Pathol. Oncol. Res. (2009) 15:423–427
DOI 10.1007/s12253-008-9141-x

CASE REPORT

Collision Metastasis of Breast and Ovarian Adenocarcinoma in Axillary Lymph Nodes: A Case Report and Review of the Literature

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Received: 7 April 2008 / Accepted: 27 November 2008 / Published online: 9 December 2008

Abstract Despite their accepted clinical and genetic association, the incidence of synchronous breast and ovarian carcinoma is rare. Moreover, collision metastasis from both breast and ovarian carcinomas to the same lymph node, to our knowledge has never been reported. Review of the literature revealed eleven cases of metastatic malignant tumors colliding in the same lymph node, none of which had both ovarian and breast carcinoma. Our case was that of a 63 year old woman presenting with a breast lump that was diagnosed as infiltrating ductal carcinoma after a needle biopsy. One month later the patient was found to have malignant ascites, omental carcinomatosis and an ovarian mass. Histology and immunohistochemistry revealed high grade serous papillary adenocarcinoma. When surgery was done to treat the breast tumor some of the axillary lymph nodes revealed metastases from the breast primary, others metastases from the ovarian primary and one had both tumors in a collision phenomenon. Immunohistochemistry was used to confirm this finding.

Keywords Collision metastasis

Introduction

Collision metastases in lymph nodes do occur but are rare. Carcinoma metastatizing to lymph nodes containing malignant lymphoma has also been reported. Review of the literature revealed only eleven cases with two malignant tumors colliding in the same lymph node. These include four cases of prostate with colonic carcinoma [1–3], three cases of prostate with urinary bladder carcinomas [4–6], one case each of prostate with gastric carcinoma [7], breast carcinoma with Hodgkin lymphoma [8], medullary with papillary thyroid carcinomas [9] and Kaposi sarcoma with Hodgkin lymphoma [10]. To our knowledge, we report the first case of collision metastasis of breast and ovarian adenocarcinomas in the same axillary lymph node.

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Report of a Case

A 63 year old woman presented with a left breast lump for which a core needle biopsy was obtained. The biopsy showed infiltrating ductal carcinoma grade II/III. Immunostains revealed positive staining for estrogen and progesterone receptors and negative staining for Her-2/neu. One month later, the patient developed moderate ascites and a peritoneal tap was performed for diagnostic cytology. The result "was positive for malignant cells and consistent with breast origin". Abdominal C.T scan showed nodular omental thickening with moderate ascites and multiple enlarged celiac, para-aortic and aorto-caval lymph nodes. Pelvic C.T scan showed multiple omental nodules and right ovarian enlargement. C.T scan of the chest revealed a 2.5 cm left breast mass with multiple enlarged subcarinal lymph nodes. No focal lung lesions or pleural effusions were seen. A diagnostic laparatomy was planned for and total abdominal hysterectomy, bilateral salpingo-oophorectomy and omental biopsy were done.

Gross examination of the specimen revealed edematous cystic right and left ovaries measuring 8.5×3×2 cm and

3.5×2.5×2 cm respectively. The surface of both ovaries and the serosa of the uterus were covered focally by a whitish exudate. The omental biopsy revealed multiple firm whitish masses. Microscopically the morphology was that of ovarian serous papillary carcinoma. The diagnosis made was bilateral ovarian papillary serous cystoadenocarcinoma with omental metastasis. Immunostains revealed positive staining of the tumor cells for of HBME1 and CA125 and negative staining for GCDFP15 which is consistent with an ovarian primary (Fig. 1).

