

Case Report

Zygomatic Bone Metastasis as an Initial Presentation of Hepatocellular Carcinoma

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Abstract

Hepatocellular carcinoma is the most common type of primary liver cancer. It metastasizes via blood or through lymphatic dissemination, most commonly to the lungs, abdominal lymph nodes, and bones. Metastases to the bones of the head and neck region, however, are extremely uncommon. A 70-year-old male was presented with a mass in the left zygomatic region. After the incisional biopsy, the histopathologic and immunohistochemical analysis confirmed a metastasis of hepatocellular carcinoma. An abdominal computerized tomography (CT) scan revealed a large primary tumor in the right liver lobe. To the best of our knowledge, this is the second case of an isolated zygomatic metastasis as an initial presentation of hepatocellular carcinoma. We also reviewed the literature regarding clinical and histopathologic characteristics of hepatocellular carcinoma that produced metastases to the zygomatic bone and the maxilla.

Keywords: Hepatocellular carcinoma, immunohistochemistry, maxilla, metastasis, zygomatic bone

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Introduction

Hepatocellular carcinoma (HCC) metastasizes via blood or lymphatic dissemination, most commonly to the lungs (55%), abdominal lymph nodes (41%), or bones (28%).¹ Metastases to osseous structures in the head and neck are extremely uncommon, particularly to the maxilla and zygomatic bone.^{2,3-13} Here, we report a rare patient who had HCC with isolated zygomatic metastasis as the initial presentation of the disease.

Case Report

A 70-year-old male patient was presented to the clinic with a complaint of a painless, soft mass in the left zygomatic region that had been slowly enlarging during the previous six months. The patient had no other signs or symptoms of the malignant disease. On the facial computerized tomography (CT) scan there was a soft-tissue-density mass emanating from the left zygomatic region, and infiltrating the lower orbital rim, maxillary sinus, and the skin, that was approximately 60 mm in the largest diameter (Figure 1). An incisional biopsy was performed and histopathology showed a neoplasm that was composed of large polygonal cells, which were, at least focally, arranged in a trabecular pattern, to some extent mimicking liver tissue (Figure 2A). Immunohistochemical analysis demonstrated a strong and diffuse, cytoplasmic positivity with HepPar 1 (human hepatocyte paraffin antibody-1) (Figure 2B). Staining for polyclonal carcinoembryonic antigen (pCEA) and CD10 was also positive (canalicular-

staining pattern), whereas monoclonal carcinoembryonic antigen (mCEA), and cytokeratin 7 and cytokeratin 20 (CK7 and CK 20) were negative. Ki-67 proliferative index was 4% in tumor cells. Based on histopathologic and immunohistochemical findings, the zygomatic mass was diagnosed as the metastasis of HCC. Findings on the CT scans of the brain, chest, pelvis, and skeletal bones were all negative (in terms of metastasis), but the abdominal CT scan showed a primary tumor mass in the right liver lobe measuring 114 mm in the largest diameter (Figure 3). The patient had been treated only with symptomatic therapy and died six months after the diagnosis had been established.

Discussion

HCC is a primary liver cancer that is clinically silent for most of its course, and the majority of patients present with an advanced disease that has little chance for effective treatment. In the study by Pawarode, et al. extrahepatic metastases were seen in 18% of 157 patients with untreated HCC.¹ In those uncommon cases when HCC produces metastases to the head and neck region, they are usually seen in the oral cavity, mandible, or maxilla. In a paper by Huang, et al. 77 cases of metastatic HCC in the head and neck region were cited.³ Regarding metastases of HCC in the maxillary and zygomatic region, only 13 cases have been reported so far (Table 1), two of them involving the zygomatic bone.^{3,4} Majority of patients with metastases of HCC in the maxillary region were males, with a mean age of 59.6 years (range: 42 to 75 years).²⁻¹⁴ Only one case of a female patient (78 years old) has been reported.¹⁰ Our patient was also a 70-year-old male, similar to other published cases. Dimensions of maxillary metastases (ranging from 12 mm to 39 mm) were stated only in four reports, including two cases with the zygomatic bone affection (30 mm and 39 mm).^{3,4,10,12} Metastasis in our case was larger, 60 mm in diameter, perhaps related to the six-month duration of visible metastatic growth before

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Table 1. Characteristics of the published cases reporting metastasis of hepatocellular carcinoma in the maxilla and zygomatic bone

