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Desmoplastic Melanoma

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1. Introduction

Desmoplastic melanoma is a rare variant of spindle cell melanoma that was first described in 1971 by Conley et al. [1] . Between 1988 and 2006, less than 2,000 patients were diagnosed with desmoplastic melanoma in the United States. It accounts for between 1 to 4 percent of all cases of cutaneous melanomas. [2] Early diagnosis of desmoplastic melanoma can often result in favorable outcomes due to the relatively slow-growing nature of the tumor. However, in most patients with desmoplastic melanoma, the diagnosis is usually reached at an advanced stage of the disease due to the significant diagnostic challenges associated with this tumor.

2. Epidemiology

An analysis of the National Cancer Insititute's Surveillance, Epidemiology and End Results (SEER) tumor registry database by Wasif et al in 2010 found that the mean age of onset for desmoplastic melanoma to be 66 $\pm$ 4 and a median age of onset of 69. Compared to other cutaneous melanomas, desmoplastic melanoma is more likely to present in an older population with a median age of onset about 10 years older. [3] The study by Wasif et al also identified a 65 percent male predominance. [3] A systematic review of literature on desmoplastic melanoma by Lens et al in 2005 yielded similar epidemiological data with a 63 percent male predominance. While desmoplastic melanoma is most likely to occur in older men, it can affect men or women of any age. [4]

Approximately 51 to 53 percent of desmoplastic melanomas are located in the head and neck; less common locations included the extremities (26 to 30 percent), and the trunk (18 to 20 percent). [3, 4] Although the overall occurrence of desmoplastic melanoma on the extremities is uncommon, compared to the lower extremities, the upper extremities appear to be a more favored location and represent 70 percent of all desmoplastic melanomas occurring on extremities. [4] This distribution for desmoplastic melanoma is similar to the pattern of distribution seen in non-melanoma skin cancers, squamous cell carcinoma and basal cell carcinoma. Overall, desmoplastic melanoma appears to be more likely to be found in chronically sun-exposed areas.

Desmoplastic melanoma is also frequently associated with other types of skin cancers, especially with other cutaneous melanomas that are also associated with sun exposure. [5] Desmoplastic melanoma has been reported to occur in conjunction with atypical lentiginous hyperplasia, lentigo maligna melanoma, and superficial spreading malignant melanoma.

Approximately 30 percent of desmoplastic melanoma occurs in combination with lentigo maligna melanoma, also known as a Hutchinson melanotic freckle, which contributes its presentation as an atypical pigmented lesion in about half of the cases. [5, 6]

3. Clinical features

Desmoplastic melanoma is commonly misdiagnosed due to its subtle presentation. It commonly appears as an indurated skin-colored papule, plaque or nodule. These lesions are usually painless. [7, 8] The diagnostic challenge for desmoplastic melanoma is frequently attributed to the observation that more than half of all desmoplastic melanomas are amelanotic, or not possessing pigmentation. Therefore, they are commonly mistaken for benign lesions, such as dermatofibromas or scars. [5] The presence of a new scar without a history of trauma may prompt the clinician to consider the possibility of desmoplastic melanoma among other differential diagnoses, especially if the scar is located on the head and neck region. The differential diagnosis for desmoplastic melanoma also includes basal cell carcinomas and dermal nevi, which can also present as pale, skin-colored lesions in the head and neck region. As previously stated, desmoplastic melanomas that are associated with lentigo melanoma often present with atypical pigmentation patterns that are more reminiscent of other subtypes of melanomas and non-melanoma skin cancers. Desmoplastic melanomas presenting with atypical pigmentation tend to have better prognosis because they are often recognized earlier. Other rare, atypical findings associated with desmoplastic melanoma include macular erythema and alopecia. [4]

4. Histological features

As with other skin cancers, a biopsy is required to definitively diagnose desmoplastic melanoma. The pathological presentation of desmoplastic melanoma is characterized by a proliferation of spindle cells, which are non-pigmented spindle-shaped melanocytes. (See Figure 1) Cellular atypia can vary widely from near-normal morphology to moderate atypia. This can lead to significant diagnostic challenge as the cells may display little atypia in many cases. The nuclei of these spindle cells tend to hyperchromatic and may be elongated. The cytoplasm is usually scant an increased nucleus to cytoplasm ratio commonly seen in malignant cells. [5, 8]

These spindle cells of desmoplastic melanoma are found in variable distributions among a background of reactive fibroblasts and collagen bundles. The appearance of collagen bundles is similar to that of a scar; this may account for the scar-like clinical appearance. Islands of lymphoid aggregates may also be seen among the collagenous background. Solar elastosis is routinely found in the dermis, consistent with the association of desmoplastic melanoma with sun exposure. [5, 8]

When desmoplastic melanoma invades surrounding nerves, it is desmoplastic neurotropic melanoma. In desmoplastic neurotropic melanoma, spindle cells may surround and/or invade nerves in the dermis. [9] Spindle cells may also undergo neural transformation to form structures resembling nerves. Typically, this occurs only when the tumor exceeds 1.5 mm in thickness or a Clark stage of greater than IV. [5] Of note, while nerve involvement is not uncommon for large tumors, desmoplastic melanomas tend not to invade the vascular or lymphatic structures with the same frequency.

