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**Original Research Article**

# Management of Acral Melanoma: Value of Sentinel Lymph Node Biopsy at Avicenne University Hospital — A Case Series of Five Patients

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**Abstract:** Acral melanoma is a rare but aggressive form of skin cancer, typically located on the palms, soles, or periungual regions. It carries a poor prognosis, particularly in North Africa, where diagnosis is often delayed. Sentinel lymph node biopsy (SLNB) is currently recommended for staging high-risk or thick melanomas, yet its specific role in managing acral melanoma remains underreported in Morocco. This retrospective descriptive study was conducted at CHU Avicenne between January 2020 and June 2024 and included five patients with histologically confirmed acral melanoma who underwent SLNB according to international guidelines. Clinical and histological parameters, sentinel lymph node status, and patient outcomes were analyzed. The average age was 61.2 years, with a mean diagnostic delay of 7.2 months. The sentinel lymph node was positive in 40% of cases, all involving thick and ulcerated tumors. In all positive cases, management was modified to include lymph node dissection and adjuvant immunotherapy. No deaths were observed during a median follow-up of 24 months. This case series highlights the frequent nodal involvement in acral melanoma in Morocco and emphasizes the value of SLNB in improving patient management and prognosis.

**Keywords:** Acral melanoma, sentinel lymph node, Morocco, prognosis, SLNB, lymph node biopsy.

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## 1. INTRODUCTION

Cutaneous melanoma is a malignant tumor of melanocytes, with a steadily increasing global incidence. Acral forms—located on the palms, soles, and periungual areas—account for less than 5% of melanomas in Caucasian populations, but up to 10–15% or more in people with darker skin, in Asia and North Africa [1]. In Morocco, despite limited national data, the Oncology Department at the University Hospital of Rabat reported that over 8% of melanomas diagnosed in 2015 were acral [2], these patients are generally older (median age ~60 years) and present with thicker lesions (median Breslow > 2 mm) [3].

The sentinel lymph node (SLN), introduced by Morton in the late 1990s for the staging of cutaneous melanoma, revolutionized nodal assessment. Identified using a combination of radioactive tracer and blue dye, it is subjected to histopathological analysis. A positive result is a major prognostic factor, altering the tumor stage and guiding decisions toward completion lymph node dissection or adjuvant therapy (immunotherapy or targeted therapy) [4]. In acral melanomas, studies report SLN positivity rates ranging from 18% in stage IB to nearly 40% in stage II, often associated with reduced overall survival [5, 6].

At Avicenne University Hospital, local data on the use of SLN biopsy (SLNB) in acral melanoma remain scarce. Our retrospective study analyzes five consecutive cases of acral melanoma managed with SLNB to:

- Evaluate the clinical and histopathological characteristics;
- Quantify SLN positivity;
- Examine the role of SLNB in therapeutic decision-making and clinical outcomes.

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## 2. MATERIALS AND METHODS

### 2.1. Study Design, Setting, and Period

This was a retrospective, descriptive study conducted at the Department of Plastic and Oncologic Surgery of Avicenne University Hospital in Rabat, over a period from January 2020 to June 2024. The objective was to assess the contribution of sentinel lymph node biopsy (SLNB) in the management of acral melanoma through the analysis of five consecutive histologically confirmed cases.

### 2.2. Inclusion and Exclusion Criteria

Patients included had melanoma located on acral sites (plantar, palmar, or periungual), diagnosed clinically and confirmed histologically, with an indication for SLNB based on international guidelines:

- Breslow thickness ≥ 1 mm,
- Or < 1 mm in the presence of poor prognostic factors (ulceration, high mitotic index).

Patients with a history of prior lymph node surgery in the draining basin or those lost to follow-up before undergoing SLNB were excluded.

### 2.3. Collected Data

For each patient, the following data were collected from medical records and the pathology register:

- Age, sex, medical history,
- Precise lesion location,
- Time to diagnosis,
- Histological characteristics: Breslow thickness, ulceration, Clark level, mitotic index, margin status,
- SLN biopsy results (positive/negative, number of SLNs, location),
- Additional therapeutic management (lymph node dissection, adjuvant treatments),
- Follow-up data: local or distant recurrence, death, follow-up duration.