No	Gender	Age	Affected bone	Size of metastasis	Size of primary tumor	Duration of metastasis before diagnosis	IHC	Presentation	Therapy	Outcome	Reference
1	M	52	Zygomatic, temporal sphenoid, orbital rim	30 mm	Not stated	3 months	-----	Initial	Partial resection-surgery for metastasis	Death after 3 months	Reichbach (1970)
2	M	62	Maxilla	12x15 mm	Not stated	1 month	-----	Not initial- had HCC for 2 years	Chemotherapy for primary and surgery for metastasis	Death after 1 month	Morishita (1984)
3	F	78	Maxilla	20 mm	Numerous nodules, 30-60 mm	1 month	-----	Initial	Surgery for metastasis	Death after 3 months	Kanazawa (1989)
4	M	59	Maxilla	Not stated	Not stated	Few months	-----	Not initial- had HCC for 4 years	Partial resection -surgery for primary tumor	Death during hospitalization	Izquierdo (2000)
5	M	59	Zygomatic	39 mm	30 mm	6 months	-----	Not initial	Surgery and reconstruction of facial bones for metastasis, liver transplantation for primary tumor	Alive after 12 months	Neff (2002)
6	M	67	Maxillary sinus	Not stated	Not stated	3 months	AFP+ HepPar 1+ CK20- P1VKA II+ pCEA+	Not initial	Surgery for metastasis, transarterial chemoembolization for primary tumor	Death after 3 months	Okada (2003)
7	M	64	Maxillary sinus	Not stated	Not stated	6 months	-----	Not initial	Surgery for metastasis	Not stated	Satake (2005)
8	M	71	Maxilla	Not stated	Not stated	Not stated	-----	Not initial- had HCC for 7 years	Chemotherapy for primary and radiation therapy for metastasis	Death after 2 months	Matsuda (2006)
9	M	42	Maxilla, sphenoid sinus	Not stated	Not stated	2 months	-----	Not initial	Chemotherapy-sorafenib and biotherapy-Avastin for primary tumor and metastasis	Alive after 6 months	Huang (2007)
10	M	42	Maxilla, maxillary sinus	Not stated	Not stated	3 months	-----	Not initial	Surgery and transarterial chemoembolization for primary tumor	Death after 3 months	Huang (2007)
11	M	75	Mandible, maxilla	Not stated	Not stated	Not stated	-----	Not stated	Not stated	Not stated	Shen (2009)
12	M	52	Maxilla	Not stated	Not stated	Not stated	-----	Initial	Surgery for metastasis	Death after 1 month	Bair (2010)
13	M	70	Maxilla, maxillary sinus, retrobulbar space	Not stated	20 mm and 30 mm	Not stated	HepPar1+ Vimentin- TTF-1- CK7- CK20- RCC Ag-	Initial	Chemotherapy for primary tumor and surgery with radiotherapy for metastasis	Death after 6 months	Kolarevic (2011)
14	M	71	Zygomatic bone, orbital rim, maxillary sinus	60 mm	114 mm	6 months	HepPar1+ CK7- CK20- CD10+ pCEA+ Ki-67 4% mCEA-	Initial	Symptomatic and supportive	Death after 6 months	Current case

IHC: immunohistochemistry; HCC: hepatocellular carcinoma; AFP: alpha-fetoprotein; HepPar 1: human hepatocyte paraffin antibody-1; CK20: cytokeratin 20; P1VKA II: protein- induced vitamin K absence or antagonist II; pCEA: polyclonal carcinoembryonic antigen; TTF-1: thyroid transcription factor-1; CK7: cytokeratin 7; RCC Ag: renal cell carcinoma antigen; mCEA: monoclonal carcinoembryonic antigen.

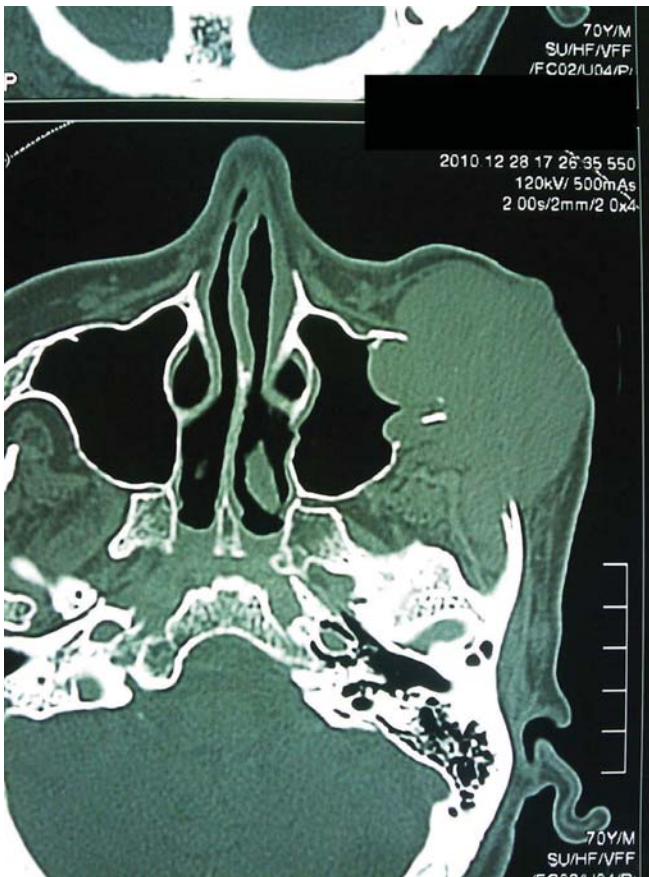


Figure 1. Facial CT scan shows soft-tissue-density mass in the left zygomatic region.

