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Research Article

Clinicopathologic Profile and Advanced Presentation of Malignant Melanoma in Southeast Nigeria: A Five-Year Retrospective Study

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ABSTRACT

Background

Malignant melanoma is an aggressive malignancy in which prognosis is strongly determined by tumour thickness, ulceration, and other histopathologic prognostic indicators. In African populations, melanoma commonly presents at acral sites and is frequently diagnosed at advanced stages. Contemporary Nigerian data incorporating standardized microstaging variables remain limited. This study evaluated the clinicopathologic characteristics and prognostic histopathologic features of malignant melanoma diagnosed at a tertiary hospital in Southeast Nigeria.

Methods

A retrospective clinicopathologic review was conducted in the Department of Histopathology, Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Nigeria. All histologically confirmed melanoma cases diagnosed between January 2021 and December 2025 were reviewed. Demographic, clinical, and histopathologic variables including anatomic site, histologic subtype, Breslow thickness, Clark level, ulceration, mitotic rate, lymphovascular invasion, tumour necrosis, and margin status were analysed descriptively using SPSS version 25.

Results

Twelve patients contributed thirteen melanoma specimens during the study period. Patients ranged from 34 to 78 years, with a mean age of 54.3 ± 14.9 years. There was equal sex distribution. Acral sites predominated, accounting for 58.3% of cases, while acral lentiginous melanoma was the most common histologic subtype (53.8%). All cutaneous melanomas demonstrated advanced tumour thickness within the pT4 category, with Breslow thickness ranging from 5 mm to 11 mm. Clark level V predominated (69.2%), and ulceration was present in 53.8% of cases. Mitotic activity ranged from 2 to 5 mitoses/mm^2, with 3 mitoses/mm^2 being most frequent. Additional adverse features included lymphovascular invasion (15.4%), microsatellites (7.7%), tumour necrosis (30.8%), and amelanotic morphology (30.8%). Most tumours were staged as T4b (53.8%).

Conclusion

Melanoma in this Southeast Nigerian cohort was characterized by acral predominance, advanced tumour thickness, and frequent ulceration, reflecting persistent late presentation and high-risk pathology. Strengthening clinical awareness of acral melanoma, promoting early biopsy of suspicious lesions, and standardizing pathology reporting practices may improve melanoma diagnosis and prognostic assessment in Nigerian settings.

Keywords: Malignant melanoma; acral lentiginous melanoma; Breslow thickness; ulceration; histopathology; Nigeria; prognostic factors; skin cancer; melanoma staging; sub-Saharan Africa

INTRODUCTION

Malignant melanoma of the skin is an aggressive malignancy whose public-health impact is disproportionate to its frequency, largely because survival declines sharply once the primary tumour becomes thick, ulcerated, or metastasizes. Using GLOBOCAN 2022 estimates, there were approximately 331,722 new melanoma cases and 58,667 melanoma deaths worldwide in 2022, with the highest incidence rates in predominantly fair-skinned populations and strong links to ultraviolet exposure patterns in those settings[1,3]. Importantly for Africa, the same dataset estimates a comparatively low absolute burden (~7,477 cases) yet a larger share of global mortality (~2,859 deaths), a pattern that is compatible with higher case fatality and delayed diagnosis in many contexts (inference).[1,3] Contemporary reviews continue to note rising incidence in many regions, reinforcing the need for locally relevant data that connects presentation patterns to pathology-defined prognostic risk.[1,3]

In populations of African descent, melanoma frequently diverges from the classical sun-exposed distribution described in Western cohorts, with a notable proportion arising on acral sites: palms, soles, and nail apparatus; where lesions can be overlooked, misattributed to trauma, chronic ulcers, infections, or benign nail pigmentation, and therefore present late.[10,11,14,28] Acral lentiginous melanoma is often described as uncommon in global percentage terms (around 2–3% of all melanomas), yet it disproportionately affects people with darker skin and is repeatedly associated with delayed diagnosis and poorer outcomes.[10,11,14,28] In a South African tertiary cohort, 84.8% of acral melanomas occurred on the foot, median symptom duration before diagnosis was 10 months, and mean Breslow thickness at diagnosis was 5.2 mm (median 4.2 mm), with over half of staged patients presenting at stage III or higher, findings that typify advanced presentation.[10] Similar observations have been reported from other sub-Saharan African settings, including Malawi, where investigators emphasized that melanoma may be under-appreciated locally and that limited prior publications hinder accurate understanding of burden and presentation.[11] More recent synthesis focusing on acral lentiginous melanoma highlights persistent survival disparities and the tendency for Black patients to present with thicker and more ulcerated tumours, underscoring how biology, visibility of tumour sites, and health-system factors can converge to worsen prognosis.[28]

