ORIGINAL ARTICLE

Repeated poisoning episodes: Alarm sign of risk situations

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KEYWORDS
Child; Poisoning; Prevention and control; Emergency medical services; Legal; Poisons

Abstract

Introduction: Prevention is an essential aspect in paediatric poisonings, especially when recurrent episodes are detected. The aims of this article are to detect the recurrence rate for suspected poisoning in emergency consultations, as well as to identify the cases in which specific preventive measures are indicated, and to determine whether the creation of a specific item for recurrent episodes in the computerised medical records system facilitates its detection.

Material and methods: A retrospective study was conducted on patients less than 18 years of age treated in the emergency room due to suspected poisoning during 2013 and 2014. Patients were divided according to the presence or absence of previous episodes. From January 2014, a specific item is present in the computerised medical records of the poisoned patient, where the history of previous episodes is registered. The preventive measures used between both groups were compared.

Results: A total of 731 consultations were recorded for suspected poisoning. A history of previous episodes was detected in 9% of cases. Medical injury reports and follow-up in outpatient clinics were more often performed in patients with recurrent episodes than in patients without them (28.8% vs 18.0%, P=.034, and 65.2% vs. 18.8%, P<.001, respectively). In 2013, the recurrence rate was 5.9% vs 12% in 2014 (P=.004).

Conclusions: The recurrence rate observed is significant. Although preventive measures are more frequently indicated in these patients, their application is low. The creation of a specific item for recurrent episodes in a computerised medical records system facilitates their detection.

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Episodios repetidos de intoxicación: signo de alarma de situaciones de riesgo

Resumen

Introducción: La prevención es fundamental en las intoxicaciones pediátricas, especialmente cuando se detectan episodios repetidos. Los objetivos de este trabajo son determinar la tasa de recurrencias en la consulta por sospecha de intoxicación, evaluar en qué casos se indican medidas preventivas específicas y conocer si la creación de un ítem para episodios previos en la historia informatizada facilita su detección.

Material y métodos: Estudio retrospectivo. Se incluyen los pacientes < 18 años atendidos en un servicio de urgencias por sospecha de intoxicación en 2013 y 2014; se dividen en 2 grupos según la existencia o no de consultas previas por el mismo motivo. Desde enero de 2014 este dato se registra sistemáticamente en el formulario de la anamnesis del episodio de urgencias para el paciente intoxicado mediante un ítem específico. Se comparan las medidas preventivas adoptadas entre ambos grupos.

Resultados: Se registraron 731 consultas por sospecha de intoxicación. En el 9% se detectaron antecedentes de episodios previos. En el grupo de pacientes con episodios repetidos se cumplió 70% de lesiones y se realizó seguimiento con mayor frecuencia que en los pacientes sin episodios previos (28,8% vs 18,0%, p = 0,034 y 65,2% vs 18,8%, p < 0,001, respectivamente). En 2013 la tasa de recurrencia fue del 5,9%, y en 2014 del 12% (p = 0,004).

Conclusiones: En un número considerable de pacientes atendidos por sospecha de intoxicación se detectan episodios previos. Aunque en estos pacientes se indican con más frecuencia medidas preventivas, su aplicación es baja. La creación de un ítem específico en la historia informatizada para episodios previos facilita su detección.

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Introduction

Poisoning is generally rare in the paediatric age group, generating approximately 0.3% of visits to paediatric emergency departments (PEDs) in Spain. However, this prevalence is not unimportant considering that it amounts to 1 visit per day in a PED that receives approximately 100,000 visits a year. Episodes of poisoning are still a cause of morbidity and mortality both in children and adolescents and pose a significant economic burden, aspects that could be minimised if effective preventive measures were put in place.

The overall prevalence of poisoning has remained stable in the past 10 years, and is most frequently unintentional. The Working Group on Poisoning of the Sociedad Española de Urgencias de Pediatría (Spanish Society of Paediatric Emergency Medicine) has reported that the prevalence of past episodes in children presenting with unintentional poisoning ranges between 1.4% and 3.1% (depending on whether they were exposed to household products or medicines, respectively), and therefore these patients constitute a high-risk subgroup for which preventive measures ought to be developed.

