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Unusual Presentation of Malignant Melanoma: A Case of Giant Amelanotic Involvement of the Hand

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A B S T R A C T

Malignant melanoma, a cancer originating from melanocytes, typically presents as a pigmented lesion. Amelanotic melanoma, a subtype lacking pigmentation, poses diagnostic challenges due to its varied clinical appearance. Acral amelanotic melanoma (AAM), occurring on the palms, soles, and subungual areas, is particularly rare. This case report describes an unusual presentation of a giant amelanotic malignant melanoma on the left hand, highlighting the diagnostic and management complexities. A 45-year-old male presented to the surgical oncology clinic with a three-year history of a progressively enlarging lump on his left hand. Initially small, the lesion rapidly grew in the past year, accompanied by ulceration and bleeding. Physical examination revealed an 8 cm x 6 cm x 4 cm rough-shaped, skin-colored mass with crusting and easily bleeding sores on the left palm. No axillary lymphadenopathy was noted. Histopathological examination of a biopsy sample indicated amelanotic malignant melanoma, which was confirmed by positive HMB-45 staining on immunohistochemistry. Magnetic Resonance Imaging (MRI) revealed a large soft tissue mass infiltrating the muscles of the left hand and causing bone marrow replacement in the 4th and 5th metacarpal bones. The patient subsequently underwent wrist disarticulation. Postoperative follow-up at one and six months showed good recovery without recurrence. In conclusion, this case underscores the importance of considering amelanotic melanoma in the differential diagnosis of unusual hand lesions, even in the absence of typical pigmentation. Proper histopathology and immunohistochemistry are crucial for accurate diagnosis and to rule out other malignancies. This report contributes to the limited literature on giant AAM of the hand and highlights the surgical management of this rare entity.

1. Introduction

Malignant melanoma (MM) is a potentially aggressive form of skin cancer that originates from melanocytes. These are the cells responsible for producing melanin, the pigment that gives skin its color. The classic presentation of malignant melanoma is a pigmented lesion, often dark brown or black, with irregular borders and uneven coloration. However, not all melanomas follow this typical pattern. Amelanotic melanoma (AMM) is a subtype of melanoma that lacks the characteristic pigmentation. This absence of pigment can make these melanomas appear pink, red, skin-colored, or even white. The atypical appearance of AMMs poses a significant diagnostic challenge. Because they do not exhibit the usual features of melanoma, they can be easily mistaken for benign skin conditions or other types of malignancies. This can lead to delays in diagnosis and treatment, which can have serious consequences for patient outcomes. Within the spectrum of melanoma, acral melanoma is a distinct type that arises on the palms, soles, and subungual regions (the areas under the fingernails and toenails). Acral melanoma is relatively rare, accounting for only a small proportion of all melanoma

cases, estimated to be around 2-3%. This predilection for acral sites adds another layer of complexity to the diagnosis and management of melanoma.[1-4]

Acral amelanotic melanoma (AAM) represents a particularly challenging entity. It combines the rarity of acral melanoma with the diagnostic difficulties of amelanotic melanoma. This combination means that AAMs are not only uncommon but also exceptionally difficult to identify in their early stages. The clinical presentation of AAMs is notoriously variable. They can mimic a wide range of benign conditions, such as warts, ulcers, pyogenic granulomas, and other non-cancerous lesions. This capacity for clinical mimicry often leads to misdiagnosis and delays in initiating appropriate treatment. Such delays can have a detrimental impact on patient prognosis, as early detection and treatment are crucial for improving outcomes in melanoma. The incidence of malignant melanoma has been on the rise globally, making it a significant public health concern. While melanoma is more frequently observed in individuals with fair skin and a history of significant sun exposure, acral melanomas, including AAMs, tend to occur across all races and ethnicities. Notably, acral melanomas often develop independently of ultraviolet radiation exposure, which is a major risk factor for other types of melanoma. This difference in etiology underscores the distinct nature of acral melanomas.[5-7]

The hand, in particular, is an infrequent location for melanoma development. Therefore, the occurrence of a giant amelanotic melanoma on the hand represents a rare clinical entity. The unusual location, combined with the amelanotic nature and the large size of the tumor, makes this presentation particularly noteworthy. Early and accurate diagnosis is of paramount importance in the management of malignant melanoma. The prognosis of melanoma is heavily influenced by factors such as the stage of the disease at diagnosis. The Breslow thickness, which refers to the depth of tumor invasion into the skin, is a critical prognostic factor. Melanomas with greater Breslow thickness have a higher propensity for metastasis, which is the spread of cancer cells to distant parts of the body. Metastatic melanoma is associated with significantly poorer survival rates compared to localized disease. Consequently, it is crucial that any suspicious lesion, especially those exhibiting atypical features, undergoes prompt biopsy and histopathological examination. This allows for timely diagnosis and the initiation of appropriate treatment, which can significantly improve patient outcomes.[8-10] This case report presents a rare and unusual case of a giant amelanotic malignant melanoma located on the left hand of a 45-year-old male.

