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Case Report

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Nevoid Cutaneous Melanoma with Balloon Cell Metastasis

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Abstract

In this case report, we describe the rare case of a patient with balloon cell melanoma metastasis. While balloon cell melanoma is a recognized histological subtype of melanoma, it is rare and due to its' unusual cytological aspect, it is difficult for the pathologist to determine the primary tumour when confronted with metastasis. Immunhistochemical stains and BRAF mutational status can be used to increase diagnostic sensitivity and to support the identification of the primary tumor. Here, we report the histological findings and the clinical course of a patient with metastatic balloon cell melanoma that originated from a primary nevoid melanoma.

Keywords: Balloon Cell Melanoma; Balloon Cell Nevus; Nevoid Melanoma; Laser Treatment

Case Presentation

A 40-year-old otherwise healthy, male patient developed a swollen lymph node in his right axilla. A biopsy showed that the lymph node was subtotally infiltrated by enlarged, pleomorphic cells with abundant pale, vacuolized cytoplasm and atypical nuclei with prominent, bright-red nucleoli (figure 1 "lymph node metastasis"). Pathological differential diagnosis included metastasis of PECOMA (Primary perivascular epitheloid cell tumour of the lung), clear cell sarcoma (CCS), clear cell renal cell carcinoma, liposarcoma, and germ cell tumour. (Figure 1)

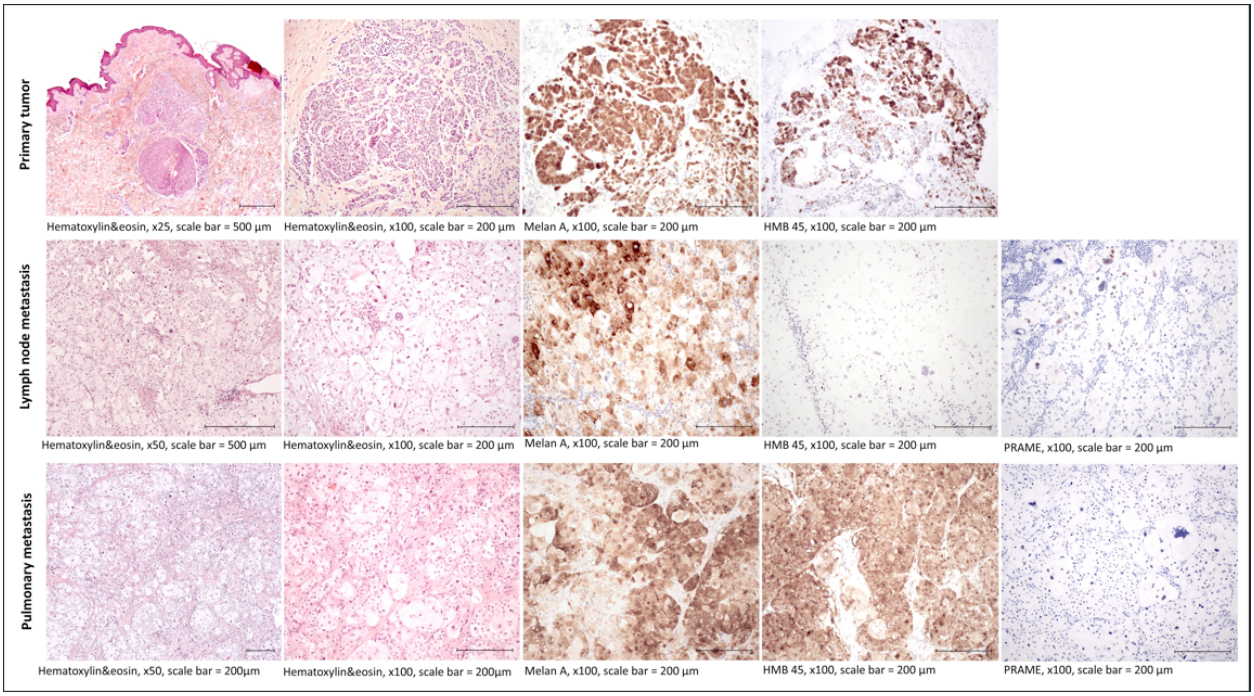

Figure 1: Histological findings of the three lesions.

