



Popliteal lymphadenectomy for cutaneous malignant melanoma with synchronous in-transit, palpable popliteal and groin metastases - a case report

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KEYWORDS :

INTRODUCTION

In malignant melanoma, distant metastases and involvement of regional lymph nodes are associated with poor prognosis.¹ For melanomas located in distal lower extremity, metastasis primarily affect lymph nodes in the inguinal region for which inguinal lymphadenectomy is recommended. Infrequently, the popliteal chain is the one involved which is rarely reported in the literature; popliteal lymphadenectomy has been the procedure of choice for its treatment when present (in cases of localized disease).^{2,3} Also, it has also been recommended for cases in which there are few in-transit metastasis⁴.

CASE REPORT

The patient was a 35-years old female who was referred to our institute following core biopsy of a mass lesion in the right popliteal region for two months. Histological examination was suggestive of high grade malignant tumour with rhomboid cells suggestive of sarcoma. On physical examination, she had non ulcerated lesion in the right sole of 1 cm in diameter with two other lesions (with the same characteristics and dimensions), in the medial aspect of leg above medial malleolus. Palpation of the popliteal fossa revealed a large nodal mass lesion (7x6 cms) with hard consistency (partially mobile in relation to deeper structures). The right inguinal region also had a large hard lymph nodal mass of approximately 5x4 cm in dimension. FNAC of both nodal stations confirmed the presence of metastatic disease. Repeat core biopsy from popliteal lesion confirmed the diagnosis of amelanotic melanoma following histological examination and IHC (HMB45, S-100, Melan A, SOX 10 and MitF – positive). In the light of this clinical picture, the diagnostic hypothesis was malignant melanoma with in-transit metastases and simultaneous involvement of the popliteal and inguinal lymph node chains.

Subsequently, pre-operative staging with Computed Tomography scans of abdomen, pelvis and chest showed no evidence of distant dissemination of the disease. Therefore, in view of locoregional disease, resection of the primary disease with in-transit metastases together with popliteal and ilio-inguinal lymphadenectomy with curative intent was planned.

Primary disease was addressed with a 2 cm wide margin excision. A S-shaped incision (with zeta-plasty) along the right leg, going from the heel region to the popliteal cavum was made, first to allow for optimal exposure, and second, heal in a manner not to cause deforming joint contracture in accordance with the technique described by Karakousis.⁵ Monoblock popliteal lymphadenectomy along with resection of two in-transit metastasis was performed through the incision. Ilio-inguinal lymphadenectomy was performed through another reverse Lazy –S shaped incision.⁶ Patient's post-operative stay in the hospital was uneventful and she was discharged on the tenth post-operative day.

Histopathological examinations of the operative specimen showed a) Primary lesion Rt sole-malignant amelanotic melanoma with tumour mass 0.8x0.6x0.5 cms (Clarke's stage V), b) In-transit nodules- both showed metastasis, c) Popliteal node – presence of metastasis with matted mass 6.4x5.9x4.0 cms, rest 2 nodes free of tumour, d) Inguinal node- presence of metastasis with matted mass 4.4x3.5x2.4 cms,

rest 7 nodes free of tumour, e) Cloquet node - no tumour and f) Iliac nodes- all 14 nodes free from tumour. Up to the present time (1 month after surgery), the patient has not presented any signs of clinical or radiological recurrence.

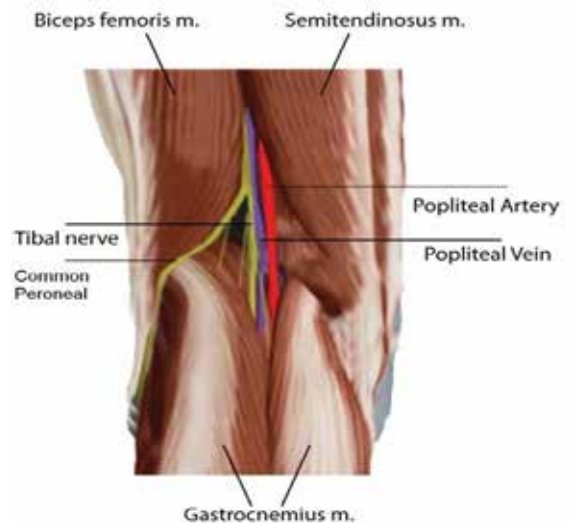


Fig 1. Schematic representation of Popliteal Fossa Anatomy.

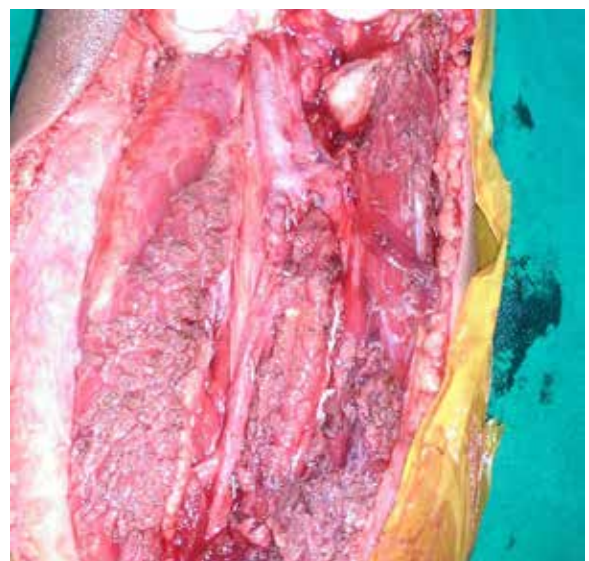


Fig 2. Close view of popliteal vessels with associated nerves.

