



RESEARCH ARTICLE

POST TRAUMATIC EXTRADURAL HAEMATOMA IN AN TWO MONTH OLD INFANT : RARE CASE REPORT WITH REVIEW OF LITERATURE

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Abstract

Traumatic brain injury is very common among children, but the incidence of acute EDH is relatively rare than adult population. Acute EDH in infants and children is a total different entity in terms of occurrence and presentation. Diagnosis of pediatric EDH is difficult due to few specific characteristics of pediatric population. Early diagnosis and prompt management leads to better neurological outcome.

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Introduction:-

Traumatic brain injury is a common cause of mortality and acquired neurological impairment in children.¹ The acute epidural hematoma (EDH) incidence in children is relatively uncommon, and represents only 2-3% of all head injuries, with even more rarer incidence in infants.²⁻⁵ It is basically due to tight adherence of the dura to the skull and folding of the skull which makes the incidence of EDH even more rarer.⁶ In neonates and infants, middle meningeal artery moves freely between the skull hence less susceptible to injury in comparison to adults, small venous sinuses bleeding is more important cause of bleeding in infants.⁷ Prerequisites for better outcomes are early diagnosis and management. Diagnosis of pediatric EDH is difficult due to few specific characteristics of pediatric population.⁸⁻⁹ Mortality rates in children including Infants vary among different studies which approximate to around 0-12%.¹⁰⁻¹⁴ Use of computed tomography (CT) as a standard diagnostic tool has led to accurate and early diagnosis of EDH. Advanced imaging has also altered the profile of patients and outcomes in all groups and also uncovered a group of patients having posttraumatic EDH who are asymptomatic and another group of patients with EDH which were detected at varying periods following the initial trauma and managed non-operatively.^{15,16}

There is lack of guidelines of pediatric EDH management. Criteria for using surgical evacuation versus conservative managements is also unclear, which further makes management of pediatric EDH more complicated.^{17,18,19} We are reporting here a rare case of acute epidural hematoma in an eight month old infant due to fall from bed, who was managed surgically.

Case presentation/ clinical presentation:

The patient is an 2 month old boy who accidentally fell from bed approximating a height of 2 feet on left side of his head. His immediate cry was noted by his mother, cry was followed by loss of consciousness. Patient was immediately taken to some hospital and then referred to our institution. As per patient's mother patient had brief period of loss of consciousness along with history of vomiting and no history of seizures, ear nose and oral bleed. On examination patient was opening eyes to pain, cries on pain, and moving all 4 limbs. His heart rate was 140/min and blood pressure was 90/60 and on general examination significant pallor was present. Pre operative CT head was suggestive of left temporo-parietal massive acute EDH with mass effect causing partial effacement of ipsilateral ventricle and slight midline shift towards right side along with fracture of left parietal bone and subgaleal hematoma in left parietal region (image-1). Blood investigation report was Hb- 5.8 gm/dl, packed cell volume, and coagulation

profile was normal. Patient was operated with left temporo-parietal craniotomy and suction and evacuation of acute EDH. Post operative period was uneventful with Post operative CT head showed a craniotomy defect in left temporo-parietal region, no midline shift, open basal cistern and normal ventricles (figure 2). Patient was discharged on post operative day 5 with satisfactory condition.

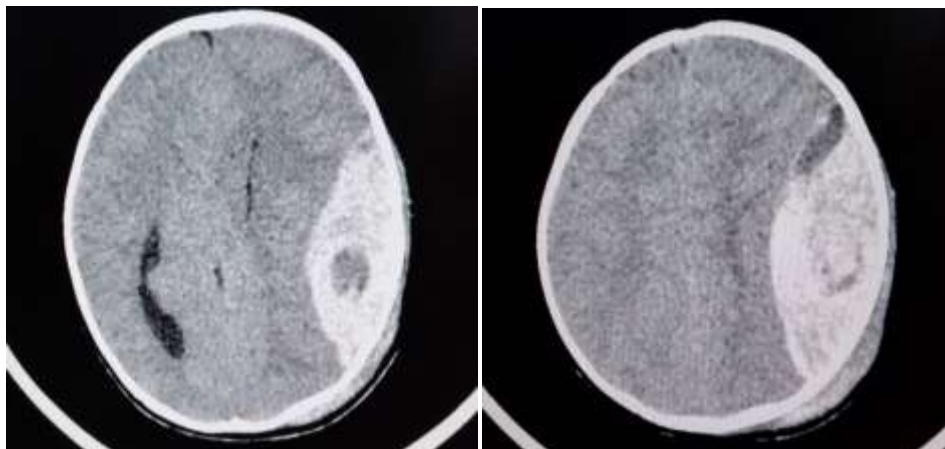


Figure 1:- Preoperative CT showing massive Left temporoparietal acute EDH with mass effect with compression of Left lateral ventricle with midline shift.

