

Original Article**Asymptomatic Extradural Hematoma-Our Observation In DMCH**Das S¹, Ghosh D², Sarkar AC³, Khan SI⁴

Conflict of interest: There is no conflict of interest relevant to this paper to disclose.

Funding Agency : was not funded by any institute or any group.

Contribution of Authors: Principal Investigator and Manuscript preparation- Data collection- Scalp block with anaesthesia- Editorial formatting-

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Received: 22.01.20

Accepted: 26.03.20

Abstract:

Background: Surgical management of extradural hematoma is evacuation of extradural hematoma until otherwise. But, a number of authors have suggested that small epidural hematoma may be managed conservatively with normal outcome in selected cases. The goal of this study was to define the clinical and radiological parameters that may help in the management of the patient with small epidural hematoma where the hematoma was asymptomatic.

Objective: This study was conducted to find out the factors influencing the decision making in the management of asymptomatic extradural hematoma though they have no evidence of raised intracranial pressure or any focal neurological deficit.

Methods: Three hundred patients were evaluated clinically and by CT scan of head to see of hematoma, location of hematoma, midline shifting and overlying skull fractures etc.

Results: All 300 patients were diagnosed within 72 hours of trauma and were tired to be managed expectantly but was not possible sometimes. All these patients were analyzed on the basis of time since trauma, GCS score, overlying skull fracture traversing any artery, vein or any venous sinuses. Among 300 patients 225 (75%) patients underwent CT scan of head within 24 hours of trauma and 185 (61.67 %) patients had overlying skull fracture. 51 (17%) deteriorated later on and 31 (10.33%) patients among them required surgical evacuation of hematoma.

Conclusion: It can be concluded that patients with small epidural hematoma with a fracture overlying major vessels or major sinuses, diagnosed within 24 hours of trauma are at risk of subsequent deterioration and may require surgical evacuation.

Key words: Asymptomatic, Extradural, Hematoma, EDH, Fracture

Bang. J Neurosurgery 2020; 10(1): 20-26

Introduction:

Extradural hematomas (EDHs) frequently present with rapid neurological deterioration that requires urgent surgical evacuation when indicated, to prevent poor neurological outcome or death. Glasgow Coma Scale score on admission is one of the most important predictors of eventual prognosis in majority of patients. Munro and Maltby⁴⁰ stated that a favorable outcome could be ensured only if an EDH was evacuated before the onset of brain dysfunction and herniation. Several authors have reported conservative treatment of small sized hematomas with a good outcome.

However, the experimental work of Ford and McLaurin²³ indicates that an EDH achieves nearly full size within a very brief period within 3 hours not usually beyond 6 hours and rarely beyond 24 hours after the injury⁴², which suggests that these lesions do not grow over a period of many hours following the initial injury. The authors emphasized that subsequent neurological decline may be secondary to cerebral edema, hypoxia or impaired cerebrospinal fluid drainage.

A small EDH is called asymptomatic if there is no clinical evidence of raised intracranial pressure and

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no evidence of focal neurological signs by the mass effect from that EDH42.

Materials and Methods:

A series of 300 small extradural hematomas being admitted after a minor head injury where the surgical point of view was insignificant, were observed in the neurosurgical units of Dhaka Medical College and Hospital, Bangladesh from January 1, 2015 to December 31, 2019.

Our study included patients presented with a GCS 34 score of 14 or 15 showing no neurological deficits. Cases with minor associated cerebral lesions like subdural hematoma, brain contusions were also included, but only if the EDH was small and producing no neurological deficit to the patient. We evaluated the patients clinically with GCS and other symptoms like headache, vomiting, altered consciousness, convulsion and also radiologically with CT scan of head by some parameters like site, thickness and volume of EDH, associated overlying skull fracture, time interval of CT scan from trauma.

Results:

Table 1 shows the results about the individual characteristics of the study population. There was no exclusion range for age of the patient. Result shows, males were more affected by the condition 202 (67.3%) and road traffic accident in 175 (58.3%), was the single most common cause for the head injury.