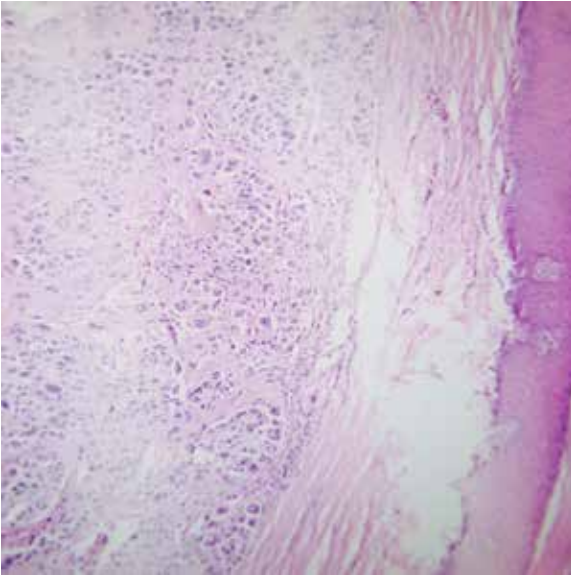


Fig 3: Sections from primary lesion showing neoplastic cells.

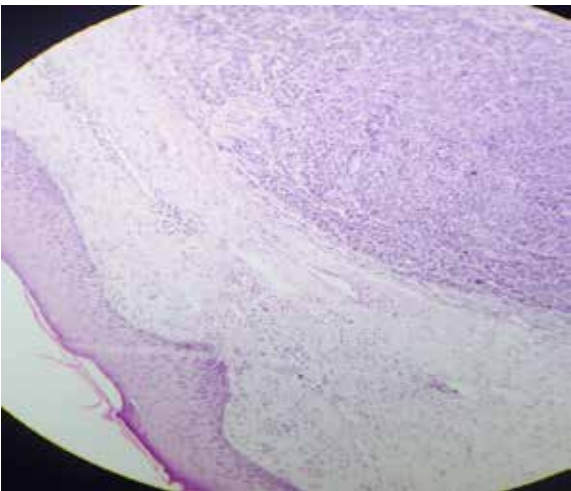


Fig 4. 10x view: Sections from popliteal lesion(with overlying skin) showing neoplastic cells.

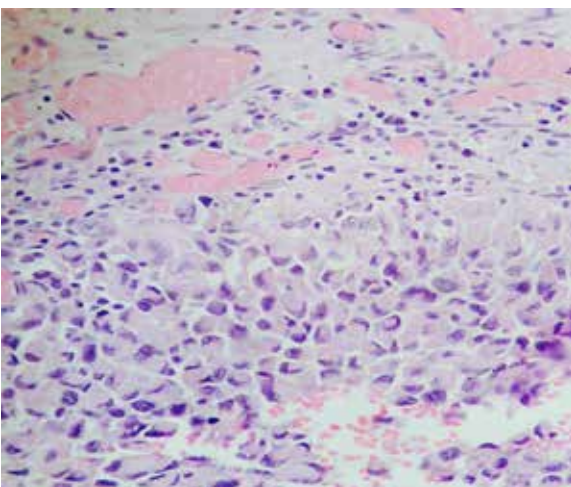


Fig 5. 40x view: Section from in-transit lesions showing neoplastic cells

DISCUSSION and REVIEW OF LITERATURE

Malignant melanoma in distal lower extremity more frequently present with inguinal lymphatic dissemination. The evidence of positive metastatic nodes in the popliteal region in such patients is a rare event with paucity of reports in the literature. The lymph nodes in the popliteal fossa lie deep to fascia and hence not easily palpable.² Popliteal lymph nodal involvement invariably presents with distant metastasis⁷

Traditionally, 2 main drainage routes have been recognized for melanomas of the distal lower extremity: a major route with origin at the medial aspect of the foot and drains into the inguinal region with in-between course along greater saphenous vein, and a minor route that originates from the lateral aspect of the foot, draining into the popliteal region.⁸ Apart from these conventional route, new lymphatic pathways were recognised with the introduction of lymphoscintigraphy for sentinel node procedures : superficial (subcutaneous) and deeper (subfascial) lymphatic channels reaching the popliteal region.^{9,10} . Lymphatic dissemination to the popliteal chain may occur concomitantly to dissemination to the inguinal chain with associated in-transit metastases occurring less frequently.^{7,10}