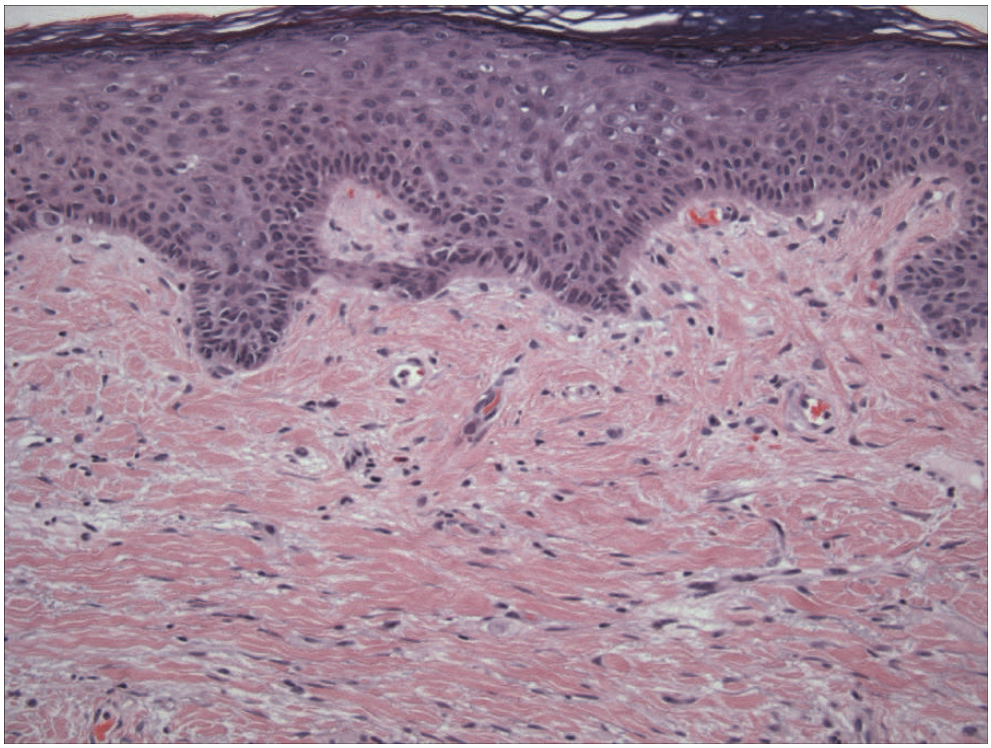


Fig. 1. Histological features of desmoplastic melanoma
(photograph courtesy of Dr. Maxwell Fung)

Immunohistochemistry can a helpful tool to distinguish desmoplastic melanoma from these other forms of cutaneous melanoma and from other benign lesions. Desmoplastic melanomas are typically positive for S100 protein, P75 growth factor, and negative for HMB-45 protein (See Figure 2). [10] Though the S100 marker is currently the most commonly used marker to diagnose desmoplastic melanoma in clinical practice, recently, it has been suggested that the P75 nerve growth factor may be a more sensitive marker. Staining for the P75 nerve growth factor can be used in conjunction with S100 staining for increased sensitivity in diagnosing desmoplastic melanoma. [11]

