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CASE REPORT

Spontaneous acute epidural hematoma secondary to skull and dural metastasis of hepatocellular carcinoma: A case report

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Abstract

BACKGROUND

The skull and dura are uncommon sites for the metastasis of hepatocellular carcinoma (HCC). Spontaneous acute epidural hematoma (AEDH) is also very rare. We report here a spontaneous AEDH secondary to skull and dural metastasis of HCC. This case is extremely rare.

CASE SUMMARY

A 48-year-old male patient with a history of HCC developed unconsciousness spontaneously. Head computed tomography showed "a huge AEDH in the left parietal and occipital region with osteolytic destruction of the left parietal bone. Emergent operation was performed to evacuate the hematoma and resect the lesion. Pathological study revealed that the lesion was the metastases from HCC. The patient died of lung infection, anemia, and liver failure 3 wk after operation.

CONCLUSION

Spontaneous AEDH caused by hepatocellular carcinoma (HCC) dural and skull metastases is extremely rare, the outcome is poor. So, early diagnosis is important. If the level of AFP does not decrease with the shrinkage of intrahepatic lesions after treatment, it is necessary to be alert to the existence of extrahepatic metastases. Since most of the patients had scalp and bone masses, physicians should pay attention to the patient's head palpation. Once a patient with the history of HCC had sudden neurological dysfunction, the possibility of spontaneous AEDH caused by the skull and dura mater metastases should be considered. Since hemorrhage is common in the skull HCC metastases, for patients with spontaneous AEDH accompanied by skull osteolytic lesions, it is also necessary to be alert to the possibility of HCC. For AEDH secondary to HCC

metastases, early diagnosis and timely treatment are critical to improve the patients' outcomes.

Key Words: Spontaneous acute epidural hematoma; Hepatocellular carcinoma; Skull and dural metastasis; Case report

Core Tip: We present a case of hepatocellular carcinoma (HCC) metastasis to the skull and dura mater with spontaneous acute epidural hematoma (AEDH). This is the first report of spontaneous AEDH secondary to skull and dura mater metastasis from HCC in the Chinese population. Pathological examination provided evidence that the dura mater was one of the targets for HCC metastasis and could also lead to AEDH in addition to the reported skull metastases. We summarize the characteristics of the 8 reported cases worldwide, discuss the possible cause of AEDH, and offer advice for clinical practice.

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INTRODUCTION

Hepatocellular carcinoma (HCC) is one of the common malignant tumors in adults, with a high incidence in Southeast Asia where hepatitis B and C are prevalent[1]. Lung and bone metastases are the most common events in the terminal stage of the disease, but metastasis to the skull and the central nervous system is relatively rare[2]. Although traumatic acute epidural hematoma (AEDH) is quite often, the spontaneous AEDH is extremely rare. We are presenting a case of HCC metastasis to the skull and dura mater with spontaneous AEDH.

CASE PRESENTATION

Chief complaints

A 48-year-old male patient was found to be unconscious and accompanied by vomiting 3 h before admission.

History of present illness

The patient was diagnosed as HCC and received transarterial chemoembolization (TACE) 6 mo ago. 3 h before admission, he was found to be unconscious and accompanied by vomiting. He was transferred to our emergency by ambulance.

History of past illness

The patient had a history of hepatitis B, but did not take regular antiviral therapy as prescribed by the doctor. He was diagnosed as HCC (BCLC stage: B) and received TACE 6 mo ago in another hospital, the detailed treatment records were unavailable. The patient did not follow the doctor's suggestion for comprehensive treatment, nor did he have regular follow-up visits to the doctors.

Personal and family history

No special personal and family history.

Physical examination

On arrival, physical examination revealed that the patient was in deep coma, Glasgow Coma score was 5 (E1V1M3). The left pupil dilated and the light reflection disappeared. No obvious traumatic change was observed on the scalp. A fixed elastic mass was found in the parieto-occipital area, without swelling or ulceration.