Because melanoma prognosis is strongly "microstaged," the pathology report is not merely confirmatory; it determines AJCC T category, informs surgical margins and nodal staging decisions, and provides the baseline risk stratification used in multidisciplinary care.[5,7,25,29] Internationally, standardised datasets such as the College of American Pathologists (CAP) protocol and the Royal College of Pathologists (RCPath) melanoma dataset, emphasize consistent reporting of Breslow thickness, ulceration, and mitotic rate (mitoses/mm^2), alongside histologic subtype and depth descriptors such as Clark level, because these factors are repeatedly shown to carry major prognostic and management implications.[7,25] AJCC 8 maintains tumour thickness and ulceration as central determinants of primary tumour (T) category; while mitotic rate was removed as a T1 defining criterion, it remains a core prognostic element recommended for recording across melanomas of all thicknesses.[5,7] The primacy of thickness has been recognised since Breslow's seminal 1970 work linking measurable tumour depth to outcome. Modern protocols and staging systems operationalize this concept with refined thresholds, definitions of ulceration, and standardized approaches to counting mitoses.[5,7,25,29]

Within Nigeria, melanoma literature remains relatively sparse and regionally fragmented, and many publications historically lacked systematic reporting of microstaging variables now considered essential for prognostication and international comparability.[9,30-33] From the same tertiary centre as the present study, an earlier 5-year series (pre-2017) reported that melanoma was rare overall but most commonly involved the sole of the foot, consistent with acral predominance in Black African patients.[31] A broader NAUTH Nnewi malignant skin tumour audit (2008–2017) also showed that melanocytic tumours constituted 19.1% of malignant skin lesions evaluated in that histopathology service, supporting the local relevance of melanocytic malignancy within the institution's diagnostic workload.[30] More recently, a Lagos study that explicitly focused on histopathologic prognostic factors reported a predominance of advanced disease at diagnosis, including high Clark levels (IV–V), frequent ulceration, and a high proportion of very thick tumours (>4 mm Breslow), aligning with the wider sub-Saharan pattern of late presentation and adverse pathology.[9] Reports from other Nigerian settings continue to highlight practical challenges including delayed presentation and the downstream need for more extensive surgery, emphasizing why contemporary, centre-specific audits that incorporate Breslow thickness, ulceration, mitotic rate and subtype are valuable both for clinical governance and for evidence building.[32,33] Accordingly, we undertook a retrospective clinicopathologic review of 12 histologically confirmed malignant melanoma cases diagnosed at Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria, between January 2021 and December 2025, describing age, sex, anatomic site, histologic subtype, Breslow thickness, ulceration, Clark level and mitotic rate to provide updated baseline data for Southeast Nigeria.[9,30-33]

MATERIALS AND METHODS

Study Design and Setting

This was a retrospective clinicopathologic study conducted in the Department of Histopathology, Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State, Southeast Nigeria. NAUTH is a major tertiary referral center serving Anambra State and neighboring states in Southeast Nigeria. The study reviewed all histologically diagnosed cases of malignant melanoma over a five-year period from January 2021 to December 2025.

The study was purely histopathology-based. Cases were identified from the departmental histopathology register, and corresponding hematoxylin and eosin (H&E) stained slides were retrieved and reviewed. Where slides were of poor quality due to storage-related deterioration, corresponding formalin-fixed paraffin-embedded tissue blocks were retrieved and fresh sections were cut and stained with H&E for reassessment.

Sampling and Sampling Technique

All cases of malignant melanoma diagnosed within the study period were included using a total population sampling technique. The study included all melanoma types, including cutaneous, mucosal, and uveal melanomas. Cases with incomplete data and those outside the study period were excluded from the analysis.

A total of twelve (12) patients with malignant melanoma were identified during the study period. These patients contributed thirteen (13) histopathology specimens, as one patient had both an initial biopsy and a subsequent excision specimen. For clinicopathologic analysis, each patient was counted once, and where multiple specimens existed, the excision specimen was considered the definitive specimen for analysis.

Data Collection

Relevant clinicopathologic data were extracted from histopathology request forms, laboratory records, and slide review. The following variables were documented: Age, Sex, Anatomic site of lesion, Histologic subtype, Breslow thickness, Clark level of invasion, Ulceration status, Mitotic rate, Tumour infiltrating lymphocytes, Lymphovascular invasion, Perineural invasion, Tumour regression, Microsatellites, Vertical growth phase, Tumour necrosis, Pigmentation, Associated nevus and Margin status.

All slides were reviewed and Tumours classified according to the World Health Organization (WHO) Classification of Skin Tumours, 2023. Breslow thickness was measured using a stage micrometer from the top of the granular layer (or base of ulceration where present) to the deepest point of invasion. Mitotic activity was assessed and recorded as number of mitoses per 10 high power fields (HPF).

