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ABOUT COVER

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AIMS AND SCOPE

The primary aim of *World Journal of Clinical Cases* (*WJCC*, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

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CASE REPORT

Multiple different remote epidural hematomas after craniotomy: A case report

Qiang He, Chuan-Yuan Tao, Rui-Hong Fu, Chao You

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Abstract

BACKGROUND

Epidural hematoma is one of the common postoperative complications after craniotomy. However, multiple remote epidural hematomas in different sites, including supratentorial and infratentorial regions, are exceedingly rare.

CASE SUMMARY

We present a rare case in which three remote epidural hematomas occurred after craniotomy. A 21-year-old woman was admitted with a headache for 1 mo, vomiting, and rapid vision loss for 1 wk. Brian magnetic resonance imaging indicated a right thalamic tumor. The intraoperative diagnosis was a cystic tumor, posterior cerebral artery aneurysm, and vascular malformation. The operation was successful. Unfortunately, the patient developed three extradural hematomas within 48 h. Family members consented to the first two hematoma evacuations but refused the third.

CONCLUSION

More attention should be paid to this kind of rare complication. Adequate preoperative evaluation is important, especially for acute patients. Monitoring neural function and early computed tomography scanning of the brain after surgery should be highlighted.

Key Words: Postoperative complication; Multiple epidural hematomas; Supratentorial and infratentorial regions; Remote epidural hematoma; Case report

Core Tip: We report a 21-year-old emergency woman who developed three remote epidural hematomas in different sites after craniotomy.

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INTRODUCTION

Postoperative hemorrhage includes intracerebral hematoma (ICH), subdural hematoma, and extradural hematoma (EDH), which are serious complications after craniotomy. EDH is one of the most frequent and devastating complications. It may occur in supratentorial, infratentorial, ipsilateral, and even contralateral sites of the operative area[1,2]. As a specific subset of EDH after craniotomy, multiple remote EDHs are very rare. In this study, we present a 21-year-old woman who developed three remote EDHs in different sites after craniotomy.

CASE PRESENTATION

Chief complaints

A 21-year-old woman visited the emergency department and was admitted to the Neurosurgery Department. She complained of headache and vomiting for 1 mo, and rapid vision loss for 1 wk.

History of present illness

The patient had a headache and recurrent vomiting, along with rapid vision loss.

History of past illness

The patient had no significant medical history.

Personal and family history

Neither the patient nor her family members had special medical history.

Physical examination

The patient was conscious. The extremities were moved as instructed. General sensory was normal. The positive sign was blurred binocular vision.

Laboratory examinations

The blood test results were within normal limits before surgery. The laboratory examination results in the whole treatment process are shown in Figure 1 and Table 1.

Imaging examinations

Computerized tomography (CT) revealed a solid cystic tumor in the right thalamus (Figure 2A). Brian magnetic resonance imaging (MRI) showed a solid cystic tumor in the right thalamus and midbrain (Figure 2B-D).

MULTIDISCIPLINARY EXPERT CONSULTATION

The patient was diagnosed with a right thalamic tumor before surgery.

FINAL DIAGNOSIS

The final diagnosis was a solid cystic tumor, right posterior cerebral artery aneurysm, vascular malformation in the thalamus, and multiple remote EDHs.

Table 1 The change of platelet count and the fluctuation of prothrombin time and activated partial thromboplastin time

Item	PLT (10^9/L)	PT (s)	APTT (s)	D-dimer (mg/L)	Fibrinogen (g/L)
Normal value	100-300	9.6-12.8	24.8-33.8	< 0.55	2.0-4.0
Preoperation	19.8	10.9	27.5	-	2.19
Before first EDH evacuation (3 h postoperatively)	17.3	13.2	29.1	32.24	1.18
After second EDH evacuation (22 h after operation)	1.6	18.2	58.2	1.96	0.69
After third EDH (41 h postoperatively)	1.9	15.2	34.5	6.23	2.62
Before discharge	8.3	13	28.7	1.92	4.33

PLT: Platelets; PT: Prothrombin time, APTT: Activated partial thromboplastin time; EDH: Epidural hematoma.

