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Acute synchronous bilateral extradural hematoma, a scarcely reported, rare entity. Analysis of cases with review of literature

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ABSTRACT

Objective: Extradural hematomas (EDHs) are contact injuries resulting from blunt trauma to the skull. It may be unilateral or bilateral. Bilateral acute extradural hematoma (EDH) was rarely reported before the advent of computed tomography. Mortality rates vary from 10.0%-40.0% and are an index of alertness and efficiency of health care and hospital set-up. EDH is an injury with preventable mortality in most cases. Bilateral acute extradural hematomas no longer confer high mortality of pre-CT era because of early diagnosis on CT, and prompt neurosurgical intervention. We present our experience with Bilateral EDH cases with an aim to investigate clinical, GCS score, and radiological features and also to analyse outcomes in these patients.

Material and methods: We analyzed cases of EDH who presented at our centre from January 2023 to December 2023 and further investigated ten cases of bilateral EDH. All the patients were examined clinically and a plain computerized tomography scan of the head was performed. The clinical details of all patients, GCS at admission and discharge, radiological findings on CT and neurosurgical intervention performed, and GOS (Glasgow outcome score) were noted.

Results: Road traffic accident was the reason for traumatic brain injury in all the cases. The GCS at admission was between 13–15 in 2 patients, 8–12 in 6 and 3–7 in 2 patients. Bilateral EDH was found in all of our patients .9 out of 10 cases were males. On CT head underlying fracture was seen in all cases. The localization of epidural hematomas in CT scans was bifrontal in four of the cases. All cases were treated with surgical management. The GOS Score was 5 in eight of the patients.

Conclusion: Posttraumatic bilateral acute extradural hematoma is a rare entity, but now does not show the high mortality previously seen in the preCT era. This is due to early radiological diagnosis on CT and profuse monitoring combined with expeditious operative procedures.

Keywords
bilateral acute extradural hematoma, post traumatic, synchronous, rare entity, outcome analysis

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INTRODUCTION

Extradural hematomas (EDHs) are caused due to contact injuries as a complication of blunt trauma to the skull. Extradural hematoma is identified by blood collected between the skull and the duramater. Usually, the bleeding is unilateral and originates from the middle meningeal artery. It may be unilateral or bilateral in location. [14]

Bilateral extradural hematoma (BEDH) is a rare entity accounting for less than 5 % of all acute extradural hematomas in adults but is extremely rare in children [5,13]. It was described by Watson et al in 1884 and was also reported in 1884 by Roy GC [15,17]. BEDH is commonly seen in the supratentorial region although some authors have reported the infratentorial location in few studies. [2,7]. Linear skull fractures are commonly associated with EDH in 61-95% of cases. In over 50% of all patients, the middle meningeal artery gives rise to the hematoma [13].

However, EDH is a major source of preventable mortality. The non-contrast head CT (Computed Tomography) Scan is the gold standard diagnostic investigation done for EDH cases. The size of the extradural hematoma, the patient's low Glasgow coma scale (GCS) score at presentation and deterioration in the neurological status are all indicators to proceed with the evacuation of hematoma. The outcome of BEDH remains quite variable and is dependent on many factors including, the initial neurological state at admission [1,2]. Hematomas present within the cranium may lead to life-threatening complications. Following traumatic head injury, the accumulated blood leads to increased intracranial pressure, which damages the brain and can lead to permanent vegetative state or death.

However, if there is uncertainty about the origin of the bleeding, other imaging modalities such as brain MRI and MRV can be done further to rule out any injury or occlusion of the superior sagittal sinus [9]. CTV can be used in acute sitting instead of time-consuming MRV. Along with finding the location of the hematoma, CT imaging also helps in detecting midline shift, skull bone fracture, basal cistern obliteration, and volume and type of hematomas which decides the further management.

