# High-grade pelvic-type serous carcinoma presenting as a breast rash

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## INTRODUCTION

Metastasis of pelvic serous cancer to the skin is extremely rare.[1] Its presentation as a rash is also infrequent.[2,3] The incidence of primary fallopian tube carcinoma or other pelvic serous carcinomas among breast cancer survivors is similarly low.[4] We report the first known case of a patient in whom these 3 exceptional conditions converged as a high-grade primary fallopian tube carcinoma presenting to dermatology as a rash of the breast following a history of breast carcinoma.

*Abbreviation used:*

WT1: Wilms tumor 1

## CASE REPORT

A 77-year-old woman negative for *BRCA1* and *BRCA2*, who had undergone lumpectomy and radiation therapy for an invasive ductal carcinoma of the left breast 2 years previously, presented 1 month after a negative mammogram with an asymptomatic left breast rash. Physical examination revealed a 4 cm × 3 cm erythematous, slightly telangiectatic plaque (Fig 1). No scale, pustules, bleeding, ulceration, or peau d'orange was noted. Three weeks later, her condition had not improved after treatment with topical betamethasone dipropionate 0.05%. Repeat examination revealed left breast telangiectasia. Upon shave biopsy of her breast skin, she was diagnosed with a poorly differentiated carcinoma involving the dermis and dermal lymphatics (Figs 2 and 3). Immunohistochemical analysis of the tumor showed triple negative staining for estrogen receptor, progesterone receptor, and *HER2*, the latter confirmed by fluorescence in situ hybridization testing. This pattern was different from that of her prior breast carcinoma, which had been positive for estrogen receptor and *HER2* oncoprotein and negative for progesterone receptor. A metastasis was suspected, and because the tumor had morphologic features that were also compatible with a pelvic gynecologic serous carcinoma, additional comparative immunostains were performed of the prior breast carcinoma and the tumor in the skin biopsy. Among these markers, the prior breast carcinoma was found to be positive for mammaglobin and negative for *pax 8*, and Wilms tumor 1 (*WT1*), whereas the current tumor in the shave biopsy was negative for mammaglobin and positive for *pax 8* (focally) and *WT1* (focally). Positron emission tomography/computed tomography imaging revealed multiple enlarged fluorodeoxyglucose-avid lymph nodes in the axilla and chest wall, thickened left breast skin, and diffuse

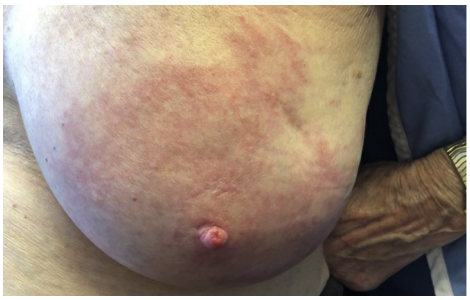

**Fig 1.** The rash upon initial presentation.

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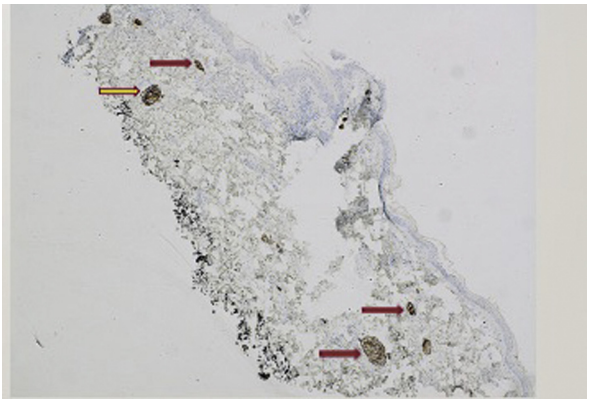

**Fig 2.** Skin biopsy specimen showing nests of tumor cells in dermal lymphatic spaces (*brown* areas indicated by *arrows*). (CK7 immunostain; original magnification: ×40.)