Other causes reported are fall from height in 75 (25%) cases, physical assault in 40 (13.3%) cases etc. All the patients were conscious and well oriented during admission. GCS 15 was found in 210 (70%) and GCS 14 in 90 (40%) of patients. All patients with GCS 14 had spontaneous eye opening

'E3' which may be due to either pain from primary impact or post traumatic psychological un- wellbeing. Some of these patients subsequently deteriorated clinically and/or radiologically who had concomitant other intracranial insults like contusion, subdural hematomas etc. Most of the patients presented with headache, 145 (48.3%). Other presentations were vomiting in 72 (24%) cases, drowsiness in 35 (11.67%)

Table-I
Characteristics of the Study Population (n=300)

Parameters	Sub group of Parameters	Number of Patients
Age	4.5 – 50 years	
Sex	Male	202 (67.3%)
	Female	98 (32.7%)
Cause of injury	RTA	175 (58.3%)
	Fall from height	75 (25%)
	Physical assault	40 (13.3%)
	Others	10 (3.3%)
GCS on admission	15	210 (70%)
	14	90 (40%)
Presentation at admission	Headache	145 (48.3%)
	Vomiting	72 (24%)
	Drowsiness	35 (11.67%)
	Cephalo-hematoma	45 (15%)
	Irritability	18 (6%)
Skull fracture	Present	185 (61.67%)
	Absent	115 (38.33%)
Site of impact	Frontal	60 (20%)
	Temporo-parietal	180 (60%)
	Occipital	30 (10%)
	Combined/Others	30 (10%)
Time from injury to diagnosis	<24 hours	225 (75%)
	24-48 hours	54 (18%)
	48-72 hours	21 (7%)

cases, cephalo-hematoma in 45 (15%) cases, irritability (in children) was 18 (6%). Skull fracture was revealed in CT scan of head in 185 (61.67%) cases. The site of primary impact was temporo-parietal in 180 (60%) cases and frontal in 60 (20%) cases. Most 225 (75%) patients were diagnosed before 24 hours of trauma. The rest were diagnosed between 24 to 72 hours from trauma.

Table 2 shows CT scan findings of study population. Most of the patients 264 (88%) had pure epidural hematoma (EDH) followed by EDH with contusion in 18 (06%) cases, EDH with subdural hematoma in 12 (04%) cases and EDH with subarachnoid hemorrhage in 06 (02%) cases. On the basis of localization on CT scan EDH was temporal in 130 (43.4%) cases followed by parietal 62 (20.6%), frontal 53 (17.6%), occipital 34 (11.4%) and in combination 21 (07%). On CT scan of brain maximum thickness of blood hematoma was

<10 mm in 117 (39%) patients and followed by 11-15 mm in 92 (30.6%) cases, 16-20 mm in 45 (15%) cases, 21-25 mm in 24 (08%) cases and >25 mm in 22 (7.3%) cases. No midline shifting was seen in CT scan in 274 (91.3%) patients, maximum

285 (95%) patients did not have ventricular effacement on CT scan of brain and normal condition of basal cisterns in 289 (96.3%) patients.

Table 3 shows Deterioration of patients and Intervention. Among 51 patients who deteriorated later, most of the patients 33 (11%) were admitted within 24 hours of trauma. Out of these 19 (6.33%) patients needed surgical evacuation of hematoma. Among all 300 patients, 291 (97%) got good recovery and most 266 (88.67%) of them were treated conservatively (Table 4). Among 51 deteriorated patients, 44 (14.67%) patients got good recovery and most of them 25 (8.33%) were treated by surgery (Table 5).

Table-II
CT scan Characteristics of Study Population (n=300)

Parameters	Sub group of parameters	Number of
Lesion/Associated lesions	Pure Epidural hematoma (EDH)	264 (88%)
	EDH with Subdural hematoma	12 (04%)
	EDH with Contusion	18 (06%)
	EDH with Subarachnoid hemorrhage	06 (02%)
Localization	Temporal	130 (43.4%)
	Parietal	62 (20.6%)
	Frontal	53 (17.6%)
	Occipital	34 (11.4%)
	Combination	21 (07%)
Maximum thickness(in mm)	< 10 mm	117 (39%)
	11-15 mm	92 (30.6%)
	16-20 mm	45 (15%)
	21-25 mm	24 (08%)
	>25 mm	22 (7.3%)
Midline shift (in mm)	No	274 (91.3%)
	Yes	26 (8.7%)
Ventricular effacement	Mild	15 (5%)
	No	285 (95%)
Condition of basal cistern	Normal	289 (96.3%)
	Compressed	11 (3.67%)

Table-III
Deterioration and Intervention of Study Population (n=51)