### 2.4. SLN Localization and Excision Technique

Sentinel lymph node localization was systematically performed by injecting technetium-99m-labeled radioactive colloids (99mTc), followed by lymphoscintigraphy to identify the drainage basins. Surgical excision was performed under general or regional anesthesia, following the identified drainage pathways. Histological analysis of the SLN included standard H&E staining, supplemented as needed with immunohistochemistry (S100, HMB-45, Melan-A).

**Figure 1: Sentinel lymph node localization using a gamma probe prior to excision.**

**Figure 2: Inguinal marking and incision for sentinel lymph node localization.**

### 2.5. Statistical Analysis

The results were analyzed descriptively. Quantitative variables were presented as mean (± standard deviation) or median, and qualitative variables as counts and percentages. The correlation between certain prognostic variables (thickness, ulceration) and SLN positivity was explored descriptively, given the small sample size.

## 3. RESULTS

### 3.1. Patient Characteristics

Five patients were included: three men and two women, with a mean age of 61.2 years (range: 49–72 years). Four patients presented with plantar melanoma (Figure 3), and one had a periungual lesion on a toe. None of the patients had a history of melanoma or other cutaneous malignancies. The mean time between lesion onset and specialized care was 7.2 months, with two patients consulting at an advanced ulcerated stage.

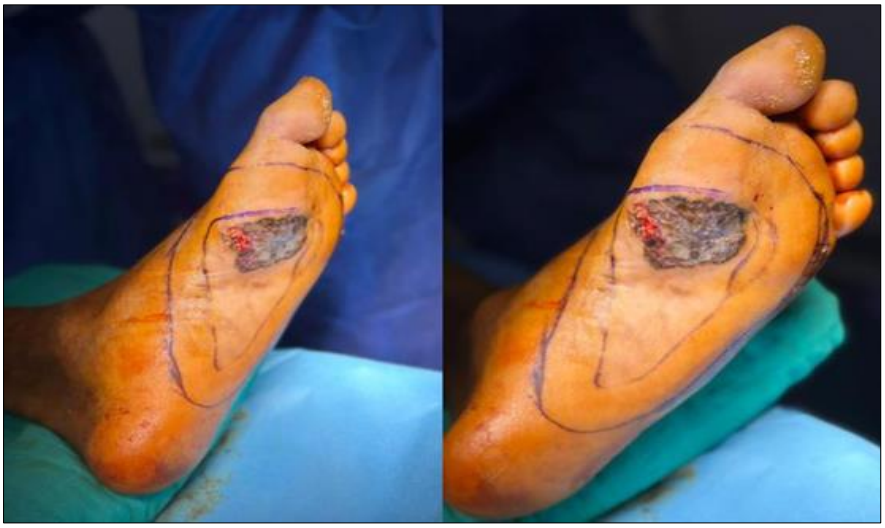

**Figure 3: Ulcerated acral melanoma of the left plantar surface: intraoperative view and marking of excision margins**

### 3.2. Histological Characteristics

The mean Breslow thickness was 3.2 mm (range: 1.2 to 7.8 mm). Three lesions showed ulceration on histological examination. All cases were classified as at least stage IB according to the 8th edition of the AJCC classification.

Clark level was IV in four cases and V in one case. The mean mitotic index was 6 mitoses/mm [2].

**Figure 4: Intraoperative excision of the inguinal sentinel lymph node**

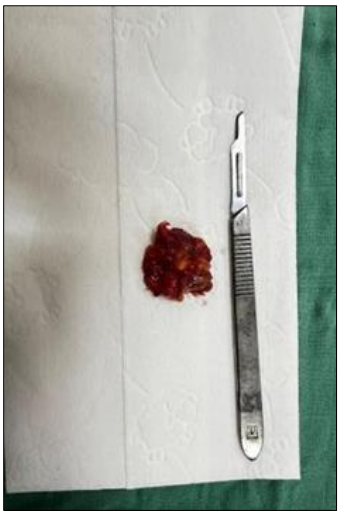

**Figure 5: Sentinel lymph node surgical specimen after excision**

### 3.3. SLNB Results

The SLNB procedure identified a single sentinel lymph node in three patients and two sentinel lymph nodes in two cases. Sentinel lymph node positivity was observed in two cases (40%), both in patients with ulcerated lesions and a Breslow thickness greater than 4 mm.

