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Head Trauma in Refugee Children Under The Age Of 2

Nalan Cavlak Adsiz[1], Ilhami Adsiz[1]
[1] Department of Emergency Medicine, Elazığ Fethi Sekin City Hospital, Elazığ, Turkey

Abstract

Background: It was aimed to determine the rates of head trauma and admission to the emergency department in refugee children under the age of2, and laboratory findings with computed tomography (CT) imaging in the emergency.

Materials and methods: Between 01/08/2018 and 01/08/2021, 71 refugee children under the age of 2 with head trauma who applied to the Elazığ Fethi Sekin City Hospital Emergency Department were analyzed using statistical methods.

Result: 66.2% of the target group admitted to our emergency was male and 33.8% was female. Those with Glasgow Coma Scale (GCS) 15 were 39.4%, those with GCS 14 were 40.8% and those with GCS 13 were 19.7% of those with pathological CT results. Hemoglobin (Hb) levels were significantly higher in those with pathological imaging. Hematocrit (Hct) value was found to be significantly higher in hospitalized patients ($p<0.05$). Blood amylase levels were low in patients with pathology in their imaging ($p<0.05$). Aspartate aminotransferase (AST) was significantly lower in those who were observed and discharged ($p<0.05$).

Conclusion: Refugee children are open to all kinds of health problems. Head trauma also takes an important place in this. As in all head trauma patients, good neurological examination and GCS scoring can be used in refugee children under the age of 2 years. CT is an effective imaging method that should be used on site. Laboratory markers need more scientific publications to provide insight before observation, discharge, and hospitalization.

Keywords: Refugee children, head injury, Glasgow Coma Scale,

Introduction

In our age, the phenomenon of refugees is a serious social problem. Wars, political imbalances and financial problems in different parts of the world have forced large groups of people to become refugees. Legally, refugees are definied as those who have to flee their country of origin for well-founded fear of persecution or serious harm, as stated in the 1951 United Nations Convention (1).

It is a predictable situation for refuguees to encounter various health problems. It is clear that children will be most affected by these problems. Refugee children are at high risk in terms of physical, developmental and behavioral health problems (2). Head trauma is also included in these problems (3).

On the other hand, when the general population is considered, head trauma is one of the most common reasons for children to apply to the emergency department (4). It is one of the most important causes of death and sequelae in the young population and especially in children under the age of 2 (5). Falls take the first place among the causes of head trauma. This is followed by traffic accidents and sports injuries (6). It can also be a part of domestic violence (7).

Diagnosis and follow-up of traumatic brain injury (TBI) due to head trauma can be made with Glasgow Coma Scale (GCS). It is also used in different algorithms in children. Pediatric Emergency Application Network, namely PECARN is one of the most frequently used algorithms (8) (9).

The aim of this study is to detect head trauma exposure in refugee children under the age of 2 who applied to our emergency department and to monitor the clinical process.

Material and Metods

Our study is a retrospective cohort study. Approval was obtained from the non-interventional research ethics committee of Firat University. The medical records of the patients who applied to the emergency department of our hospital between 01/08/2018 and 01/08/2021 were reviewed. Refugee children under the age of 2 who presented with isolated head trauma were included in the

Corresponding Author: Nalan Cavlak Adsiz
e-mail: drnalancavlakadsiz@hotmail.com
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study. Repeated applications were excluded due to the same trauma. Information on 72 refugee children under the age of 2 who applied with isolated head trauma was obtained. Brain CT results, laboratory findings, observation follow-up forms and existing comorbidities were examined. The disease process of those who were hospitalized was observed. The clinical conditions of the patients, which were determined according to GCS, were examined. It was determined that PECARN algorithm was taken into account in most cases, but the family's request and the physician's clinical preference were also effective when making the CT scan decision. No data could be found about the education and socioeconomic status of the parents.

Statistics

Descriptive statistics of data are expressed as mean and standard deviation (SD). Differences between means were analyzed by independent sample t-test and one way analysis of variance. Tukey test was used to determine the differences between groups for one-way analysis of variance. All statistical analyzes were performed using the SPSS 22 program. Significance level was taken as p<0,005.

