EDITORIAL

Current Status of Lymphatic Mapping with Sentinel Lymph Node Biopsy (SLNB) in Cutaneous Melanoma

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Sentinel lymph node biopsy (SLNB), a procedure known as lymphatic mapping with sentinel lymph node biopsy, was developed, described and published by Donald Morton and Alistair Cochran in 1992. It is based on Cabañas’ early works in patients with penile cancer, and is current standard procedure for the staging of patients with cutaneous melanoma with Breslow depth greater than 1 mm without palpable lymph nodes in the lymphatic drainage zone. It is one of the most important advances in oncologic surgery in the last decades: not only did it put an end to the existing controversy to decide between elective and therapeutic dissection in intermediate thickness melanoma, but its implications have been such, that the technique is already essential for lymph node staging in many other neoplasms, especially breast cancer, non-melanoma skin cancer and head and neck mucosal cancer.

It is a minimally-invasive technique that, although not without complications, these are obviously less common compared with those occurring in patients undergoing elective lymph node dissection thus allowing, with a lower rate of complications, to classify patients with stage I and II cutaneous melanoma by risk based on the presence or absence of subclinical (not previously identified) lymph node metastases.

However, for lymphatic mapping and SLNB to be useful and meet its purpose, and for staging to be real, it has to meet some requirements; at least 5:

1. Taking care of technical aspects that enable a high rate of sentinel lymph node (SLN) identification and minimal false negative rate.
2. Low rate of complications.
3. Adequate histological assessment, including immunohistochemistry.
4. Cautious interpretation of the study sensitivity.
5. Adequate selection of patient candidates for the procedure, including the diagnostic procedure.

The technique lymphatic mapping with SLNB is carried out with is essential to ensure adequate identification of the first node that drains the tumor. The combined technique (dye and radiocolloid) is with no doubt the standard procedure and has to be carried out during the primary tumor resection. If the pigmented lesion has been previously split, the biopsy should not be broad and no reconstruction of the area should be made (flaps or grafts).

The pursued objectives with an adequate biopsy and mapping technique are to obtain a high identification rate and a minimal false negative rate.

Currently, SLN accepted identification rate is 99.4%, and false-negative rate depends on primary tumor Breslow level, with 4.8% in patients with intermediate melanoma and 10.5% in those with thick melanoma, based on the results obtained in D. Morton’s MSLT-1 trial.

The critical points to be followed for an adequate identification of the true SLN are: the first station lymph node zone must be free of palpable lymph nodes; it is advisable to have an ultrasound not showing lymph nodes with suspected metastasis and, if this is the case, ultrasound-guided fine aspiration biopsy should be performed; biopsies with broad margins, with grafts or with flap rotation of any kind should be avoided; use of perilesional colloidal rhenium sulfide on the eve of the intervention or even two hours prior to the intervention.

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procedure; performance of preoperative scintigraphy (bidi-
mensional image), which allows for anatomic localization
(tridimensional identification can be made with SPECT-CT,
ever at sites with complex drainage such as the head
and neck), which allows for the drainage site to be identi-
fied on the skin; use of perilesional dye at least 10 minutes
prior to the procedure and once the incision on the lymph
node area is made; and intraoperative palpation of it to rule
out by touch the presence of suspicious lymph nodes that
have not received the colloid or dye (Dr. Merrick Ross verbal
communication). Following these steps enables the highest
identification rate possible.

The false negative rate is minimized by following the
above steps and adding an adequate histopathological study
that allows for sub-microscopic metastases to be identified.
Avoiding the study with frozen sections is recommended and
waiting for definitive assessment. Negative SLNs with con-
ventional testing (hematoxylin and eosin staining) should be
analyzed with immunohistochemical staining (HMB-45 and/
or Melan-A).

The probability of having a metastatic SLN ranges from
5% to up to 40% and depends mainly on Breslow’s level and,
although other factors have been associated, these are not
yet clearly defined and are the subject of controver-
sy; these include Clark’s level, anatomic site (higher risk in
head and neck melanomas), primary tumor regression, ul-
ceration (probably the second most important factor after
tumor thickness), lymphovascular invasion, mitotic index
(in those with Breslow’s level lower than 1 mm) and age
(it is metastatic more frequently in subjects younger than
20 years and it rarely contains metastases in those older
than 80 years).