In high risk melanoma, in-transit metastases occur in approximately 5% to 8% of patients and has a negative prognostic feature. A solitary or a localised cluster of in-transit metastasis is reasonably managed by surgical excision usually with a 5- to 10- mm margin of excision. Re-excision is advisable only with smaller number of recurrent smaller lesions .^{11,12} Follow up every 2 to 3 months is usually advisable because new in-transit metastases often occur in that interval. No ideal management is recommended for multiple in-transit metastasis because systemic dissemination almost occurs either simultaneously, within few months or many years after in-transit metastases although local ablation of smaller lesions with carbon dioxide laser therapy may be helpful. Amputation is seldom indicated and does not improve survival.¹¹

The reported prevalence of popliteal basin drainage ranges from 1%-20% .(1,8,9) However, metastatic disease in popliteal lymph nodes was clinically detectable in 0.31% and 2.8% of the cases in series of Thompson et al. and Menes et al. respectively. Two patients (2/106=0.018%) had synchronous palpable popliteal and groin metastases and underwent radical groin and popliteal dissection in study conducted by Menes et al.¹⁰ There are two basic indications to perform popliteal lymph node dissection: i) grossly palpable metastatic disease on clinical examination or ii) microscopic disease identified in sentinel node biopsy specimens.⁹ Whenever there is lymphatic drainage to the popliteal fossa, it is accompanied by drainage to the groin. However, the popliteal nodes may be metastatic in the absence of a detectable groin metastasis. Reverse condition is more prevalent with metastatic groin nodes with undetectable popliteal nodes (with both clinical and radiological investigation of ipsilateral popliteal fossa). The mean interval to develop distant metastatic disease in surgically treated case of metastatic popliteal node was 39 months (ranges 3-127 months) as reported by Thompson et al.

Popliteal nodal dissection is an uncommon procedure but adequately indicated according to data available. A thorough familiarity of the anatomical landmarks and technical details of the dissection procedure of the popliteal fossa is mandatory. In 1980, Karakousis published an elegant description of this infrequent operative procedure with detailed information about the surgical anatomy of the popliteal fossa and the technique of popliteal lymphadenectomy.⁵ The long S-shaped incision used to access the popliteal fossa is designed to offer generous exposure of the popliteal cavum with its neurovascular structures and avoid deforming joint contracture. Z-plasty incision for the same purposes has been described by others.^{13,14} The basic step in this surgery is the identification of the popliteal fascia, which serves as the main anatomical reference point because of its proximity to the neurovascular bundle. After raising medial and lateral flaps, common peroneal nerve is identified at the medial edge of biceps femoris muscle followed by identification of tibial nerve which is more medial to common peroneal nerve. Attempts are also made to preserve both the lateral and medial cutaneous nerve with resulting communicating ramus to avoid cutaneous anaesthesia. The popliteal vessels are approached after stripping of the deep fascia. The popliteal artery lies

deeper and more medial to the popliteal vein between the head of gastrocnemius muscle. All fibro fatty areolar tissues dissected along the popliteal vessels and nerves are removed in continuity as a specimen.^{5,13,14}

Metastasis to the regional inguinal nodal basins occur in about 30% of melanoma cases.¹⁵ Mozzillo et al. concluded that combined inguinal and pelvic lymphadenectomy should be considered for patients with palpable inguinal nodal disease.¹⁶ Sterne et al. have suggested that extensive ilio-inguinal lymph node dissection has a significant impact on both disease free and melanoma specific survival.⁶ The findings of other studies have indicated that reducing the extent of surgery increases the risk of local failure and leads to lower survival rates.^{17,18}

Though melanoma are radioresistant, post-operative adjuvant radiotherapy for stage 3 patients with adverse features like extracapsular nodal extension, large nodal mass (>3cm), 4 or more involved nodes or recurrent disease after previous lymph node dissection, results in improved locoregional control with reasonable complication rates but with no obvious survival benefit in most reports. This treatment modality is also effective in providing local control in cases of gross disease in relatively small area.¹⁹ When multiple in-transit metastases occur, various locoregional management have been described and practiced. Isolated limb perfusion (ILP), developed by Creech et al. is the most effective regional treatment method, because it achieves higher tissue concentrations (>20 times than systemic route) of the chemotherapeutic agents in the affected limb.²⁰ Melphalan-based ILP along with hyperthermia for in-transit melanoma metastases is associated with complete response rates of 40% to 50% and overall response rates of 75% to 80%.²¹ Over the years, tumor necrosis factor-alpha (TNF) has gained popularity of its effectiveness in treating large tumors. Hence, TNF is increasingly used in combination with melphalan for treating in-transit metastases by means of ILP in cases where simple surgical procedures fail to attain limb salvage.²²

CONCLUSION

The present case described a rare surgical problem of dissemination of melanoma of distal lower extremity with peculiarity of presence of synchronous in-transit and palpable popliteal and groin node metastasis. However, this particular presentation is resolved by a therapeutic approach with thorough knowledge of anatomy and surgical technique that is safe and effective despite only being used exceptionally. Survival benefit of this mode of treatment has not been proven due to rarity of this manifestation and resultant lack of randomized trials.

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