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Evaluation of Pediatric Patients Admitted to the Hospital for Drug Intoxication

İlaç Zehirlenmesi Nedeniyle Hastaneye Başvuran Çocuk Hastaların Değerlendirilmesi

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Öz

Giriş ve Amaç: İlaç zehirlenmeleri, çocukların karşılaştığı en yaygın zehirlenme şekli olup ölümcül sonuçlar doğurabilen, ancak uygun tedbirler alınırsa önlenebilen bir durumdur. Çocuklar bir toplumun geleceğidir, bu yüzden ilaç zehirlenmesi önemli bir halk sağlığı sorunu oluşturmaktadır. Yüksek doz ilaç kombinasyonları, yanlış kullanım, kötü saklama koşulları ve çocukların ilaçlara erişimi gibi faktörlerin tümü ilaç zehirlenmesine katkıda bulunabilmektedir. Amacımız, ilaç zehirlenmesinin çocuklar üzerindeki etkisini anlamak, bu çocukların özelliklerini belirlemek ve bu sorunun önlenmesi için alınabilecek tedbirler hakkında farkındalık oluşturmaktır.
Gereç ve Yöntemler: Bu çalışma, Karabük Üniversitesi Tıp Fakültesi Eğitim ve Araştırma Hastanesi çocuk acil servisine ilaç içme ve ilaç maruziyeti şikayetiyle başvuran 100 hasta üzerinde retrospektif olarak yapılmıştır.
Bulgular: Hastaların yaş ortalamasının 7,65±6,51 yıl, %58'inin kız olduğu ve %71'inin kazayla ilaç içtiği görülmüştür. Hastaların içtiği ilaçlar incelendiğinde %18 ile en yüksek oranla analjezik-anti-İnflamatuar (Parasetemol) grubu olduğu saptanmıştır. Hastaların yatış durumları incelendiğinde %22'sinin hastaneye yatışı olmadığı görülmüştür. Hastaların %56'sının semptom yaşadığı, en çok yaşanılan semptomun %33 ile bulantı kusma olduğu görülmüştür. Hastaların hiçbirinde mortalite görülmemiştir.
Sonuç: Çalışma sonuçları çocukların sıklıkla kazayla ilaç aldıklarını göstermektedir. En çok analjezik-antipiretik grubu ilaçlar ile karşılaşılması ise, toplum içinde çok yaygın bir şekilde kullanılmasının öngörülebilen bir sonucu olduğunu düşündürmektedir. Ayrıca %78 gibi çok yüksek bir yatış oranı bulunması, ne yazıkki önlenebilecek bir durum için kısıtlı imkanlarımızın fazladan harcanmasına neden olmaktadır. Bunun için etkin bir halk sağlığı politikasının oluşturulması ve yaygın şekilde kullanılan ilaçlara yönelik önleyici tedbirlerin alınması, zehirlenmelerin sıklığını azaltabilir. Bulgularımızın, klinisyenlere yol göstereceğini düşünmekteyiz.

Anahtar Kelimeler: İlaç zehirlenmeleri, intoksikasyon, ilaç, pediatrik hastalar

Abstract

Aim: Drug poisoning is the most common form of poisoning in children, and it is a situation that can lead to fatal consequences, but can be prevented if appropriate precautions are taken. Children are the future of a society, so drug poisoning poses an important public health problem. Factors such as high-dose drug combinations, misuse, poor storage conditions, and children's access to drugs can all contribute to drug intoxication. The aim of this study