Timing of admission	No. of patients deteriorated	Conservative	Surgery
< 24 hours	33 (11%)	14 (4.67%)	19 (6.33%)
24-48 hours	11 (3.67%)	05 (1.67%)	06 (2%)
48-72 hours	07 (2.33%)	01 (0.33%)	06 (2%)
Total	51	20	31

Table-IV
Outcome: Study Population (n=300)

Parameter	Number of Patients	Surgery Group	Conservative Group
Good recovery without any sequelae	291 (97%)	25 (8.33%)	266 (88.67%)
Good recovery with minor sequelae	05 (1.67%)	04 (1.33%)	01 (0.33%)
Death	04 (1.33%)	02 (.67%)	02 (0.67%)
Total	300	31	269

Table-V
Outcome: Among Deteriorated Patients (51 patients):

Parameter	Number of patients	Surgery group	Conservative group
Good recovery without any sequelae	42 (14%)	25 (8.33%)	17 (5.67%)
Good recovery with minor sequelae	05 (1.67%)	04 (1.33%)	01 (0.33%)
Death	04 (1.33%)	02 (.67%)	02 (0.67%)
Total	51	31	20

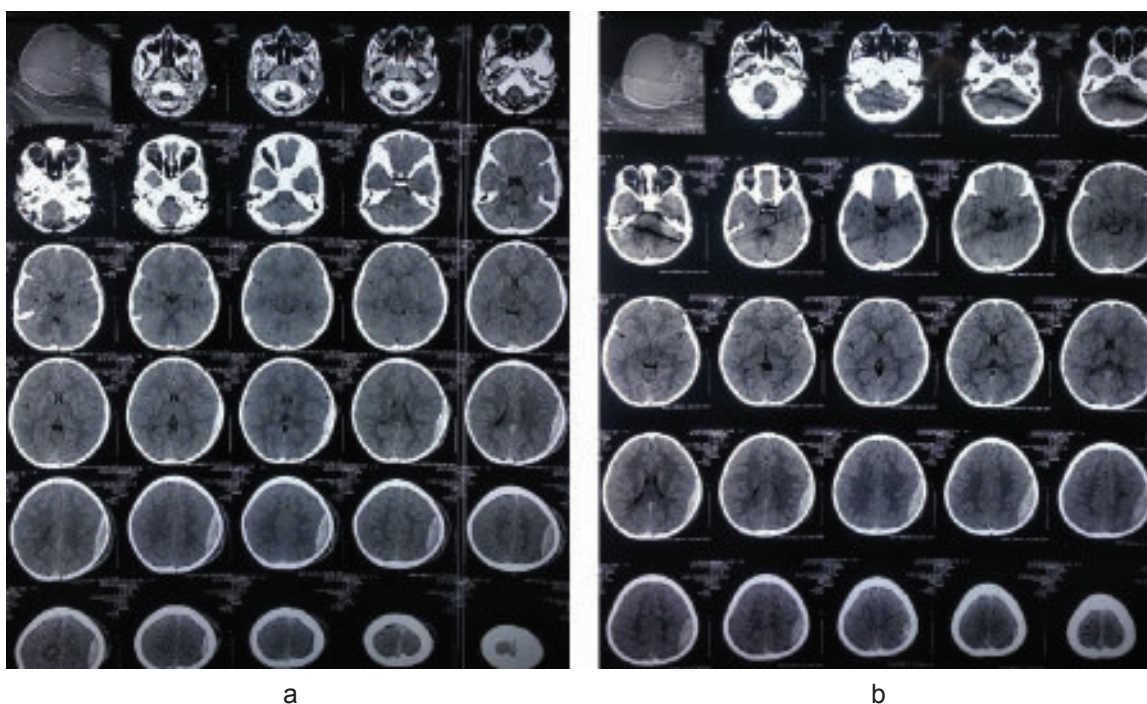


Fig.-1 (Patient 1): Hematoma did not increase in size. Patient was treated conservatively. (a) CT head on admission (b) CT head on 3rd post admission day.