High mortality rates (42-100%) have been reported in previously reported cases of BEDH. However with the widespread use of CT scan, early diagnosis has led to improved surgical results and prognosis. Bilateral acute extradural hematomas no longer show very high mortality in patients which was seen in the pre-CT era because of timely diagnosis, and rapid neurosurgical intervention. However, if the patient presented with a good level of consciousness and remains stable or improves, then it is up to the neurosurgeon to weigh the risks against the benefits of a surgical over conservative treatment [1]. Not much literature is available on traumatic bilateral intracranial hematomas possibly owing to resources like CT imaging being limited in many parts of our developing country. We present our experience with ten cases of bilateral EDH diagnosed on CT Scan along with analysis of clinical features, radiological findings and their outcome.

Materials and methods

We present ten patients of bilateral EDH who were admitted to our tertiary care centre from January 2023 to December 2023. All the cases were examined clinically and GCS (Glasgow Coma Score) at admission was noted. Plain computerized tomography (CT) scan of the head was performed in all the ten cases. We noted the age and gender, mode of injury, site of hematomas, GCS at presentation and discharge, treatment and their outcome in these bilateral traumatic head injury cases. The patients were evaluated by the Glasgow Outcome Score (GOS) after 6 months.

Results

Ten patients were admitted to the emergency at our tertiary care centre who presented with injury due to road traffic accidents in all the patients. Nine out of ten patients were males. Four patients presented with altered sensorium, headache and vomiting. The GCS at admission was between 13–15 in 2 patients, 8–12 in 6 and 3–7 in 2 patients. (Table 1) CT was done in all the patients. Bilateral EDH was diagnosed on CT in all of our patients. On CT head, underlying fracture was also seen in all cases. The localization of epidural hematomas in CT scan were bifrontal in four cases (Figure 2,6,8,9), bitemporal in one case (Figure 4), frontal and parietotemporal in one case(Figure1), frontoparietal and parietal in one case(Figure 5), parietotemporal on both sides in one case (Figure7), parietotemporal and parietal in one case (Figure 3) and bilateral occipital in one case (Figure 10). The size of the hematomas (thickness) ranged between 1.9 to 3.6 cm in all the cases. All cases were treated with surgical management. The GCS at discharge was between 13–15 in nine patients, 8–12 in one patient. GOS Score was 5 in eight of the patients. (Table 1)

Table 1. Clinical and radiological (CT) features, GCS and Outcome of patients

S. no	AGE	GENDER	GCS (admission)	HEMATOMA (RIGHT)	HEMATOMA (LEFT)	TREATMENT	GCS (Discharge)	GOS
1.	13 yr	Male	15	Frontal	Parietotemporal	Surgery	15	5
2.	55 yr	Female	7	Frontal	Frontal	Surgery	14	4
3.	46 yr	Male	5	Parietotemporal	Parietal	Surgery	10	4
4.	35 yr	Male	10	Temporal	Temporal	Surgery	15	5
5.	26 yr	Male	11	Frontoparietal	Parietal	Surgery	15	5
6.	22 yr	Male	15	Frontal	Frontal	Surgery	15	5
7	22 yr	Male	10	Parietotemporal	Parietotemporal	Surgery	14	5
8	21 yr	Male	9	Frontal	Frontal	Surgery	15	5
9	14 yr	Male	10	Frontal	Frontal	Surgery	15	5
10	21yr	Male	9	Occipital	Occipital	Surgery	15	5