is to understand the effects of drug poisoning on children, to identify the characteristics of these children and to raise awareness about the measures that can be taken to prevent this problem.
Method: This study was conducted retrospectively on 100 patients who applied to the pediatric emergency department of Karabuk University Faculty of Medicine Education and Research Hospital with the complaints of drug use and drug exposure.
Results: It was observed that the mean age of the patients was 7.65±6.51 years, 58% of them were girls and 71% of them accidentally drank drugs. When the drugs consumed by the patients were examined, it was determined that the analgesic-anti-inflammatory (Paracetemol) group was the highest with 18%. When the hospitalization status of the patients was examined, it was seen that 22% of them were not hospitalized. It was observed that 56% of the patients experienced symptoms, and the most common symptom was nausea and vomiting with 33%. No mortality was observed in any of the patients.
Conclusion: Study results show that children often take drugs accidentally. The fact that analgesic-antipyretic group drugs are mostly encountered suggests that it is a predictable result of their widespread use in the community. In addition, the high hospitalization rate with 78% unfortunately leads to an extra expenditure of our limited resources for a condition that could have been prevented. For this reason, establishing an effective public health policy and taking preventive measures for commonly used drugs can reduce the frequency of poisonings. We think that our findings will guide clinicians.

Keywords: Drug poisoning, intoxication, drugs, pediatric patients

1.Introduction

Pediatric drug poisoning is a common health problem that can often lead to hospitalization and requires urgent medical attention [1-8]. Many studies indicate that drug poisoning is a common, potentially fatal, emergency [9-14]. Poisonings occur when substances are ingested, inhaled, injected or absorbed through the skin in quantities that are harmful to the body [15]. This may be due to different reasons. High-dose drug combinations, misuse, poor storage conditions, and children's access to drugs are among the reasons cited in medical articles [1-6].

Socio-economic status and types of poisoning vary in different parts of the world. Even in the same regions, the etiology and demographic data of poisonings change over time [16]. Therefore, studies on pediatric drug poisoning have increased rapidly in recent years and it has become important to take preventive measures, early diagnosis and appropriate treatment approaches [1-7].

Common drugs in pediatric drug poisoning include analgesics, antidepressants, antiepileptics, antipsychotics, anti-inflammatories, antibiotics, antihistamines, and antipyretics. However, the frequency order of these is not clear. Different results have been obtained in similar studies [5-12]. Therefore, in this study, information about the prevalence, etiology, clinical features, diagnosis and treatment approaches of pediatric drug poisoning will be given.

The aim of our study is to evaluate the factors of poisoning, symptoms and outcomes of pediatric patients admitted to the emergency department with drug intoxication.

2.Method

2.1. Study Setting

Our study was carried out between 01.01.2021 and 31.12.2022. Our study is a retrospective cross-sectional study. Our study was started after the approval of the local ethics committee numbered 2023_1246. Our study was conducted in accordance with the Declaration of Helsinki. All data used in this study were anonymized before statistical analysis and reporting. Among the patients who were admitted to the emergency department and had the X44 code in the ICD coding system, those with drug poisoning were selected. The drugs taken by the patients from the hospital automation system, their symptoms, laboratory data and outcomes were recorded.

2.2. Inclusion and exclusion criteria

Among the patients who were admitted to the emergency department and had the X44 code in the ICD coding system, those with drug poisoning were selected. Those over the age of 18 and ICD code X44 were coded, but other poisonings other than drugs were excluded from the study. In addition, patients with missing data were also excluded from the study.

2.3. Primary outcome

The primary aim of our study was to compare the poisoning factors, symptoms and outcomes of pediatric patients who applied to the emergency department with drug poisoning, and to evaluate the relationship between the unit they were hospitalized in and their length of stay.

2.4. Statistical analysis

Statistical analysis of the research was done with SPSS 20.0 (SPSS, Chicago, IL) program. Frequency and descriptive statistics were calculated. In descriptive statistics, continuous variables were presented as median (min-max), and categorical variables as percentages. Chi-square and Fisher-Freeman Halton Test was used to reveal the difference between categorical bivariate groups.

Study analyzes were analyzed at 95% confidence interval and p<0.05 significance level.

3.Results and Discussion

3.1. Results

It was observed that the mean age of the patients was 7.65±6.51 years, 58% were girls and 42 were boys. In addition, when all of the cases were examined, it was seen that 71% of them took drugs accidentally and the remaining 29 of them took drugs for suicidal purposes (Table 1).

