymph node metastases, the patients were sent directly for axillary dissection. If the cytological result was negative, the next step was sentinel lymph node biopsy.

The classification adopted after surgery and the histological examination was the pTNM.

## Results

One hundred and fourteen (114) patients were consecutively examined in our surgical Unit. Six cases were excluded because of definitive histological diagnosis of non-infiltrating carcinoma. Of the 108 eligible cases, 106 had monofocal carcinomas, while 2 had bifocal carcinomas. There were 106 females and 2 males, the average age being 61 years.

The histological features are given in Table I.

In 104 of the 108 patients, ultrasound-guided fine needle aspiration was carried out successfully; in two patients ultrasonography did not reveal any lymph nodes, one patient refused the aspiration, and in one case the specimen material obtained was insufficient for diagnosis.

The results of the correlation between the ultrasound-guided fine needle aspiration and the axillary histological examination are summarized in Table II.

The axillary cytological examination gave a positive result in 18 patients (17.3%) who were directly subjected to axillary dissection. In all the cases, the histological examination confirmed the positiveness (1 micrometastases).

The remaining 86 patients were subjected to sentinel lymph node biopsy which turned out to be positive in

TABLE I - Percentage of distributions on the definitive histologic examination

Hystotype	Stage	Grading
Ductal 66.6%	pT1a 0.9%	G1 26.9%
Lobular 16.6%	pT1b 22.2%	G2 44.4 %
Mixed 10.4%	pT1c 47.2%	G3 28.7 %
Tubular 3.8%	pT2 29.7%	
Mucoid 1.9%		
Others 0.9%		

TABLE II - Results from the correlation between cytologic and histologic examination

	HYSTO+	HYSTO -	TOT
CYTO+	18(TP) 1 microm	0(FT)	18
CYTO-	13 (FN) 6 microm	73 (TN)	86
	31	73	104

TP= True Positive; FN= False negative; FP= False Positive; TN= True Negative

Sensibility= 58,06%; Specificity= 100%  
 Predictive value positive= 100%; Predictive value negative= 84,9%  
 Accuracy= 87,5%.

13 cases (6 micrometastases). Of a total of 104 patients, 31 cases (29.8 %) showed positive axilla.

The sensitivity of the method was, therefore, found to be 58.06 % with 100% specificity. The predictive positive value was 100% while the negative value was 84.9% for an accuracy of 87.5%

## Discussion

The involvement of the axillary lymph node stations remains the most important parameter for breast cancer staging.

In the last few years, there has been a rapid and widespread growth of the sentinel lymph node biopsy method. However, some authors have highlighted in literature how experiences show up to 20% false negatives with the cryosection procedure<sup>15</sup>.

In patients eligible for sentinel lymph node biopsy, there are further indications in relation to the basic pre-operative evaluation in favour of the pre-operative axillary ultrasound examination, including the need to exclude involvement of many axillary lymph node stations where there is higher risk of false negatives and a possible particular clinical situation defined as neo-sentinel node<sup>17</sup>, reported by Van Rijk. This hypothesis is based on the possibility that the real sentinel lymph node may be in such an advanced stage of metastasis as to have low lymphatic flow. The lymphatic drainage would therefore be deviated towards another lymph node which is, however, not yet touched by the disease ("neo sentinel node"). Because of the ultrasound features of the real sentinel lymph node, ultrasonography could therefore be found to be involved in the diagnostic process, allowing cytological examination by fine needle aspiration.

We have tried to validate our experience by introducing a new fast and widely used, minimally invasive method, which would make it possible to carry out certain intra-operative lymph node biopsies using the sentinel lymph node biopsy method by selecting pre-operative ultra-

sonography for axillary staging because of the wide possibility of the method, the limited costs of the examination, its non-invasiveness, the rapidity of execution and because it is the ideal guide for conducting a cytological examination using fine needle aspiration. This method limits the involvement of multiple disciplines within the hospital structure, a fundamental point for rapid management of the examination and cutting down costs and waiting lists<sup>18,19</sup>. In our experience, we avoided resorting to the sentinel lymph node method in 17.3% of the patients examined following an already positive result given by the cytological examination during axillary ultrasonography.

In the light of our experience conducted in our surgical Unit in collaboration with a multidisciplinary team of the Parma Hospital-University, we can state that axillary ultrasonography must be carried out in all patients eligible for sentinel lymph node biopsy according to the guidelines of this method.

Fine needle aspiration carried out in all the cases increased the sensitivity of the method by up to 58% . In conclusion, we believe that it is useful to carry out axillary ultrasonography in all the patients associating it with a cytological examination by fine needle aspiration. The minimum cost of the method and of the human resources is amply rewarded by the direct indication for surgical axillary dissection in case of a positive result. If negative, the patients will, however, be eligible for surgical sentinel lymph node biopsy, thereby reducing the risk of false negatives.

## Riassunto

SCOPO DELLO STUDIO: La metodica del linfonodo sentinella è oggi utilizzata per lo studio delle stazioni linfonodali ascellari nelle pazienti affette da carcinoma mammario.

METODI: Sono stati studiati consecutivamente 114 pazienti utilizzando lo studio preoperatorio ecografico ascellare e la citologia ecoguidata dei linfonodi ascellari. Abbiamo utilizzato strumento ATL Ultramark 9 con sonda a multi frequenza lineare da 5 - 7,5 MHz o Aloka SSDD-1400 con sonda lineare da 7,5 MHz.

RISULTATI: Sono stati esaminati 114 pazienti ;6 sono state escluse poichè la diagnosi istologica definitiva era risultata di carcinoma non infiltrante. 106 avevano carcinoma monolocale, due carcinoma bifocale. In 104/108 lo studio ecografico ascellare è stato condotto con successo. In 18 casi è risultato positivo (17,3%). 86 casi furono sottoposti a metodica del linfonodo sentinella: positivi 13 casi (6 micrometastasi). 31 casi su 104 (29,8%) evidenziavano la presenza di positività ascellare. La sensibilità dell'ecografia è stata pari a 58%, la specificità pari al 100%. Il valore predittivo positivo pari al 100%, il valore predittivo negativo pari a 84,9 %con una accuratezza di 87,5%.

DISCUSSIONE: L'ecografia è di aiuto in tutti I casi in cui si può seguire la metodica del linfonodo sentinella; il costo della metodica e delle risorse umane è ridotto ed è ampiamente compensato dalla possibilità di dare una indicazione diretta verso l'esecuzione della linfadenectomia ascellare nei casi positivi preoperatoriamente (17,3 % nella nostra esperienza).

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