Data Analysis

Data obtained were entered into Microsoft Excel and subsequently analyzed using Statistical Package for Social Sciences (SPSS) version 25 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize demographic and clinicopathologic variables. Continuous variables such as age and Breslow thickness were expressed as mean ± standard deviation and range, while categorical variables were presented as frequencies and percentages.

Ethical Consideration

Ethical approval for the study was obtained from the Research and Ethics Committee of Nnamdi Azikiwe University Teaching Hospital, Nnewi. Patient confidentiality was maintained throughout the study, and no patient identifiers were used.

RESULTS

Clinical Characteristics

A total of twelve patients with malignant melanoma were studied during the review period. The patients ranged in age from 34 to 78 years, with a mean age of 54.3 ± 14.9 years and a median age of 50 years at diagnosis. There was an equal sex distribution with six males and six females, giving a male-to-female ratio of 1:1 (Table 1).

The specimens received were predominantly biopsies, accounting for 8 cases (66.7%), followed by excision specimens in 3 cases (25.0%). One case each was received as an amputation specimen and ocular enucleation, representing 8.3% respectively (Figure 1).

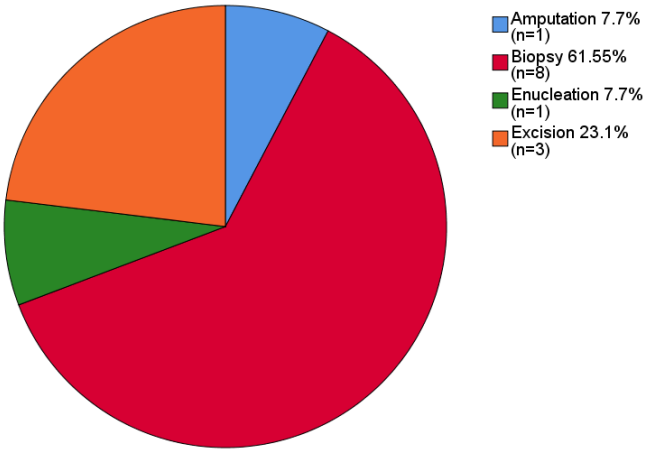

Figure 1: Distribution of specimen types of malignant melanoma cases

With respect to anatomic distribution, acral sites predominated, accounting for 7 cases (58.3%). These involved the left foot, left heel, little toe, right sole, sole, right thumb, and right hand. Non-acral cutaneous sites accounted for 4 cases (33.3%), including lesions involving the breast, left thigh, right groin, and upper back. One case (8.3%) involved the eye and was classified as uveal melanoma. No mucosal melanomas were identified in this series (Table 1).

Table 1: Anatomic Site Distribution of Malignant Melanoma Cases

Site Category	Specific Site	Frequency (n)	Percentage (%)
Acral	Left foot	1	8.3
Acral	Left heel	1	8.3
Acral	Little toe	1	8.3
Acral	Right sole	1	8.3
Acral	Sole	1	8.3
Acral	Right thumb	1	8.3
Acral	Right hand	1	8.3
Non-acral cutaneous	Breast	1	8.3
Non-acral cutaneous	Left thigh	1	8.3
Non-acral cutaneous	Right groin	1	8.3
Non-acral cutaneous	Upper back	1	8.3
Uveal	Right eye	1	8.3
Total		12	100

Histologically, acral lentiginous melanoma was the most common subtype accounting for 7 cases (53.8%), followed by superficial spreading melanoma in 3 cases (23.1%). Nodular melanoma was seen in 2 cases (15.4%), while uveal melanoma accounted for 1 case (7.7%). Among cutaneous melanomas, Breslow thickness ranged from 5 mm to 11 mm, with the majority of tumours measuring 5–6 mm (53.8%). Clark level V predominated, occurring in 9 cases (69.2%), while 3 cases (23.1%) were Clark level IV (Table 2). Breslow thickness and Clark level were not applicable to the uveal melanoma.

Table 2: Histologic subtype, Breslow thickness and Clark level of malignant melanoma. Breslow thickness and Clark level were not applicable to the uveal melanoma

Variable	Category	Frequency (n)	Percentage (%)
Histologic subtype	Acral lentiginous melanoma	7	53.8
	Superficial spreading melanoma	3	23.1
	Nodular melanoma	2	15.4
	Uveal melanoma	1	7.7
	Total	13	100
Breslow thickness (cutaneous cases)	5–6 mm	7	53.8
	7–8 mm	4	30.8
	≥9 mm	1	7.7
	Not applicable (uveal)	1	7.7
	Total	13	100
Clark level (cutaneous cases)	Level IV	3	23.1
	Level V	9	69.2
	Not applicable (uveal)	1	7.7
	Total	13	100

Mitotic activity was assessed in the area of highest mitotic activity and expressed as mitoses per mm^2. Counts obtained in 10 high power fields using a Leica microscope (HPF area ≈ 0.20 mm^2) were converted to mitoses per mm^2. Mitotic activity ranged from 2 to 5 mitoses/mm^2. The most common mitotic rate was 3 mitoses/mm^2, observed in 6 cases (46.2%). This was followed by 4 mitoses/mm^2 and 5 mitoses/mm^2, each seen in 3 cases (23.1%), while 2 mitoses/mm^2 was identified in 1 case (7.7%).