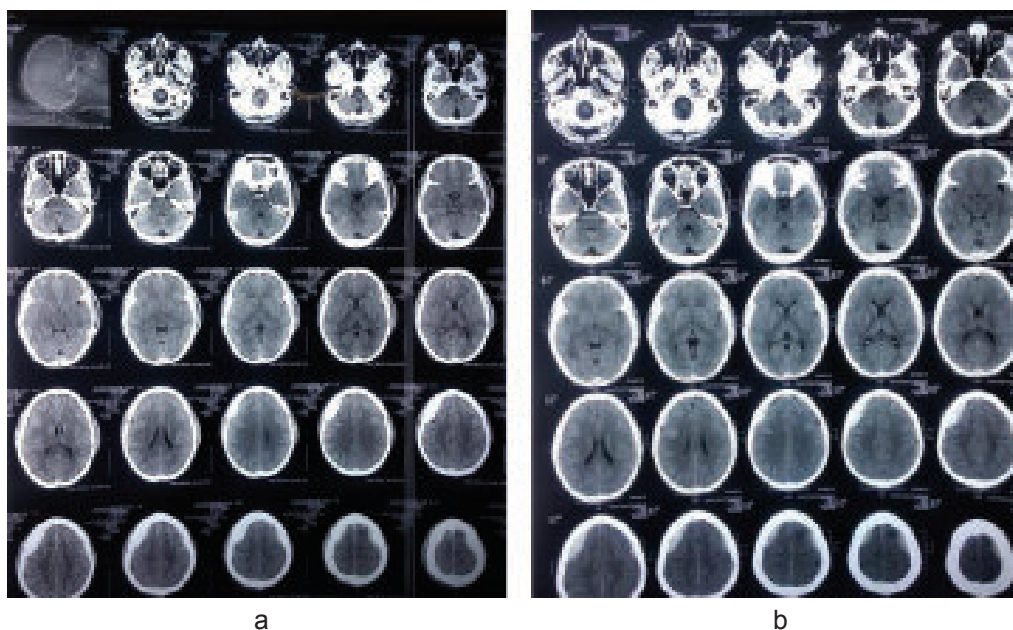


Fig.-2 (Patient 2): Hematoma increased in size but surgery was not required. Patient was treated conservatively. (a) CT head on admission, (b) CT head on 3rd post admission day.

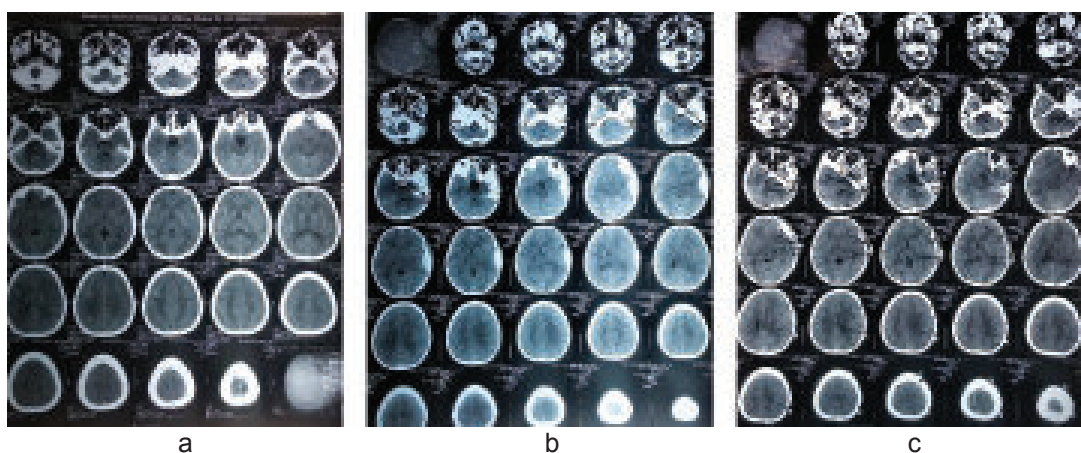


Fig.-3 (Patient 3): Hematoma increased in size and patient deteriorated clinically. Surgical evacuation was done. (a) CT head on admission (b) CT head on 3rd post admission day (c) CT head 2nd Post-operative day.