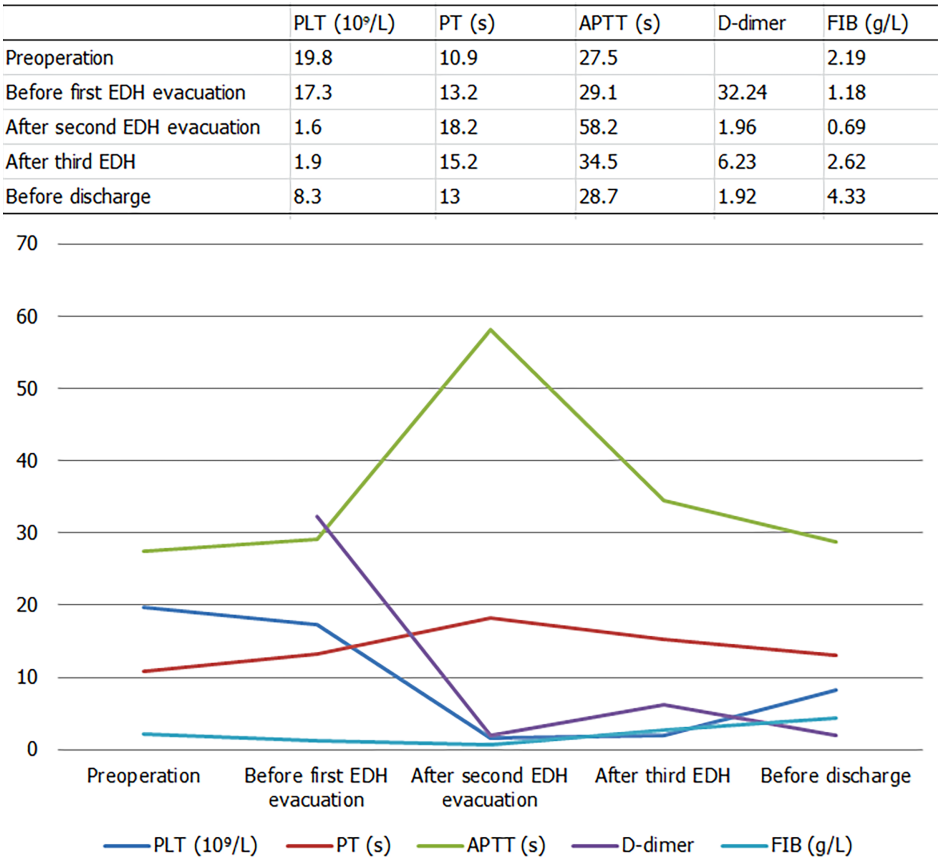

Figure 1 The change of platelet count and the fluctuation of prothrombin time and activated partial thromboplastin time were observed after the second extradural hematoma evacuation. PLT: Platelets; PT: Prothrombin time, APTT: Activated partial thromboplastin time; EDH: Epidural hematoma.

TREATMENT

Under the neuro-electrophysiological monitoring, a triangular approach was performed. The cystic mass was dissected, and then yellow fluid was released from the cyst. However, a small artery was observed below the cyst cavity. In addition, a red bulge was observed and considered an aneurysm, which had a drainage vein (Figure 3). Therefore, aneurysm clipping and vascular malformation resection were performed. Neuro-electrophysiological monitoring revealed a decline in the left lower limb. The entire procedure lasted 6.5 h.

Because the patient did not wake up from anesthesia after 3 h, CT confirmed the first EDH of about 130 mL in the occipital (Figure 4A). Hematoma evacuation was performed. However, the second EDH after 22 h and the third EDH after 41 h developed in the left frontotemporal and the frontal regions (Figure 4B and C). Familial members consented to the second hematoma evacuation but refused the third.

