

Metastasis of rectal signet ring adenocarcinoma to the breast in a young woman after 10 years, a rare case report and review of the literature

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ABSTRACT

Breast metastasis of malignant tumors is very rare. The most common malignant tumor in this organ is of primary ductal origin.

The most common site of metastasis in colorectal adenocarcinoma is liver. Metastasis of colorectal cancer to the breast parenchyma is an extremely rare event. Since 25 years ago, 22 cases of colorectal metastasis to the breast, presenting as breast mass have been reported in the English literature.

In this case report, we will describe our experience with a young lady presenting with a breast mass 10 years after the diagnosis of colorectal cancer. Less than a year after excision of the breast mass (lumpectomy), the breast metastasis became so extensive that palliative mastectomy was the only palliative surgery to be performed for her.

To the best of our knowledge our patient is the youngest case of breast metastasis from colorectal adenocarcinoma developing 10 years after surgery (the longest interval reported so far).

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1. Introduction

Breast cancer is the most common primary cancer in women, but metastasis from non-mammary breast cancers to the breast is extremely rare and less than 400 cases of metastatic tumor to the breast have been reported so far [1].

Metastatic colon cancer to the breast is a very rare event and 22 cases have been reported in the English literature so far [2].

Herein we report our extremely rare experience with a young patient (26-year-old lady) with metastatic colorectal cancer to the breast.

2. Case report

A 26 year old lady, known case a rectal adenocarcinoma

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presented with a left breast nodule, 10 years after her first surgery for rectal adenocarcinoma.

The patient's past medical history showed several operations, the first of which has been in 16 years of age, when she first diagnosed to have rectal mass. She has been operated in another center with the diagnosis of mucinous signet ring rectal adenocarcinoma, stage III. Then she received 6 cycles of chemotherapy (FOLFOX). She remained stable, married and gave birth to a healthy girl. During the last 10 years she had two episodes of bowel obstruction and surgery without histologic evidence of tumor recurrence, after that she palpated a small and firm mass in her left breast, measuring 2.5 cm in greatest diameter. The mass was excised which showed signet ring adenocarcinoma, although the previous slides were not available to compare, however the immunohistochemical studies of the current tissue, showed negative ER (estrogen receptor) and CK7 and positive CDX-2 and CK20 (Fig. 1). The margins of the mass were free. The patient received palliative FOLFOX4 chemotherapy, however in less than a year, despite of chemotherapy, her breast became larger and larger and so painful that she requested palliative mastectomy, which

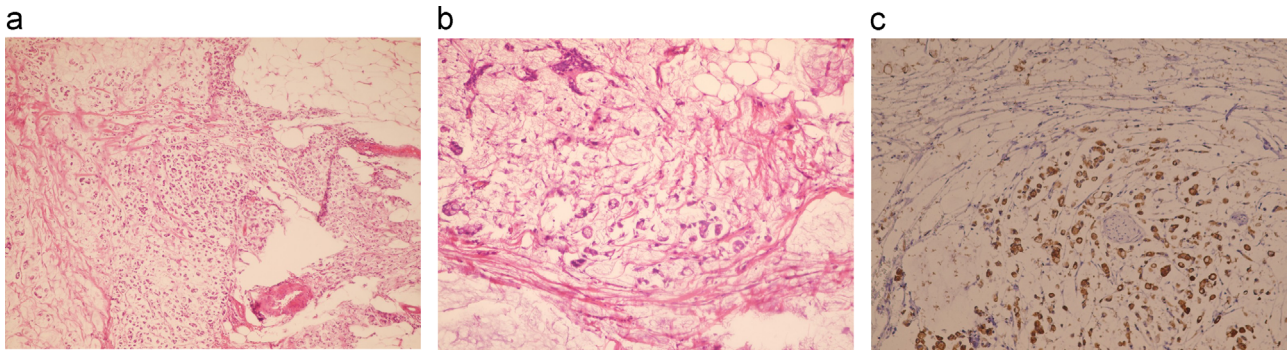


Fig. 1. a: Low power view of the breast mass shows mucinous signet ring adenocarcinoma (H&E $\times 100$). b: High power view of the same section. (H&E $\times 400$). c: CK20 positivity in the tumoral cells.