Immunohistochemical stains were negative for pancyotkeratine markers (AE 1/3) and positive for Melan A and S100, facilitating the diagnosis of a lymph node metastasis of malignant melanoma with balloon cell phenotype. The patient reported that he had received laser ablation of two clinically benign nevi on the back and on the right ventral shoulder one year before. We excised the scar on the shoulder, and histological examination revealed superficial scar tissue with two underlying melanocytic aggregates: one mainly nodular, and one with arborizing branches, each composed of monomorphous cells with unremarkable cytology. In higher magnification, isolated mitotic figures and lacking maturation were visible. (Figure 1 "primary tumour"). We diagnosed dermal rests of a primary cutaneous melanoma with nevoid phenotype and, although it did not express a balloon cell phenotype, we suspected it was the origin of metastasis.

To further investigate this, we analysed both lesions for the presence of a BRAF mutation by molecular panel testing (AmpliCancer Panel V2) which revealed a BRAF V600E mutation in both of the lesions as a potential hint for a linkage. The axillary metastasis additionally showed a TP53 mutation which was absent in the primary tumour.

The staging unfortunately showed metastatic spread to the lung, diaphragm and liver, and biopsy of the pulmonary pleura again confirmed metastasis of BCM (figure 1 "pulmonary metastasis").

All three lesions were Melan A positive. In the HMB45 stain, the primary lesion on the shoulder showed partial positivity, the pleural metastasis was positive and the lymph node metastasis was negative. S100 stain was positive in both metastases, but unfortunately, S100- and PRAME stains could not be performed in the primary lesion on the shoulder, because the paraffin block was used up.

The patient was treated with vemurafenib in a clinical trial and after his first staging showed stable disease, ipilimumab was added to the therapy regimen in an individual treatment decision (as PD-1 inhibitors were not approved for melanoma therapy at that time) [1]. Unfortunately, the disease progressed under this therapy after 3 months and none of the consecutive treatment regimens including Pembrolizumab and whole brain irradiation led to a control of the melanoma. The patient died 18 months after first diagnosis of the lymph node metastasis.

BCM is an extremely rare type of melanoma (0.15%) supposed to have a similar prognosis to other melanoma types [2]. The term "balloon cell" is a histologic description of melanocytic lesions that contain >50% of enlarged, round, balloon-shaped, foamy melanocytes. This change of melanocytes can be found in benign nevi ("balloon cell nevus") as well as primary melanoma or melanoma metastasis [2].

When confronted with a BCM, the distinction from other malignant clear cell tumours is challenging and should be supported by immunohistochemical staining (Melan A, HMB 45, S100). The differentiation of CCS and BCM is especially difficult, as these stains are frequently positive in both entities. In this case, the utilization of PRAME ("preferentially expressed antigen in melanoma") can be helpful, as it is not (or weakly) expressed in CSS, but widely expressed in melanoma [3-5].

BCM can clinically appear brown as well as amelanotic and does not have distinct clinical hallmarks [2]. Common dermatoscopic features include hairpin vessels, a structureless morphology, and white/yellow dots corresponding to balloon cell aggregates, which may be a helpful clue in the diagnosis [2, 6, 7].

Conclusions

To our knowledge, this is the first case showing balloon cell melanoma metastasis progression likely from a primary nevoid melanoma. However, we cannot exclude the origin from another primary (2 lesions lasered in the patient's history) or a BCM of unknown primary. As an early diagnosis is crucial for the initiation of the correct treatment modality, clinicians and pathologists need to be aware of the diagnostic pitfalls of BCM and the great versatility of melanoma. In addition, the case again demonstrates that melanocytic lesions should not be lasered without receiving a histologic report.

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Conflict of Interest: None.

Ethics Approval: A formal institutional board approval was not needed. The principles outlined in the Declaration of Helsinki were followed.

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