Laboratory examinations

Laboratory examination revealed that alanine aminotransferase (ALT) was 80U/L, aspartate aminotransferase (AST) was 77U/L, the γ-glutamine transpeptidase (GGT) was 339 U/L, the albumin

level was 42.6 g/L and the total bilirubin was 10.70μmol/L. The alpha-fetoprotein of this patient was over 1210 ng/mL. The platelet count of this patient was 132 × 10^9/L. The results of coagulation test showed: Prothrombin time (PT) 15.20 s, activated partial thromboplastin time (APTT) 36.00 s. Immunological test results for hepatitis B were HBsAg 691.19 IU/mL, HBeAg 0.01 IU/mL, HBeAb 0.75 IU/mL and HBcAg 146.13 IU/mL. The hepatitis B virus- deoxyribonucleic acid of this patient was 3.75 × 10^4 copies/mL.

Imaging examinations

Head computed tomography (CT) showed "a huge AEDH in the left parietal and occipital region with osteolytic destruction of the left parietal bone" (Figure 1).

FINAL DIAGNOSIS

Cerebral hernia, Acute epidural hematoma, skull and dural metastasis of HCC (BCLC stage: C), hepatitis B infection, cirrhosis (Child-Pugh grade A).

TREATMENT

The patient received emergency craniotomy to evacuate the hematoma. During the operation, the parietal bone was found being invaded by a gray-red elastic mass. After removing the bone flap and evacuating the hematoma, the base of the mass was found to be located on the dura mater, with abundant blood supply. The tumor and the invaded dura mater were resected. The base of the tumor was adjacent to the superior sagittal sinus, but did not invade the sinus. No hematoma or tumor invasion was found during the exploration of the subdural space. After resection of the skull lesion, the bone flap was put back and fixed properly.

OUTCOME AND FOLLOW-UP

After the operation, the pupils of the patient retracted to normal and were sensitive to light reflection, but the patient remained in light coma and underwent tracheotomy. A comprehensive postoperative examination revealed that the patient had lung and bone metastases. Later, the patient developed secondary lung infection, anemia, and liver failure, and died 3 wk after the operation.

DISCUSSION

Regional lymph nodes, lungs and bones are common sites for HCC metastasis. Osseous metastasis of HCC often occurs in vertebrae, pelvis and ribs, the skull is a rare metastatic site for HCC[2]. Spontaneous ADEH is very rare, and may be caused by infection, dural vascular anomalies, tumors or coagulopathies[3]. Most of the reported cases are spinal spontaneous AEDH. Intracranial spontaneous AEDH caused by metastases are extremely rare. Delgado *et al*[4] reported that epidural hematoma was the first presentation of HCC in a tiny portion of patients. As far as we know, only 8 cases of spontaneous AEDH caused by metastatic HCC have been reported so far, which are summarized below (Table 1). All of the patients were male and over 40 years old, 7/8 cases were from Asian countries, including South Korea and Japan. The geographical distribution of these cases may be related to the epidemiology of hepatitis virus infection. 7/8 patients came to the doctors due to AEDH related symptoms. Only 5/8 of the patients had known histories of HCC. The parieto-occipital region seems to be the preferred metastatic site (5/8). The metastatic HCC is highly invasive, all of the cases had osteolytic changes. Nearly half of the patients had lesions close to the sinus, where the arachnoid particles or the sinus might be eroded by the tumor and lead to hemorrhage. In addition, the lesions located at the base of the middle cranial fossa or the large wing of the sphenoid bone may be related to the erosion of the middle meningeal artery. Impaired liver function induced coagulopathy also contributed to the bleeding in 2 of the patients. The hematomas were huge in most of the cases, 5 of them had deteriorating consciousness and 4 of them developed brain herniation on diagnosis. The outcome of the patients was poor, only 1 patient survived, 1 patient left vegetative state, and the other 6 patients died of liver failure and related complications shortly after operation.