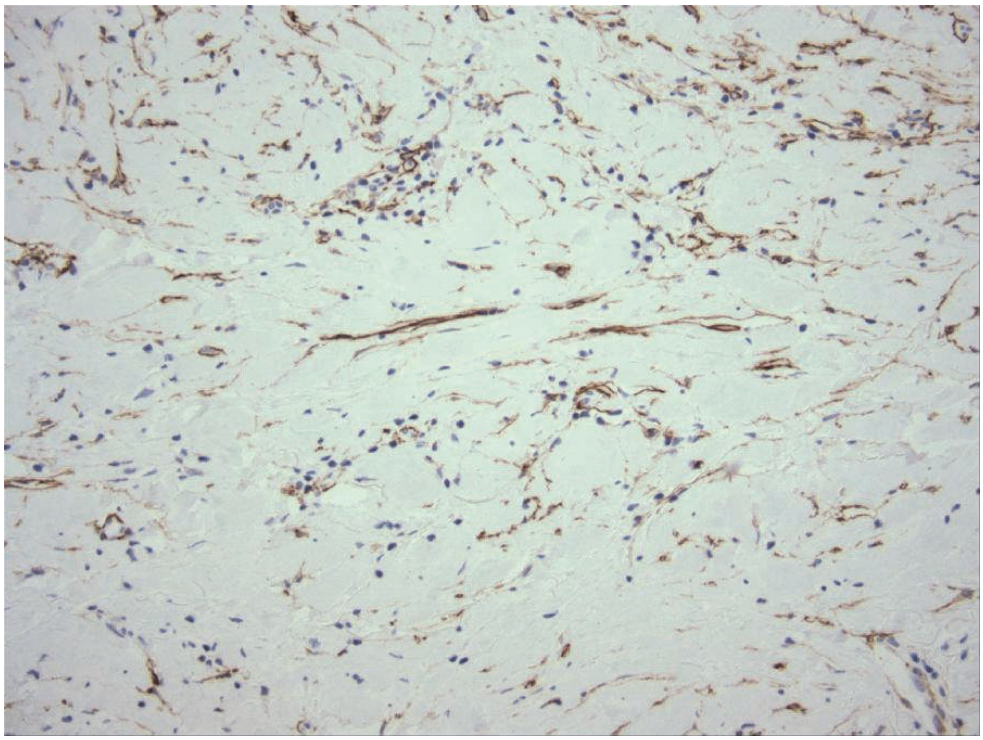


Fig. 2. S100 marker staining for desmoplastic melanoma
(photograph courtesy of Dr. Maxwell Fung)

5. Treatment

Desmoplastic melanoma is typically slow-growing but commonly presents in an advanced stage due to its insidious nature. The mean Breslow thickness (measured from the granular layer of the epidermis to the deepest portion of the tumor) at diagnosis ranges from 2.0 mm to 6.5 mm, and most tumors are already Clark stage IV or V at time of diagnosis. Neurotropic involvement ranged from 17 to 78 percent. [4]

As with most skin cancers, surgical excision is the primary treatment modality for desmoplastic melanoma. Wide excision with margins of 1-cm to 2-cm is associated with less risk of recurrence and better prognostic outcomes. [3] It has even been suggested that margins of at least 2-cm are needed for even small lesions. [12]

Despite its tendency to recur locally at the primary site, desmoplastic melanoma is less likely to have nodal metastases than other forms of cutaneous melanoma. In cases where sentinel node biopsies were performed, only 3 percent of these patients were found to have involvement of desmoplastic melanoma cells in the sentinel lymph nodes. Therefore, controversy exists regarding criteria for selecting appropriate patients with desmoplastic melanoma for sentinel lymph node biopsy due to the rare occurrence of nodal invasion. [3, 12] However, the incidence of lymph node involvement is significantly higher when there is nerve involvement, as in DNM. Therefore, sentinel lymph node biopsy is currently recommended for DNM. [9]

The use of post-operative adjuvant radiation for desmoplastic melanoma has been found to be effective in decreasing the rate of recurrence. Adjuvant radiation of the local site is indicated if margins of the tumor are not clearly defined or intense neurotropic invasion is observed. [13] Adjuvant immunotherapy and chemotherapy are not routinely recommended for treatment of desmoplastic melanoma, and the use of these modalities has not been proven to improve outcomes. [4]

6. Prognosis

Comparing tumors of the same stage, prognosis of desmoplastic melanoma is more favorable than that of other subtypes of cutaneous melanoma. However, because desmoplastic melanoma is usually diagnosed at a later stage than other cutaneous melanoma, is the overall prognosis for desmoplastic melanoma is poorer. For stage I and II lesions, the 5-year survival rate is approximately 90 percent; however, only 29 percent of cases are diagnosed in stage I. [2] When all stages of the tumor are accounted, the overall 5-year survival rate from desmoplastic melanoma is 72 percent. [2] Of note, survival in desmoplastic melanoma and desmoplastic neurotropic melanoma was found to be comparable despite the wider spread of desmoplastic neurotropic melanoma. This may be due to the success of adjuvant radiation therapy in treatment of more advanced lesions. [2]

Desmoplastic melanomas have a high local recurrence rate that ranges from 7 to 56 percent. [4] The high local recurrence rate of desmoplastic melanoma may be attributed to difficulties in defining surgical margin during resection of the tumor. Local recurrence was more common in desmoplastic neurotropic melanoma than in desmoplastic melanomas without nerve involvement. [2] For desmoplastic melanomas without neural invasion, rates of metastatic disease were generally found to be as low as 7 percent [4] In comparison, desmoplastic neurotropic melanoma metastasize at a higher rate of approximately 15 percent. [9]