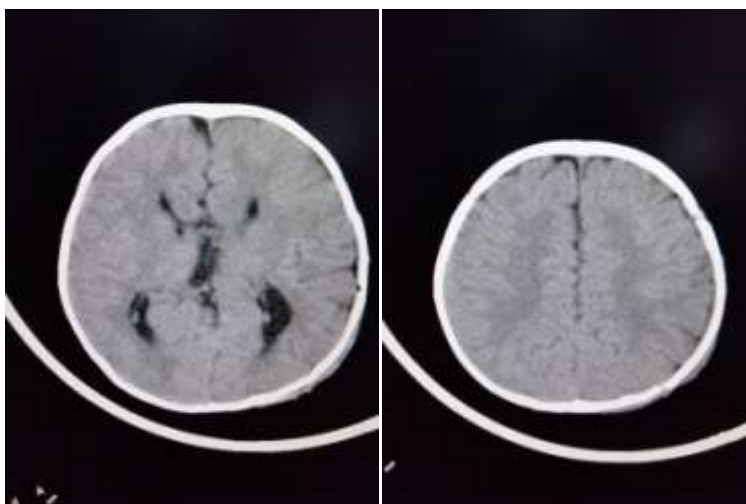


Figure 2:- Postoperative CT with complete evacuation of EDH with no midline shift with normal left lateral ventricle.

Discussion:-

Traumatic acute EDH is rare in children especially in infants and is a life threatening condition, it becomes a rare clinical entity in infants due to some nonspecific presentation and also due to presence of various factors like pliability of infant skull.²⁰⁻²⁴ In neonates and infants middle meningeal artery moves freely between the skull hence less susceptible to injury in comparison to adults, with small venous sinuses bleeding as more important cause of bleeding in infants.^{21,25,26} In infants the dura is strongly attached to the skull and therefore EDH is rare in these age group.¹⁸ In many previous studies, it has been stated that the most common cause of injury in infants is fall from height.^{11,13,27,28} Few authors however have also emphasized that even fall from a minor height can lead to acute EDH²⁹⁻³² but according to Beni-Adani et al¹¹ fall from more than 1 metre height carries worse prognosis.

The most common site of EDH in infants is parietal & temporoparietal area.³³ In many studies there is 4% increased risk of EDH in children with skull fractures.³⁴⁻³⁷ Although according to few studies association of EDH occurrence with skull fracture is rarely seen in infants because of the deformity and pliability of infant skull bone and skull fracture is also not detectable in conventional radiographic films because of thinness of skull bone.^{38,39}

Pallor and anemia is also considered as very important clinical sign of EDH in infants and children with no otherwise haemorrhagic site. Dhellemes p et al., Pasaoglu et al. reported 90% incidence of pallor and anemia in their study and Ciurea AV et al also found association of moderate pallor in patients.^{33,34} Presence of Subgaleal hematoma is also seen in acute EDH cases, and large subgaleal hematomas may also lead to anemia, hypotension and shock.^{33,40,41} Cephalhaematoma is also common with 66.6% occurrence in study by ciurea et al. Dhellemes et al³⁵ also stated that decrease in loss of consciousness and presence of hemiparesis are late signs and have no specificity in children.

The treatment of choice remains surgical excision with no specific criteria present. However chen et al stated that EDH with volume greater than 30 ml, with thickness greater than 15 mm, and a midline shift of more than 5 mm.⁴² For smaller lesions with no neurological compromise a conservative approach is preferred. The prognosis is better in younger children, and depends upon the clinical status of the patient with poor outcome in patients with higher TINS (Trauma infant neurological score) score, and low CCS (Children Coma Scale) presence of associated injury, prompt diagnosis and early management. The mortality has decreased significantly in post CT era mostly related to early diagnosis and prompt management. The mortality in infants ranges from 6-12% with Beni-Adani et al., Rocchi et al., Ersahin et al. and Pasaoglu 12% reported 6.6%, 5.5%, 6%, 12% mortality in their series respectively.^{11,14,20,29}