Adolescents are another group of patients requiring specific prevention strategies. In this age group, exposure for recreational purposes and exposure with suicidal intent are more frequent, and carry a higher risk of recurrence. Thus, there is evidence that 6%–14% of adolescents that attempt suicide make another attempt in the first year of followup. At present, the prevention of paediatric poisoning includes measures with a general scope, such as health education for families, but situations with a sustained risk may call for the use of targeted interventions, such as the involvement of social services or legal authorities.

Despite the importance of recurrent poisoning, few data have been published on its prevalence and the characteristics of its management.

The objectives of the study were to establish the rate of recurrence in patients visiting the emergency department with suspected poisoning, to assess the cases in which specific preventive measures are indicated, and to determine whether the introduction of a specific item on recurrent episodes in the electronic health record facilitates their detection.

Materials and methods

We conducted a retrospective descriptive study between January 2013 and December 2014 in the PED of a tertiary care women’s and children’s hospital. We reviewed the electronic health records of all patients aged less than 18 years with a reason for visit or discharge diagnosis associated with exposure to a toxic substance. We classified patients based on whether they had a documented history of past episodes.

The data collection protocol included age, sex, type of substance involved (medicines, household products, alcohol and/or illegal drugs and other), reason for exposure (unintentional, recreational purpose and suicidal intent/abuse), previous episodes, need for treatment in the PED, patient...
Repeated poisoning episodes

Table 1  Characteristics of poisoning-related visits by past history of poisoning.

<table>
<thead>
<tr>
<th></th>
<th>Previous episodes (n = 66)</th>
<th>Single episode (n = 665)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age (years)</td>
<td>15.0</td>
<td>4.6</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Female sex</td>
<td>43 (65.2%)</td>
<td>353 (53.1%)</td>
<td>.061</td>
</tr>
<tr>
<td>Substance</td>
<td></td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Medicine</td>
<td>54 (81.8%)</td>
<td>306 (46%)</td>
<td></td>
</tr>
<tr>
<td>Household product</td>
<td>2 (3%)</td>
<td>175 (26.3%)</td>
<td></td>
</tr>
<tr>
<td>Alcohol and/or illegal substances</td>
<td>10 (15.2%)</td>
<td>136 (20.5%)</td>
<td></td>
</tr>
<tr>
<td>Other substances</td>
<td>0 (0%)</td>
<td>48 (7.2%)</td>
<td></td>
</tr>
<tr>
<td>Reason for exposure</td>
<td></td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Unintentional</td>
<td>17 (25.8%)</td>
<td>428 (64.4%)</td>
<td></td>
</tr>
<tr>
<td>Recreational</td>
<td>10 (15.2%)</td>
<td>138 (20.8%)</td>
<td></td>
</tr>
<tr>
<td>Suicide attempt/abuse</td>
<td>39 (59.1%)</td>
<td>99 (14.9%)</td>
<td></td>
</tr>
<tr>
<td>Treatment in emergency department</td>
<td>34 (51.5%)</td>
<td>228 (34.3%)</td>
<td>.005</td>
</tr>
<tr>
<td>Hospital admission</td>
<td>37 (56.1%)</td>
<td>138 (20.8%)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Injury report</td>
<td>19 (28.8%)</td>
<td>120 (18.0%)</td>
<td>.034</td>
</tr>
<tr>
<td>Followup in outpatient services</td>
<td>43 (65.2%)</td>
<td>125 (18.8%)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

destination at discharge, and specific preventive measures implemented based on reason for exposure (completion of injury report and/or patient followup in outpatient services).

To detect past episodes of suspected poisoning, we reviewed the electronic health records (EHRs) of the hospital and of the shared EHR system of the Institut Català for each patient. Since January 2014, the patient history form for emergency visits due to suspected poisoning in the hospital EHR database has a series of specific items, including a past history of poisoning.

The collected data were entered and processed in a Microsoft Access database created for the purpose. We tabulated quantitative and categorical variables. The data was subsequently analysed using the statistical software SPSS version 20.0 for Windows (IBM, Armonk, New York). We have described quantitative variables using the mean or median, and categorical variables using absolute frequencies and percentages. We performed tests to analyse the distribution of the data (Kolmogorov-Smirnov), and for the comparison of quantitative data (Student t, Mann–Whitney U) and qualitative data (chi square, contingency tables, Fisher exact test). We defined statistical significance as a P-value of less than 0.05.

