

Pediatric Traumatic Extradural Hematoma at King Abdullah University Hospital

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Abstract

Objectives: Retrospective analysis of all childhood cases of traumatic acute Epidural Haematoma (EDH) admitted to King Abdullah University Hospital (KAUH), Jordan between 2005-2006.

Methods: Twenty-two pediatric patients were diagnosed with EDH by brain CT. 16 children underwent surgery.

Results: Survival rate was 87 % and ninety percent of survivors had a good or moderate outcome. The incidence of traumatic EDH corrected to the average served population was 3-5 times the reported incidence from developed countries with road traffic accidents forming more than 45% of the causes. One explanation for this high incidence is the lack of use of safety measures for children in cars like children seats and belts.

Conclusion: In this study, we are attempting to bring focus to the topic of preventable RTA related head injuries in developing countries. This is the first reported study about pediatric AEDH from the north of Jordan. It can form scientific evidence that can strengthen the work of the different children and road safety societies.

Keywords: Epidural Haematoma, Head Injury, Outcome.

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Introduction

Patients with an acute Extradural Haematoma (EDH) have improved outcome with rapid resuscitation and surgical evacuation.^{1,2} Moreover, the wide availability of cranial CT allowed early and accurate diagnosis of the haematoma and early surgical intervention with improvement in both mortality and morbidity.³

In some developed countries, a 'zero-mortality' was considered as a goal earlier.^{4, 5} However, there is a lack of studies on the incidence and outcome of EDH in children in the developing countries and only few studies have addressed EDH in general in developing countries.^{6,7}

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The present study is the first report about pediatric AEDH from the northern part of Jordan.

The results of this study can be used as a scientific evidence to strengthen the work of the different child and road safety societies in the developing world and to convince the politicians in these countries about the humanitarian and the financial loss from these accidents and the importance of implementing the children security measures in automobiles.

Materials and Methods

Retrospective analysis of the clinical, radiologic, demographic and surgical features, obtained in 22 children (age <16 years) who underwent either surgical or conservative treatment for EDH between January 2005 and January 2007 (database of King Abdullah University Hospital (KAUH), Jordan). All patients were treated according to the protocol at KAUH. Brain Computed Tomographic scan (CT) studies were performed in all patients, Standard EDH evacuation with craniotomy was the utilized surgical procedure. Surgical evacuation was done if the haematoma was more than 1 cm, symptomatic or with mass effect. All patients were monitored in the intensive care unit and controlled in the outpatient clinic 4-6 weeks after discharge. Patients were managed by the admitting neurosurgeon. All patients were classified according to Glasgow Coma Scale (GCS) ⁸ and the outcome was evaluated by Glasgow Outcome Scale (GOS) ⁹ (good recovery, moderately disabled, severely disabled, vegetative survival, death). For descriptive purposes, GOS can be a good outcome (good recovery or moderately disabled) or poor outcome (severely disabled, vegetative survival). Age, sex, cause of injury, GCS, associated skull fracture, pupil reactivity, treatment and clinical outcome were determined. During the period of investigation, the department of Neurosurgery (KAUH) served an average population of 900,000.

An epidural hematoma is a collection of blood between skull bone and dura usually following head trauma. They can be caused by Road Traffic

Accidents (RTA), falls (FD) and assaults. RTA includes both motor vehicle accidents like car crash and accidents to road users like pedestrians and cyclists. Falls from a height can be accidental, homicidal, and suicidal. All falls in our study were reported by the patient or family as accidental. The height of the fall is an important factor for the outcome, however, in the present study this was ignored due to conflicting data by the family or the child mostly due to unwitnessed fall accidents. An assault is an offence that causes bodily harm, in the present study it was caused by quarrels.

Data were analyzed using SPSS v13.0. As this was a retrospective analysis, no changes were made to patient's treatment. Ethical approval was obtained from the hospital ethical review board.

Results

22 patients (12 male patients and 10 females), age <16 year were admitted into KAUH with the diagnosis of traumatic AEDH in the study period of 24 months, making an average of 11 cases per year.