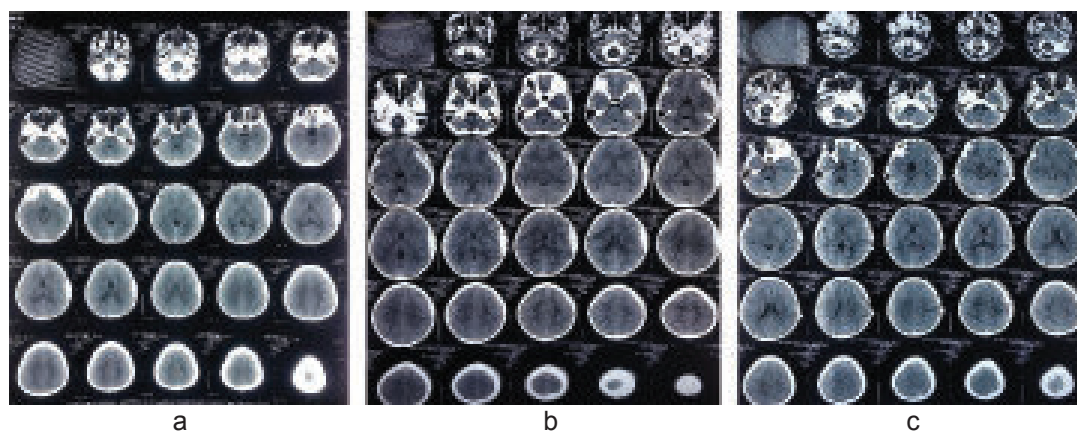


Fig.-4 (Patient 4): Hematoma increased in size and patient deteriorated clinically. Surgical evacuation was done. (a) CT head on admission (b) CT head on 4th post admission day (c) CT head 1st Post-operative day.

Discussion:

At first this possibility was attributed to a venous origin of the hematoma that would allow the brain to slowly adapt itself to its presence. Patients having admitting GCS 14-15 with EDH <1cm thickness without any midline shift on CT scan of head can be treated conservatively with excellent outcome in majority of cases⁴⁴. Later, McLaurin and Ford²³ suggested that the lack of clinical symptoms was not correlated to this venous origin. In fact, they believed that an extradural hematoma has nearly always an arterial origin and it reaches its definitive size within minutes or at the most within hours³. The clinical manifestation²⁰ is the result of the summation of several factors such as the size of the clot, its location and the individual brain tolerance to its presence. Pozzati¹⁵ suggested the possible interaction of the two factors (arterial and venous) provided the bleeding sources are of "low tension", while Iwakuma¹¹ thinks bleeding of arterial origin prevails in younger patients. The incidence of delayed extradural hematoma (DEDH) following an initially negative CT scan of head is reported in 10-30% cases⁴³.

Temporal and temporo-parietal localizations are present in >64% of our "asymptomatic" cases. This percentage is near to the incidence of temporal localizations in other series of extradural hematoma (in any clinical condition) reported in the CT era. As early as in 1980 Shields³³ speculated that some hematoma may undergo spontaneous re-absorption without surgical evacuation. More recently, several studies^{3,24,28,35,36} confirmed that a selected number of patients may be treated conservatively with success.

The mechanism of hematoma reabsorption was correlated with the formation of a fibrovascular neo-membrane functioning as an absorption structure. This process requires many days, with the fastest described as completed in 13 days²⁶, and may undergo periods of expansion between the fifth and the fifteenth day²⁴ but we observed the patients for 72 hours. The decision not to operate on hematoma having a maximum thickness of less than 10mm with a midline shift of less than 5 mm appears as safe in terms of the results obtained.

Temporal location of the hematoma (>43% in our series) does not allow large lesions to remain asymptomatic rather subsequently may enlarge in size and require surgery. We think that, facing the challenge of an early

diagnosis of asymptomatic extradural hematoma, it is necessary to follow the patients with serial clinical evaluation and CT scan of head (particularly on day 1, day 3 and sometimes on day 5) to see expansion of hematoma and/or clinical deterioration. In our series, skull fracture was present in the (61.67%) of patients in CT scan of head. Many of these patients may harbor an EDH underlying the fracture but that may deteriorate the patient as the fracture transmit intracranial pressure towards exterior. To conclude, our study seems to indicate that, extradural hematoma in patients with minor head injury are benign lesions that can be treated conservatively in a well-selected group of cases. Early diagnosis of this recognized disease and successful conservative management is possible in a large number of cases but will require close follow up to see whether there is expansion of hematoma size and/or clinical deterioration of patients especially in early period of the disease.

Conclusion: Small EDHs should not be always ignored and kept on the floor or corridor unattended. They also should not be overlooked in outpatient department or discharged immediately after admission. Rather they should have a close follow up clinically through GCS score, time since trauma and diagnosis and also radiologically through CT scan of head to see whether the hematoma is expanding or not. Considering all these, it is concluded that patients with small epidural hematoma

- Diagnosed within 24 hours of trauma
- With a fracture overlying major vessels or major sinuses may deteriorate subsequently and require surgical evacuation.

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