THE MICROBIAL FLORA OF CLINICALLY INFECTED CUTANEOUS METASTASES

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INTRODUCTION

- Cutaneous metastases (CM) are neoplastic lesions that arise from an internal malignancy or in-transit metastases from high-risk skin cancer.
- CM have a broad range of morphological features, and they often resemble benign conditions. In most cases, they present as single or multiple rapidly-growing skin-colored asymptomatic nodules with intact overlying skin. They can also present as asymptomatic macules, plaques, telangiectasias, or erythematous patches. However, in some cases CM can be associated with pain, malodor, ulceration, erosion, bleeding, and fungating wounds.
- The management of CM depends on the primary underlying malignancy, number of skin lesions, tumour size, and depth of invasion. There is very little evidence to guide the therapeutic management of symptomatic wounds, indicating that only metronidazole, topically was able to reduce foul odor.
- In this study, we sought to characterize the microbial flora in skin lesions in patients with symptomatic cutaneous metastases. We observed that 50% of symptomatic lesions in CM harbor pathogenic and/or opportunistic bacteria. In addition, we found that the use of oral antibiotics lead to better improvement in infection symptoms of skin wounds in patients with CM. These findings have important clinical implications and should be used to guide medical management of infection-related symptoms in cutaneous metastases in the outpatient setting.

METHODS

- We conducted a retrospective chart review study of electronic medical records (EMR) of patients seen in the outpatient practice of the Dermatology Service at Memorial Sloan Kettering Cancer Center. Data were collected for patients seen between August of 2006 and June of 2015. We limited our analysis to patients in which 1) the diagnosis of cutaneous metastasis(es) was made by a provider in the Dermatology Service and, 2) a bacterial and/or fungal culture was obtained from one affected symptomatic skin lesion.
- Descriptive statistical analysis and Pearson's chi-square tests were performed using Microsoft Excel. P-value less than 0.05 was considered statistically significant. Bacterial and fungal swab cultures were analysed as previously described.

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RESULTS

Figure 1: Clinical presentation of cutaneous metastases wounds originating from breast cancer (top) and melanoma (bottom).

Table 1: Demographic and clinical characteristics of patients with cutaneous metastases.

Feature	No. (%)
Total	64 (100)
Gender	
Male	16 (25)
Female	48 (75)
Age, mean (SD)	60.3 (12.3)
Cancer type or site	
Breast	36 (56)
Skin	12 (19)
Gastrointestinal	7 (11)
Gynaecologic	2 (3)
Lung	2 (3)
Other or unknown	5 (8)
Location of cutaneous metastases	
Head/Neck	9 (14)
Trunk	48 (75)
Upper extremities	1 (2)
Lower extremities	6 (9)

Figure 2: Gram-positive bacteria (A) and Gram-negative bacteria (B) isolated from affected tissue in patients with cutaneous metastases.

Table 2: Outcome during follow-up in the outpatient clinic.

	Symptoms improved				P-value
	No.	Yes (%)	No	(%)	
Antimicrobial therapy					
No oral antibiotics (no treatment and topical-only)	12	(46.2)	14	(53.8)	
Oral antibiotics (oral-only and combination oral/topical)	7	(87.5)	1	(12.5)	0.04

DISCUSSION

- We retrospectively identified 64 cancer patients that were referred to an Oncodermatology Clinic for evaluation and had their CM cultured. The most common primary malignancies were breast cancer and melanoma in 56.3% and 12.5% of patients, respectively. Tissue biopsy from cutaneous lesions was obtained in 70.3% of patients, and in all of these cases the histopathology results were consistent with metastatic spread from the patient's known primary malignancy.
- Microbiological analysis lead to the isolation of 17 distinct bacterial and fungal species. Polymicrobial communities were isolated in 21.9% of patients. Opportunistic and/or pathogenic bacteria were identified in 50.0% of patients. The best response to treatment was observed in patients that received oral antibiotics, either alone or in combination with topical antibiotics, which led to improvement with skin lesion-related symptoms in 87.5% of these patients. Our findings suggest that patients treated with oral antibiotics do significantly better than those patients treated without oral agents.
- The most commonly identified organisms in our cohort were *S. aureus* (found in 25.0% of patients, specifically 20.3% MSSA and 4.7% MRSA) and *P. aeruginosa* (found in 15.6%).
- Future directions should include prospective multi-center studies to improve our understanding of the clinical characteristics, treatment modalities, and outcomes of cancer patients affected by CM. In addition, with new technologies becoming available in clinical microbiology, future research could potentially better define, quantitatively and qualitatively, the microbial flora of cutaneous metastases.

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