This is the first report of the spontaneous AEDH secondary to the skull and dura mater metastasis from HCC in the Chinese population. In this case, the spontaneous AEDH was huge and developed brain herniation. The patient died of liver failure shortly after the operation. Pathological study revealed that the tumor had a sinusoid structure and the dura mater was invaded by the metastatic tumor

Table 1 Summary of patients with spontaneous acute epidural hematoma caused by metastatic hepatocellular carcinoma in the literature

Ref.	Age	Gender	Country	Metastases location	Close to the sinusor MMA	Osteolytic change	Clinical manifestations	Cerebral hernia	Previous diagnosed HCC	Coagulopathy	Outcome
Kim *et al* [2], 2016	41	M	South Korea	Left parieto-occipital region	Y	Y	Headache, vomiting, drowsiness	N	Y	N	Died of liver failure, 4 mo later
McIver *et al*[5], 2001	50	M	United States	Left parietal region	N	Y	Headache, right-sided weakness	N	N	NA	Survive
Hayashi *et al*[6], 2000	70	M	Japan	Right parietal bone	N	Y	Headache, left-sided weakness	N	Y	Y	Died of liver failure and pneumonia 2 mo later
Kanai *et al* [7], 2008	56	M	Japan	Left parieto-occipital region	Y	Y	Headache, deteri-orating consciousness	Y	N	N	Died of liver failure 3 wk later
Nakagawa *et al*[8], 1992	52	M	Japan	Occipital area	Y	Y	Headache, deteri-orating consciousness	Y	N	NA	Died of liver tumor 4 mo later
Woo *et al* [9], 2010	46	M	Korea	The greater wing of the right sphenoidBone	Y	Y	Severe headache, deteriorating consciousness	Y	Y	Y	Died of multi-organ failure 5 d later
Kim *et al* [10], 2010	53	M	Korea	Right middle-Cranial fossa floor	Y	Y	Sudden mentalDe-terioration to semicoma	Y	Y	NA	Vegetative state
Nakao *et al*[11], 1992	58	M	Japan	Left frontal bone	N	Y	Scalp and bone mass	N	Y	N	Died of liver failure 15 mo later

HCC: Hepatocellular carcinoma; M: Male; MMA: Middle meningeal artery; Y: Yes; N: No; NA: Not available.

(Figure 2), which provided the evidence that the dura mater was also a target for HCC metastasis and could also lead to AEDH besides the reported skull metastases. Blood-rich sinusoid structure of HCC and the erosion of the adjacent sinus might contribute to the AEDH in this case. Postoperative coma delayed comprehensive treatment of the primary HCC. Due to the rapid progression of AEDH, timely and effective surgery can save the neurological function of patients to the greatest extent. According to the guiding role of BCLC staging in the treatment and prognosis of HCC, the post-operative Eastern Cooperative Oncology Group performance status (ECOG-PS) of these patients is important to the assessment of anti-cancer effect and expected survival[12]. If neurosurgical procedure restored the performance status to ECOG-PS 0 to 2, these patients could be defined as BCLC grade C, systemic therapy can be beneficial to these patients with the following anti-cancer options: Atezolizumab combined with bevacizumab, sorafenib, and Renvatinib as first-line therapy. Regorafenib and cabozantinib have been recommended as second-line treatments. With systemic anti-cancer treatment, the overall survival of these patients is expected between 8 to 13 mo. If surgical therapy cannot restore the ECOG-PS to under 2, the prognosis of these patients is pessimistic. Best supportive care can only prolong the survival up to 3 mo. So, the early diagnosis and timely treatment of AEDH secondary to HCC metastasis is extremely important. Therapies such as nucleoside analogues and anti-viral agents are also considered beneficial to these patients. Physicians should pay attention to whether the dynamic change of AFP is parallel to the liver associated manifestation. If the intrahepatic nodules shrink after TACE, but the AFP remain stable or even increase with follow-up, extrahepatic metastasis should be considered. A systemic physical examination and multiple organ imaging examinations such as PET/CT allowed these patients to discover the asymptomatic metastases which require timely intervention. Early diagnosis of the metastases is the key to prevent lethal complications such as AEDH.