Ulceration was present in 7 cases (53.8%) and absent in 5 cases (38.5%). Ulceration status was not applicable in one case of uveal melanoma. Among cutaneous melanomas, therefore, ulceration was identified in the majority of tumours.

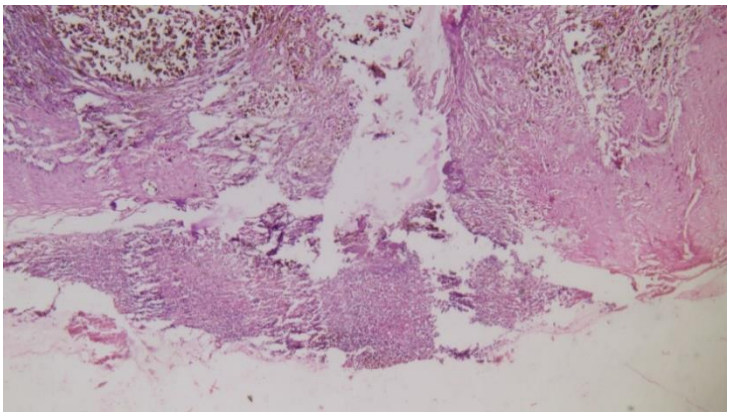

Figure 2: Ulceration in malignant melanoma (H&E stain)

Tumour-infiltrating lymphocytes were most commonly non-brisk, occurring in 6 cases (46.2%), while brisk lymphocytic infiltration was seen in 4 cases (30.8%). Absent lymphocytic response was identified in 2 cases (15.4%). Tumour-infiltrating lymphocytes were not applicable in the uveal melanoma.

Tumour regression was not identified in any of the cases. Microsatellites were observed in one case (7.7%), while the remaining cases showed no evidence of microsatellite formation.

Lymphovascular invasion was identified in 2 cases (15.4%), while the remaining 11 cases (84.6%) showed no evidence of lymphovascular invasion. Perineural invasion was not identified in any of the cases.

Vertical growth phase was present in 7 cases (53.8%) and absent in 5 cases (38.5%). Assessment of vertical growth phase was not applicable in one case of uveal melanoma.

Tumour necrosis was identified in 4 cases (30.8%), while the remaining 9 cases (69.2%) showed no evidence of tumour necrosis.

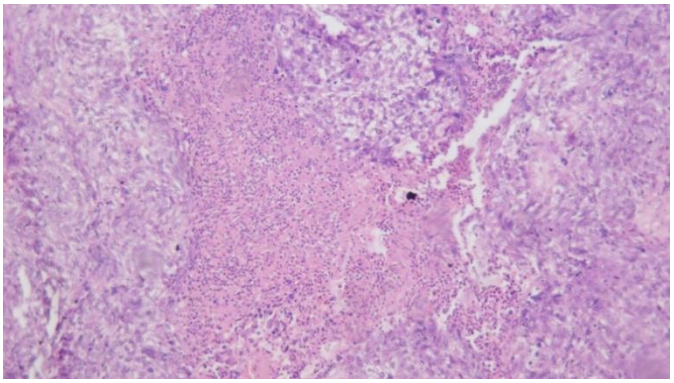

Figure 3: Tumour necrosis in malignant melanoma (H&E stain)

Most tumours were pigmented, accounting for 9 cases (69.2%), while amelanotic melanoma was identified in 4 cases (30.8%).

None of the tumours showed an associated nevus.

Peripheral and deep surgical margins were assessed in excision and amputation specimens. The peripheral margins were clear in 4 cases (30.8%), while margin assessment was not applicable in 9 cases (69.2%), which consisted mainly of biopsy specimens.

For the deep margins, tumour involvement was identified in 3 cases (23.1%), while one case (7.7%) had a clear deep margin. Deep margin assessment was not applicable in 9 cases.

None of the specimens were inked; therefore, the closest margin distance could not be determined in any of the cases.

Pathologic staging revealed that the majority of tumours were advanced. T4b stage was identified in 7 cases (53.8%), while 6 cases (46.2%) were classified as T4a.

All cutaneous melanomas were classified according to the AJCC staging system, with staging based on Breslow thickness and ulceration status. The single case of uveal melanoma was staged separately using the AJCC classification for posterior uveal melanoma and was categorized as T4a.