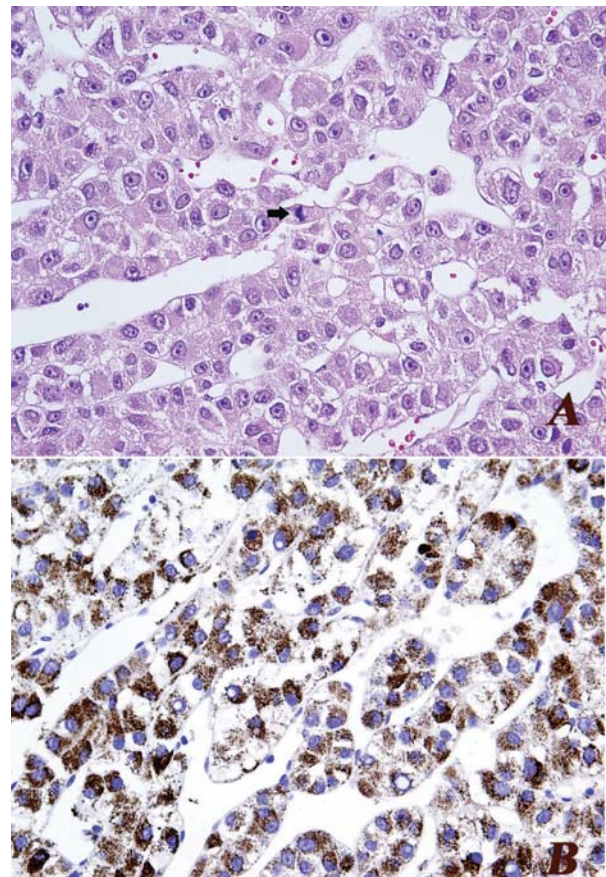


Figure 2. Biopsy findings of the zygomatic bone metastasis: **A)** large, polygonal tumor cells in a trabecular pattern with mitotic figures in the center (arrow); **B)** HepPar 1 immunohistochemical stain shows strong and diffuse positivity in the cytoplasm of tumor cells (A - hematoxylin and eosin (H&E), original magnification x 400; B- streptavidin-biotin, original magnification x 400).



Figure 3. Abdominal CT scan with primary tumor in the right liver lobe.

the diagnosis. Duration of metastasis before the correct diagnosis has been stated in eight published papers, ranging from one month up to six months.^{2,3,4,6,7,9,10,12} Dimensions of primary liver tumor

has been declared only in three of the published papers, ranging from 20 mm to 60 mm,^{3,5,10} much smaller than the primary tumor in our patient (114 mm). In most cases, the diagnosis has been

made using the routine hematoxylin and eosin (H&E) sections; immunohistochemistry was performed only in cases reported by Kolarevic, et al.⁵ and Satake, et al.⁶ In the head and neck region, a number of other metastatic tumors, notably from the breast, kidney, and adrenal glands may histopathologically mimic the trabecular, liver-like pattern of HCC; hence, immunohistochemistry might be very useful, especially in those cases with initial presentation of HCC as a metastasis.^{4,5,8,9} In eight cases, the patients already knew the primary liver tumor^{2,3,6,7,9,11,12} and in one report it was not stated whether the manifestation of HCC metastasis was an initial presentation of malignant liver tumor.¹³

To explain the absence of lung involvement (as in our case), it has been suggested that HCC could disseminate into plexus of vertebral veins (Battson's plexus) which represent a pathway up and down the spine that does not involve the heart or the lungs. This venous plexus provides an explanation of 'aberrant' metastatic patterns and absence of lung involvement.¹⁴ In published reports, surgical therapy (eight cases) was applied for metastases in the maxillary region.^{3-8,10,12} Radiation therapy was applied for metastases in the maxillary region in two cases,^{5,11} and the combination of surgical and radiation therapy for metastasis in one case.⁵ In two papers the outcome was not stated,^{6,13} but in eight cases there was a lethal outcome one to six months after the diagnosis of bone metastasis^{2,4,5,7,8,10-12} and one patient died during hospitalization.⁹ One patient who was treated with liver transplantation for primary tumor and surgery for metastasis was reported to be alive after 12 months.³ Huang, et al. reported two cases with sinonasal metastases of HCC who were treated with chemotherapy (sorafenib) and biotherapy (Avastin), and with surgery and transarterial chemoembolization (TACE).² The patient who was treated with the combination of chemotherapy and biotherapy was alive after six months.² Our patient was deemed as surgically unresectable both for metastasis and for primary tumor; also because of primary tumor size, he was not a candidate for chemotherapy, so he only received supportive therapy and died six months after the diagnosis had been established.

To the best of our knowledge, this is the third well documented and reported case of a zygomatic HCC metastasis, and the second one with an isolated metastasis in the zygomatic bone as an initial presentation of HCC. Immunohistochemistry with HepPar 1, combined with pCEA and CD10 antibodies is a useful adjunct that can focus further imaging studies and facilitate diagnosis in such patients.

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Conflicts of interest: None.

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