Case Report

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Intraoperative development of contralateral extradural hematoma during evacuation of traumatic acute subdural hematoma: A rare cause of malignant brain bulge during surgery

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Abstract: Intraoperative development of epidural hematoma (EDH) is an unusual happening. We report a 36-year-old female who developed severe brain bulge while she was being operated for a traumatic left fronto-temporal acute subdural hematoma. Immediate post-operative CT scan revealed a massive contralateral EDH, which was subsequently evacuated. When a craniotomy is performed for a traumatic hematoma, intraoperative severe brain swelling should alert the surgeon about possibility of contralateral EDH formation especially if there is contralateral skull fracture.

Keywords : brain swelling, extradural hematoma, head injury, skull fracture, traumatic subdural hematoma

INTRODUCTION

Though delayed formation of extradural hematoma (EDH) on the contralateral side is a known entity [1,2,3,4], intraoperative development of EDH on the contralateral side is of uncommon occurrence[5,6]. We report a young female who developed a contralateral EDH during the removal of a traumatic acute subdural hematoma.

CASE REPORT

A 36-year-old female had a road traffic accident and immediately became comatose. When admitted an hour after the injury, she was decerebrating, with bilateral non-reacting pupils of 4 mm size and had right-sided hemiparesis. Plain CT of head done after endotracheal intubation revealed a left fronto-temporal acute subdural hematoma (SDH), and linear fracture of right temporal squama. Maximum thickness of SDH was one centimeter (cm) with underlying fronto-temporal contusion (Figure 1), midline shift measuring 15 mm and effacement of all basal cisterns. She was immediately taken up for surgery, and left fronto-temporal craniotomy was performed. Dural opening revealed a very tense brain. The SDH was evacuated but the brain started bulging immediately after its evacuation, asnd soon came about four cm above the craniotomy margin. Hence, a decompressive temporal lobectomy was carried out followed by a large duroplasty. Bone flap was replaced. CT head in the immediate postoperative period revealed a huge contralateral acute extradural hematoma in the fronto-temporo-patietal region, with gross midline shift to the left at the site of previously observed temporal bone fracture(Figure 2). The hematoma was immediately evacuated by trephine craniotomy. There was no apparent underlying active bleeding at the time of evacuation. Following evacuation the brain became lax.

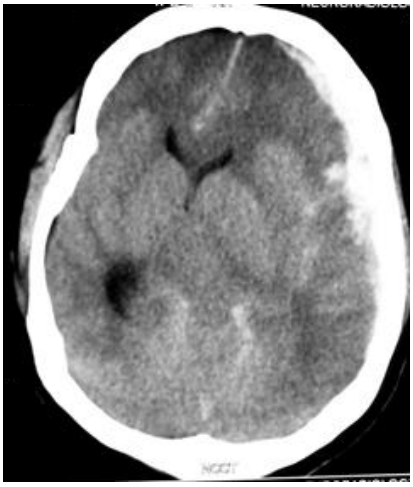

FIGURE 1: Non-contrast CT scan of head showing left fronto-temporal acute subdural hematoma with midline shift, and fracture of right temporal.

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Dural was hitched and bone flap was anchored back. Patient however remained comatose in the post-operative period and expired 12 hours later.

FIGURE 2 : Non-contrast CT of head showing a large right acute extradural hematoma in the temporo-patietal region with gross midline shift

DISCUSSION

"Intraoperative hematoma" is defined as a hematoma, not present on initial CT scan, but one that develops on the contralateral side during the process of evacuation of an acute traumatic hematoma[5]. It manifests most dramatically by severe brain swelling during or following the craniotomy after the dura is opened. Development of contralateral hematoma is one of the causes of post-operative deterioration or non-recovery of patients following surgery for traumatic intracranial hematoma, especially if osmotic dehydration, hyperventilation, CSF otorrhea /rhinorrhea, hypovolemia or surgical decompression have been associated, alone or in combination, after the trauma[1,2,3]. There should be a high degree of suspicion in such a patient, and post-operative CT head must be obtained without any delay to rule out this possibility. In contrast, "delayed epidural hematoma" is any EDH developing after an initial CT scan had revealed no hematoma[1]. However, delayed EDH can develop at any time after the initial CT scan, especially if the initial CT scan is done early (within first few hours following injury). Intraoperative EDH, in contrast, develops primarily due to rapid loss of tamponade effect on dura and skull during a craniotomy and manifests most dramatically as severe brain shift during or soon after the craniotomy[5].

Causes of massive intraoperative brain bulge include acute cerebral vascular engorgement due to loss of cerebral vasomotor tone, expansion of other contusions in the same or opposite hemisphere and acute contralateral extradural hematoma[7]. If brain continues to be tense inspite of osmotic diuretics and induced hyperventilation, wound should be closed after attaining hemostasis (without replacing the bone flap) and immediate CT scan should be undertaken to rule out clots elsewhere. The decision whether to make exploratory contralateral burr holes or whether to obtain a CT scan first, can be difficult. If the swelling is massive and sudden and there is evidence of contralateral skull fracture, exploratory burr holes should be undertaken[5,6]. The usual source of hemorrhage in the delayed and intraoperative EDH is skull fracture & stripped dura or venous sinus injury, rather than a torn middle meningeal artery[2,5].

CONCLUSION

A high degree of suspicion should be kept for contralateral extradural hematoma if during surgery there is massive brain bulge in a trauma patient. We would advice exploratory burr holes especially if a fracture is demonstrated on the preoperative CT scan on contralateral side. This would save some invaluable time, which may help in changing the outcome in some of the patients.

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