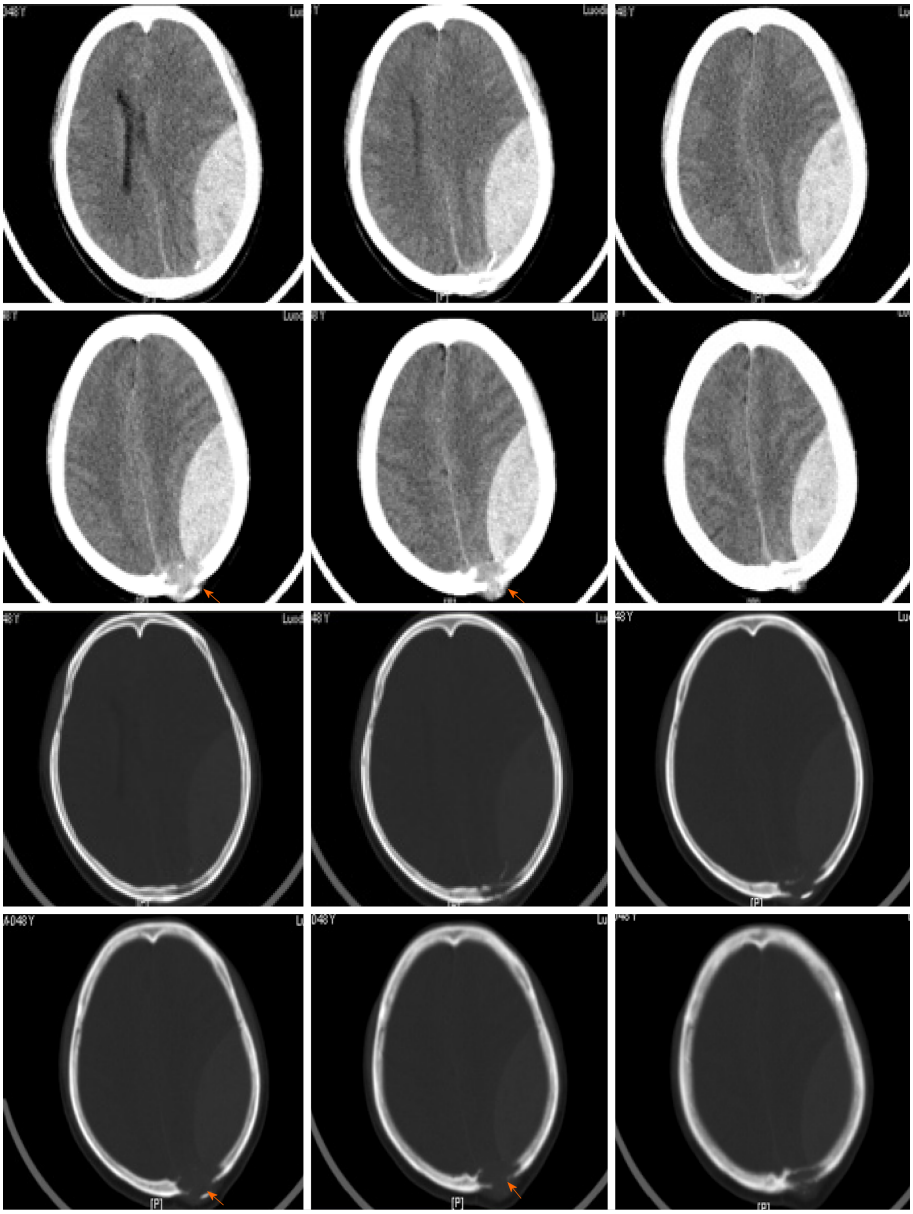

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Figure 1 The head computed tomography scan of the patient showed a huge acute epidural hematoma in the left parietal and occipital region. An osteolytic destruction of the left parietal bone can be found (indicated by the orange arrows).