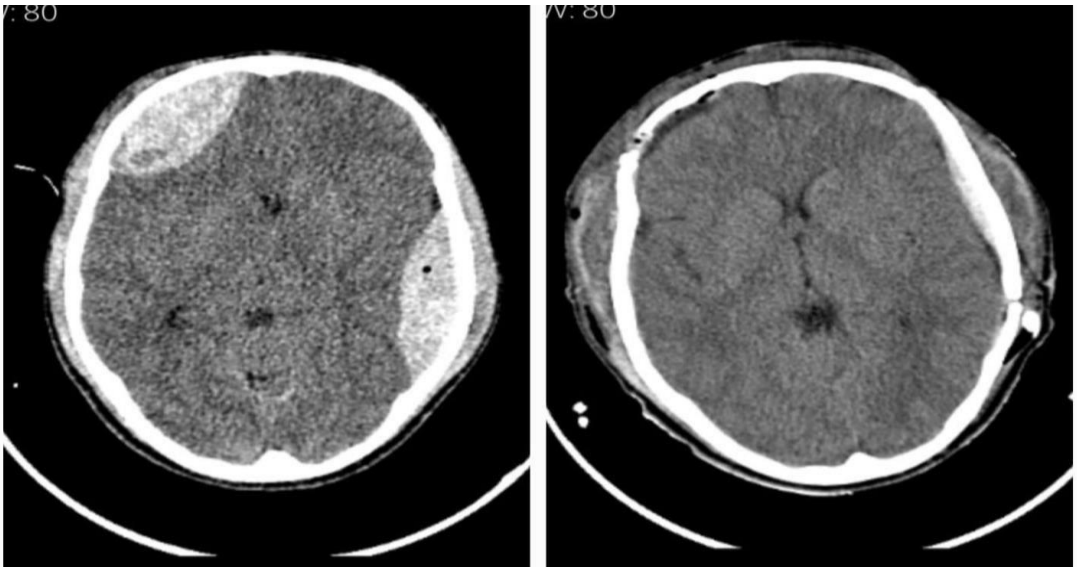

Figure 1. Axial CT Brain shows Frontal and Parietotemporal hematoma.

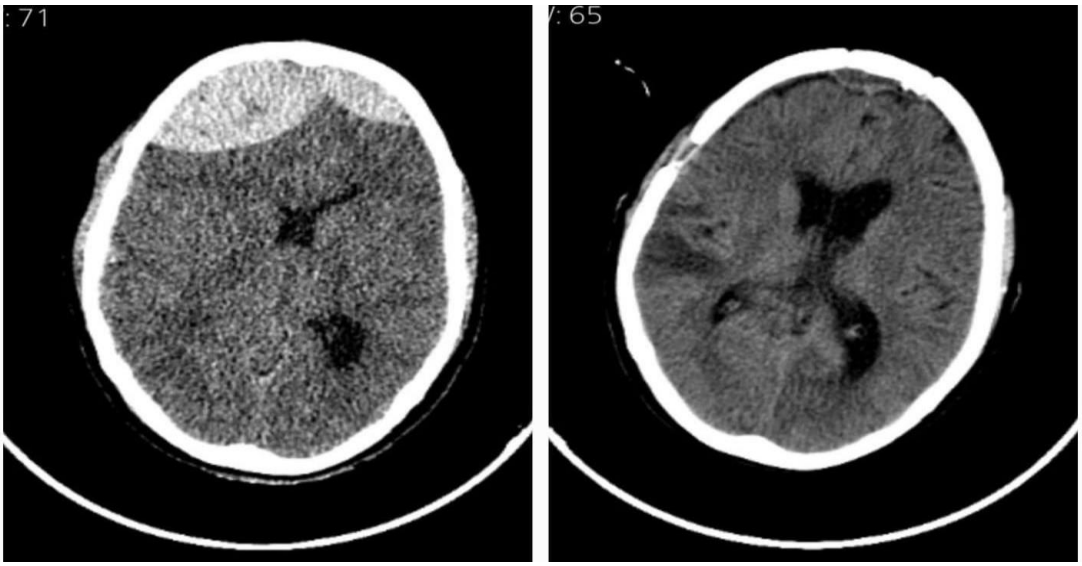

Figure 2. Axial CT Brain shows Bifrontal hematoma.