One month later, an elective left breast lumpectomy with axillary clearance was undertaken. Gross examination of the lumpectomy specimen revealed an ill-defined firm mass measuring 2.9×1.7 cm. Twenty lymph nodes were obtained from the axillary fat. Microscopic examination of the breast mass revealed an infiltrating ductal carcinoma (Fig. 2) that is morphologically distinct from the previously resected ovarian carcinoma. Of the 20 axillary lymph nodes obtained seven showed metastatic deposits which were of two distinct morphologies; in one lymph node, the metastatic deposits were identical to that of the breast primary; in five lymph nodes, the metastatic deposits were identical to the ovarian primary and in a single lymph node, two separate deposits were seen. One was identical to the breast primary and one to the ovarian primary. Immunostains for GCDFP15, HBME1 and CA125 were performed on the breast primary and the metastatic deposits in the axillary lymph nodes. The breast primary as well as the metastatic deposits that were morphologically similar to it was positive for GCDFP15 and negative for HBME1 and CA125. In contrast the metastatic deposits that were similar morphologically to the ovarian primary were also immunophenotypically similar to the corresponding primary (Fig. 3). They were negative for GCDFP15 and positive for HBME1 and CA125. The single lymph node with collision metastasis had both immunophenotypes correlating with the corresponding primaries (Fig. 4).

Comment

Despite their clinical association and molecular link through mutations in the BRCA-1 and BRCA-2 genes, the overall occurrence of synchronous breast and epithelial ovarian cancers is rare [11, 12]. In general, ovarian serous carcinomas present at an advanced stage, however; the disease is confined to the peritoneal cavity in 85% of patients. Distant metastases are unusual at presentation and during the course of the disease. Metastasis of primary ovarian serous carcinoma to axillary lymph nodes is uncommon with only rare isolated cases reported. To our knowledge, collision metastasis of ovarian serous carcinoma and mammary duct carcinoma in the same axillary lymph node has never been reported. In the literature, only eleven cases of metastatic malignant tumors colliding in the same lymph node have been reported. These include nine