CONCLUSION

Spontaneous AEDH caused by HCC dural and skull metastases is extremely rare, the outcome is poor. So, early diagnosis is important. If the level of AFP does not decrease with the shrinkage of intrahepatic lesions after treatment, it is necessary to be alert to the existence of extrahepatic metastases. Since most of the patients had scalp and bone masses, physicians should pay attention to the patient's head palpation. Once a patient with the history of HCC had sudden neurological dysfunction, the possibility of spontaneous AEDH caused by the skull and dura mater metastases should be considered. Since hemorrhage is common in the skull HCC metastases, for patients with spontaneous AEDH accompanied by skull osteolytic lesions, it is also necessary to be alert to the possibility of HCC. For AEDH secondary to HCC metastases, early diagnosis and timely treatment are critical to improve the patients' outcomes.

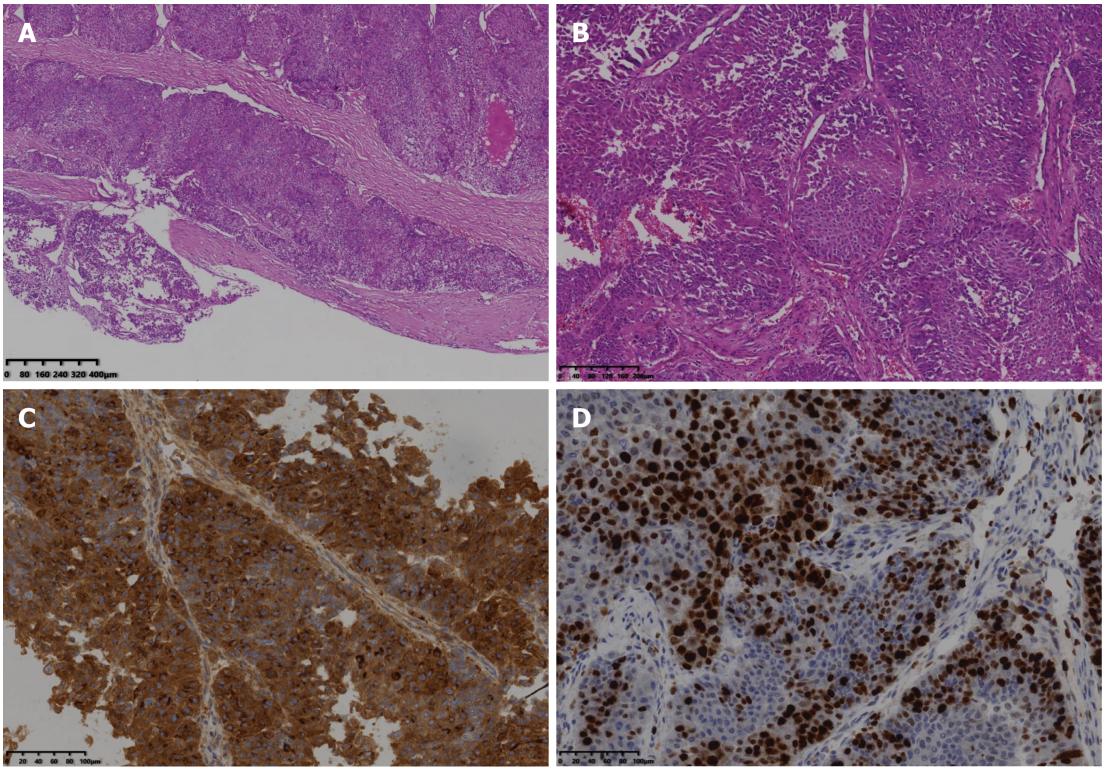

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Figure 2 Pathological examination of the lesion. A: Low-powered picture of the HE staining revealed that the dura mater was invaded by the metastatic tumor; B: High-powered observation of the HE staining showed a sinusoid structure of the metastatic hepatocellular carcinoma. Immuno-histochemistry staining showed that metastatic hepatocellular carcinoma was strongly positive for C: AFP and D: Ki67.

FOOTNOTES

Author contributions: Lv GZ, Li GC and Yang Y were the patient's neurosurgeons, reviewed the literature and contributed to manuscript drafting; Lv GZ reviewed the literature and contributed to manuscript drafting; Tang WT analyzed and interpreted the imaging findings; Zhou D was responsible for the revision of the manuscript for important intellectual content; all authors issued final approval for the version to be submitted.

