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CASE REPORT

Dermoscopic characterization and image study of a Sister Mary Joseph nodule in a patient with esophageal cancer

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ABSTRACT

A Sister Mary Joseph nodule (SMJN) is rare cutaneous metastasis spreading to the umbilicus. It originates mostly from an intra-abdominal or pelvic malignancy and is an ominous sign. In this paper, we report a case of a SMJN in a 64-year-old man with esophageal cancer. We recorded his clinical progression, radiologic and nuclear scintigraphic images, and histopathologic and dermoscopic findings. The image study provided information on the localization of the SMJN and dermoscopy showed a polymorphous vascular pattern. The patient received palliative therapy because of terminal disease.

Introduction

A Sister Mary Joseph nodule (SMJN) is an unusual umbilical metastasis that was described by Dr Hamilton Bailey in 1949. The Sister Mary Joseph nodule is named after Sister Mary Joseph, a surgical assistant to Dr William James Mayo, who found the umbilical infiltration as a sign of metastasis during skin preparation for surgery.[1] This rare cutaneous metastasis is usually clinically diagnosed in patients with a known cancer history, and the origin is confirmed by histopathology. Image studies using computed tomography (CT) and positron emission tomography (PET) also provide anatomical and functional perspectives on SMJN. A SMJN is a poor prognostic sign of internal malignancies. The most common origin of SMJN is intra-abdominal or intrapelvic cancers. A SMJN originating from esophageal cancer is rare and only three cases have been reported in the English literature. However, rare studies have discussed the use of dermoscopy for screening cutaneous metastasis. In this paper, we report a case of a SMJN in a patient with esophageal cancer.

Case Report

A 64-year-old man had a progressively enlarging painless skin nodule over the umbilicus for 1 month with abdominal pain, bloating, and constipation. He had been diagnosed with esophageal squamous cell carcinoma (SCC) Stage III (pT3N2M0), had completed neoadjuvant chemoradiation therapy, and had received an esophagectomy 6 months previously. Examination of the skin revealed an erythematous, smooth, solid, nontender, nonmovable nodule over the umbilicus (Figure 1A). Dermoscopic examination showed a polymorphous vascular pattern consisting of serpentine vessels, dotted vessels, and comma-shaped vessels with a white veil (Figure 1B). A skin biopsy was performed. The histopathological examination showed diffuse infiltration of hyperchromatic and pleomorphic tumor cells in the dermis with a grenz zone (Figures 2A and 2B). Immunohistochemical staining was positive for pankeratin (AE1/AE3) (Figures 2C and 2D) and negative for cytokeratin-7 (CK-7) and CK-20 (Figures 2E and 2F, respectively). Poorly differentiated SCC of the esophagus with umbilical metastasis (i.e., SMJN) was diagnosed. Further image studies using ^{18}F-fluorodeoxyglucose PET/CT revealed a hypermetabolic mass invading the periumbilical area (Figures 1C and 1D). The lower third of the esophagus, right axillary lymph node, right pulmonary hilar lymph node, and right infraclavicular node all showed hypermetabolic signals, which suggested dissemination. The SMJN progressively enlarged and occupied the whole umbilicus with a poorly healed biopsy wound after 6 months. A new indurative lesion developed near the original site, and was highly suspected to