2. Case Presentation

This case report details the clinical presentation, diagnostic process, and subsequent management of a 45-year-old male who presented to the surgical oncology clinic with a progressively enlarging mass on his left hand. The patient's clinical journey, as elucidated through a comprehensive examination and diagnostic testing, reveals a rare and challenging presentation of amelanotic malignant melanoma. The patient was a 45-year-old male. This demographic information, while seemingly simple, is crucial in establishing the context of the case. Age is a significant factor in the incidence and prevalence of various malignancies. While melanoma can occur at any age, the risk generally increases with age. Understanding the patient's age helps to frame the likelihood of certain diagnoses within the broader epidemiological context of melanoma. The patient's gender is also recorded as male. While melanoma affects both genders, there can be variations in incidence, location, and prognosis between males and females. These demographic details provide a foundation for understanding the patient within the larger population affected by melanoma. The patient's primary presenting complaint was a "lump on the left hand." This seemingly straightforward complaint initiated the entire diagnostic process. However, the critical details lie in the progression and characteristics of this lump. The table specifies that the lump was "progressively enlarging over three years, with accelerated growth

and the appearance of bleeding wounds in the past year." This description is crucial for several reasons; Chronicity and Progression: The three-year duration indicates that this was not an acute process. The lesion had been present for a considerable period, suggesting a slow initial growth phase. This chronicity is important in differentiating melanoma from other conditions that might present with a more rapid onset; Accelerated Growth: The key change occurred in the past year, with a notable acceleration of growth. This rapid increase in size is a significant red flag in the evaluation of any mass. It raises concern for malignant transformation or aggressive growth patterns, necessitating urgent investigation. Rapid growth suggests a change in the underlying biological behavior of the lesion; Bleeding Wounds: The appearance of bleeding wounds is another alarming symptom. Ulceration and bleeding from a skin lesion are often indicative of a disruption of the normal skin barrier. This can occur due to rapid growth outstripping the blood supply, direct invasion of blood vessels by malignant cells, or fragility of the lesion. Bleeding also increases the risk of secondary infection and highlights the potential for a more advanced stage of the disease. The combination of progressive enlargement, accelerated growth, and bleeding wounds strongly suggested the need for a thorough investigation to rule out malignancy and determine the underlying cause of the lesion. The history of present illness provides a more detailed account of the evolution of the patient's condition. The table reiterates the three-year duration of the lesion, reinforcing the chronic nature of the condition. This extended timeframe suggests that the initial growth of the tumor may have been indolent, potentially contributing to any delay in seeking medical attention. The initial presentation is described as a "small, painless nodule on the left palm." This is a crucial piece of information. The lesion began as a small nodule, which is consistent with the early stages of many skin tumors. The fact that it was initially painless might explain why the patient did not seek immediate medical attention. Pain is a common motivator for patients to seek medical care, and its absence can lead to a delay in diagnosis. This highlights the importance of educating the public about the need to seek evaluation for any persistent or growing skin lesion, even if it is not painful. The recent changes are characterized by a "rapid increase in size, appearance of ulcerations, and bleeding from the surface." This echoes the information in the presenting complaint but provides further emphasis. The transition from a small, painless nodule to a rapidly growing, ulcerated, and bleeding mass represents a significant change in the clinical course. These changes are highly concerning for malignant transformation and local progression of the disease. Ulceration signifies a breakdown of the epithelial barrier, potentially facilitating invasion and metastasis. The patient "denied fever, weight loss, or history of trauma to the hand." This is important negative information. The absence of systemic symptoms like fever and weight loss suggests that, at the time of presentation, the disease might have been localized, without overt signs of widespread metastasis. However, it is crucial to recognize that the absence of systemic symptoms does not rule out the possibility of occult metastasis. The denial of a history of trauma is also relevant. Trauma can sometimes lead to the development of benign lesions or inflammatory processes. By excluding trauma, the clinical picture points more strongly towards a primary neoplastic process rather than a reactive or post-traumatic condition. The physical examination findings provide a detailed description of the lesion and the surrounding area. The mass was located on "the thenar and hypothenar eminences of the left palm, extending to involve the base of the fifth digit." This precise anatomical description is essential. The thenar eminence is the fleshy area at the base of the thumb, while the hypothenar eminence is the corresponding area at the base of the little finger. The location on the palm is significant because acral melanoma, a particularly aggressive subtype, is found on the palms, soles, and nail beds. The extension of the mass to involve the base of the fifth digit further delineates the

