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## Zygomatic Metastasis From Breast Cancer

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**Abstract:** Breast cancer continues to be the second most common cancer among women, after nonmelanoma skin cancer; in the United States, there is an average lifetime risk of 11% for developing a breast malignancy. Metastatic tumors from distant primary foci to the maxillofacial (MF) region are reported to account for only 1% of all MF malignancies, usually with grave prognosis. In the MF region, the bones more frequently involved in metastasis are the mandible, maxilla, temporal bone, frontal bone, and malar bone; the soft tissues more affected are gingiva, parotid gland, tongue, submandibular gland, and cheek. We describe a unique case of a solitary mass found in the body of the right zygoma, revealing a metastasis from breast cancer. According to the literature, the zygomatic complex is a very unusual site for metastasis; we found only 4 cases of metastatic localization from lung, rectum, liver, and uterine cancer. In MF region, oral and nasal cavity has been described as atypical sites of metastasis from breast cancer; this is to our knowledge the first recorded instance of malar metastasis from breast cancer.

**Key Words:** Zygomatic, breast, metastasis, cancer

Breast cancer continues to be the second most common cancer among women, after nonmelanoma skin cancer; in the United States, there is an average lifetime risk of 11% for developing a breast malignancy.<sup>1</sup> An average woman has a 3% to 4% chance of death from a breast malignancy; risk factors include family/personal history of breast malignancy, early menarche, increasing age, late menopause, alcohol consumption, nulliparity, and previous exposure to ionizing radiation.<sup>2</sup> Genetic mutations such as BRCA1/BRCA2

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are positive predictors,<sup>3</sup> and risk of disease in these individuals has been estimated at 60% to 80%.<sup>4</sup> Metastatic tumors from distant primary foci to the maxillofacial (MF) region are reported to account for only 1% of all MF malignancies, usually with grave prognosis.<sup>5–9</sup> Most patients have had a previously known primary cancer; nevertheless, metastasis in MF region was the initial manifestation in approximately one third of the patients, and in some cases, the primary tumor remains unknown despite additional investigations.<sup>10–14</sup> Shen et al<sup>15</sup> in 2009 reported a review of the Chinese and English literature for metastatic tumors to the MF region; in the search conducted from January 1950 to April 2007, they collected 461 articles with 746 histopathologically confirmed cases of MF metastatic tumors. According to their study, the most frequent sites of primary cancers were lung and bronchus, breast, kidney, liver with internal biliary ducts, and prostate.

In the MF region, the bones more frequently involved in metastasis were mandible, maxilla, temporal bone, frontal bone, and malar bone; the soft tissues more affected were gingiva, parotid gland, tongue, submandibular gland, and cheek. We describe a unique case of a solitary mass found in the body of the right zygoma, revealing a metastasis from breast cancer.

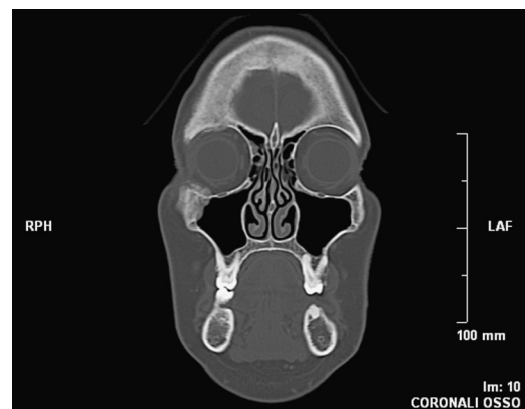
### CLINICAL REPORT

We introduce a case of a 61-year-old woman who underwent in 2006 a left-sided radical mastectomy with axillary clearance; the histopathologic examination showed invasive ductal carcinoma of the breast G3 pT4 N1a (2N+/26) with local vascular and neuronal invasion and the following immunohistochemical profile: ER, 70%; PgR, 0%; C-erb2 positive.

The patient was put on adjuvant chemotherapy with FEC (fluorouracil, epirubicin, and cyclophosphamide)–docetaxel (Taxotere) from June 2006 to October 2006; from November 2006, she was put on hormone therapy with anastrozole with a result clinically and radiologically free from disease until December 2009.

Laboratory tests, performed in this period as follow-up, revealed an abnormal increase in creatine, aspartate aminotransferase, alanine aminotransferase, and gamma-glutamyl transpeptidase levels associated to pathologic serum levels of the tumoral markers carcinoembryonic antigen (5.05) and CA-15-3 (70.10).

On January 2010, a positron emission tomography (PET) total body was undertaken, and it revealed 3 foci localized in the right iliac crest, liver, and zygoma; a computed tomography (CT)



**FIGURE 1.** Coronal CT scan demonstrating the right zygomatic lesion, extended to the orbit, the maxillary sinus, and the soft tissue of the cheek.