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REFERENCES

1 **Yang JD**, Hainaut P, Gores GJ, Amadou A, Plymoth A, Roberts LR. A global view of hepatocellular carcinoma: trends, risk, prevention and management. *Nat Rev Gastroenterol Hepatol* 2019; **16**: 589-604 [PMID: 31439937 DOI: 10.1038/s41575-019-0186-y]

2 **Kim YS**, Moon KS, Lee KH, Jung TY, Jang WY, Kim IY, Jung S. Spontaneous acute epidural hematoma developed due to skull metastasis of hepatocelluar carcinoma: A case report and review of the literature. *Oncol Lett* 2016; **11**: 741-744 [PMID: 26870277 DOI: 10.3892/ol.2015.3947]

3 **Zhang B**, Chen J, Zou N, Wang L, Wang H, Jiang J, Chen D, Lu X. Spontaneous resolution and complete recovery of spontaneous cervical epidural hematoma: Report of two cases and literature review. *Neurochirurgie* 2019; **65**: 27-31 [PMID: 30635115 DOI: 10.1016/j.neuchi.2018.10.008]

4 **Delgado Maroto A**, Del Moral Martinez M, Dieguez Castillo C, Casado Caballero FJ. Acute epidural haematoma as a presentation of hepatocellular carcinoma: Case report and literature review. *Gastroenterol Hepatol* 2019; **42**: 177-179 [PMID: 29779760 DOI: 10.1016/j.gastrohep.2018.03.006]

5 **McIver JI**, Scheithauer BW, Rydberg CH, Atkinson JL. Metastatic hepatocellular carcinoma presenting as epidural hematoma: case report. *Neurosurgery* 2001; **49**: 447-449. [PMID: 11504122 DOI: 10.1227/00006123-200108000-00034]

6 **Hayashi K**, Matsuo T, Kurihara M, Daikoku M, Kitange G, Shibata S. Skull metastasis of hepatocellular carcinoma associated with acute epidural hematoma: a case report. *Surg Neurol* 2000; **53**: 379-382 [PMID: 10825524 DOI: 10.1016/s0090-3019(00)00208-1]

7 **Kanai R**, Kubota H, Terada T, Hata T, Tawaraya E, Fujii K. Spontaneous epidural hematoma due to skull metastasis of hepatocellular carcinoma. *J Clin Neurosci* 2009; **16**: 137-140 [PMID: 19013817 DOI: 10.1016/j.jocn.2008.02.020]

8 **Nakagawa Y**, Yoshino E, Suzuki K, Tatebe A, Andachi H. Spontaneous epidural hematoma from a hepatocellular carcinoma metastasis to the skull--case report. *Neurol Med Chir (Tokyo)* 1992; **32**: 300-302 [PMID: 1378949 DOI: 10.2176/nmc.32.300]

9 **Woo KM**, Kim BC, Cho KT, Kim EJ. Spontaneous epidural hematoma from skull base metastasis of hepatocellular carcinoma. *J Korean Neurosurg Soc* 2010; **47**: 461-463 [PMID: 20617094 DOI: 10.3340/jkns.2010.47.6.461]

10 **Kim BG**, Yoon SM, Bae HG, Yun IG. Spontaneous intracranial epidural hematoma originating from dural metastasis of hepatocellular carcinoma. *J Korean Neurosurg Soc* 2010; **48**: 166-169 [PMID: 20856668 DOI: 10.3340/jkns.2010.48.2.166]

11 **Nakao N**, Kubo K, Moriwaki H. Cranial metastasis of hepatocellular carcinoma associated with chronic epidural hematoma--case report. *Neurol Med Chir (Tokyo)* 1992; **32**: 100-103 [PMID: 1376859 DOI: 10.2176/nmc.32.100]

12 **Villanueva A**. Hepatocellular Carcinoma. *N Engl J Med* 2019; **380**: 1450-1462 [PMID: 30970190 DOI: 10.1056/NEJMra1713263]

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