extent of the lesion and its potential impact on hand function. The mass measured "approximately 8 cm x 6 cm x 4 cm in greatest dimensions." This measurement is crucial for documenting the size of the tumor and for comparing it with subsequent measurements to assess growth or response to treatment. A mass of this size on the hand is considered large and would undoubtedly cause functional impairment. The dimensions provide a quantitative assessment of the tumor burden. The shape of the mass was described as "roughly shaped, multinodular." This description suggests an irregular growth pattern, which is often characteristic of malignant tumors. The multinodular appearance indicates that the tumor was composed of multiple lobules or nodules, further supporting the possibility of an aggressive growth pattern. The color of the mass was "pinkish-white with areas of crusting. Different from the surrounding skin." This is a key finding. The pinkish-white color indicates a lack of typical melanin pigmentation, which is a hallmark of amelanotic melanoma. Most melanomas are pigmented, but amelanotic melanomas lack pigment, making them more challenging to diagnose. The areas of crusting are consistent with the ulceration and bleeding described earlier. The color difference from the surrounding skin highlights the abnormal nature of the lesion. The surface characteristics included "superficial ulcerations that bled easily upon gentle palpation." This finding is consistent with the history of bleeding wounds. Ulcerations represent a breakdown of the skin barrier, increasing the risk of infection and potentially facilitating tumor spread. The fact that the lesions bled easily upon gentle palpation indicates the fragility of the tissue and the likelihood of neovascularization, which is the formation of new blood vessels that support tumor growth. The consistency of the mass was "firm." Palpation is an important part of the physical examination. A firm consistency is often associated with solid tumors, as opposed to cystic or fluid-filled lesions. The mass was "slightly tender to touch." Tenderness can be present in both benign and malignant lesions. In this case, the slight tenderness may be due to inflammation or irritation associated with the ulceration and bleeding. While not a definitive sign of malignancy, tenderness contributes to the overall clinical picture. The examination of the lymph nodes is a crucial part of the evaluation for melanoma, as it helps to assess for regional metastasis. The table states, "No regional lymphadenopathy detected." This means that there was no evidence of enlarged lymph nodes in the left axilla (armpit). Regional lymph nodes are the first site of potential metastasis for melanoma. The absence of lymphadenopathy is a favorable finding, suggesting that the disease, at the time of examination, might have been localized. However, it is essential to note that the absence of clinically detectable lymphadenopathy does not entirely rule out the possibility of microscopic metastasis to the lymph nodes. Further evaluation, such as sentinel lymph node biopsy, might be considered in certain cases. Radiological imaging plays a vital role in assessing the extent of the disease and evaluating for bone involvement or distant metastasis. The X-ray revealed "inhomogeneous opacity with irregular borders in the metacarpal region extending to the 4th and 5th digits, appearing to exert pressure on the proximal and middle phalanges. Good bony alignment otherwise." This description indicates that the tumor was visible on the X-ray and was affecting the bones of the hand. Inhomogeneous opacity suggests that the tumor had varying densities, which can be seen in malignant lesions. Irregular borders are another characteristic of malignancy, as benign lesions tend to have smoother, well-defined borders. The involvement of the metacarpal region and the extension to the 4th and 5th digits indicate the local aggressiveness of the tumor. The apparent pressure on the proximal and middle phalanges suggests that the tumor was causing compression or invasion of the surrounding bone structures. Despite these abnormalities, the good bony alignment otherwise suggests that there was no major fracture or dislocation. The MRI revealed a "large, irregularly lobulated soft tissue mass (7.4 cm x 13.7 cm x 12.1 cm) in the left hand with isointense to hyperintense signal on T1-weighted and hyperintense

signal on T2-weighted/STIR sequences, showing extensive enhancement post-contrast. Infiltration of multiple muscles and bone marrow replacement in the 4th and 5th metacarpal bones. Major arteries and carpal bones appeared normal." The MRI confirmed the large size of the mass, providing more precise measurements (7.4 cm x 13.7 cm x 12.1 cm) compared to the physical examination. The description of the mass as "irregularly lobulated" further supports the possibility of a malignant process. The signal intensity on MRI sequences provides information about the tissue composition of the mass. "Isointense to hyperintense signal on T1-weighted" and "hyperintense signal on T2-weighted/STIR" sequences are typical findings for soft tissue tumors. These signal characteristics suggest that the mass contained a significant amount of water and cellularity. "Showing extensive enhancement post-contrast" is a critical finding. Contrast enhancement indicates increased vascularity, which is often associated with malignancy. Tumors require a rich blood supply to support their rapid growth, and this increased blood flow is reflected by contrast enhancement on MRI. The MRI revealed "infiltration of multiple muscles," indicating that the tumor was invading the surrounding soft tissues. This is a sign of local aggressiveness and can have implications for surgical planning. The finding of "bone marrow replacement in the 4th and 5th metacarpal bones" is a significant and concerning finding. Bone marrow replacement suggests that the tumor cells were invading and replacing the normal bone marrow, which is a sign of advanced local disease. This finding has implications for treatment and prognosis. The fact that the "major arteries and carpal bones appeared normal" is a relatively favorable finding, suggesting that these structures were not directly involved or compromised by the tumor. However, the proximity of the tumor to these structures still poses a risk. Histopathological examination of tissue samples is essential for establishing a definitive diagnosis of melanoma and determining its subtype. The biopsy revealed "solid nests of round to oval cells with significant pleomorphism, scant cytoplasm, nuclei with coarse chromatin, and prominent nucleoli. Numerous multinucleated giant cells and frequent mitotic figures." The description of "solid nests of round to oval cells" indicates that the tumor was composed of clusters of cells with a relatively uniform shape. "Significant pleomorphism" means that the cells varied considerably in size and shape, which is a characteristic feature of malignant cells. "Scant cytoplasm" suggests that the cells had a small amount of cytoplasm relative to the nucleus. "Nuclei with coarse chromatin" refers to the appearance of the genetic material within the nucleus, which is often clumped or irregular in malignant cells. "Prominent nucleoli" means that the nucleoli, which are structures within the nucleus, were large and easily visible, which is another characteristic of malignant cells. The presence of "numerous multinucleated giant cells" is a notable finding. These are large cells with multiple nuclei, which can be seen in various pathological conditions, including some types of tumors. The observation of "frequent mitotic figures" is a crucial finding. Mitotic figures are cells undergoing cell division, and their presence in large numbers indicates a high rate of cell proliferation, which is a hallmark of cancer. Immunohistochemical staining showed "strong positive staining for HMB-45; negative staining for Myogenin and P-63. Confirmed amelanotic malignant melanoma." HMB-45 is a melanocyte-specific marker, meaning that it is typically expressed by melanocytes (the cells that give rise to melanoma) and melanoma cells. "Strong positive staining for HMB-45" confirms the melanocytic origin of the tumor. Myogenin is a marker for rhabdomyosarcoma, a type of soft tissue sarcoma, while P-63 is a marker for squamous cell carcinoma, a type of skin cancer. "Negative staining for Myogenin and P-63" helps to rule out these other types of malignancies. The combination of positive HMB-45 staining and negative staining for Myogenin and P-63 definitively confirmed the diagnosis of amelanotic malignant melanoma. The final clinical diagnosis was "amelanotic malignant melanoma." This diagnosis was based on the totality