Conclusion:-

Acute EDH in infants and children is a total different entity in terms of occurrence and presentation. It is very rare in infants with incidence rate of approx 2%. They present nonspecifically with low haemoglobin, increasing pallor, bradycardia, loss of consciousness and even seizure. In this era of CT scan the diagnosis and management has become early and prompt resulting in improved prognosis. It is a neurosurgical emergency and needs urgent intervention. With neural compression, midline shift of more than 5 mm, volume greater than 30 cc needs urgent surgical management to obtain a good outcome. Despite extensive studies a mortality rate of approx 4-12% is attributed to these injuries.

References:-

1. Parslow RC, Morris KP, Tasker RC. Epidemiology of traumatic brain injury in children receiving intensive care in the UK. *Arch dis child* 2005;90:1182-7.
2. Choux M, Griesli G, Peragut JC. Extradural hematoma in children child's brain 1974;1:337-347.
3. Gallagher JP, Browder EJ 1968. Extradural hematoma experience with 167 patients. *J neurosurg* 1968;29:1-12.
4. Mazza C, Pasqualin A, Feriotti G, Da Pian R. Traumatic extradural haematoma in children: experience with 62 cases. *Acta Neurochir* 1982;65:67-80.
5. Pillay R, Peter JC 1995. Extradural hematoma in children. *S Afr Med J* 1995;85:672-4.
6. Vincon M, Pierrat V, Tchofo PJ, Soto- Ares G, Dhellemmesp. Traumatic intracranial haemorrhage in newborns. *Child's Nervous System* 2005; 21(12): 1042- 1048).
7. Hamlar A, Heckly A, And M, et al. Pathophysiology of intracranial epidural hematoma following birth. *Medical hypotheses* 2006;66:371-374).
8. Duhaime AC, Alario AJ, Lewander WJ, Schut L, Sutton LN, Seidl TS, et al. Head injury in very young children: mechanisms, injury types, and ophthalmologic findings in 100 hospitalized patients younger than 2 years of age. *Pediatrics* 1992;90:179-85.)
9. Ben Abraham R, Lahat E, Sheinman G, Feldman Z, Barzilai A, Harel R, et al. Metabolic and clinical markers of prognosis in the era of CT imaging in children with acute epidural hematomas. *Pediatr Neurosurg* 2000;33:70-5) %.
10. Ammirati M, Tomita T. Epidural hematomas in infancy and childhood. *J Pediatr Neurosci*. 1985;12:123-128.
11. Beni – Adani L, Flores I, Spektor S, Umansky F, Constantini S. Epidural hematoma in infants; a different entity? *J Trauma* 1999;46:306-311),
12. Maggi, Aliberti F, Petrone G, Ruggiero C. Extradural hematomas in children. *J Neurosurgical Sci* 1998;42:95-9),
13. Brown GJ, Lam LT. Isolated extradural hematoma in children presenting to an emergency department in Australia. *Pediatr Emerg Care* 2002;18:86-90),
14. Rocchi G, Caroli E, Raco A, Salvati M, Delfini R. Traumatic epidural hematoma in children. *J Child Neurol* 2005;20:569-72).