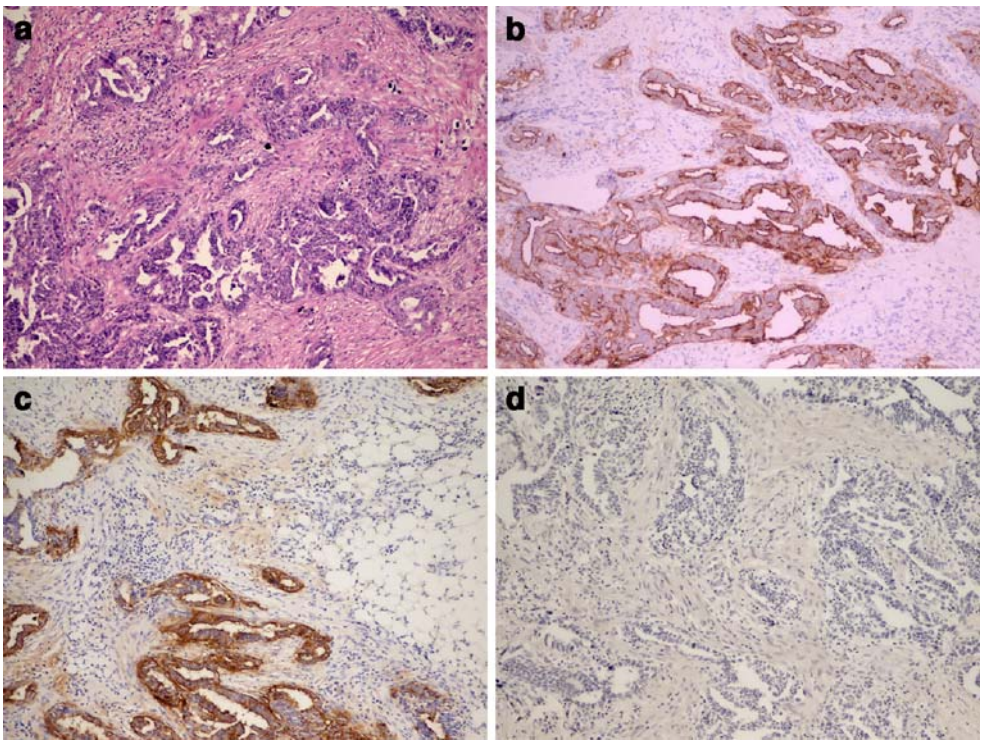

Fig. 1 Ovarian serous carcinoma: **a** H&E **b** HBMEI **c** CA125 **d** GCDFP15

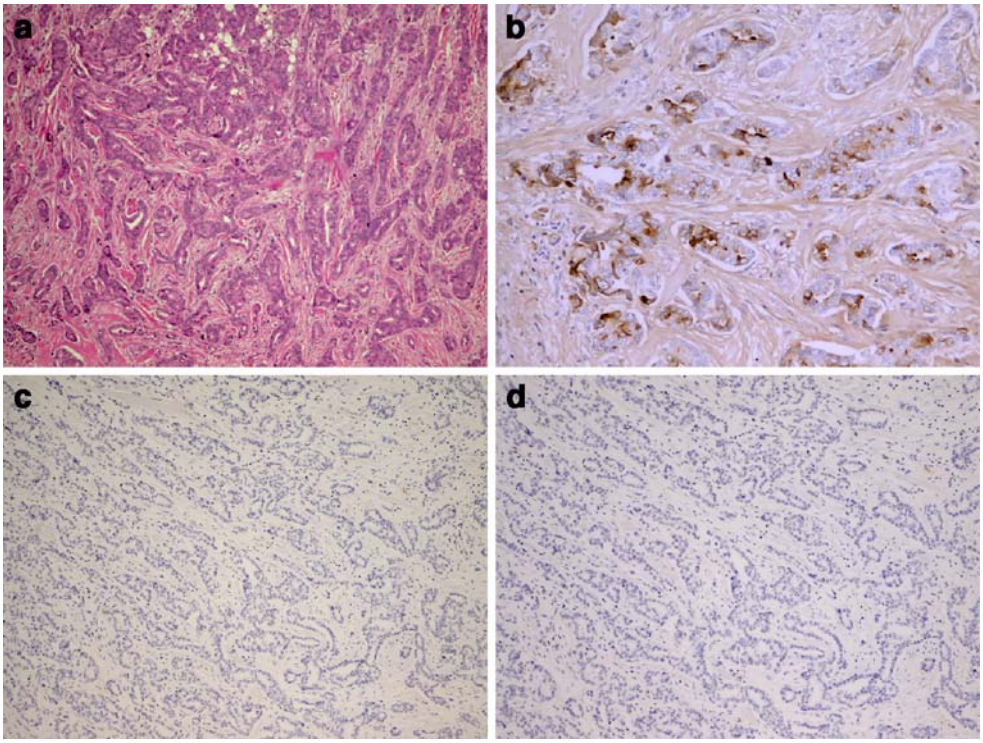

Fig. 2 Breast ductal carcinoma: **a** H&E **b** GCDFP15 **c** HBMEI **d** CA125

cases of two colliding carcinomas and two cases of Hodgkin lymphoma, one colliding with metastatic breast carcinoma, and one with Kaposi sarcoma (see Table 1).

Thus the majority of cases that have been reported were form elderly male patients with prostate adenocarcinoma reported as one of the colliding tumors in eight cases. The other tumors in these cases were of colorectal, urinary bladder or gastric origin (cases 1–8).

This finding highlights the fact that prostate carcinoma , being the most common carcinoma in men and one of the indolent carcinomas, is the one most likely to be colliding in a lymph node with another carcinoma.