Table 1: Age distribution, gender and purpose of taking drug of the patients

Feature		**Mean±Sd**	**Min-Max (Medyan)**
Age		7,65±6,51	1 -18(4)
		n	
Gender	Female	58	58,0
	Male	42	42,0
Purpose	Accidentally	71	71,0
	Suicide attempt	29	29,0
	Total	**100**	**100,0**

The mean duration of hospitalization was 1.36±1.19 days, and The mean length of stay (LOS) in the pediatric intensive care unit(PICU) was 0.16±0.54 days (Table 2).

Table 2: Length of stay (LOS)

Feature	**Mean±Sd**	**Min-Max (Medyan)**
LOS in hospital	1,36±1,19	0 -4(1)
LOS in PİCU	0,16±0,54	0 -3(0)

Analgesic group was the highest with %32, while the neurological system agents group drugs were in the second place with a rate of %28. We found that paracetamol was the most commonly taken drug in total, and psychiatric drugs is in second rank (Table 3).

Table 3: Drugs that cause intoxication in children

Pharmaceuticals	**Patient group (n = 100)**	**%**
Analgesic-antipyretic		**(%32)**
Paracetamol	18	18.0
Diclofenac	12	12.0
Others	2	2.0
Neurological system agents		**(%28)**
Psychiatric	16	16.0
CNS	6	6.0
Antiepileptic	4	4.0
Anti-Parkinson	2	2.0
Cardiovascular system drugs		**(%8)**
Beta-blocker	2	2.0
Calcium channel blocker	2	2.0

Ace 2 Antagonist	2	2.0
others	2	2.0
Other drugs		**(%34)**
Antihistaminic	8	6.0
Antibyotic	2	2.0
Leukotriene Receptor Antaganost	4	4.0
Proton pump inhibitor Antidiabetic	4	4.0
Iron	2	2.0
Anti-thyroid	4	4.0
	2	2.0
Antiemetic	2	2.0
others	6	6.0

Mortality was observed in any of the patients in the study (Table 4).

Table 4: Mortality rate

Feature	n	%
Mortality rate	0	0
None	100	100.0

When the treatment options administered to the patients were analyzed, it was found that activated charcoal was administered to 42% and gastric lavage to 30%. When the drugs administered to the patients as treatment were analyzed, it was observed that the highest rate was 34% observation and 16% was ½ Saline physiologic (SP) (Table 5).

Table 5: Applied treatment rates

Feature		**n**	**%**
Activated charcoal	Yes	42	42.0
	No	58	58.0
Gastric Lavage	Done	30	30.0
	Not implemented	70	70.0
Treatment	İv hidrasyon	51	51.0
	Observation	34	34.0
	N- AcetylCysteine (Nac Protocol)	2	2.0
	Proton pump inhibitor (panto)	18	6.0
Total		100	100.0

When the symptoms of the patients was analyzed, we saw that most of them(56%) were symptomatic and rest of them(44%) were asymptomatic. It was observed that nausea and vomiting was the most 4%, tachycardia with 10%, headache with 9%, and dizziness with 8% (Table 6).

In our study, electrolyte disturbances were also evaluated. Although no electrolyte disturbance was detected in 57% of the patients, at least one or more electrolyte disturbance was observed in 43% of the patients. The most common electrolyte disorder was hyponatremia, which was observed in 13% of patients. The second most common electrolyte disturbance was hypocalcemia with a rate of 8% and the third most common was hyponatremia and hypocalcemia together with a rate of 6% (Table 6).

common symptom experienced by 33% of the patients with symptoms. The second most common symptom was somnolence with 1