of the clinical, radiological, and histopathological findings. The absence of pigmentation (amelanotic), the location on the hand (acral), and the confirmation by immunohistochemistry all contributed to this diagnosis (Table 1).

The management of malignant melanoma, particularly in rare presentations such as this case of giant amelanotic melanoma on the hand, requires a carefully considered and individualized approach. The treatment strategy is guided by factors such as the stage of the disease, the location and size of the tumor, and the overall health of the patient. This section will delve into the specifics of the treatment procedure employed in this case, as well as the subsequent follow-up care provided to the patient. The primary treatment modality for localized malignant melanoma is surgical excision. In this particular case, the surgical intervention consisted of a wrist disarticulation of the left hand. This radical surgical approach was necessitated by the size and invasive nature of the tumor. Wrist disarticulation, also known as amputation at the wrist joint, is a procedure that involves the separation of the hand from the forearm at the level of the radiocarpal joint. This is a significant surgical undertaking with substantial implications for the patient's functional ability and quality of life. The decision to proceed with wrist disarticulation was undoubtedly made after a thorough evaluation of all available treatment options and a careful consideration of the risks and benefits. Several factors likely contributed to the decision to pursue such an extensive surgical procedure. The sheer size of the tumor, measuring approximately 8 cm x 6 cm x 4 cm, indicated a substantial tumor burden on the hand. The MRI findings further revealed the invasive nature of the tumor, demonstrating infiltration of multiple muscles within the hand and bone marrow replacement in the 4th and 5th metacarpal bones. These findings suggested that the tumor had deeply invaded the surrounding tissues and was not amenable to a more conservative local excision. In cases where the tumor involves critical structures or has extensive local invasion, achieving complete tumor removal with adequate surgical margins becomes the primary objective. Adequate surgical margins are crucial to minimize the risk of local recurrence. Local recurrence refers to the reappearance of the tumor at the original site after treatment. Wide surgical excision aims to remove not only the visible tumor but also a margin of healthy tissue surrounding it, thereby ensuring that any microscopic residual disease is eliminated. Given the extent of tumor involvement in this case, a more limited resection would likely have resulted in positive surgical margins or an unacceptably high risk of local recurrence. Therefore, wrist disarticulation was deemed the most appropriate surgical approach to achieve the goal of complete tumor removal and provide the patient with the best chance for long-term survival. The decision to perform a wrist disarticulation is a complex one, requiring careful consideration of the functional implications for the patient. The loss of a hand significantly impacts a person's ability to perform daily tasks, engage in work-related activities, and maintain independence. However, in cases of advanced malignancies where limb-sparing surgery is not feasible, the primary focus shifts to eradicating the disease and preventing it from spreading. Preoperative counseling and shared decision-making are essential in such situations. The patient must be fully informed about the nature of the disease, the rationale for the proposed treatment, the potential risks and benefits of surgery, and the expected functional outcomes. The patient's preferences and values should be taken into account when making treatment decisions. The overarching goal of the surgical intervention, in this case, wrist disarticulation, was to achieve complete tumor removal with adequate surgical margins. This goal is fundamental to the surgical management of malignant melanoma. Complete tumor removal is the cornerstone of curative treatment for localized melanoma. The aim is to physically eliminate all cancerous cells from the body, thereby preventing local recurrence and reducing the risk of distant metastasis. Distant metastasis occurs when cancer cells spread from the primary tumor to other parts of