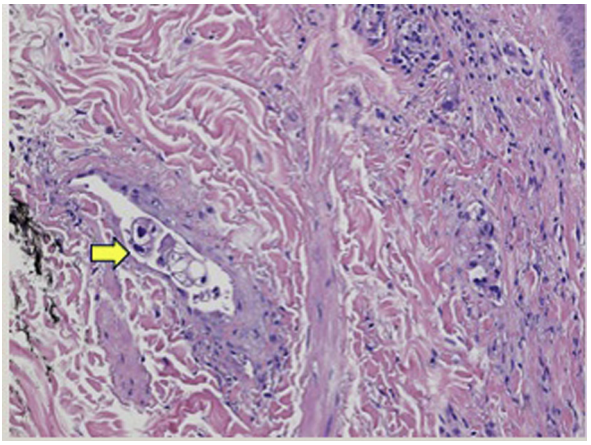

**Fig 3.** Skin biopsy specimen showing nests of tumor cells in dermal lymphatic spaces (*arrow*). (Hematoxylin-eosin stain; original magnification: ×200.)

fluorodeoxyglucose-avid peritoneal carcinomatosis of the peritoneal surface, mesentery, omentum, and overlying the bowel loops. An axillary node biopsy was performed, and an additional biopsy specimen from a pelvic nodule was collected by fine-needle aspiration. The tumor cells in these samples were morphologically and immunohistochemically similar to the tumor cells in the current breast skin biopsy and dissimilar from those in her prior breast carcinoma. A number of additional immunohistochemical stains were performed, which showed a *p53* mutant staining pattern and a diffuse, strong p16 staining pattern. These findings, in conjunction with the morphology, were used to render a pathologic diagnosis in favor of a high-grade, pelvic-type serous carcinoma. Multiagent paclitaxel and carboplatin were initiated. The chemotherapy regimen diminished her tumor burden, and the patient subsequently underwent debulking surgery. Pathologic evaluation of the removed tissue identified a primary right fallopian tube high-grade serous carcinoma, with metastases. The primary fallopian tube tumor cells were both morphologically and immunohistochemically similar to the tumor seen in the skin, axillary, and peritoneal biopsy specimens and were dissimilar from the prior primary breast carcinoma.

## DISCUSSION

Metastasis of any nonmammary tumor to the breast is very uncommon, comprising less than 1% of all breast carcinomas.[5] Breast metastases from serous pelvic carcinomas are a tiny subset of this group, with only sporadically published cases.[1] The largest study of this topic, by Recine et al,[6] found 18 ovarian or peritoneal serous carcinomas that metastasized to the breast. Of these, only 3 patients did not have a prior diagnosis of ovarian or peritoneal carcinoma, which factored into the differential diagnosis, and only one presented with an erythematous rash similar to that of our patient.[1-3,5,7] Panse et al[1] recorded 2 cases described as the first presentation of serous carcinoma to metastasize to the breast in patients with a history of both pelvic and breast carcinomas. Our patient, with a history of breast carcinoma but not a previous pelvic serous carcinoma, thus stands apart from previous cases described. Moreover, the majority of reported serous metastases to the breast presented with an accompanying mass, enlarged lymph node, pain, or ascites.[1,5,7] Our patient's anomalous presentation was compounded by the highly uncommon occurrence of a skin rash as the initial presenting symptom of serous pelvic carcinoma.[2] Furthermore, 2 of the stains studied, *pax 8* and *WT1*, did not show the characteristic findings that would be expected with this type of tumor. Specifically, the vast majority of pelvic-type, high-grade serous carcinomas stain strongly and diffusely positive for *pax 8* and *WT1* (95% of tumors stain positive for *pax 8*, and 97% of tumors stain positive for *WT1*).[8] In contrast to the expected staining, the current tumor showed variable staining, which ranged from areas that were completely negative to focal areas that were weakly positive. The plethora of rarities in this case highlights this case's importance to the development of future differential diagnoses. Our patient's history of ipsilateral breast carcinoma could have mistakenly led to deeming her breast findings a recurrence rather than a metastasis. Given that the 5-year survival rate of patients with stage IV fallopian tube serous carcinoma is exceedingly low, correctly identifying the metastatic serous nature of this

carcinoma was essential in enabling the proper chemotherapy regimen to be swiftly implemented.[9]

**Conflicts of interest**

None disclosed.

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