On admission, 8 patients had a GCS of 13-15, 8 patients had a GCS of 9-12, and 6 patients had a GCS of 3-8. Change in pupil size and reactivity were seen in 2 patients. 7 patients had a vault skull fracture and 1 patient had both vault and skull base fracture. Two patients have associated brain contusion. The cause of the injury was road traffic accident in 10 patients, fall in 11 and direct trauma to the head (assault) in 1 patient. In total, 16 patients underwent a neurosurgical operation, all with craniotomy and evacuation of EDH.

In the 6 patients who were treated conservatively, 3 had a GCS of 13-15 and 2 had a GCS of 9-12, all end with full recovery. Whereas 1 was presented with severe head injury and had bilateral fixed dilated pupils and died.

Overall, 16 patients underwent surgery. Of these patients, 5 had a GCS of <9 on admission, 6 had a GCS of 9-12 and 5 a GCS of 13-15. Two mortalities in the operated patients and one in the conservatively treated group making the mortality

in the operated and non-operated 12.5 % and 13.6%, respectively with an average of 13%.

Clinical data about the operated patients are presented in Table (1), whereas Table (2) details the Glasgow Outcome Score (GOS) according to the admission GCS.

Table (1): Car accident and fall group outcome in relation to ages in operated patients (n = 16). RTA (road traffic accident), FD (fall down).

	0-1	1-5	6-10	11-15
RTA	0	2	4	2
FD	0	5	2	0
Assult	0	0	1	0
Good outcome, RTA		2	2	1
Good outcome, FD		4	2	

Table (2): Outcome in patients undergoing neurosurgical procedures in relation to GCS (n = 16).

GOS	Outcome	GCS 3-8 (n = 5)	GCS 9-12 (n =6)	GCS 13-15 (n =5)
5	Good	1	5	5
4	Moderate	1	0	0
3	Poor	2	0	0
2	Vegetative	0	0	0
1	Death	1	1	0

Discussion

In this study, survival from traumatic extradural haematoma was 87%. Ninety percent (17/19), of survivors had a Glasgow Outcome Score of 4 or 5, indicating good or moderate outcomes. This is comparable to the survival rate in other studies.¹⁰⁻¹² It should be noted that the outcome after an acute extradural haematoma is influenced not only by surgery but also of additional injuries, delay in presentation and treatment, GCS and pupils status preoperative.^{8, 11}

The incidence of traumatic EDH in children was approximately 1 patient per month for this centre. Compared to developed countries, the incidence of EDH in children in our region is high especially those related to RTA. In our study, the mean was 11 cases per year compared to other reports of 2-4 cases per year.^{2, 13} One explanation is the decreased use of safety measures in vehicles (like baby and children seats and child restraint, booster cushion and seats) compared to the developed world. Although some developing countries like Jordan had improved prehospital transfer times and rapid access to neurosurgery, however general people application of safety measures in automobiles is lagging behind.

Fall is the most common cause of EDH in pediatric population forming around 63%,¹⁴ however in the present study RTA forms more than 45%. The outcome was worse with the increasing age in RTA with no significant difference in FD group. A possible explanation is the more mobility of the older children and less use of safety measures in cars. However, the number of patients is small to make a conclusion. In the series of head injury, males highly dominated over females as victims of head injury, while in the present study females form 45 % of patients. We emphasize here that both sexes are exposed to the lack of safety measures in automobiles.

The clinical status of the patient (assessed by GCS) and the size of the EDH (small or large) are the variables that influence decisions about operative or conservative treatment.¹⁰ It has been shown that small asymptomatic epidural haematoma can be managed conservatively.¹⁵ In our study, all 5 patients treated conservatively with repeated CT and intensive observation had a good outcome. In one patient, surgery was considered unhelpful due to brain stem damage; the patient was treated conservatively and could not be salvaged.

Conclusion

The incidence of pediatric traumatic extradural hematoma in Jordan is high compared to developed countries; however, the outcome of management in Jordan is comparable to the developed countries. The main causes are RTA and FD, both of which are preventable through enough use of safety measures.