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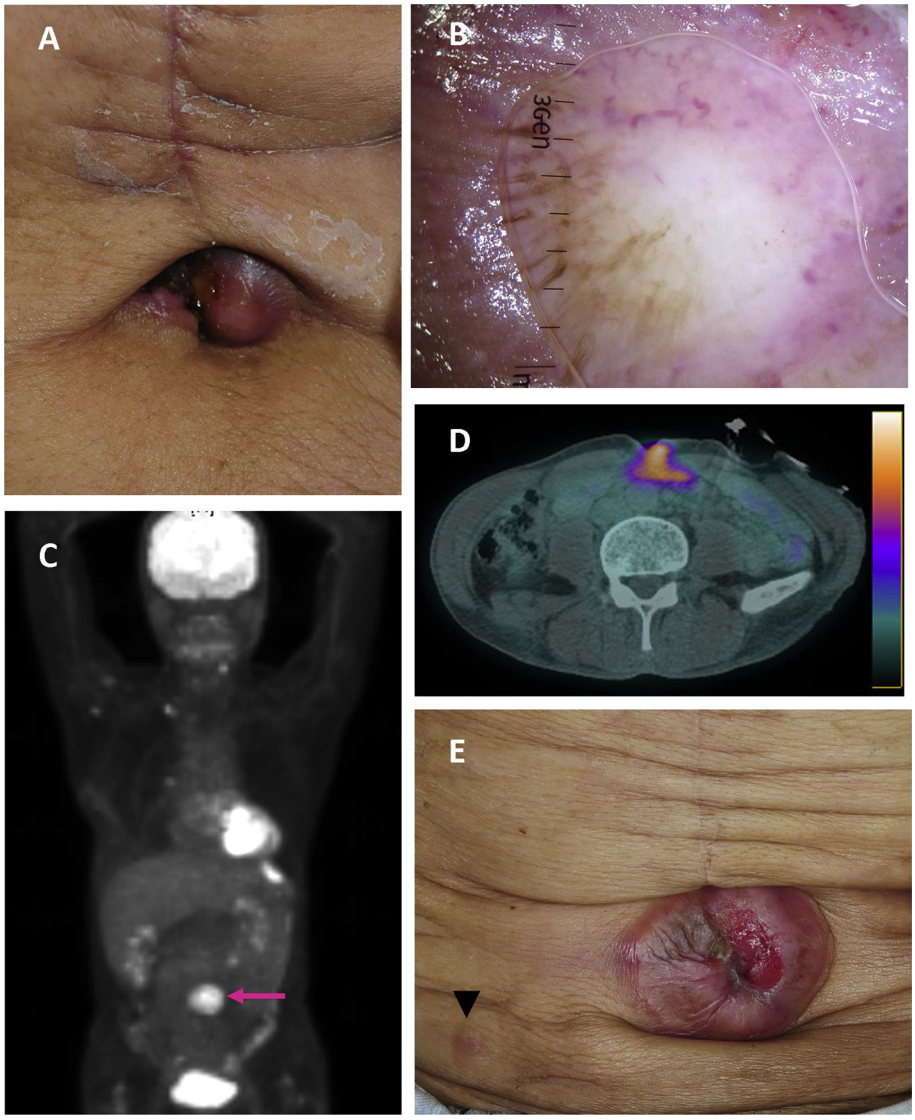

Figure 1 Features of the Sister Mary Joseph nodule. (A) The nodule appears as an erythematous and indurated nodule over the umbilicus. (B) The dermoscopic examination reveals a white veil, and serpentine, dotted, and comma-shaped vessels. Direct compression by the dermoscope causes blanching of the nodule. (C) The pink arrow indicates a hypermetabolic SMJN from the anterior view on whole-body positron emission tomography. (D) Positron emission tomography/computed tomography imaging shows prominent glucose hypermetabolic signals over the periumbilical area and the abdominal cavity. The gradient color bar on the right side of the photograph is a reference for glucose metabolic activity. (E) Six months later, the nodule has enlarged and occupies the whole umbilicus. The arrow head indicates another possible cutaneous metastasis. SMJN = Sister Mary Joseph nodule.

have a similar pathogenesis of cutaneous metastasis (Figure 1E). He underwent palliative therapy because of the diagnosis of umbilical metastasis, and he survived at least for 8 months until he was lost through follow up.