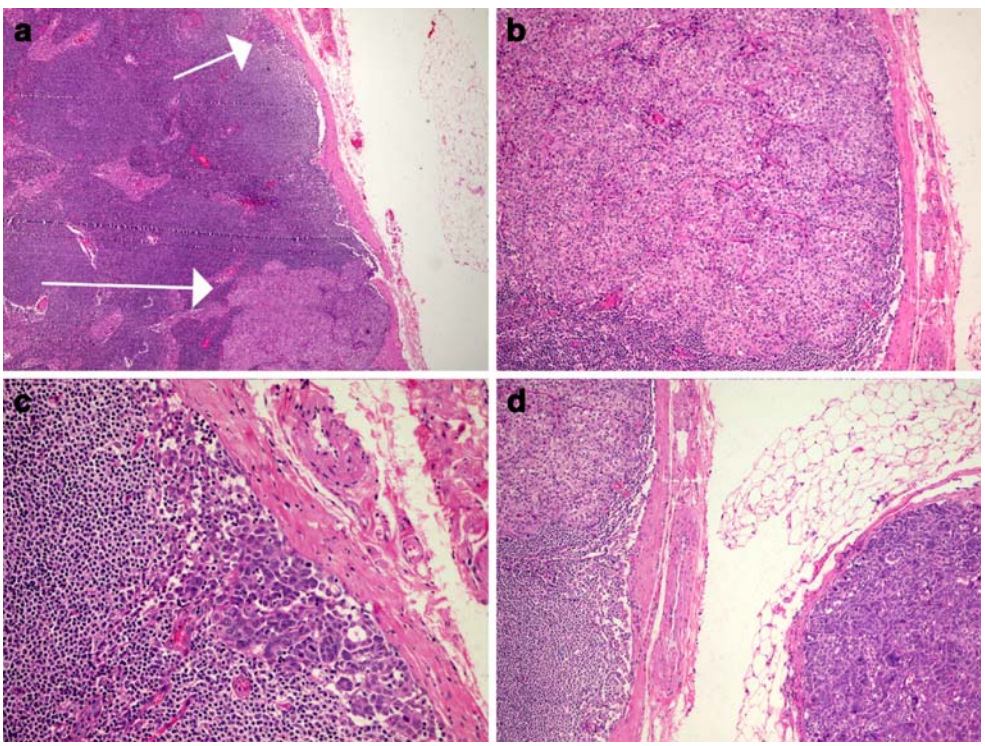

Fig. 3 Axilllary lymph node with collision metastasis: **a** H&E; ovarian mets (short arrow), breast mets (long arrow) **b** Higher magnification of breast mets **c** Higher magnification of ovarian mets **d** two lymph nodes with two types of tumor