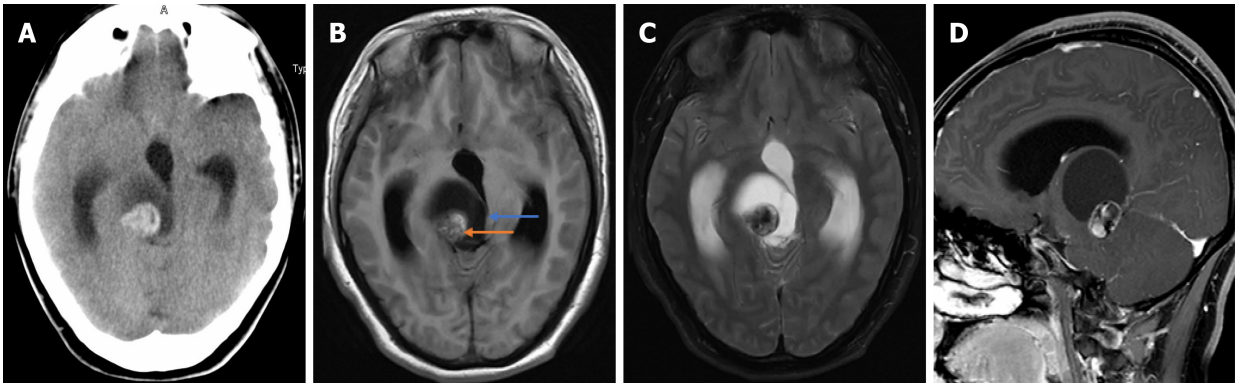

Figure 2 Computed tomography image and magnetic resonance imaging images of the mass before surgery. A: Computerized tomography image revealing a solid cystic mass in the right thalamus; B, C: T1 and T2 imaging showing heterogeneous signals and cystic and solid components; D: Inhomogeneous enhancement in the solid part was observed after administration of a contrast agent.

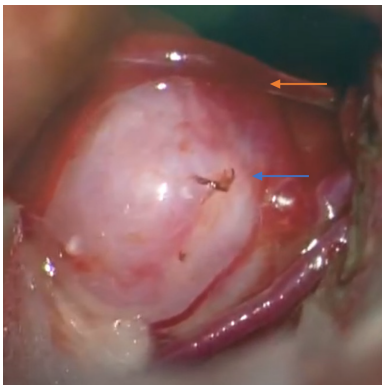

Figure 3 Intraoperative picture showing an aneurysm (blue arrow) and the draining vein (yellow arrow).

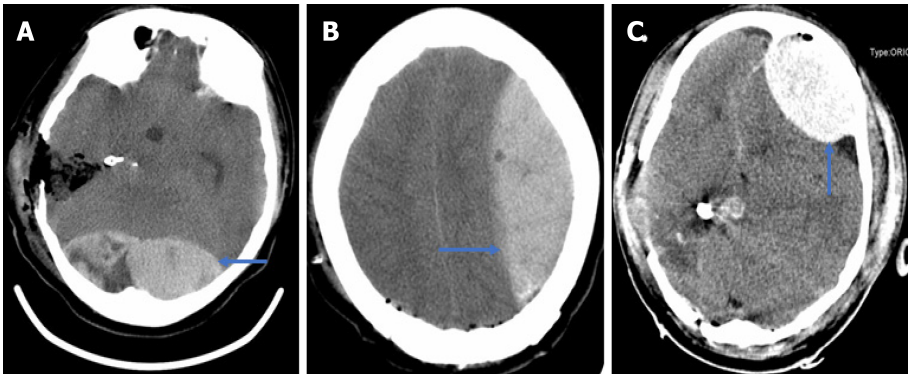

Figure 4 Three extradural hematomas in the occipital, the left frontotemporal, and the left frontal region, respectively (A-C).

OUTCOME AND FOLLOW-UP

The patient's family members refused further treatment and asked for discharging. The patient died.