the body, forming secondary tumors. Metastatic melanoma is associated with a significantly poorer prognosis compared to localized disease. Achieving adequate surgical margins is equally important. Surgical margins refer to the rim of healthy tissue that is removed along with the tumor. The width of the surgical margins is determined by factors such as the thickness of the melanoma (Breslow thickness) and the location of the tumor. Wider margins are generally recommended for thicker melanomas, as they have a higher risk of local recurrence. In the context of this case, the extensive nature of the tumor necessitated a radical surgical approach to ensure that adequate margins were achieved. The wrist disarticulation allowed for the removal of the entire tumor-bearing area, including the affected muscles and metacarpal bones, along with a surrounding cuff of healthy tissue. The importance of achieving clear surgical margins cannot be overstated. Positive surgical margins, which indicate that cancer cells are present at the edge of the removed tissue, are associated with a higher risk of local recurrence. In such cases, further surgery or other adjuvant therapies may be necessary to eliminate any residual disease. The surgical team meticulously plans and executes the procedure to maximize the chances of achieving complete tumor removal with clear margins. This involves careful preoperative imaging studies to delineate the extent of the tumor, meticulous surgical technique, and intraoperative assessment of the surgical margins, if feasible. The success of the surgical intervention in achieving its goal is ultimately confirmed by the histopathological examination of the resected specimen. The intraoperative findings provide a description of what was observed during the surgical procedure. In this case, the gross examination of the resected specimen showed a large, multinodular mass involving the palm and the base of the fifth digit. This description corroborates the preoperative clinical and radiological findings. The resected specimen refers to the tissue that was removed during the surgery, in this case, the left hand distal to the wrist joint. The observation of a large mass is consistent with the preoperative measurements obtained from the physical examination and MRI. The description of the mass as multinodular is also consistent with the preoperative findings. This nodular appearance suggests an aggressive growth pattern. The fact that the mass involved the palm and the base of the fifth digit confirms the location and extent of the tumor as determined by the preoperative evaluation. This information is important for the pathologist in interpreting the histopathological findings and for the surgical team in assessing the adequacy of the resection. Intraoperative findings provide valuable information that can guide further management decisions. For example, if the surgeon had observed unexpected tumor extension or involvement of critical structures during the procedure, it might have influenced the extent of the resection or the need for additional procedures. The histopathology of the resected specimen is crucial for confirming the diagnosis and assessing the adequacy of the surgical excision. In this case, the histopathology confirmed amelanotic malignant melanoma with free surgical margins at the incision site. This finding is of paramount importance. The confirmation of amelanotic malignant melanoma by histopathology reinforces the diagnosis that was initially made based on the biopsy sample. Histopathology provides a detailed microscopic examination of the tissue, allowing for a precise characterization of the tumor cells and their relationship to the surrounding tissues. The most significant aspect of the histopathology report is the finding of free surgical margins. Free surgical margins indicate that no cancer cells were observed at the edges of the resected specimen. This is a critical indicator of a successful surgical excision and is associated with a lower risk of local recurrence. The pathologist carefully examines the edges of the resected tissue to ensure that there is a margin of normal tissue separating the tumor from the cut edge. The width of the margin considered adequate depends on the type and stage of the cancer. In the case of melanoma, achieving free surgical margins is a primary goal of surgical treatment. Positive surgical

margins, which indicate that cancer cells are present at the edge of the specimen, are associated with a higher risk of local recurrence and may necessitate further surgery or other adjuvant therapies. The finding of free surgical margins in this case is a positive prognostic indicator, suggesting that the surgical intervention was successful in achieving complete tumor removal. Adjuvant therapy refers to additional treatment given after the primary treatment, such as surgery, to reduce the risk of cancer recurrence. Adjuvant therapies for melanoma may include immunotherapy, targeted therapy, radiation therapy, or chemotherapy. In this particular case, the patient did not receive adjuvant radiotherapy or chemotherapy. The decision not to administer adjuvant therapy is a complex one and is based on a careful assessment of the individual patient's risk of recurrence, the potential benefits and risks of adjuvant therapy, and the patient's overall health status. Several factors might have contributed to the decision not to administer adjuvant therapy in this case. The finding of free surgical margins is a favorable prognostic indicator, suggesting a lower risk of local recurrence. The absence of lymph node involvement at the time of surgery also suggests a lower risk of distant metastasis. Furthermore, the potential side effects and toxicities associated with adjuvant therapies must be weighed against the potential benefits. Adjuvant therapies can have significant side effects, and the decision to administer them should be made on an individualized basis. It is important to note that the decision regarding adjuvant therapy is a dynamic one and may be revisited based on ongoing follow-up and surveillance. If there is any evidence of recurrence or metastasis during follow-up, adjuvant therapy may be considered at that time. Postoperative follow-up is an essential component of the management of malignant melanoma. It allows for the early detection of any recurrence or metastasis, as well as the management of any complications related to the surgery. At the 1-month follow-up visit, the patient showed good recovery, and there was no evidence of local recurrence or distant metastasis. This early postoperative assessment is crucial for evaluating the patient's initial recovery from surgery and identifying any immediate complications, such as infection, wound dehiscence, or pain. The absence of local recurrence at this early stage is encouraging, but it is important to recognize that longer-term follow-up is necessary to monitor for any delayed recurrence. The absence of distant metastasis at this time is also a positive finding, suggesting that the disease, at least in the short term, remained localized. At the 6-month follow-up visit, the patient's condition remained good, and there was still no evidence of local recurrence or distant metastasis. This continued absence of recurrence and metastasis at 6 months is a favorable indicator. However, it is crucial to emphasize that melanoma can recur or metastasize even years after the initial treatment. Therefore, ongoing long-term follow-up is essential. The patient was scheduled for regular clinical evaluations for continued monitoring. This highlights the importance of long-term surveillance in the management of melanoma. Regular follow-up visits allow for the early detection of any recurrence or metastasis, as well as the management of any potential long-term complications of the surgery. The follow-up schedule typically includes periodic physical examinations, imaging studies, and laboratory tests. The frequency of follow-up visits depends on the stage of the melanoma and the individual patient's risk of recurrence. During follow-up visits, the physician will carefully examine the surgical site for any signs of local recurrence. Imaging studies, such as chest X-rays, CT scans, or PET scans, may be performed to evaluate for distant metastasis. Laboratory tests, such as blood tests to assess liver function and lactate dehydrogenase (LDH) levels, may also be performed. Patient education is also an important aspect of follow-up care. Patients should be instructed on how to perform self-examinations of their skin and lymph nodes, and they should be advised to report any new or changing lesions to their physician promptly (Table 2).