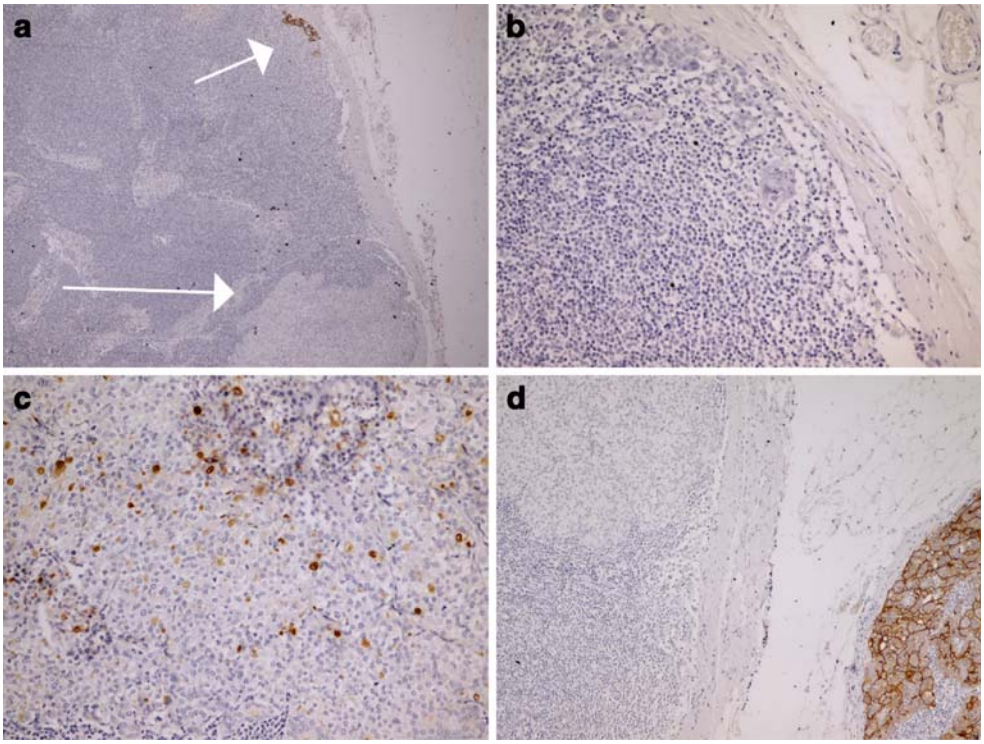

Fig. 4 Collision metastasis IHC: **a** CA125 **b** Negative GCDFP15 in ovarian mets **c** GCDFP15 in breast mets **d** CA125 in two axillary lymph nods

In case 10, both components originated from the same anatomic site with metastasis of medullary and papillary thyroid carcinoma to the same cervical lymph node [9].

In case 9, metastatic deposits of breast carcinoma were identified in a cervical lymph node involved by interfollicular Hodgkin lymphoma [8]. Only one of the colliding tumors in this case is metastatic. This case is an example of breast carcinoma colliding with a lymphoma. To our knowledge breast carcinoma has never been reported with another carcinoma colliding together in the same lymph node.

In the present case, the diagnosis of colliding ovarian and breast carcinoma in an axillary lymph node was suspected on a morphologic basis in a patient known to have synchronous ovarian and breast carcinomas; this finding was confirmed by immunohistochemical stains.

In conclusion, collision metastasis in a lymph node is extremely rare and should be considered when a polymorphic

Table 1 Review of published cases of collision metastases in the same lymph node

Case No	Source, year	Age/sex	Colliding tumors	Site of lymph node	Confirmation by IHC	The initially diagnosed tumor
1	Mogan [3], 1969	?/M	Prostate AC/Rectal AC	?	No	?
2	Wade et al [1], 2004	80/M	Prostate AC/colon AC	Mesenteric	Yes	Prostate
3	Same as No. 2	61/M	Prostate AC/Rectal AC	Perirectal	Yes	Prostate
4	Mourra et al [2], 2004	70/M	Prostate AC/Rectal AC	Perirectal	Yes	Prostate
5	Ergen et al [4], 1995	67/M	Prostate AC/ bladder TCC	Pelvic	No	Urinary bladder
6	Gohji et al [5], 1997	78/M	Prostate AC/ bladder SCC	Pelvic	Yes	Prostate
7	Overstreet & Haghighi [6], 2001	67/M	Prostate AC/ bladder TCC	Pelvic	Yes	Urinary bladder
8	Terada et al [7],1993	83/M	Prostate AC/Stomach AC	Para-aortic	Yes	Stomach
9	Allal et al [8], 1996	73/F	Breast IDC/Hodgkin lymphoma	Cervical	Yes	breast
10	Pastolero et al [9],1996	41/M	Papillary thyroid carcinoma / medullary thyroid carcinoma	Cervical	Yes	Medullary carcinoma
11	Carbone et al [10], 1983	82/F	Kaposi sarcoma/ Hodgkin lymphoma	Supraclavicular	No	Kaposi sarcoma
12	Present case	63/F	Breast IDC/ovary serous papillary carcinoma.	axillary	Yes	breast

AC: adenocarcinoma; TCC: transitional cell carcinoma; SCC: squamous cell carcinoma; IDC: infiltrating ductal carcinoma; IHC: immunohistochemistry

histological appearance is present in a patient suspected or known to have two or more malignant neoplasms.

Appropriate immunohistochemical stains should be used to confirm the diagnosis.

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