References

1. Miller JD, Tocher JL and Jones PA. Extradural haematoma- earlier detection, better results. *Brain Injury* 1988; 2:2: 83-86.
2. Wester K. Decompressive surgery for 'pure' epidural hematomas: does neurosurgical expertise improve the outcome? *Neurosurgery* 1999; 44:3: 495-500.
3. Cordobes F, R.D. Lobato and J.J. Rivas et al., Observation of 82 patients with extradural haematoma. Comparison of results before and after the advent of computed tomography, *J Neurosurg* 1981; 54: 179-186.
4. Bricolo and L.M. Pasut. Extradural haematoma: toward zero mortality. A prospective study, *Neurosurgery* 1984; 14: 8-12.
5. Paterniti, P. Fiore and Macri E. Extradural haematoma. Report of 37 consecutive cases with survival, *Acta Neurochir (Wien)* (1994); 131: 207-210.
6. Berker M, Cataltepe O, Ozcan OE. Traumatic epidural haematoma of the posterior fossa in childhood: 16 new cases and a review of the literature. *Br J Neurosurg.* 2003; 17(3):226-229.
7. Le Roux AA, Nadvi SS. Acute extradural haematoma in the elderly. *Br J Neurosurg.* 2007; 21(1):16-20.
8. Teasdale and Jennett B., Assessment of coma and impaired consciousness, *Lancet* 2. 1974; 81-84.
9. Jennett B, Bond MR. Assessment of outcome after severe brain damage *Lancet* 2. 1975; 480-481.
10. Cheung PS, Lam JM, Yeung JH, Graham CA, Rainaer TH. Outcome of traumatic extradural haematoma in Hong Kong., *Injury* 2007; 38(1):76-80
11. Heinzelmann M, Platz A and Imhof HG. Outcome after acute extradural haematoma, influence of additional injuries and neurological complications in the ICU, *Injury* 27 1996; 345-349.
12. Dhellemmes P, Lejeune JP, Christiaens JL, Combelles G. Traumatic extradural hematomas in infancy and childhood. Experience with 144 cases *J Neurosurg* 1985; 62(6):861-864.
13. Rocchi G, Caroli E, Raco A, Salvati M, Delfini R. Traumatic epidural hematoma in children, *J Child Neurol.* 2005; 20 (7):569-572.
14. Ammirati M, Tomita T. Posterior fossa epidural hematoma during childhood. *Neurosurgery.* 1984; 14(5):541-544.
15. Knuckey NW, Gelbard S, Epstein HM. The management of "asymptomatic" epidural hematomas. A prospective study. *J Neurosurg.* 1989; 70(3):392-396.

ورم الدم في الأم الجافية الخارجية المصحوب بصدمة لدى الأطفال في مستشفى الملك المؤسس عبد الله الجامعي

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الملخص

الهدف: تهدف هذه الدراسة الى إجراء تحليل استرجاعي لجميع الحالات المتعلقة بالأطفال المصابين بورم الدم الحاد في الأم الجافية الخارجية المصحوب بصدمة (EDH)، التي أدخلت الى مستشفى الملك المؤسس عبد الله الجامعي في الأردن بين عامي 2005 و 2006.

الطرق: استخدم التصوير المحوري للدماغ لتشخيص الإصابة لدى 22 من الأطفال. كما خضع 16 طفلاً للجراحة.

النتائج: بلغ معدل البقاء على قيد الحياة 87%. وكانت النتائج التي تم الحصول عليها جيدة أو معتدلة لما نسبته 90% من الباقين على قيد الحياة.

وكان معدل وقوع الإصابة بالمرض يتراوح بين 3 و 5 أمثال معدل وقوعها في الدول المتقدمة. وتشكل حوادث المرور على الطرق ما نسبته 45% من أسباب الإصابة.

ويتمثل أحد التفسيرات لارتفاع معدل حدوث الإصابة في نقص استخدام احتياطات الأمان بالنسبة للأطفال في السيارات، ومن بينها المقاعد المخصصة للأطفال، والأحزمة.

الختامة: في هذه الدراسة نحاول أن نضع في بؤرة الاهتمام موضوع الإجراءات الوقائية المتعلقة بإصابات الرأس في الدول النامية. وهذه هي الدراسة الأولى - في حدود علم الباحثين - التي تتناول هذا الموضوع في شمال الأردن. ومن الممكن أن تشكل نتائجها دليلاً علمياً من شأنه أن يعزز العمل على حماية الأطفال والاهتمام بإجراءات السلامة المرورية.

الكلمات الدالة: ورم الدم في الأم الجافية الخارجية (EDH)، إصابات الرأس.