7. Summary

Desmoplastic melanoma is a rare subtype of cutaneous melanoma that is particular challenging to diagnosis due to its atypical amelanotic appearance. Desmoplastic melanoma is characterized histologically by the proliferation of atypical spindle-shaped melanocytes, and neurotropism is not uncommonly observed with this tumor. While desmoplastic melanoma tends to recur locally at higher frequency compared to other subtypes of melanomas, it is less likely to travel to the nodal basin or metastasize. Treatment of desmoplastic melanoma relies primarily on surgical excision with wide margins and adjuvant radiotherapy for advanced disease. Prognosis tends to be favorable when tumor margins are clearly defined and adequate surgical margin is achieved.

8. References

[1] Conley J, Lattes R, Orr W: Desmoplastic malignant melanoma (a rare variant of spindle cell melanoma). Cancer 1971; 28(4): 914-36.

[2] Quinn MJ, Crotty KA, Thompson JF, Coates AS, O'Brien CJ, McCarthy WH: Desmoplastic and desmoplastic neurotropic melanoma: experience with 280 patients. Cancer 1998; 83(6): 1128-35.

[3] Wasif N, Gray RJ, Pockaj BA: Desmoplastic melanoma - the step-child in the melanoma family? J Surg Oncol; 103(2): 158-62.

[4] Lens MB, Newton-Bishop JA, Boon AP: Desmoplastic malignant melanoma: a systematic review. Br J Dermatol 2005; 152(4): 673-8.

[5] McCarthy SW, Scolyer RA, Palmer AA: Desmoplastic melanoma: a diagnostic trap for the unwary. Pathology 2004; 36(5): 445-51.

[6] Anstey A, McKee P, Jones EW: Desmoplastic malignant melanoma: a clinicopathological study of 25 cases. Br J Dermatol 1993; 129(4): 359-71.

[7] Chamberlain A, Ng J: Cutaneous melanoma--atypical variants and presentations. Aust Fam Physician 2009; 38(7): 476-82.

[8] Barnhill RL, Gupta K: Unusual variants of malignant melanoma. Clin Dermatol 2009; 27(6): 564-87.

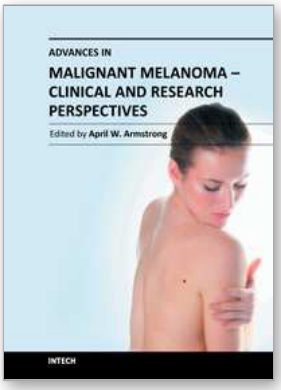
[9] Chen JY, Hruby G, Scolyer RA, et al.: Desmoplastic neurotropic melanoma: a clinicopathologic analysis of 128 cases. Cancer 2008; 113(10): 2770-8.

[10] Chorny JA, Barr RJ: S100-positive spindle cells in scars: a diagnostic pitfall in the re-excision of desmoplastic melanoma. Am J Dermatopathol 2002; 24(4): 309-12.

[11] Lazova R, Tantcheva-Poor I, Sigal AC: P75 nerve growth factor receptor staining is superior to S100 in identifying spindle cell and desmoplastic melanoma. J Am Acad Dermatol; 63(5): 852-8.

[12] Maurichi A, Miceli R, Camerini T, et al.: Pure desmoplastic melanoma: a melanoma with distinctive clinical behavior. Ann Surg; 252(6): 1052-7.

[13] Vongtama R, Safa A, Gallardo D, Calcaterra T, Juillard G: Efficacy of radiation therapy in the local control of desmoplastic malignant melanoma. Head Neck 2003; 25(6): 423-8.



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This book titled Advances in Malignant Melanoma - Clinical and Research Perspectives represents an international effort to highlight advances in our understanding of malignant melanoma from both clinical and research perspectives. The authors for this book consist of an international group of recognized leaders in melanoma research and patient care, and they share their unique perspectives regarding melanoma epidemiology, risk factors, diagnostic and prognostic tools, phenotypes, treatment, and future research directions. The book is divide into four sections: (1) Epidemiology and Risk Factors of Melanoma, (2) Clinical Phenotypes of Melanoma, (3) Investigational Treatments for Melanoma and Pigmentary Disorders, and (4) Advances in Melanoma Translational Research. This book does not attempt to exhaustively cover all aspects of the aforementioned topics. Rather, it is a compilation of our authorsâ€™ pearls and unique perspectives on the relevant advances in melanoma during the recent years.

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