Table 6: Symptom prevalence

Feature		**n**	**%**
Symptom Signs of poisoning upon initial examination	Symptomatics	56	56.0
	Asymptomatic	44	44.0
symptom experienced			
nausea vomiting	yes	33	33.0
	No	67	67.0
unconsciousness	lethargic	2	2.0
	somnality	14	14.0
	Sleeping state	2	2.0
	None	82	82.0
Other arrhythmia conditions	None	100	100.0
Heart rate	Bradycardia	10	10.0
	Tachycardia	4	4.0
	None	86	86.0
Seizure status	None	100	100.0
Having eye problems	Blurred vision	4	4.0
	Blackout	3	3.0
	None	93	93.0
Toxic Hepatitis	None	100	100.0
Experiencing a headache	Yes	9	9.0
	None	91	91.0
Hypotension Survival Status	Yes	4	4.0
	No	96	96.0
Hypertension	None	100	100.0
Electrolyte Disturbances	Hyperkalemia + Hyperchloremia	2	2.0
	Hypercalcemia	2	2.0
	Hyperchloremia	2	2.0
	Hypomagnesemia + Hypercalcemia	2	2.0
	hypokalemia	2	2.0
	hypocalcemia	8	8.0
	Hypocalcemia + Hyponatremia	2	2.0
	Hypomagnesemia + Hypokalemia + Hypocalcemia	2	2.0
	Hyponatremia	13	13.0
	Hyponatremia + Hypokalemia + Hypocalcemia	2	2.0
	Hyponatremia + Hypocalcemia	6	6.0
	None	57	57.0
Other Symptoms	Dizziness	8	8.0
	Suprapubic pain- Disüri	3	3.0
	Cough	2	2.0
	weakness	2	2.0
	None	85	85.0
Total		100	100.0

3.2. Discussion

Drug poisoning is an important issue in terms of public health, so it has been frequently investigated by different researchers. It is thought that little ages may be a risk factor in accidental poisonings that are not intended for suicidal purposes. For example, in a 10-year study conducted by Alwan et al. examining a very large patient cluster, 62.2% of the patients were children aged 0-5, 9% were children aged 6-12, and 28.8% were children aged 13-18. It has been observed that children between the ages of 18 In some studies, pediatric drug intoxications were observed in older age groups. For example, Duyu et al. found the mean age of 10.8 ± 6.4 years in their study, and they observed that 53.5% of the cases were between 13-18 years of age [7]. Özkan et al., like Bork et al., found the mean age above 7 years [12,13]. Our study found that the mean age of pediatric cases was 7.65 years. This result shows that different average ages can be observed in different geographies and different cultures [8-13].

When the gender distribution of pediatric drug poisoning cases is examined, it was observed that it was more common in girls in many studies [1,3,4,7,12]. İn our study, we found that it was more common in girls.

Considering the purposive tendency of drug poisoning in children, it is seen that while accidental intoxication is at a young age, it is seen that in older girls, suicidal poisonings increase [1]. However, Duyu et al. observed in their study that suicidal poisonings were more common than accidental [7]. But their study group was the patients in the PİCU and their study population is a smaller part of drug poisoning cases. But this small part is also the riskiest part. Because this group includes children with drug overdose. Therefore, suicidal poisonings might be more common in this risky group. On the other hand, many studies have found that most pediatric drug poisonings are accidental [8-15]. Our study also showed that, like these studies, most cases of pediatric drug poisoning were accidental.

When evaluated in terms of hospitalization time, in a recent study by Gökalp et al., the mean observation time of patients who were under observation for more than 24 hours was found to be 50 ± 26 hours (max. 168 hours). The reason for this can be considered as the fact that hospitalizations under 24 hours were not included in the calculation while calculating the length of stay in this study. Because Bédard et al. found the average length of stay as 18 hours in their study [6]. In another study, Şenses et al. found the average of 1.23±1.22 days [2]. In our study, we found that, the period was 1.36±1.19 days. This result was similar to that found by Şenses et al. [2]. In addition, in our study, it was observed that the average length of hospitalization, which was 1 day, was prolonged as the amount of hospitalization in the intensive care unit increased and there was a statistically significant relationship between the hospitalized unit and the duration (χ^2=90.29; p=0.00). In a similar study [7], the average length of stay of the patients in the pediatric intensive care unit was 4.3±6.7 days, while the total hospital stay was 5.8±7.1 days, which supports the result of our study.