DISCUSSION

This five-year, single-centre review from Nnamdi Azikiwe University Teaching Hospital, Nnewi, demonstrates a melanoma profile dominated by advanced primary tumours, largely acral, thick, and frequently ulcerated. These features are consistently associated with poor clinical outcomes in African populations.

Overall interpretation of the findings

Across the 13 melanoma diagnoses reviewed (January 2021–December 2025), the burden of adverse histopathologic features was striking: all cutaneous primaries were in the pT4 thickness range (Breslow 5–11 mm), ulceration was present in the majority of cutaneous cases, Clark level was predominantly IV–V, and mitotic counts clustered around 3–5 mitoses/mm^2. The

AJCC-aligned staging summary was correspondingly advanced, with T4a in 6/13 (46.2%) and T4b in 7/13 (53.8%), recognizing that one T4a value applied to the uveal melanoma case, where staging is anatomically and biologically distinct from cutaneous melanoma. These patterns matter clinically because modern melanoma care is stage-driven: the headline prognosis and many management decisions are anchored first on Breslow thickness and ulceration, then refined by additional risk markers and regional/distant spread status.[1,4-8]

The overall picture is not unique to this institution; rather, it aligns with what multiple African series have described: melanoma is less common in incidence terms than in high-UV, lighter-skinned populations, yet when it appears in many sub-Saharan settings it is often diagnosed late, with thick, ulcerated tumours and limited opportunities for early curative treatment.[1,10-12]

Demographics and anatomic distribution in context

The mean age at diagnosis in this NAUTH series (mid-50s) is broadly consistent with adult-predominant melanoma patterns reported in African cohorts, including Malawi (mean 57 years) and South Africa (mean ~61 years for acral melanoma in one tertiary cohort), while reminding us that in contrast to many Western datasets, African melanoma is not typically framed by high rates in younger adults.[10,11]

The anatomic pattern strongly supports an acral predominance (palms/soles/digits), with recorded sites showing the foot/hand region as the major locus of disease. This mirrors large African series: in Malawi, 95% of cutaneous melanomas were acral and 87% were on the foot; in the South African acral melanoma cohort, 84.8% were located on the foot.[10,11]

Clinically, acral location is not a simple geographic detail, it is a mechanism for delayed diagnosis. Lesions on soles and nail units are easily hidden, mislabelled as trauma-related changes, chronic ulcers, fungal disease, or benign pigmentation, and are less likely to trigger early excision in routine practice. Contemporary reviews of acral lentiginous melanoma (ALM) repeatedly emphasize diagnostic delay and its link to thicker, ulcerated tumours at presentation, particularly among people with darker skin phototypes.[13-15]

Histologic subtype pattern and why it matters here

In this NAUTH cohort, acral lentiginous melanoma was the most frequent histologic subtype (7/13; 53.8%), followed by superficial spreading melanoma (3/13; 23.1%) and nodular melanoma (2/13; 15.4%), with one uveal melanoma (1/13; 7.7%). This subtype distribution is compatible with broader African evidence that ALM constitutes a substantial share of melanoma diagnoses in Black African populations, despite being a minority subtype globally.[10.11.13-15]

A key interpretive point for Discussion is that ALM is not primarily driven by ultraviolet exposure in the same way as trunk/head-and-neck melanomas in fair-skinned populations. Reviews increasingly describe acral melanoma as biologically distinct, with different mutational patterns and clinical trajectories, and stress that prevention and early detection messages must be tailored to this reality: sun safety messaging alone will not prevent most ALM cases, whereas foot/hand examination and prompt biopsy of suspicious acral lesions can plausibly shift stage at diagnosis.[13-15]

Microstaging and core prognostic factors

The dominant prognostic narrative in this series is depth and ulceration. All cutaneous cases had Breslow thicknesses in the 5–11 mm range, which is well beyond the >4 mm threshold defining AJCC T4 disease.[4,5]

When placed against African comparators, the NAUTH pattern is highly consistent with late-presenting melanoma: Malawi reported 84% of cases with Breslow thickness >4 mm (median 9 mm), and the Lagos series from LUTH reported 84% with Breslow >4 mm and 67% ulceration, with Clark IV–V in 88%; South Africa also documented high mean/median thickness at diagnosis for acral melanoma.[9-11]

Mitotic rate and vertical growth phase further support a high-risk primary tumour profile. AJCC 8 retained mitotic rate as a clinically meaningful prognostic element (even though it was removed from defining T1 subcategories), and multiple contemporary sources still emphasise routine documentation because higher mitotic activity tracks with aggressive biology and poorer survival.[4,6-8]

From a reporting and benchmarking standpoint, the variables used in this study map tightly onto international synoptic reporting expectations: Breslow thickness, ulceration and mitotic rate are core, while Clark level, lymphovascular invasion, microsatellites and other features can meaningfully refine risk discussions and downstream management, especially in settings where imaging and sentinel node biopsy are not uniformly available.[6-8,16]

Additional adverse features and special diagnostic challenges

Several "second-tier but high-impact" features deserve explicit interpretation in this dataset.