Table 1. Summary of patient's clinical findings.

Category	Finding	Detail/Value
Patient demographics	Age	45 years
	Gender	Male
Presenting complaint	Lump on the left hand	Progressively enlarging over three years, with accelerated growth and appearance of bleeding wounds in the past year.
History of present illness	Duration of lesion	3 years
	Initial presentation	Small, painless nodule on the left palm.
	Recent changes (past year)	Rapid increase in size, appearance of ulcerations, and bleeding from the surface.
	Associated symptoms	Denied fever, weight loss, or history of trauma to the hand.
Physical examination (Figure 1)	Location of the mass	Thenar and hypothenar eminences of the left palm, extending to involve the base of the fifth digit.
	Size of the mass	Approximately 8 cm x 6 cm x 4 cm in greatest dimensions.
	Shape of the mass	Roughly shaped, multinodular.
	Color of the mass	Pinkish-white with areas of crusting. Different from the surrounding skin.
	Surface characteristics	Superficial ulcerations that bled easily upon gentle palpation.
	Consistency	Firm.
	Tenderness	Slightly tender to touch.
Lymph node examination	Left axillary lymph nodes	No regional lymphadenopathy detected.
Radiological findings	X-ray of the left hand	Inhomogeneous opacity with irregular borders in the metacarpal region extending to the 4th and 5th digits, appearing to exert pressure on the proximal and middle phalanges. Good bony alignment otherwise.
	MRI of the upper limbs with contrast	Large, irregularly lobulated soft tissue mass (7.4 x 13.7 x 12.1 cm) in the left hand with isointense to hyperintense signal on T1-weighted and hyperintense signal on T2-weighted/STIR sequences, showing extensive enhancement post-contrast. Infiltration of multiple muscles and bone marrow replacement in the 4th and 5th metacarpal bones. Major arteries and carpal bones appeared normal.
Histopathological findings	Biopsy	Solid nests of round to oval cells with significant pleomorphism, scant cytoplasm, nuclei with coarse chromatin, and prominent nucleoli. Numerous multinucleated giant cells and frequent mitotic figures.
	Immunohistochemistry	Strong positive staining for HMB-45; negative staining for Myogenin and P-63. Confirmed amelanotic malignant melanoma.
Clinical diagnosis	Final Diagnosis	Amelanotic Malignant Melanoma

Table 2. Summary of treatment procedure and follow-up.

Category	Finding	Detail/Value
Treatment procedure	Surgical Intervention	Wrist disarticulation of the left hand.
	Goal of Surgery	To achieve complete tumor removal with adequate surgical margins.
	Intraoperative Findings	Gross examination of the resected specimen showed a large, multinodular mass involving the palm and the base of the fifth digit.
	Histopathology of Resected Specimen	Confirmed amelanotic malignant melanoma with free surgical margins at the incision site.
	Adjuvant Therapy	The patient did not receive adjuvant radiotherapy or chemotherapy.
Postoperative follow-up	1-month follow-up	Good recovery, no evidence of local recurrence or distant metastasis.
	6-month follow-up	The condition remained good, with no evidence of local recurrence or distant metastasis.
	Ongoing Monitoring	Regular clinical evaluations were scheduled for continued monitoring.

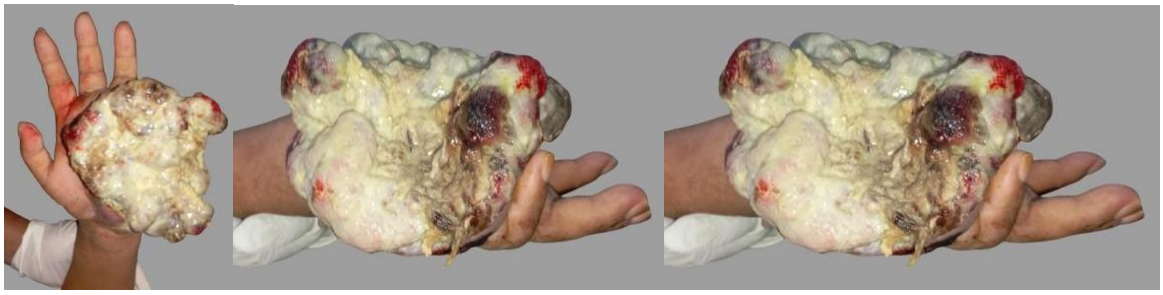

Figure 1. (A) Anterior view (B) Medial view, (C) Lateral view. A mass measuring 8 cm x 6 cm x 4 cm, irregular shape, different color from the surrounding skin, crust (+), lesions bleed easily (+), tenderness (+).

