Opinion and debate

Selective biopsy of sentinel node in melanoma. Survey results of nuclear medicine services in Spain

Biopsia selectiva de ganglio centinela en el melanoma. Resultados de encuesta en servicios de medicina nuclear de España

R. Díaz-Expósito a, d, *, S. Vidal-Sicart b, d, M.E. Rioja-Martín c, d

* Corresponding author.
E-mail address: rafidiaz@hotmail.com (R. Díaz-Expósito).

Introduction

During the first semester of 2014 the Working Group1 of Radio-guided Surgery (RGS) of the Spanish Society of Nuclear Medicine and Molecular Imaging (SEMNIM) analyzed the data obtained with a survey carried out in the Departments of Nuclear Medicine of our country with the aim of evaluating the uniformity of the criteria and techniques used in selective sentinel lymph node biopsy (SSLNB) in malignant melanoma (MM). The survey collected data regarding: the year of technique implementation, the number of cases, inclusion criteria, previous ultrasonography of lymph node regions, rate of scintigraphic and surgical localization and the false negative rate in both the validation and application phases. The survey also included questions related to the injection site, radiotracer used, the imaging protocol performed, the use of SPECT and/or SPECT-CT, the use of a portable gamma camera and dyes, the histological studies carried out and the role of nuclear medicine staff in the operating room.

The survey was sent to 135 centers with Nuclear Medicine Departments and response was obtained from 42 centers, 38 of which provided data.

Results

Validation phase

The validation phase was carried out in 17 centers, with only 11 having data in this phase which included 10–50 patients (mean: 15).

The rates of scintigraphic and surgical localization ranged from 95% to 100% and the false negative rate in axillary lymph node dissection was of 0–5%.

Application phase

The SSLNB technique had been used for more than 10 years in 22 centers. Based on the care level of each hospital, the number of patients included was from 20 in some centers to more than 1000 in others.

Thirty-three centers replied to the survey in regard to the indication of Breslow thickness. In 8 centers (24.2%), the indication was MM with Breslow thickness of only 1–4 mm; 8 centers (24.2%) included Breslow 1–4 mm plus patients with <1 mm and in 3 centers (9%) Breslow 1–4 mm in addition to >4 mm. In 14 centers (42.4%) the procedure was performed without considering the Breslow index to indicate SSLNB (Fig. 1).

Previous ultrasonography of the lymph node regions was not undertaken in 44.7% of the centers, and in 10.5% this study was only carried out in the case of palpable adenopathies.

All the centers (100%) performed intradermal perilesional periscar tissue injection of the radiotracer, which was albumin nanocolloid in 92% of the centers. Two centers used this radiotracer or rhenium sulfide and one center only used the latter. The activity used was of 37–74 MBq in the one-day protocol (36.8% of the centers) and 111–148 MBq in the two-day protocol (34.2%) at a volume of 0.1–1 ml.

Early dynamic and static image acquisition was routine in all the centers. Three centers did not perform delayed images and in 67.5% (25/37) these were carried out at 60–120 min postinjection. SPECT-CT studies were performed in all the patients in 24.3% of the centers who responded to the survey (9/37), while this study was individualized in the remaining centers (28/37), with the most common indication being the presence of head/neck drainage.

Dyes were not used in 28 centers (73.7%), 7 (18.4%) always used them and in 3 centers (7.9%) they were sometimes used. One case of anaphylactic reaction to the dye was reported (methylene blue).

The portable gamma camera was used to guide surgery in 7 centers while this tool was not or was only used in selected cases in the remaining centers. The presence of nuclear medicine staff in the operating room during radioguided surgery was a constant (except in 1 center), and in 62% (23/37) nuclear physicians were responsible for the gamma probe during surgery.

At the time of the survey none of the centers used fluorescence.

The rate of localization (scintigraphic and surgical) in the application phase was greater than 95% in practically all the cases. In 17 centers the false negative rate (assessed by the appearance of
lymph node recurrence) was 0–5% (0% in 5), being greater than 5% in 3 centers and greater than 8% in 1.

The “10% rule” was reportedly used in the operating room in 33/38 surveys.

The use of hematoxylin–eosin (37/38) and immunohistochemistry (36/38) was unanimous in the analysis of the sentinel lymph node. The implementation of polymerase chain reaction (PCR) was reported in 7.8% (3/38) of the surveys. The section of the survey related to “protocol of each center” was answered in approximately half of the surveys, being very difficult to describe the protocols used in each center here due to limitations in length.

Limitations

One limitation of the present study is that we do not know the number of centers in which SPECT-CT equipment or portable gamma cameras are available to perform radioguided surgery, and this may therefore induce a bias in the evaluation of these sections.

Comments

The use of SSLNB has been accepted worldwide as a highly precise staging method in cutaneous MM. The results collected in this survey demonstrate this although certain aspects differed among the participating centers basically due to the presence of different equipment.

The validation phase was apparently carried out in 44.7% of the centers responding to the questionnaire.

With regard to the results obtained in the application phase of the technique it was of note that some centers have performed SSLNB in MM for almost 2 decades (1996).

The importance of Breslow thickness as an independent predictor of global survival in patients with MM is well known. Although it is generally accepted that SSLNB in MM is indicated in lesions of 1–4 mm, this indication is extended in many departments. Thus, in up to 42.4% of the centers SSLNB is used for any Breslow thickness (Fig. 1).