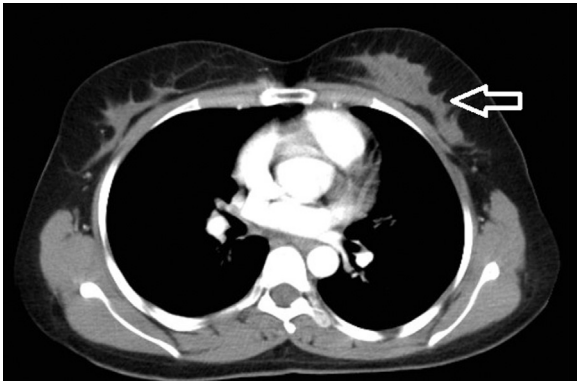


Fig. 2. Mediastinal window image shows left breast mass (arrow).



Fig. 3. Slices from the mastectomy specimen show hard mass occupying the whole breast tissue.

showed a very hard breast mass completely occupied by tumor (Fig. 2). Gross examination of the breast showed a hard breast, fully occupied by the mass (Fig. 3).

The new microscopic sections of the breast were similar to the previous excisional biopsy. Complete investigation failed to show any other location of metastasis and spread of the cancer.

Now 3 months after mastectomy, she is still alive and active, but refused to receive any additional medication.

3. Discussion

Signet ring carcinoma of the breast, has previously been defined as a subtype of mucin producing carcinomas, however it's no longer considered by the World Health Organization (WHO) to

represent a distinct entity [3,4]. Presence of signet ring adenocarcinoma in the breast can be seen in two broad categories of tumors i.e. primary and metastatic carcinoma, so in every signet ring adenocarcinoma of the breast primary breast signet ring adenocarcinoma should be considered as the first diagnosis, because signet ring cells can be seen in different histological types of invasive breast carcinoma (ductal, lobular, metaplastic and mucinous) [3–5]. On the other hand, breast metastasis from extra mammary sites is rare and less than 400 cases have been reported during the last 25 years in the English literature and overall metastatic tumors of the breast consist of only 2.7% of all breast tumors [2]. Metastasis of gastrointestinal tumors including colon to the breast is even more uncommon and to the best of our knowledge 22 cases of metastatic breast tumors from the colon have been reported during the last 25 years, in the English literature [3].

Table 1 [1–22] shows the characteristics of the 22 reported patients with metastatic colorectal adenocarcinoma in the whole English literature. All of the previous patients except for two have been female patients [4,5]. The age range has been between 28 and 86 years-old, and only one patient with metastatic colon adenocarcinoma in the previous literature has been less than 30 years of age (28 year-old) [6]. Our case has been unique according to the age; it means that our case has been the youngest patient with metastatic colorectal adenocarcinoma to the breast, reported in the whole literature (26-year-old).

Most of the previous cases have been in right breast (14 patients) and only 8 cases have been in the left breast. The most common location in the breast has been in the upper outer quadrant, which is the same as common site for primary breast tumors [1].

The largest reported size of the breast metastasis from colon has been 6 cm in the greatest diameter and the range of the size has been 1–6 cm. Our case presented with breast mass, 10 years after her first surgery (colectomy) which is the longest duration reported in the literature, i.e. the other reported cases have presented either synchronously to less than 7 years after the primary surgery for colon adenocarcinoma.

In some of the previous reported cases, the primary diagnosis in the biopsy has been wrong and has been reported as infiltrating ductal carcinoma of the breast [22] and after performing immunohistochemistry corroborating with the past history, the patient was diagnosed as metastatic colon carcinoma to the breast.