15. Knuckey N, Gelbard S, Epstein M: The management of 'asymptomatic' epidural hematomas. A prospective study. *J Neurosurg* 1989;70:392- 396.),
16. Png D, Horton J, Herron J, et al: Nonsurgical management of extradural hematomas in children. *J Neurosurg* 1983;59:958 – 971.)
17. Gutierrez FA, Mc Lone Dg, Raimondi AJ(1981) Epidural hematomas in infancy and childhood.In: American Society for Pediatric Neurosurgery (ed) Concepts in pediatric neurosurgery. Karger, Basel, Switzerland, pp.188-201.)
18. Jamous MA, Abdel Aziz H,Al Kaisy F, Eloqayli H, Azab M, Al – Jarrah M. Conservative management of acute epidural hematoma in pediatric age group. *Pediatr Neurosurg* 2009;45:181-4),
19. Baker SP, O'Neill B, Haddon Jr W, Long WB, The injury severity score: a method for describing patients with multiple injuries and evaluating emergency care. *J Trauma* 1974;14:187-96).
20. Erashin Y, Mutluer S,Guzelbag E. Extradural hematoma: Analysis of 146 cases. *Childs Nerv Syst.*1993;9:96-9.),
21. Cardobes F, Lobato RD, Rivas JJ, Munoz MJ, Chillon D, Portillo JM,et al. Observation on 82 patients with extradural hematoma. *J Neurosurg.* 1981;54:179-86.)
22. Vincon M,Pierrat V , Tchofo PJ, Soto- Ares G, Dhellemmesp. Traumatic intracranial haemorrhage in newborns. *Child's Nervous System* 2005; 21(12): 1042- 1048),
23. Rocchi G, Caroli E, Raco A, Salvati M, Delfini R. Traumatic epidural hematoma in children. *J Child Neurol.*2005;20:569-72.),
24. Mazza C ,Pasqualin A, Feriotti G, Da Pian R. Traumatic extradural haematomas in children: Experience with 62 cases. *Acta Neurochir(Wein)* 1982;65:67-80.)
25. Hamlar A, Heckly A, And M, et al. Pathophysiology of intracranial epidural hematoma following birth. *Medical hypotheses* 2006;66:371-374). High vascularity of dura can also be considered another important cause of bleeding.Choux M, Griosli F, Peragut JC.Extradural hematomas in children. *Childs Brain.* 1975;1:337-47)
26. Erashin Y, Mutluer S, Guzelbag E (1993).
27. Extradural hematoma: analysis of 146 cases. *Childs Nerv Syst* 9:96-99.) .)
28. Ben Abraham R, Lahat E, Sheinman G, et al. Metabolic and clinical markers of prognosis in the era of CT imaging in children with acute epidural hematomas. *Pediatr Neurosurg.* 2000;33:70-75).
29. Pasaoglu A, Orhon C, Koc K, et al. Traumatic extradural haematomas in pediatric age group. *Acta Neurochir (Wien).*1990;106:136-139).
30. Tarantino CA, Dowd MD, Murdock TC. Short vertical falls in infants. *Pediatr Emerg Care.* 1999;15:5-8.).
31. Helfer RE, Slovis TL, Black M, Injuries resulting when small children fall out of bed. *Pediatrics.* 1977;60:533-535.).
32. Lee AC, Fong D. Epidural haematoma and stroller- associated injury. *J Paediatr Child Health.* 1997;33:446-447.) [
33. iurea AV, Kapsalaki EZ, Coman TC, Roberts JL, Robinson JS,3rd, Tascu A, et al. Supratentorial epidural hmatoma of traumatic etiology in infants. *Childs Nerv Syst.* 2007;23:335-341)
34. Dhellemmes P, Lejeune JP, Christiaens JL, et al. Traumatic extradural hematomas in infancy and childhood: experience with 144 case; *J Neurosurg.* 1985;62:861-864.
35. Gutierrez FA, McLone DG, Raimondi AJ: Epidural hematomas in infancy and childhood, in American Society for Pediatric Neurosurgery(ed): Concepts in Pediatric Neurosurgery I. Basel: S Karger, 1981, pp 188-201)
36. Bonadio WA, Smith DS, Hillman S. Clinical indicators of intracranial lesion on computed tomographic scan in children with parietal skull fracture. *Am J Dis Child.* 1989;143:194-196.)
37. Quayle KS, Jaffe DM, Kuppermann N,et al. Diagnostic testing for acute head injury in children: when are computed tomography and skull radiographs indicated? *Pediatrics.* 1997;99:E11.
38. Dias MS. Ttaumatic brain and spinal cord injury. *Pediatr Clin N Am.* 2004;51:271-303.)
39. ObanaWG, Pitts LH. Extracerebral lesions. *Neurosurg Clin N Am.* 1991;2:351-72.) .
40. Luerssen TG. Head injuries in children. *Neurosurg Clin N Am.* 1991;2:399-410.)
41. Bruce DA, Schut L, Sutton LN. Cephalhematoma and subgaleal hematoma. In: Wilkins RH, Rengachary SS, editors. *Neurosurgery.* New York: McGraw-Hill; 1985.pp.1622-3.)
42. Chen TY ,Wong CW , Chang CN , Lui TN , Cheng WC ,Tsai MD ,Lin TK (1993) . The expectant treatment of asymptomatic supratentorial epidural hematomas . *Neurosurgery* 32: 176 -179.