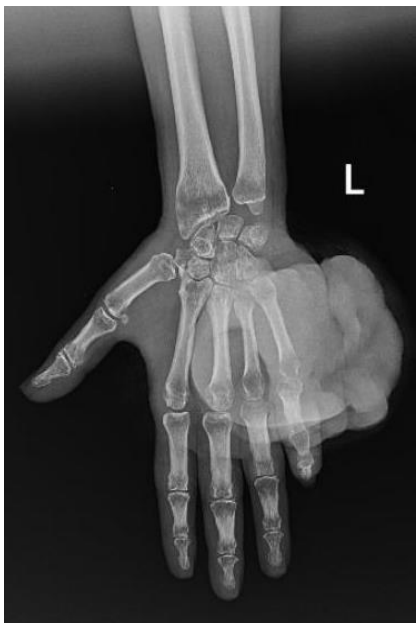

Figure 2. Anteroposterior left manus X-rays.

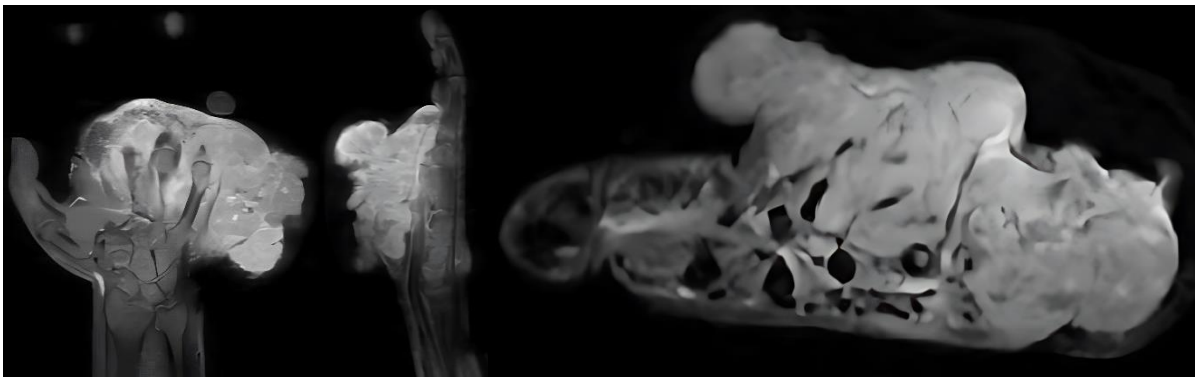

Figure 3. MRI. (A) Coronal section; (B) Sagittal section; (C) Axial section. A malignant soft tissue mass in the left-hand region caused deformity of the fifth metacarpal bone to the middle phalangeal bone of the fifth digiti of the left hand and infiltrated the left abductor digiti minimi muscle, left opponens digiti minimi (ODM) muscle, left flexor digiti minimi (FDM) brevis muscle, left palmar muscle, left lumbrical muscle, left palmar interossei muscle, and left dorsal interossei muscle with the impression of receiving feeding from the left ulnar artery and left radial artery and accompanied by bone marrow replacement in the 4th-5th metacarpal bone of the left hand.

3. Discussion

The case described herein is notable for its rarity. Malignant melanoma, while representing a significant form of skin cancer, exhibits variations in its presentation and distribution. Acral melanoma, a subtype that occurs on the palms, soles, and subungual regions, constitutes a relatively small percentage of all melanoma cases. Within this subset, amelanotic melanoma, characterized by the absence of typical melanin pigmentation, presents an even less frequent occurrence. The combination of acral location and amelanotic features, as observed in this case, underscores the uncommon nature of this particular presentation. The clinical significance of this rarity lies in the diagnostic challenges it poses. Physicians may be less familiar with such atypical presentations, potentially leading to delays or misdiagnoses. The absence of pigmentation, a hallmark of most melanomas, can cause amelanotic melanomas to mimic benign skin conditions or other malignancies. This diagnostic ambiguity can result in delayed treatment, which can negatively impact patient outcomes.[11,12]