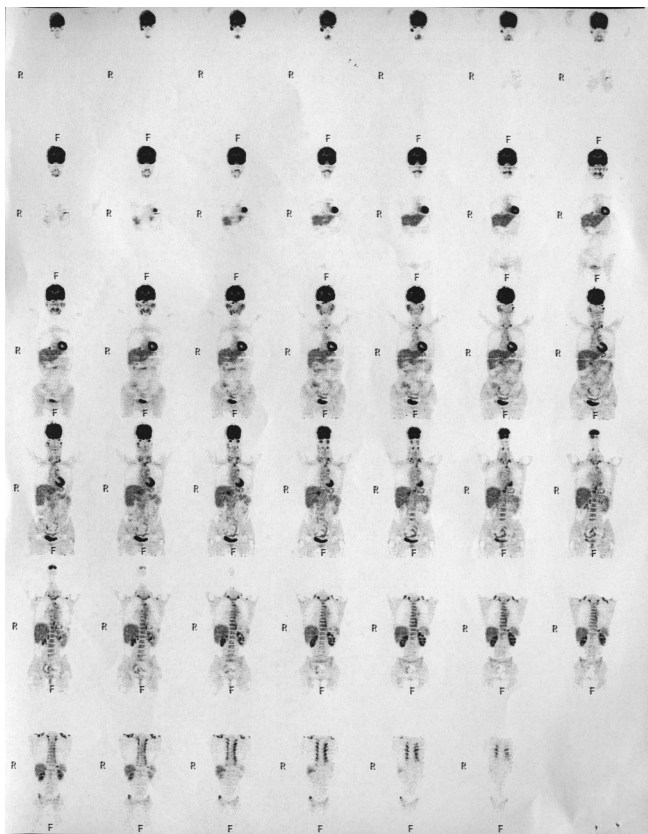


FIGURE 2. Positron emission tomography total body.

showed the lesion on the right zygoma extended to the orbit, the maxillary sinus, and the soft tissue of the cheek (Figs. 1–5).

On February, the patient was put on hormonotherapy with exemestane, and on March, she was referred by her general prac-

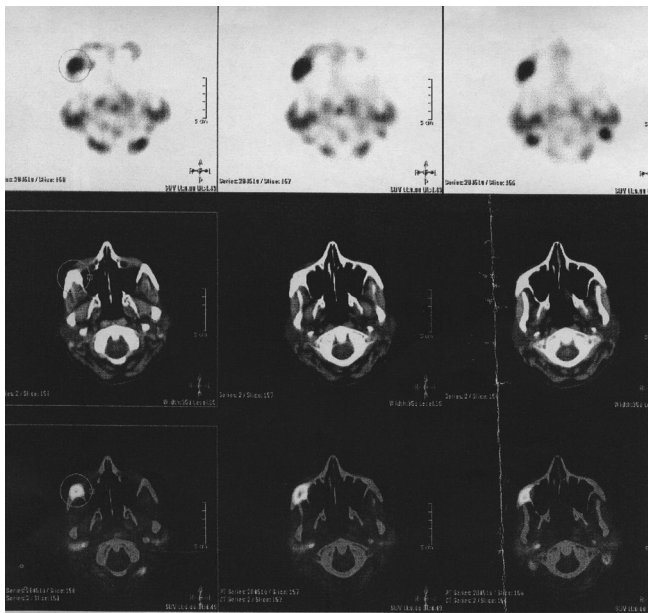


FIGURE 3. Axial CT-PET scan confirming the zygomatic metastasis.

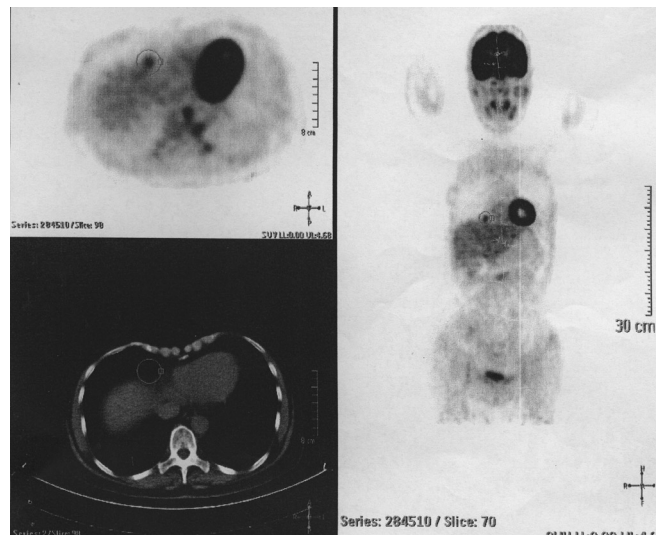


FIGURE 4. Axial CT-PET scan demonstrating the hepatic mass.

itioner to our clinic for a swelling and painful facial mass; the medical examination revealed an asymmetry of the midface due to the zygomatic mass and a mild proptosis; after few days, we performed an incisional biopsy under general anesthesia through an intraoral access with a high index of suspicion for breast metastasis, and the definitive histopathologic examination confirmed our initial diagnosis.