Microsatellites were identified in 1/13 (7.7%). In AJCC 8, microsatellites are not a cosmetic histologic detail; they represent regional metastatic behaviour and are integrated into N categorisation (even in the absence of node metastasis) and therefore prognostic staging.[4,5]

Recent cohort work also supports microsatellites as an independent adverse prognostic marker, associated with lower overall and melanoma-specific survival, making the single positive case in this cohort clinically meaningful and discussion-worthy even though it is numerically small.[17]

Lymphovascular invasion (LVI) was present in 2/13 (15.4%), while perineural invasion (PNI) was absent in all cases. LVI is commonly interpreted as a marker of metastatic potential and is routinely captured in datasets and prognostic modelling; more recent evidence in early-stage melanoma populations continue to associate LVI with higher risk of distant metastasis alongside classic factors such as thickness and ulceration.[16,18]

Perineural invasion, although not identified in this study, is a recognised feature in melanoma, particularly in neurotropic and desmoplastic subtypes, where tumour cells may invade along nerve sheaths and contribute to aggressive local behaviour.[7,19]

Tumour necrosis was present in 4/13 (30.8%). While necrosis is not universally emphasised in every melanoma checklist, it has been investigated as an additional prognostic discriminator, particularly among thick melanomas, suggesting that necrosis may further mark biologically aggressive disease in a cohort that is already heavily weighted toward pT4 primaries. An important limitation is that much of the classic necrosis-prognosis literature is older; nonetheless, it remains relevant when interpreting high-thickness tumours. (20-seminal, pre-2015).[20]

The pigmentation findings are also clinically important: 4/13 (30.8%) were amelanotic. Amelanotic melanoma is repeatedly described as a diagnostic pitfall because it evades "typical" visual cues, can mimic inflammatory or benign lesions, and is often diagnosed later, contributing to thicker tumours and worse outcomes. The proportion of amelanotic cases in this series therefore supports a pragmatic recommendation: clinicians should maintain suspicion and biopsy thresholds for atypical, non-pigmented acral lesions, ulcers, and nodules, not only "dark" lesions.[21,22]

Finally, no case showed regression and no case had an associated nevus. In isolation these are neutral observations; in context, they may reflect the dominance of thick, late-presenting tumours and the acral-heavy subtype mix, where nevus association may be less prominent. The key discussion point is not that "absence is protective," but that these features did not offset the heavy burden of established high-risk markers (depth, ulceration, mitoses).[7,10,23]

Surgical pathology quality signals and margin considerations

Margin reporting in this series should be interpreted through the reality of specimen mix: most specimens were biopsies, so "not applicable" margins were frequent. Where margins were assessable (excision/amputation), peripheral margins were clear in 4/13 (30.8%), and deep margins were involved in 3/13 (23.1%), a meaningful signal of incomplete clearance in a subset of definitively resected cases, potentially reflecting either advanced infiltration, constrained excision in clinically challenging sites (e.g., foot), or both.

One practical limitation is that none of the cases were inked, meaning the closest margin distance could not be determined. This is not a minor technicality: synoptic protocols emphasise inking and clear documentation of margin status/distance because these details anchor decisions about re-excision, amputation level, and local control, especially in acral melanoma where tissue conservation and function compete with oncologic clearance.[6-8]

International guidance also underscores that optimal initial diagnostic management is a complete excision biopsy when feasible, enabling accurate microstaging (thickness, ulceration, mitoses) and cleaner margin interpretation. Where incisional or partial biopsies dominate, there is greater risk of under-measuring thickness, misclassifying ulceration in fragmented specimens, and delaying definitive surgery, factors that can compound late presentation.[6,7,24]

Uveal melanoma case and interpretive boundaries

The presence of one uveal melanoma highlights an important reality for tertiary pathology services: melanoma is not exclusively cutaneous. However, uveal melanoma differs substantially from cutaneous melanoma in biology, prognostic factors, staging

approach, and treatment pathways; therefore, combining it with cutaneous cases is analytically acceptable only when clearly signposted (as done here), and when thickness-based variables are explicitly treated as "not applicable". The CAP uveal melanoma protocol and NCI guidance both emphasise the distinct staging approach for uveal tumours and their clinical separation from skin primaries.[25,26]

A constructive way to frame this in Discussion is that the uveal case illustrates the breadth of melanoma diagnoses encountered at NAUTH, but that the clinicopathologic conclusions regarding acral predominance, Breslow thickness, ulceration and margin issues principally describe cutaneous melanoma in this setting.