Table 1: Descriptive Statistics

	Average	Median	SD
Wbc	14,33	12,30	13,78
Hb	11,39	11,50	1,83
Hct	33,68	33,40	4,74
Urea	22,34	23,00	8,72
Creatinin	0,33	0,27	0,20
AST	47,86	44,00	23,47
ALT	58,97	57,00	42,37
Amylase	24,25	21,00	13,41

According to GCS, those who were discharged from the hospital as a result of observation without CT scan, those who were discharged from the hospital with CT scan, and those with pathological findings, are summarized in Table 2. Pathological results included 2 subdural hematomas, 1 intracerebral hemorrhage, and 7 cranial bone fracture.

Demographic data are also collected in Table 2. Male gender predominates in the patients who apply. The observed patients were followed for at least 6 hours in the emergency room observation area, and no-nausea-vomiting, drowsiness, or a newly developed neurological deficit was observed. The activities and food intake of the patients were observed and they were discharged with recommendations within their current situation.

Table 2: Demographic Information

		n	%
Gender	Male	47	66,2
	Female	24	33,8
Age	1	34	47,9
	2	37	52,1
Hospitalization	+	15	21,1
	-	56	78,9
GCS	13	14	19,7
	14	29	40,8
	15	28	39,4
Mortalite	Exitus	1	1,4
	Discharged	70	98,6
CT Diagnosis	Observation	23	32,4
	Normal	38	53,5
	Pathological	10	14,1

Table 3:

		CT Diagnosis						Hospitalization			
		Observation		Normal		Pathological		+		-	
		n	%	n	%	n	%	n	%	n	%
GCS	13	1	4,3	5	13,5	8	72,7	10	66,7	4	7,1
	14	0	0,0	26	70,3	3	27,3	5	33,3	24	42,9
	15	22	95,7	6	16,2	0	0,0	0	0,0	28	0,0

When Table 4 is examined, Hb,Hct and Ast values showed significant differences according to CT diagnostic groups (p<0,05). When the CT diagnostic groups were compared according to the Tukey test, the Hb values of the groups with pathology as a result of tomography were statistically significantly higher than the Hb values of the group that did not have tomography (p<0,05). On the hand, the Hct values of the group formed by those who did not undergo CT scan were statistically significantly lower than the Hct values of the other groups (p<0.05). Ast values of the group of those who did not undergo CT scan were statistically significantly lower than Ast values of the other groups (p<0.05).

When Table 5 is examined, there was a significant difference between those who were hospitalized and those who did not (p<0.05) for Hct and Amylase values. It is seen that those who are hospitalized have higher Hct values than those who do not and those who are hospitalized are lower than those who do not have Amylase values.

Table 4:

CT Diagnosis	Observation		Normal		Pathological		p value
	Average	SD	Average	SD	Average	SD	
Wbc	17,93	23,18	12,08	4,69	14,36	4,38	,282
Hb	10,62**A**	1,68	11,58**AB**	1,44	12,38**B**	2,70	**,019***
Hct	31,08**A**	4,04	34,28**B**	3,48	37,08**B**	6,94	**,001***
Urea	24,46	10,02	21,09	8,62	22,07	5,22	,350
Creatinin	0,38	0,15	0,32	0,24	0,29	0,13	,359
AST	36,83**A**	17,49	51,62**B**	23,27	58,27**B**	27,96	**,014***
ALT	52,48	42,31	59,38	39,33	71,18	52,87	,489
Amylase	27,83	16,16	23,16	12,76	20,45	6,98	,255

* p<0.05 Horizontally, means that do not share capital letter are significantly different (p<0.05).

Table 5:

Hospitalization	+		-		p value
	Mean	SD	Mean	SD	
Wbc	14,06	4,67	14,40	15,36	,934
Hb	11,98	2,49	11,24	1,61	,165
Hct	36,04	6,45	33,04	4,01	**,029***
Urea	20,74	6,78	22,76	9,17	,430
Creatinin	0,41	0,33	0,31	0,15	,272
AST	50,80	20,12	47,07	24,39	,588
ALT	68,73	47,51	56,35	40,95	,318
Amylase	19,20	4,97	25,61	14,62	**,008***

* p<0.05

Discussion

War and persecution result in massive migrations. Current estimates indicate that there are 23 million refugees in the world (10). This number is increasing day by day. The phenomenon of migration, which is an international problem in today's world, affects children more than adults. Children who have to migrate with their families and sometimes even alone, face various health problems. Along with the migration process, low socioeconomic conditions in the destination country also make children vulnerable to various health problems. Head traumas are also included in these problems.