DISCUSSION

Immunohistochemical analysis is a reliable diagnostic tool for identification of the likely site of the primary lesion in cases in which unexpected metastatic foci are identified.<sup>16</sup> Breast carcinoma has a relatively characteristic immunohistochemical profile that

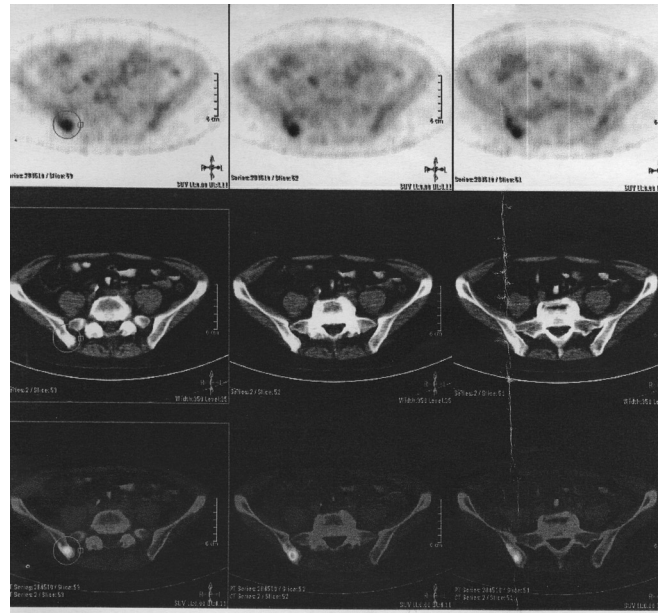


FIGURE 5. Axial CT-PET scan revealing a metastasis to the iliac crest.



allows identification with a very high degree of certainty. Cytokeratins 7 and 20 allow localization of the site of origin of the metastatic tumor cells to limited anatomic regions.<sup>17</sup> Cytokeratin 20 is a type I keratin that exhibits a relatively restricted range of tissue expression; it is found primarily in epithelium that derives from the gastrointestinal tract, urothelium, and Merkel cells of the skin. Cytokeratin 7 is a type II keratin and is identified in a variety of glandular epithelia to include endometrium, ovary, lung, and breast; it seems absent for the most part in adenocarcinomas arising in the gastrointestinal tract. Breast carcinomas typically show a cytokeratin 7–positive/cytokeratin 20–negative immune profile, as was evident in this case.<sup>18</sup> In addition, because the epithelial cells of the normal breast mammary glands are responsive to estrogen and progesterone hormone levels, the cells of adenocarcinomas arising from the breast glands often have estrogen and progesterone receptor sites on their cell membranes that can be decorated with appropriate immunohistochemical stains.<sup>19</sup> In the present case, estrogen receptor was positive, and progesterone receptor was negative; in conjunction with the cytokeratin 7/20 profile, identification of the lesion as a metastatic breast adenocarcinoma was virtually ensured. Solomayer et al<sup>20</sup> in 2000 published a retrospective study of 648 patients with metastatic breast cancer treated from 1977 to 1985. First metastasis was seen in the skeletal system (thoracic spine, pelvis, lumbar spine, and ribs) in 296 patients (46%), in the visceral organs (liver, lung, brain, and ovaries) in 268 patients (41%), and in both systems in 84 patients (13%). The disease remained confined to the skeleton or the visceral system in 180 patients (28%) and 188 patients (29%), respectively. Two hundred eighty patients (43%) developed both bone and visceral metastases. According to other studies,<sup>21,22</sup> patients with bone metastases at the time of first relapse had a significantly better prognosis in terms of survival, overall survival, and metastasis-free interval than patients with visceral metastases. Patients with both osseous and visceral metastases had the same prognosis as patients with visceral metastases only at first relapse.

In conclusion, the above case is significant for multiple reasons; according to the literature, the zygomatic complex is a very unusual site for metastasis; we found only 4 cases of metastatic localization from lung,<sup>23</sup> rectum,<sup>24</sup> liver,<sup>25</sup> and uterine<sup>26</sup> cancer. In MF region, oral<sup>27</sup> and nasal<sup>28</sup> cavities have been described as atypical sites of metastasis from breast cancer; this is to our knowledge the first recorded instance of malar metastasis from breast cancer.

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## Huge Maxillofacial Teratomas

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**Abstract:** Teratomas arising from the head and neck are extremely rare. Sporadic reports in the literature mostly involve infant and young people. In this clinical report, we present a huge teratoma of the infratemporal fossa in an old patient. Current diagnosis and management approaches of this rare entity are described.