When the drug groups that cause pediatric drug poisoning are examined, common drugs include analgesics, antidepressants, antiepileptics, antipsychotics, anti-inflammatories, antibiotics, antihistamines and antipyretics. However, the frequency order of these is not clear. Different results were obtained in similar studies. For example, in the study of Alwan et al., topical agents ranked first. However, for this result, which they found themselves, they showed that the massage oil culture is very common in Malaysia. Due to this, they blamed the excessive use of topical agents such as minyak kayu putih and minyak captive. In the same study, analgesics were found to be the second most common [1]. Some studies have shown that poisoning due to analgesic-antipyretics is more common without naming the active substance [8,9,11]. There are also studies showing that nervous system drugs are more common [2,3,7,12]. In some studies, parastemol is in the foreground as the active ingredient, and analgesic-antipyretic group drugs are seen to be in the first place [4,14]. Paracetamol which is an analgesic-antipyretic group, and followed by neurological system agents, were most frequently associated with pediatric pharmaceutical intoxication in the present study.

When evaluating the incidence of symptoms in cases of drug intoxication in pediatric cases, soave et al. found 51.4% of the patients symptomatic, and gastrointestinal symptoms were the most common in 37.6% [10]. Duyu et al. also observed central nervous system symptoms in 54.6% of the patients [7]. Ozan et al., on the other hand, found 73% of the cases to be asymptomatic, but they observed nausea and vomiting (8.1%) most frequently among the patients with symptoms [4]. Although Gökalp et al. did not give a rate in their study of 453 patients, it was found that 23 patients had abnormal physical examination findings and 59 patients had abnormal symptoms [11]. However, no information was given about which system symptom it is. In our study, we found that 56% of the cases had symptoms. The most common symptom was nausea-vomiting.

When pediatric drug poisonings are examined in terms of mortality rates, it is seen that the death rate is low. For example, Gökalp et al. reported this rate as 0% in their study, but in the same study, it was reported that a patient followed in the intensive care unit was discharged from the hospital with severe neurological sequelae and became dependent on mechanical ventilator [11]. In the study of Duyu et al. on patients hospitalized in the intensive care unit, they found the mortality rate to be 1.2% [7]. In our study, as in similar studies, no mortality was observed [9,10,13].

When evaluated in terms of Electrolyte Disturbances, it was observed that 252 patients had abnormal laboratory findings in the study of Gökalp et al. Although its statistical rate has not been reported, it corresponds to approximately 55% of 453 patients. However, there is no information about which laboratory findings were present in this study [11]. In our study, at least one electrolyte disorder was observed in 43% of the patients. The most common electrolyte disorder was hyponatremia, which was observed in 13% of patients. In the second place, hypocalcemia was observed with a rate of 8%, and in the third place with a rate of 6%, hyponatremia and hypocalcemia coexisted.

When the treatment methods applied were examined, it was seen that different methods were used. Ozan et al. found the observation rate as 24.9%, gastric lavage rate as 7%, active life rate as 11.4% and activated charcoal+lavage rate as 56.8% in their study [4]. Ozan et al. found gastric lavage rate (52.4%) and oral activated charcoal rate (45.9%) to be [5]. Duyu et al. showed that gastric lavage was applied in 41.9% of the cases and activated charcoal in 44.1% [7]. Gökalp et al. found in their study that gastric lavage was applied in 25.6% of the total cases, activated carbon in 30.9% and specific antidote in 2% [11]. In the present study, when the treatment options applied to the patients were examined, it was found that activated charcoal was applied to 42% and gastric lavage was applied to 30%. In addition, it was found that the observation rate was 34%.

4. Cocnlusion

According to our study, although childhood drug poisonings occur frequently (71%) by accident, it is seen that only a low rate of 22% of the cases can be resolved with simple medical interventions. On the other hand, it shows that mostly (78%) results in hospitalization, and more than half of the hospitalized patients are symptomatic (56%). Therefore, raising awareness about child poisoning and taking preventive measures can reduce the frequency of poisonings and have a positive effect on children's health.

In this context, public health institutions can initiate an effective public health program, ensure that posters, advertisements and brochures are prepared to increase awareness for parents, and they can organize reminder campaigns from time to time to prevent children from accidentally taking drugs. These campaigns can inform children about storing medicines, checking before swallowing and using medicine packaging correctly. In addition, simple precautions such as safety precautions for children and locked caps can be taken in medicine packages to prevent children from taking medicines by mistake.

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