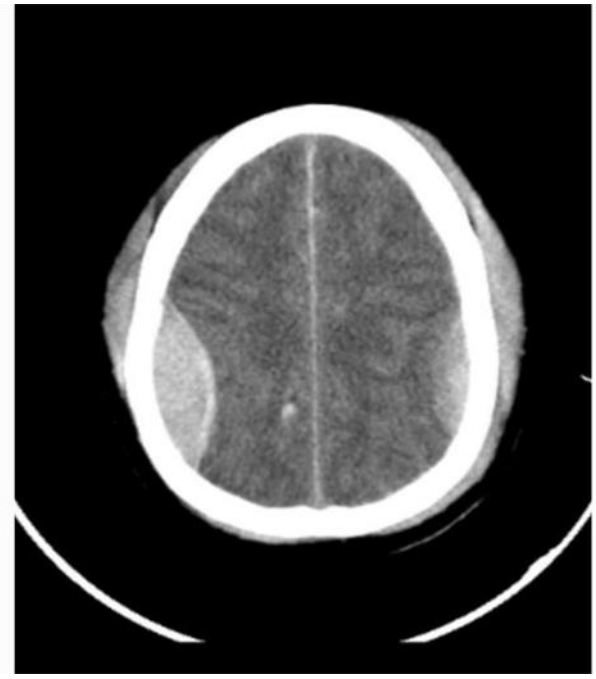

Figure 3. Axial CT Brain shows Parietotemporal and Parietal hematoma.

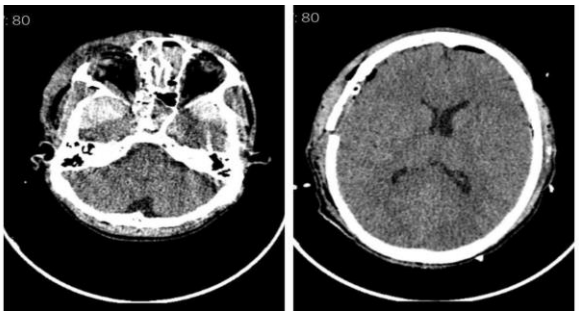

Figure 4. Axial CT Brain shows Bitemporal hematoma.

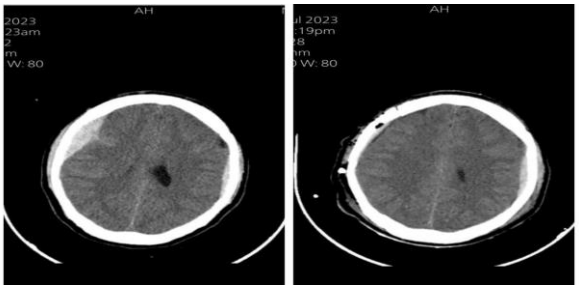

Figure 5. Axial CT Brain shows Frontoparietal and Parietal hematoma.

Discussion

Epidural hematomas are one of the most common complications of closed head injuries. Yet, they rarely show bilateral localization.

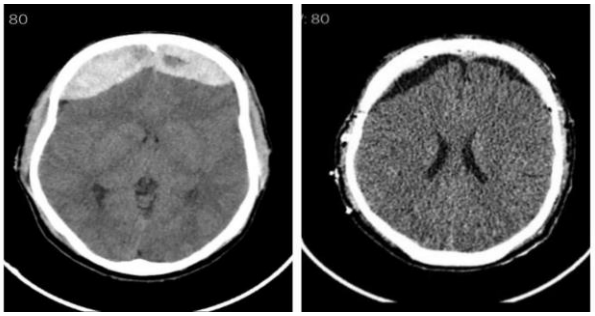

Figure 6. Axial CT Brain shows Bifrontal hematoma.