Discussion

Cutaneous metastases occur in 0.7–9.0% of all patients with various kinds of malignancies such as visceral cancer, leukemia, lymphoma, and melanoma. In a retrospective study of 4020 patients with metastatic disease, the origins of common cutaneous metastases in women were the breast, colon, and melanoma. In men, the most common metastases were the lungs, colon, and melanoma.[2] Cutaneous metastasis may be the first presenting feature of an internal malignancy in 7.6% of patients. Breast cancer and melanoma account for 58% of cases.[3] The incidence of skin metastases in newly diagnosed esophageal carcinoma is 1.3%.[4]

A SMJN is a rare cutaneous metastasis involving the umbilicus and presents as an umbilical nodule. A SMJN could result from contiguous extension or from hematogenous or lymphatic spread. The umbilicus has an anatomical susceptibility to cutaneous metastasis because it lacks a muscle layer. The transversalis fascia and linea alba (or Scarpa's fascia) are the only barriers between a peritoneal tumor and the umbilical skin. The vascular drainage system and embryologic remnants associated with the umbilicus are hints for routes of tumor spreading. A SMJN can be an indurated, bulging, fissured, or ulcerated skin lesion with variable coloring. It is easily ignored by clinicians if the skin lesion presents with only mild erythema. A SMJN almost always originates from an intra-abdominal or intrapelvic malignancy. The most common primary site of SMJN in men is the gastrointestinal tract. Ovarian and gastrointestinal cancers are the most common origin of SMJN in women.[5] It is an indicator of a poor prognosis. The mean life expectancy is 2–11 months without treatment or 17.6–21 months