Limitations and recommendations for practice and research in Nigeria

The most important limitation is the small sample size (n=13) from a single centre; this constrains subgroup inference (e.g., comparing ALM vs non-ALM) and prevents meaningful modelling. Retrospective design introduces missing data and heterogeneity in specimen handling (biopsy vs excision). The lack of inking prevented closest margin measurement, reducing the precision of surgical pathology audit.

Despite these limitations, the dataset has strong signal value because the findings align closely with larger African series: acral predominance and predominantly thick, ulcerated primaries at diagnosis. That consistency strengthens the inference that late presentation remains a key driver of adverse melanoma pathology in the region.[9-12,14,15]

Practically, the discussion points translate into actionable recommendations for NAUTH and similar Nigerian centres:

Raise clinical suspicion for acral melanoma: integrate routine inspection of soles, palms, and nails into general medical/surgical reviews (especially in chronic foot-lesion pathways).[10,11,14,15]

Biopsy early, including amelanotic lesions that are persistent, enlarging, ulcerated, bleeding, or "non-healing," regardless of colour.[21,22]

Standardise pathology reporting using CAP/RCPath/ICCR-aligned synoptic elements and ensure routine inking of margins for excisions and amputations.[6-8,16]

Build multicentre Nigerian datasets with prospective follow-up, nodal assessment where feasible, and outcomes (recurrence, metastasis, survival). This is essential to move from pattern description to locally valid risk stratification and quality improvement.[12,27]

CONCLUSION

In this NAUTH series, melanoma most often presented as acral lentiginous melanoma with very thick (pT4) primaries and frequent ulceration, features that align with wider African evidence of late presentation and high-risk pathology. These findings support targeted local interventions: routine acral examination, early biopsy (including nonpigmented lesions), and strengthened pathology processes (synoptic reporting and routine inking) to enable clearer surgical audit and better stage-appropriate care.[6,10,11,13-16]

REFERENCES

1. Ferlay J, Ervik M, Lam F, Laversanne M, Colombet M, Mery L, et al. *Global Cancer Observatory: Cancer Today. Melanoma of skin (GLOBOCAN 2022)* [Internet]. Lyon (FR): International Agency for Research on Cancer; 2024. Available from: https://gco.iarc.fr/today. Accessed 2026 Apr 13.

2. Bray F, Laversanne M, Sung H, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide. CA Cancer J Clin. 2024.

3. Long GV, Swetter SM, Menzies AM, Gershenwald JE, Scolyer RA. Cutaneous melanoma. Lancet. 2023;402(10400):485–502.

4. Gershenwald JE, Scolyer RA, Hess KR, Sondak VK, Long GV, Ross MI, et al. Melanoma staging: evidence-based changes in the AJCC 8th edition cancer staging manual. CA Cancer J Clin. 2017;67(6):472–492.

5. Keung EZ, Gershenwald JE. The AJCC 8th edition melanoma staging system: implications for melanoma treatment and care. Expert Rev Anticancer Ther. 2018;18(8):775–784.

6. College of American Pathologists. Protocol for the examination of excision specimens from patients with invasive melanoma of the skin. Version 1.1.0.0. Northfield (IL): College of American Pathologists; 2024. Available from: https://documents.cap.org/protocols.

7. Royal College of Pathologists. Dataset for the histological reporting of primary cutaneous malignant melanoma and regional lymph nodes. London: RCPath; 2019. Available from: https://www.rcpath.org.

8. Scolyer RA, Rawson RV, Gershenwald JE, Ferguson PM, Prieto VG. Melanoma pathology reporting and staging. Mod Pathol. 2020;33(Suppl 1):15–24.

9. Obadofin OO, Badmos KB, Omoseebi OO, Banjo AAF. Malignant melanoma in Lagos, Nigeria: elucidating histopathologic prognostic factors. West Afr J Med. 2022;39(6):623–627.

10. de Wet J, Tod B, Visser WI, Jordaan HF, Schneider JW. Clinical and pathological features of acral melanoma in a South African population. S Afr Med J. 2018;108(9):777-781.

11. Mulenga M, Montgomery ND, Chagomerana M, et al. Epidemiological and histopathological profile of malignant melanoma in Malawi. BMC Clin Pathol. 2019;19:5.

12. Ayanlowo OO, Adegbulu AA, Cole-Adeife O. Cutaneous cancers in Africans: a systematic review. Dermatol Rev. 2022;3(6):369–383.

13. Kim SH, Tsao H. Acral melanoma: a review of pathogenesis, progression, and management. Biomolecules. 2025;15(1):120.

14. Dugan MM, Perez MC, Karapetyan L, Zager JS. Management of acral lentiginous melanoma: current updates and future directions. Front Oncol. 2024;14:1323933.