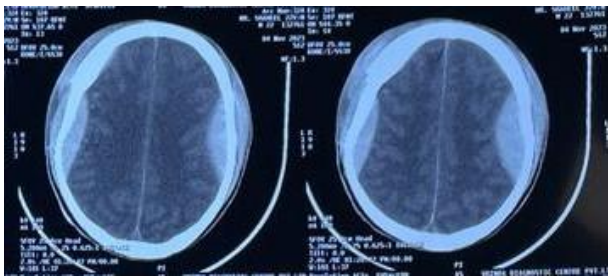

Figure 7. Axial CT Brain shows Bi-Parietotemporal hematoma.

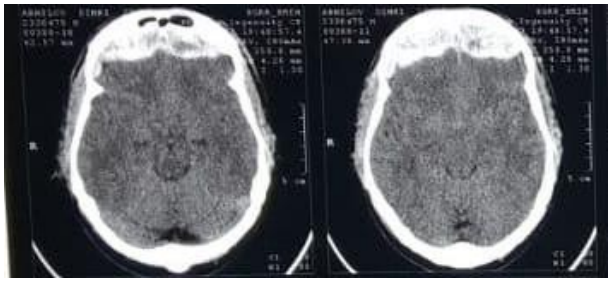

Figure 8. Axial CT Brain shows Bifrontal hematoma.

After an immense review of the literature in the last 20 years, we found fewer studies describing bilateral extradural hematoma. The reported literature has approximately 18 patients with GCS scores of 13–15, 25 patients with GCS between 8 and 12, and the majority 28 with GCS from 3 to 7. More number of male cases have been reported in other similar studies probably due to their work hazards. [1,3,4,6,8,9,10,11,12,16] Similarly our study shows six patients with GCS between 8 and 12 ,two patients with GCS of 13-15 and GCS 3–7 in 2 patients.. Our study also shows predominance of male patients owing to more travelling due to work.

Majority of the studies showed presence of fracture on CT similar to the presence of fracture on CT in all our cases. Bilateral extradural hematoma can be divided into two categories according to the time of bleeding, but most of the cases occur

synchronously similar to our cases. The other type is sequential extradural hematoma wherein delayed hematoma is seen by postoperative CT scan on the contralateral side after the evacuation of the prior hematoma – similar case was reported by Fricia M et al. [6] In our study, all the patients developed synchronous bilateral EDH similar to findings in previous studies. [1,3,4,6,8,9,10,11,12,16]

Figure 9. Axial CT Brain shows Bifrontal hematoma.

Figure 10. Axial CT Brain shows Bioccipital hematoma.

All the studies showed that most of the cases of bilateral extradural hematoma were managed surgically with use of various surgical techniques at different centers. However, only two cases were treated conservatively [8,9]. Early surgical evacuation of bilateral extradural hematoma revealed favorable postoperative outcomes and GOS of 5 [1,9,10]. Many of the studies show GOS score of 5 in majority of patients similar to the good outcome in our patients. [1,3,4,6,8,9,10,11,12,16]

In developing country like ours, with limited resources, poor patient economic status, and time delay in reaching to the nearest medical centre, managing such cases of bilateral hematomas is a bigger challenge as prompt neurosurgical intervention is required. Taking care of various obstacles in developing countries and widespread use of CT scan, it is possible to reduce the mortality and therefore we may be able to minimize the postoperative neurological deficit which is hindrance to the patient's whole life.

Conclusions

Bilateral extradural hematomas are extremely rare but may lead to serious complications. The gold standard for diagnosis for these cases is CT Scan. With the widespread avai;ability of CT scan in developing countries, diagnosis before deterioration of the neurological status usually has an impact over the results of surgery, prognosis and even confers the possibility of a conservative treatment. Management of these cases includes careful planning, judicious surgical approach, and timely management for good results. Prompt surgical evacuation leads to good postoperative outcomes despite the surgical risks. In summary, Post traumatic bilateral acute extradural hematoma is a rare entity, but now do not show the high mortality previously seen in the pre CT era in developing countries. This is due to radiological diagnosis on CT and profuse monitoring combined with expeditious operative decompression procedures.

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