Another very important point in the reported cases of metastatic colon adenocarcinoma to the breast is the histomorphology of the primary tumor. In more than 50% (13 cases) of the reported cases, the microscopy of the primary colon adenocarcinoma has been mucinous and signet ring. It seems that these types of tumors have a more tendency to metastasize to the breast.

The most common location of colon cancer with subsequent

Table 1
Clinicopathologic characteristics of the reported breast metastasis of colorectal cancer.

No	Author	Age years	Breast mass characteristics			Colon cancer characteristics		
			Site	Side	Size (mm)	Duration (Months)	Histology	Site
1	Oksuzoglu et al. [1]	52/F	Upper outer	left	14	NR*	Signet ring mucinous	Sigmoid
2	Lal [2]	28/F	Upper inner	right	20	Synchronous	Well differentiated	Sigmoid
3	Ahmed et al. [8]	28/F	Upper inner	right	20	< 1	Signet ring mucinous	Sigmoid
4	Wang et al. [9]	38/M	Nipple	Right	60	84	Signet ring mucinous	Rectum
5	Ho et al. [10]	50/M	Upper outer	Right	15	72	Well differentiated	Ascending
6	Noh et al. [11]	63/F	Lower inner	Right	20	48	Well differentiated	Sigmoid
4	Perin et al. [12]	46/F	Upper inner	right	10	36	Well differentiated	Sigmoid
5	Vakili et al. [13]	38/F	Lower outer	left	30	15	Well Differentiated	Ascending
6	Selcukbiricik et al. [14]	37/F	Upper outer	left	10	18	Signet ring mucinous	Sigmoid
7	Fernández de Bobadilla et al. [15]	40/F	Upper outer	left	40	12	Signet Ring mucinous	Ascending
8	Singh et al. [16]	42/F	Upper outer	Right	50	11	Signet ring mucinous	Rectum
9	Bhirangi et al. [17]	86/F	Upper outer	Right	20	Synchronous	Poorly Differentiated	Ascending
11	Prete et al. [18]	43/F	Upper outer	Right	45	NR*	Well differentiated	Transverse colon
12	Mihai et al. [19]	53/F	Lower inner	Left	10	60	Poorly differentiated	Rectum
13	Hebber et al. [20]	38/F	Upper outer	Right	30	12	Signet Ring mucinous	Sigmoid
15	Hasukic et al. [21]	63/F	Upper outer	Right	30	30	Signet ring mucinous	Rectum
17	Hisham et al. [22]	32/F	NR*	Left	10	10	Signet ring mucinous	Rectum
18	Alexander et al. [23]	28/F	Upper outer	Right	NR*	11	Signet ring mucinous	Rectum
19	Özakyl et al. [24]	42/F	Upper outer	Right	30	6	Well differentiated	Sigmoid
20	Li et al. [25]	54/F	Upper outer	Right	30	< 1	Poorly differentiated	Rectum
21	Sanchez et al. [26]	36/F	Upper outer	Left	60	5	Signet ring mucinous	Rectum
22	Cabibi et al. [27]	76/F	Upper outer	Right	16	84	Signet ring mucinous	Descending colon
23	Current case	26/F	Upper outer	Left	25	120	Signet ring mucinous	Rectum

* NR: Not reported.

breast metastasis has been in rectosigmoid area.

In none of the previous cases, extensive breast metastasis with diffuse parenchymal involvement has been reported. However this event has occurred in our case, i.e. metastasis has been diagnosed despite of chemotherapy in a very short period of time after excision of margin free breast mass.

4. Conclusion

As a conclusion, in a patient with previous history of colon adenocarcinoma, especially mucinous signet ring type in rectosigmoid area, metastatic tumor should be considered, and also in young patients, it can be very aggressive and life threatening.

Clinical practice points

- What is already known about this subject? *Breast masses are mostly caused by primary tumors of the breast.*
- What are the new findings? *The breast masses caused by metastasis especially from colon is extremely rare especially after long time (10 years duration).*
- How might it impact on clinical practice in the foreseeable future? *Detecting the breast masses caused my metastasis from other organs in the patients who are known cases of cancer.*

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