The diagnosis of amelanotic melanoma, in general, and acral amelanotic melanoma, in particular, is fraught with challenges. The typical diagnostic algorithm for melanoma relies heavily on the recognition of pigmented lesions with irregular borders, asymmetry, and color variegation. However, amelanotic melanomas deviate from this classic presentation, often appearing as pink, red, skin-colored, or even white lesions. In this case, the patient presented with a progressively enlarging, skin-colored mass on the hand. The lack of pigmentation in the lesion likely contributed to the initial diagnostic uncertainty. The lesion could have been mistaken for a variety of other conditions, including benign tumors, pyogenic granulomas, warts, or other soft tissue malignancies. The diagnostic process in this case involved a combination of clinical evaluation, radiological imaging, and histopathological examination. The clinical evaluation raised suspicion due to the rapid growth and the presence of ulceration and bleeding. Radiological imaging, including X-ray and MRI, provided further information about the size, extent, and invasive nature of the tumor. However, the definitive diagnosis ultimately relied on histopathological examination and immunohistochemical staining. Histopathological examination of the biopsy sample revealed cellular

characteristics consistent with melanoma. The subsequent immunohistochemical staining for HMB-45, a melanocyte-specific marker, confirmed the diagnosis of amelanotic malignant melanoma. Immunohistochemistry plays a crucial role in differentiating amelanotic melanoma from other malignancies that may have a similar histological appearance. This case highlights the importance of maintaining a high index of suspicion for melanoma, even in the absence of typical pigmentation. Clinicians should be aware of the varied clinical presentations of melanoma and should consider amelanotic melanoma in the differential diagnosis of any suspicious lesion, particularly in high-risk locations such as the acral regions.[13-15]

Acral amelanotic melanomas are notorious for their ability to mimic a wide range of benign and malignant conditions. This phenomenon, known as clinical mimicry, poses a significant diagnostic challenge. The varied clinical presentations of AAMs can lead to misdiagnosis and delayed treatment, potentially impacting patient outcomes. AAMs can resemble common benign lesions such as warts, calluses, and fungal infections. They may also mimic inflammatory conditions such as pyogenic granulomas or ulcers. In some cases, AAMs can even present as seemingly innocuous skin tags. This clinical variability is due to the lack of melanin pigmentation, which typically provides the characteristic color and pattern of most melanomas. Without this pigmentation, AAMs can adopt a variety of appearances, depending on factors such as the degree of vascularity, inflammation, and keratinization. The potential for clinical mimicry underscores the importance of a thorough clinical evaluation and the use of appropriate diagnostic tools. Any persistent or growing lesion, particularly in the acral regions, should be viewed with suspicion. Biopsy and histopathological examination are essential for establishing a definitive diagnosis and differentiating AAM from other conditions.[16,17]

Histopathological examination and immunohistochemistry are indispensable tools in the diagnosis of amelanotic malignant melanoma. As discussed earlier, the absence of pigmentation makes clinical diagnosis challenging. In such cases, histopathology and immunohistochemistry provide the definitive evidence for melanoma. Histopathological examination involves the microscopic examination of tissue samples obtained through biopsy. In this case, the histopathological examination of the biopsy sample revealed solid nests of round to oval cells with significant pleomorphism, scant cytoplasm, nuclei with coarse chromatin, and prominent nucleoli. Numerous multinucleated giant cells and frequent mitotic figures were also observed. These cellular characteristics are consistent with malignant melanoma. However, histopathological findings alone may not always be sufficient to definitively diagnose amelanotic melanoma, as other malignancies can exhibit similar histological features. This is where immunohistochemistry plays a crucial role. Immunohistochemistry is a technique that uses antibodies to detect specific proteins in cells. In the case of melanoma, immunohistochemical staining for melanocyte-specific markers such as HMB-45 is essential for confirming the diagnosis. HMB-45 is a monoclonal antibody that recognizes an antigen present in melanocytes and melanoma cells. Positive staining for HMB-45 strongly supports the diagnosis of melanoma. In this case, the immunohistochemical staining showed strong positive staining for HMB-45, confirming the diagnosis of amelanotic malignant melanoma. Immunohistochemistry also played a vital role in excluding other malignancies from the differential diagnosis. Negative staining for Myogenin and P-63 helped to rule out rhabdomyosarcoma and squamous cell carcinoma, respectively. The combination of histopathological examination and immunohistochemistry provides the most accurate and reliable method for diagnosing amelanotic malignant melanoma. These techniques are essential for differentiating melanoma from other malignancies and benign conditions, ensuring timely and appropriate treatment.[18-20]

4. Conclusion

This case report highlights the diagnostic challenges and management complexities associated with a rare presentation of malignant melanoma. The patient presented with a giant amelanotic melanoma on the hand, a location and subtype that are both uncommon. The absence of typical pigmentation in amelanotic melanoma can lead to misdiagnosis and delayed treatment, as these lesions may mimic benign skin conditions or other malignancies. In this case, the diagnosis was further complicated by the tumor's large size and involvement of the hand, an infrequent site for melanoma. The diagnostic process underscored the importance of histopathological examination and immunohistochemistry in confirming the diagnosis of amelanotic melanoma. Immunohistochemical staining for HMB-45 was crucial in establishing the melanocytic origin of the tumor and ruling out other malignancies. The surgical management of this case involved a wrist disarticulation due to the size and invasive nature of the tumor. This radical approach aimed to achieve complete tumor removal and minimize the risk of local recurrence. The patient demonstrated good recovery postoperatively, with no evidence of recurrence or metastasis at the 6-month follow-up. This case report contributes to the limited literature on giant AAM of the hand and emphasizes the need for clinicians to consider amelanotic melanoma in the differential diagnosis of unusual hand lesions, even in the absence of typical pigmentation. Early recognition and accurate diagnosis, facilitated by proper histopathology and immunohistochemistry, are crucial for timely intervention and improved patient outcomes.

5. References

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