No intraoperative incidents were reported. The mean interval between primary melanoma excision and SLNB was 20 days.

### 3.4. Therapeutic Implications

The two patients with positive SLNs underwent completion lymph node dissection. Micrometastases were found in one case (1/14 nodes), while no additional nodal involvement was observed in the other. One patient received adjuvant anti-PD1 immunotherapy (nivolumab). The other three patients with negative SLNs were followed with clinical and ultrasound monitoring every three months.

### 3.5. Follow-up and Outcomes

Median follow-up was 24 months (range: 12–36 months). One patient with a positive SLN experienced regional nodal recurrence at 16 months, which was surgically managed. No melanoma-related deaths were reported during follow-up. Patients with negative SLNs did not develop local or distant recurrence.

| Patient | Sex | Age | Location | Breslow | Ulceration | SLN (+/−) | Dissection | Follow-up Outcome |
|---|---|---|---|---|---|---|---|---|
| 1 | M | 62 | Plantar | 4.5 mm | Yes | + | Yes | Nodal recurrence at 16 months |
| 2 | F | 49 | Periungual | 1.2 mm | No | − | No | Negative at 36 months |
| 3 | M | 68 | Plantar | 7.8 mm | Yes | + | Yes | No recurrence at 18 months |
| 4 | M | 57 | Plantar | 2.6 mm | Yes | − | No | Negative at 12 months |
| 5 | F | 70 | Plantar | 2.1 mm | No | − | No | Negative at 30 months |

## 4. DISCUSSION

### 4.1. Role of Sentinel Lymph Node in the Management of Acral Melanoma

Sentinel lymph node biopsy (SLNB) has revolutionized the management of cutaneous melanoma by enabling minimally invasive and reliable nodal staging. It is currently recommended by leading medical societies (ASCO, ESMO, NCCN) for intermediate- and high-risk melanomas [1, 2]. In the specific case of acral lentiginous melanoma (ALM), nodal involvement at diagnosis is significantly higher than in other histological subtypes [3,4]. This observation, confirmed in our series (2 positive cases out of 5, or 40%), aligns with international literature, where SLN positivity ranges from 18% to 39%, depending on thickness and ulceration [5–8]. Multicenter studies from Asia and North America have shown that acral melanoma is often diagnosed at a later stage due to its location, with higher Breslow thickness and a greater proportion of stage II and III at diagnosis [4-9].

### 4.2. Epidemiology and Specific Features in Morocco

In Morocco, and more broadly in the Maghreb, melanoma remains a rare but frequently advanced-stage disease at diagnosis, particularly in acral forms. According to the Rabat Cancer Registry (2012–2017), the incidence of cutaneous melanoma is estimated at 0.4/100,000 inhabitants, with a male predominance and a median age similar to our series (~60 years) [10]. Acral lentiginous melanoma accounts for up to 10% of cases in some Moroccan series [11,12]. Several factors contribute to delayed diagnosis: late consultation, limited access to specialized dermatologic care in rural areas, and misleading clinical presentation (plantar or periungual

pigmented lesion often mistaken for trauma or fungal infection) [11-13].

In our series, the average delay between lesion discovery and management exceeded 7 months, explaining the high proportion of thick (>2 mm) and ulcerated tumors, known poor prognostic factors. Moroccan data confirm these trends, highlighting the need for awareness campaigns to promote early diagnosis and rapid referral to specialized centers [12-14].