DISCUSSION

Remote EDH is defined as EDH at a site away from the primary surgical site. Although EDH accounts for 20%[1] among remote site bleeding[3,4], only 12% required surgical intervention[2]. According to published articles, only three cases of multiple postoperative EDHs were reported. Wolfsberger *et al*[5] presented a patient with four EDHs in the supratentorial area after surgery for the fourth ventricular

choroid plexus papilloma. Lim *et al*[6] and Gaurav Tyagi *et al*[7] reported two EDHs in the supratentorial area after posterior fossa surgery. However, our patient had three remote EDHs in different locations, including supratentorial and infratentorial regions.

The drastic fluctuation of ICP is a trigger point of postoperative remote ICH[4,8,9]. The fluctuation may result from tumor resection and/or rapid release of cerebrospinal fluid (CSF) and sac fluid. Patients with ventricular drainage systems have a higher incidence of remote ICH than those without[10]. The fast decline of ICP results in negative pressure in a distant area. This fluctuation causes the rupture of blood vessels. With the increasing hematoma caused by vessel rupture, the dura and skull are separated. The phenomenon aggravates hematoma expansion. The above points are a vicious cycle. In our case, the lesion was in the thalamus and midbrain with a posterior cerebral artery. Angiographic assessment should be necessary but was not performed. Because the acute onset occurred and the lesion compressed the aqueduct, the patient had acute obstructive hydrocephalus. Those are special factors for the first occipital EDH.

The pins of a Mayfield head holder may be a reason[11], which may damage the transverse sinus. However, no evidence of fracture was found at the pin sites. Therefore, the cause was ruled out. Age may be a factor for the first EDH because the not-tight adhesion between the dura and skull is more frequent in young people[12,13]. Our patient was a 21-year-old woman. EDH may also result from jugular vein compression because of the extended neck position and intraoperative rotation[14,15]. The patient was positioned in a supine gesture with the head rotation about 65 degrees during surgery, which could lead to obstruction of cerebral venous return.

Coagulopathy is a possible explanation. Our patient had a normal coagulation function before surgery. For the second EDH, consumptive coagulopathy after tumor resection and first EDH might disturb coagulation. The disturbance presented increasing prothrombin time, activated partial thromboplastin time, and international normalized ratio and decreasing fibrinogen, combining with drastically declining platelets. The volume of the first EDH was 130 mL. After the first EDH hematoma evacuation, changes in ICP between the supratentorial and infratentorial regions led to the second left supratentorial EDH. The third EDH could also be attributed to those hypotheses. Thrombocytopenia may play an important role in the third bleeding. Platelet counts in our patients decreased drastically, although the patient was infused with platelets. Unfortunately, a thromboelastogram test was not performed. Decreased factor XIII activity and factor X deficiency may result in EDH[16-18], but the patient and her family did not have this medical history.

We noticed that no definitive source of ooze could be identified during the two hematoma evacuations. There was no visible bleeding on the edge of the dura mater. In the first EDH, the pupil change was noted in time. CT confirmed the EDH. In the third and second EDH, the assessment of CT scan was also a matter of time. Accordingly, early computed tomography scanning of the brain after surgery should be highlighted. Postoperative pupil changes and not waking up from anesthesia are indications for early CT scanning.

CONCLUSION

Although multiple remote EDH is an uncommon complication, attention should be paid to it. Understanding the mechanism of the complication, sufficient preparation and evaluation before an operation, and meticulous operation during surgery are the keys to preventing postoperative EDH, especially for acute onset. Intraoperative administration of ICP should be meticulous. It is important to monitor the ICP and nerve function after the operation. When the pupil change and the patient cannot recover from anesthesia in time, early CT scanning of the brain should be a priority.

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FOOTNOTES

Author contributions: You C and Tao CY were the patient's neurosurgeons, reviewed the literature, and were responsible for the revision of the manuscript; He Q and Fu RH contributed to manuscript drafting and data collection; all authors issued final approval for the version to be submitted.

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