15. Thakker S, Jaguan D, Belzberg M, Gulati N, Campbell JR, DeClerck BK, et al. Acral lentiginous melanoma. Part I. Epidemiology, etiology, clinical presentation, and diagnosis. J Am Acad Dermatol. 2026;94(2):421–432.

16. International Collaboration on Cancer Reporting. Invasive melanoma histopathology reporting guide. 2nd ed. Sydney: ICCR; 2019. Available from: https://www.iccr-cancer.org.

17. Riquelme-Mc Loughlin C, Sandoval-Clavijo A, Blanco de Tord M, et al. Prognostic role of microsatellites in melanoma and implications in the AJCC classification system: a cohort study. J Am Acad Dermatol. 2023;88(2):338-347.

18. Ozbagcivan O, Kazaz E. Predictive factors for distant metastasis in early cutaneous melanoma: a 20-year experience of a Turkish tertiary referral hospital. *An Bras Dermatol.* 2025;100(6):501212.

19. Varey AHR, Goumas C, Hong AM, Mann GJ, Fogarty GB, Stretch JR, et al. Neurotropic melanoma: an analysis of the clinicopathological features, management strategies and survival outcomes for 671 patients treated at a tertiary referral center. *Mod Pathol.* 2017;30(11):1538–1550.

20. Ladstein RG, Bachmann IM, Straume O, Akslen LA. Tumour necrosis is a prognostic factor in thick cutaneous melanoma. Am J Surg Pathol. 2012.

21. Misiąg P, Molik K, Kisielewska M, et al. Amelanotic melanoma: biochemical and molecular induction pathways. Int J Mol Sci. 2024;25(21):11502.

22. Kakish D, Alsamhori JF, Ayman A, Al-Sawalha M, et al. Amelanotic melanoma: diagnostic challenges, treatment innovations, and the emerging role of artificial intelligence in early detection. *J Med Surg Public Health.* 2025;6:100189.

23. Dessinioti C, et al. Nevus-associated melanoma: proportions and clinicopathologic correlates. J Am Acad Dermatol. 2023;89(2):345–353.

24. Scottish Intercollegiate Guidelines Network (SIGN). *Cutaneous melanoma (SIGN 146)* [Internet]. Edinburgh: SIGN; 2017 [updated 2023]. Available from: https://melanomafocus.org/wp-content/uploads/2022/11/sign146.pdf.

25. College of American Pathologists. *Protocol for the examination of specimens from patients with uveal melanoma* [Internet]. Northfield (IL): College of American Pathologists; 2021. Available from: https://documents.cap.org/protocols.

26. PDQ Adult Treatment Editorial Board. Melanoma treatment (PDQ®) [Internet]. Bethesda (MD): National Cancer Institute (US); 2002–. Updated 2025 May 2. Available from: https://www.cancer.gov/types/skin/hp/melanoma-treatment-pdq. Accessed 2026 Apr 12

27. Amaral T, Ottaviano M, Arance A, Blank C, Chiarion-Sileni V, Donia M, Dummer R, Garbe C, Gershenwald JE, Gogas H, et al. Cutaneous melanoma: ESMO Clinical Practice Guideline for diagnosis, treatment and follow-up. Ann Oncol. 2025;36(1):10–30.

28. Fariyike O, Johnson NA, Craig P, Nobes J, Levell NJ, Venables Z. Understanding acral lentiginous melanoma: from the clinic to guidelines. *Clin Exp Dermatol.* 2025;llaf501.

29. Breslow A. Thickness, cross-sectional areas and depth of invasion in the prognosis of cutaneous melanoma. *Ann Surg.* 1970;172(5):902–908.

30. Ozor NS, Ezejiofor IF, Ezejiofor OI, Menkiti FE, Madubuike KC, Ndukwe CO, et al. Malignant skin Tumours seen in Nigeria: Nnamdi Azikiwe University Teaching Hospital Nnewi, a 10-year review (January 2008 to December 2017). *Clin Dermatol Rev.* 2023;7(4):352–357

31. Emegoakor CD, Okoli CC, Okoye O. Malignant melanoma in a Nigerian tertiary hospital. *Orient J Med.* 2016;28(1–2):49–53

32. Gbeneol TJ, Nwachukwu AC, Oti AN, Onwuagha IJC, Briggs MKN, Ovusike KA. Malignant melanoma: our experience at the University of Port Harcourt Teaching Hospital, Port Harcourt. *Niger Health J.* 2022;22(1):129–139

33. Elimian HO, Sokunbi AE, Oludiran OO. Six years of malignant melanoma management: a review of diagnosis and the challenges of treatment and follow-up. *Sierra Leone J Med.* 2025;2(2):35–40.