Response to trauma and long-term prognosis in head traumas in the pediatric age group differ compared to the adult age group. According to the figures of the United States, approximately 10 out of 100,000 children die from head trauma each year (11). Approaches under 2 year of age and above show differences when evaluating pediatric head trauma. Under 2 years of age, clinical evaluation is more difficult. Babies may be asymptomatic. The type of trauma, clinical findings of the skull or scalp, the infant's wakefulness and the response to stimuli may be indicative (12). However, the gold standard is computed tomography. It is especially important in the early diagnosis pf intracranial hemorrhages (13). However, some studies show that even in a single-shot CT, the risk of death from life-threatening cancers such as brain tumors and leukemia may increase, and that low-dose ionizing radiation that brain is exposed to in infancy may affect cognitive abilities in adulthood (14) (15). The current situation has shown that there is a need for algorithms that take into account age in children with head trauma. The most reliable of all clinical parameters is the GCS score (16).

Head trauma patients with GCS scores between 13 and 15 are included in the mild head trauma group. Since the rate of intracranial lesion detection is high in the patients with a GCS score of 13 in this group, they are included in the moderate head trauma group by some authorities (17). The risk is lower in those with a GCS score of 14, but it is high enough to justify CT scan (18). Dolanbay et al. found similar results in their study and used brain CT as the gold standard (19). There is no consensus among those with a GCS score of 15. It is necessary to determine the correct clinical parameters in patients with GCS 15 and to justify the CT scan (16).

PECARN (Pediatric Emergency Care Applied Research Network) and several other clinical decision rules have been developed. Thus, it was aimed reduce unnecessary CT use and to ensure accurate identification of patients with real head trauma (20).

In our study, GCS was taken into account in refugee children under the age of 2 with head trauma, who came within the targeted time frame, but PECARN clinical decision rules could not be fully applied to all cases.

Here, the wishes of the family and the decision made by the physician according to the clinical situation came to fore. Those with an entry GCS of 15 were in the majority. (95.7%). It showed a high correlation in the detection of pathological conditions with CT scanning. It was concluded that GCS scoring was effective in the decision of CT scan and observation hospitalization process.

The hemogram and some biochemical markers taken in the emergency room of the patients who were observed and the patient groups with or without pathology after CT scan were examined. In some studies, a correlation between low neurological level of head trauma and low hemoglobin has been shown in children (21)

HB levels in our study; subdural hematoma, intracerebral hemorrhage and cranial bone fracture were significantly higher in the pathological group. As a result of the analysis in Table5, hematocrit was found to be high in the same group, that is, in the patients with pathology and hospitalization. On the other hand, the hematocit values of the observation group were significantly low. In general, hemoglobin and hematocrit values decrease in patients with bleeding. However, there are no drastic decrease in bleeding in the intracranial area. We found elevated hemoglobin and hematocrit in the group with intracranial pathology. There may be increased intracranial pressure after trauma. One study claims that perihematomal edema will continueto in crease in the first 7 to 10 days (Staykow at al. 2011). This edema can couse a pressure increase. And cerebral blood flow may be impaired. As a result, we thought that peripheral blood hemoglobin and hematocrit levels might increase in the first admission to the emergency depertment

In addition, AST values were significantly lower in patients who were discharged after the end of observation period. It was determined that the AST value secreted from many tissues, especally the liver, was low. Noted in our work. it was hoped that this finding, which did not make sense in the light of our current analyses, would from the basis for new studies. It was thought that the analysis could be remarkable in the follow-up of the blood parameters of the patients under observation. In some studies, salivary amylase levels were examined in mild head trauma and no significant correlation was found with the severity of the trauma. However, salivary amylase level in patients with isolated head trauma was significantly associated with pathological findings in CT examinations (22). In our study, on the other hand, a significantly low blood amylase level was found in patients who were hospitalized after a pathology was detected. We studied blood amylase levels at the first admission to the emergency department. Therefore, different results may have been obtained. We think that this analytical data needs to be supported by further studies.

It is possible to prevent unnecessary CT scans and reduce mortality and morbidity with detailed examination, good neurological follow-up and evaluation of concurrent laboratory data. Considering the fact that the discharge and hospitalization processes of the patients took place in the light of the determinations made in the first step, the value of the available data is understood.

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