Both retrospectively and, recently, prospectively1, the
prognostic value of SLN has been confirmed and SLN his-
tological status is therefore an independent factor, just as
tumor thickness. This way, in patients with 1.2 mm or higher
Breslow melanomas, survival is lower, and disease-free in-
terval is shorter in patients with metastatic SLN when com-
pared with those whose SLN is negative for metastasis.

On the other hand, SLN therapeutic value is poor, i.e.,
the possibility for lymphatic mapping and SLNB to prevent
neoplastic progression in patients with metastatic SLN is
questionable. In the MSLT-1 trial, survival was not better in
patients undergoing SLN biopsy compared with those who
remained under observation, and disease-free interval was
only 7% better in intermediate melanomas and 10% in thick
melanomas, i.e., patients undergoing lymphatic mapping
and SLNB have a lower relapse index at the mapped zone
compared with those who remain under observation.

In patients with metastasis-positive SLN, the number, as
well as the size and site of metastasis are prognostic factors
for recurrence and survival.

Patients with thin melanomas of less than 1 mm Breslow
thickness have very low possibilities of metastasis to the
SLN, 5.2% on average, and lymphatic mapping with SLNB
is therefore not indicated. However, there are subgroups
where the procedure should be considered. Probably the
factor that most accurately predicts the presence positive
SLN in melanomas with less than 1 mm thickness is tumor
thickness: mean SLN metastasis in patients with less than
0.75 mm to 1 mm it is 2.9%, and in those with 0.75
mm to 1 mm it is 7.1%.

Other factors that influence and increase the probability
of metastatic SLN in patients with thin melanomas include
mitotic index higher than 1 mitosis/mm², lymphovascular
invasion, ulceration (infrequent in thin melanomas), tumor
lymphocytic infiltration and regression, with all these being
factors that have to be taken into account when deciding be-
tween lymphatic mapping with SLNB or surveillance. For some
authors, the possibility of metastatic SLN in the presence of
at least one of the above mentioned factors is as high as 18%.

Unlike intermediate melanomas, the prognosis is not
changed by SLN histological status in patients with melano-
mas with less than 1 mm Breslow thickness.

In patients with metastasis to the SLN, worldwide con-
sensus is to perform complementary lymphadenectomy of
the area regardless of the type of metastasis, although fac-
tors such as the number of metastatic SLNs, the presence
of parenchymal and non-subcapsular metastases, ulceration
and tumor thickness are currently known to be directly
proportionally associated with the possibility of metastat-
ic non-sentinel lymph nodes. However, metastatic SLN-relat-
ed complementary lymphadenectomy current value lies in
that an average of 21% of these patients will have meta-
static lymph node at dissection, which allows for them to
be stratified by recurrence risk; i.e., those with metastasis
in non-sentinel lymph nodes have worse survival and dis-
 ease-free interval than those with metastases restricted to
the SLN and eventually might be candidates for adjuvant
therapies or clinical trials.

In summary, lymphatic mapping with SLNB has been in-
stituted as the standard approach for lymph node staging in
patients with cutaneous melanoma with Breslow thickness
of more than 1 mm. If there is no possibility to perform it,
there are two attitudes that can be adopted: to keep the
lymph node zone under surveillance or to refer the patient
to centers or groups that do it with adherence to interna-
tional standards (this attitude is preferred).

Lymphatic mapping and SLNB is not indicated in stage
0 or less than 0.75-mm thick melanomas or in those thin
melanomas between 0.75 and 1-mm thickness, except if in
the patient other risk factors coexist, although these are
not yet adequately established. The key to attain success is
adhering to the recommended technique since the diagnos-
tic process.

Finally, evidence shows that in patients with metastatic
SLN the behavior to be followed is to complete the lymphad-
enectomy of the lymph node area undergoing mapping.

REFERENCES

1. Gallegos JF. ¿Qué es el ganglio centinela? Con cepcio y aplicaciones en
2. Morton DL, Wen DR, Wong JH, Economou JS, Cagle LA, Storm FJ,
Foshag LJ, Cochran AJ. Technical details of intraoperative lymphatic
zapping for early stage melanoma. Arch Surg 1992;127:392-399
3. Nieweg OE, Uren RF, Thompson JF. The history of sentinel node biopsy.
Cancer J 2015;21:3-6
DF et al. Final trial report of sentinel-node biopsy vs nodal observation
5. Balch CM, Thompson JF, Gershenson J. Age as a predictor of senti-
nel node metastasis among patients with localized melanoma: an in-
verse correlation of melanoma correlation and incidence of sentinel
node metastasis among young and old patients. Ann Surg Ocol