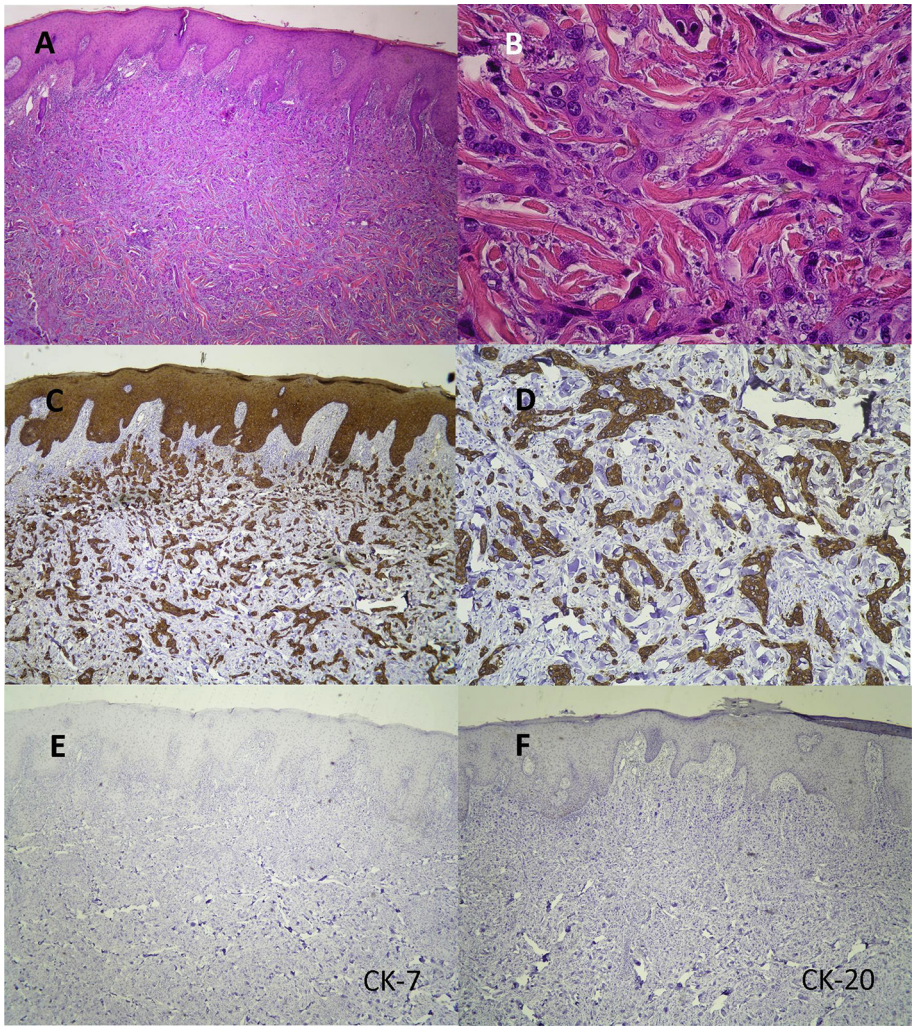

Figure 2 Immunohistochemical findings. (A) The tumor has infiltrated the dermis, including the deeper areas. It lacks an epidermal connection (hematoxylin and eosin; original magnification, ×40). (B) The neoplastic cells are hyperchromatic and pleomorphic. The cytoplasm is glassy and mitotic figures are visible (hematoxylin and eosin; original magnification, ×100). (C) Pankeratin (AE1/AE3) staining is positive for neoplastic cells (original magnification, ×40). (D) A high power view of Figure 2C (pankeratin; original magnification, ×100). (E) The tumor sample is negative on CK 7 staining (original magnification, ×40). (F) The tumor sample is negative on CK 20 staining (original magnification, ×40). CK = cytokeratin.

with aggressive management. A SMJN originating from esophageal SCC is extremely rare, and only three cases have been reported.[6–8] The differential diagnosis of umbilical nodules includes umbilical hernia, pyogenic granuloma, epidermal cyst, hemangioma, endometriosis, hypertrophic scar, and other rare conditions.[9]

A dermoscopic examination can provide some important clues for cutaneous metastasis. In one case series, 88% (15/17) of cutaneous metastases showed variable vascular patterns on dermoscopy. The most common subtype was serpentine vessels (77%, 13/17). Other vascular patterns of cutaneous metastasis included arborizing vessels, comma-shaped vessels, dotted vessels, and mixed types (i.e., more than 1 subtype).[10] The dermoscopic image of the SMJN in our patient showed a polymorphous vascular pattern with serpentine, comma-shaped, and dotted vessels, which was quite similar to the findings of a previous case report.[11] A polymorphous vascular pattern on dermoscopy implies neoangiogenesis may have a role in cancer metastasis. Direct compression of the nodule by the dermoscope may produce a white veil caused by blanching of the vessels. Using the noncontact mode with a polarized light in the dermoscope could avoid this problem, but photography is technically difficult because of poor stability.

An image study using integrated CT and PET (i.e., PET/CT) allows more accurate information on the localization and extent of SMJN, staging of internal malignancy, and treatment strategy.[12,13] In our patient, the image findings of SMJN on PET/CT were just “the tip of the iceberg” of the intra-abdominal neoplasm, implying disseminated peritoneal seeding.

The gold standard for diagnosis of a SMJN is histopathological and immunohistochemical examination, which can identify the cell origin of the internal malignancy. Sometimes immunohistochemical stains are needed to define the cell origin in lesions without a known primary site or poor differentiation. In this patient, positive results for pankeratin AE1/AE3 confirmed an epithelial origin. Negative results for CK-7 and CK-20 were compatible with metastatic SCC from the esophagus. Cytokeratin-7 and CK-20 are helpful for distinguishing between some common cancers such as cervical SCC, lung adenocarcinoma, colonic adenocarcinoma, and breast cancers.[14]

The two main types of esophageal cancer are SCC and adenocarcinoma. The former is the predominant type (approximately 90%) worldwide, except in some regions of North America and Europe. The overall 5-year survival rate for patients with

esophageal cancer is <20% and decreases to 4% in patients with distant metastasis.[15] Therefore, a SMJN is a poor prognostic sign in a patient with esophageal cancer.

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