Over the years the protocol of administration (perilesional injection of 37–74 MBq of 99mTc-albumin nanocolloid in most centers) and the acquisition technique (dynamic study plus delayed images up to 120 min postinjection) have been standardized, with notable differences among centers using the one-day (36.8%) and the two-day protocols (34.2%)

It is of note that only 34% of the centers surveyed systematically use previous ultrasonography to evaluate the different lymph node regions (Table 1).

With regard to the use of tomographic images, SPECT-CT was occasionally used in 73% of the centers, being of note its indication in doubtful cases or in patients presenting lesions in the head and neck as described in the literature.

Table 1

<table>
<thead>
<tr>
<th>Validation phase</th>
<th>Cases</th>
<th>10–50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scintigraphic localization</td>
<td>95–100%</td>
<td></td>
</tr>
<tr>
<td>Surgical localization</td>
<td>95–100%</td>
<td></td>
</tr>
<tr>
<td>False negative rate (axillary lymph node dissection)</td>
<td>0–5%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application phase</th>
<th>Cases</th>
<th>20–1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scintigraphic localization</td>
<td>27/29 (95–100%)</td>
<td></td>
</tr>
<tr>
<td>Surgical localization</td>
<td>24/27 (95–100%)</td>
<td></td>
</tr>
<tr>
<td>False negative rate 0–5% (lymph node recurrence)</td>
<td>17/21 (80%)</td>
<td></td>
</tr>
</tbody>
</table>

| Previous ultrasonography of lymph node regions | Cases | 10.5% (if palpable adenopathies) |
| Injection site | Perilesion-periscar tissue |
| Radiotracer | Nanocolloid 35/38 (92.1%) |
| | Rhenium sulfide 1/38 (2.6%) |
| | Both 2/38 (5.2%) |
| Volume (ml) | 0.1–0.4: 29/38 (76.3%) |
| | 0.4–3 ml: 7/38 (18.4%) |
| | 3–30 ml: 2/38 (5.2%) |
| Type | Methylene blue |
| | Iosulfan blue |
| | Patent blue |
| Dye | 7/38 (18.4%) |
| | 3/8 (7.9%) |
| Other | No |
| Other rule | No |
| Deferral hematoxylin–eosin histology study | 37/38 (97.3%) |
| Immunohistochemistry | 36/38 (94.7%) |
| PCR | 3/8 (7.8%) |
| Nuclear physician present in the operating room | 37/38 (97.3%) |
| The nuclear physician uses the gamma probe | 23/37 (62.1%) |

Few centers systematically use dyes in the operating room together with the use of a radiotracer. Nonetheless, the percentages of scintigraphic and surgical localization were greater than 95% in practically all the centers and, likewise, the false negative rates were of less than 5%.

One relevant aspect of note in the results obtained in the survey was the scarce number of departments using a portable gamma camera in the operating room (18%) (Table 1) despite the elevated percentage of cases in which nuclear medicine staff is present. We would like to remark the importance of the presence of the nuclear physician, who has done the scintigraphic study in the Nuclear Medicine Department, in the operating room.

Conclusions

Standardization of the use of SSLNB in melanoma is high in the basic technique in Departments of Nuclear Medicine, although certain aspects continue to differ probably due to the diversity of equipment and logistics of each department.
Conflict of interest

The authors declare no conflict of interest.

Acknowledgments

The authors would like to thank all the professionals of the different centers of nuclear medicine who answered the questionnaire despite their daily work load and the time required to do so.

ANNEX A. Centers participating the national survey of selective sentinel lymph node biopsy in melanoma.

Andalucía:
H. Clínico Universitario, Granada
H.U. Puerta del Mar, Cádiz
H.U. Reina Sofía, Córdoba
H.U. Virgen Macarena, Sevilla
H.U. Virgen de las Nieves, Granada
H.U. Virgen del Rocío, Sevilla
H.U. Virgen de la Victoria, Málaga
H. Xanit Internacional, Benalmádena

Aragón:
H. Clínico Universitario «Lozano Blesa», Zaragoza
H.U. Miguel Servet, Zaragoza

Cantabria:
H.U. Marqués de Valdecilla, Santander

Castilla-La Mancha:
H. General Universitario, Ciudad Real
H. Virgen de la Luz, Cuenca

Castilla and León:
Centro Médico Isodiagnóstico, Valladolid
H. Clínico Universitario, Salamanca
H.U. de Burgos

Catalonia:
H. Clinic, Barcelona
H.U. Bellvitge, Hospital de Llobregat, Barcelona
H. Santa Creu i Sant Pau, Barcelona

Community of Madrid:
H. Quirón, Madrid
H.U. 12 de Octubre, Madrid
H.U. La Paz, Madrid

H.U. Ramón y Cajal, Madrid
H.U. Rey Juan Carlos, Madrid

Community of Valencia:
H. Clinic Universitari, Valencia

Extremadura:
H. Infanta Cristina, Badajoz
H. San Pedro de Alcántara, Cáceres

Galicia:
Complejo Hospitalario Universitario, Vigo
H. Clínico Universitario; Santiago
H. Povisa, Vigo
H. Santa María Nai, Ourense

Navarra:
Clínica Universidad de Navarra, Pamplona
Complejo Hospitalario de Navarra, Pamplona

Basque Country:
H.U. Araba, Álava
H.U. de Basurto, Bilbao
H.U. de Cruces, Bilbao

Principality of Asturias:
H.U. Central de Asturias, Oviedo

Centers answering the questionnaire in which the SLNB is not available or which were unable to provide the information:
H. Cruz Roja, Madrid
H. Juan Ramón Jiménez, Huelva
H. Punta de Europa, Algeciras
H. San Juan, Alicante

References