### 4.3. Prognostic Value of SLNB

SLN positivity is the main independent prognostic factor for recurrence and overall survival across all melanoma sites. The MSLT-1 meta-analysis showed that five-year survival is significantly reduced in the presence of a positive SLN, supporting intensified surveillance and consideration of adjuvant therapies [1-15]. In ALM patients, SLNB retains the same value: nodal positivity often indicates early and silent dissemination, justifying multidisciplinary management. In our series, the two patients with positive SLNs presented classical risk factors (Breslow > 4 mm, ulceration) and received intensified treatment (dissection, adjuvant immunotherapy). One of them experienced regional recurrence, illustrating the poor prognosis of high-risk acral forms [4-16].

The false-negative rate of SLNB is low in the literature (<5%) but increases in plantar or periungual locations due to the complexity of lymphatic pathways [17,18]. Technical expertise and the use of dual tracers and intraoperative lymphoscintigraphy are therefore essential, especially in Maghrebian settings where experience is still developing.

### 4.4. Therapeutic Impact and Benefits of SLNB

Detection of a positive SLN changes therapeutic strategy:

- **Completion lymph node dissection**: Once systematic, it is now debated in light of the MSLT-II and DeCOG-SLT studies, which did not show significant improvement in overall survival but did impact regional disease control [19, 20].
- **Adjuvant therapy**: Since 2017, anti-PD1 immunotherapies and targeted therapies (BRAF/MEK inhibitors) have transformed adjuvant management of stage III melanoma, including cases with micrometastases in the SLN [21,22]. SLNB thus helps identify patients eligible for these treatments, now increasingly available in Moroccan centers [23].

In our experience, SLNB enabled personalized follow-up and adaptation of treatment intensity based on nodal status. SLN-negative patients remained relapse-free, while one SLN-positive patient relapsed despite dissection and adjuvant therapy, illustrating the severity of advanced acral melanoma.

### 4.5. Study Limitations

Our study has several limitations:

- Small sample size (n=5), limiting statistical analysis and generalizability;
- Retrospective design, prone to selection and data collection bias;
- Heterogeneous follow-up duration (12–36 months), limiting long-term survival analysis;
- Absence of molecular data (BRAF, c-KIT mutations), frequently observed in acral melanoma and potentially impacting prognosis.

Nevertheless, this study provides a realistic snapshot of the challenges faced in Maghrebian centers and supports the need for multicenter databases to better define the characteristics of the North African population.

### 4.6. Practical Recommendations and Perspectives

- SLNB should be extended to all acral melanomas ≥1 mm thick, and to those <1 mm with poor prognostic features (ulceration, high mitotic index), per international guidelines [1, 2];
- Technical expertise should be enhanced through continuous training of surgical and pathology teams in Morocco;
- A national melanoma registry and participation in Maghreb-wide multicenter studies would improve understanding of incidence, outcomes, and molecular biology of acral melanomas;
- As immunotherapies and targeted therapies become more accessible in Moroccan centers, accurate SLN staging is essential to optimize access to these innovative treatments.

## 5. CONCLUSION

Acral melanoma remains a major diagnostic and therapeutic challenge, particularly in Maghreb countries where late detection, limited access to specialized dermatologic care, and lack of clinical awareness contribute to poor prognosis. Although limited by its small sample size, this Moroccan case series highlights the high rate of nodal involvement at diagnosis, reflecting the intrinsic severity of acral melanoma.

Sentinel lymph node biopsy (SLNB) is now the gold standard for nodal staging in this melanoma subtype. When performed using a standardized procedure, SLNB enables early identification of high-risk patients and guides therapeutic strategies toward appropriate adjuvant treatment. At Avicenne University Hospital, SLNB enabled accurate risk stratification, tailored follow-up, and initiation of innovative therapies in patients with micrometastases.

Widespread implementation of SLNB in acral melanoma management in Morocco is essential. It should be accompanied by public awareness campaigns for earlier diagnosis, development of regional registries, and broader access to novel therapies. Prospective, multicenter studies incorporating molecular analyses are needed to better understand the evolution and distinct characteristics of acral melanoma in North African populations.

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