The study was approved by the ethics committee of the hospital.

Results

During the period under study, the PED received 196,979 visits, of which 731 (0.4%) were for suspected poisoning. The median age of patients was 5.2 years (interquartile range, 2.2–15.0 years) and 54.8% were female. Medicines were involved in 49.2% of cases, household products in 24.2%, alcohol and/or illegal drugs in 20.0%, and other substances in 6.8%. The reason for exposure was unintentional in 60.9% of cases, recreational in 20.2% and suicidal intent or abuse in 18.9%. There was a history of past episodes in 9% of cases.

Of all patients, 35.8% required treatment at the PED and 23.9% were admitted to hospital. An injury report was filed for 19% of patients, while 23% were followed up in outpatient services. Table 1 presents the characteristics of the episodes based on whether a past history of poisoning episodes was identified. Table 2 summarises the characteristics of episodes in patients with a past history of poisoning by reason for exposure.

In 2014, following the introduction of the specific item in the patient history in the emergency department records, a past history of poisoning episodes was detected in 12% of the patients that visited the PED with suspected poisoning, compared to 9% in 2013 (P = .004).

Discussion

The incidence of recurrent poisoning episodes in paediatric patients is considerable, amounting to 9% of the total visits for suspected poisoning managed in the emergency department of our hospital during the 2 years under study. Most cases occurred in adolescents, and we found that the need for treatment in the PED and the need for hospital admission were more frequent compared to patients without past episodes of poisoning. These findings are probably related to the reason for exposure, which was intentional in nearly 2/3 of cases, the majority corresponding to patients that poisoned themselves with suicidal intent.

In adolescence, there is a surge of risk behaviours such as substance use, and individuals may experience the onset of psychiatric disorders. Both factors promote events of intentional self-poisoning that in many cases recur over time.12,13,16,17 The PED is the health care setting where adolescent patients that have abused substances, usually with acute problems secondary to this use, like acute intoxication or trauma, are most frequently managed. Therefore, paediatric emergency physicians play an important role in the detection of substance use in adolescents. In this context, performance of brief interventions during the visit and
referral to specialty services are measures that have proven
effective in the prevention of new episodes.18

The study also evinced the need to perform a thorough
psychiatric evaluation and strict monitoring of adolescents
that have deliberately ingested poison with suicidal intent.
A study conducted in the same PED by Margarit et al.
found that 65% of patients managed after a suicide attempt
had a psychiatric history, 15% used substances regularly,
and 17.4% had made previous attempts.11 Thus, the cor-
correct followup of these patients could reduce the risk of
recovery.

On the other hand, and in agreement with the findings of
previous studies, we found that in the overall paediat-
tric population, episodes of poisoning were most frequently
unintentional, and that repeated episodes did also occur
in this subset of patients. Unintentional poisoning happens
most frequently in children aged less than 4 years and
in the usual residence,1,18 and medicines are the most
frequently involved substances.1,2,7,9 In recent years, evi-
dence has emerged of the predominance of unintentional
paediatric poisoning episodes associated with psychiatric
drugs in Spain, exceeding the incidence of poisoning by
analgesic and antipyretic drugs.8,30 This evinces an alarming
accessibility of this type of drug in households, and suggests
that it would be very helpful for the paediatrician in charge
to be aware of the presence of psychiatric drugs in the
household and to perform targeted preventive interventions
in these families.

To present, the greatest efforts in the prevention of poi-
soning have focused in raising awareness in the community
through health education. There is evidence that this stra-
strategy improves safety in the home and is associated with
a reduction in the number of poisoning episodes.10,21 Fur-
thermore, scientific societies have developed strategies for
monitoring poisoning cases. Thus, in 2008 the Working
Group on Poisoning of the Sociedad Española de Urgencias de Pedi-
atria launched a toxicology surveillance system with the
participation of every PED in Spain that has allowed raising
awareness of changes in the epidemiology of paediatric poi-
sioning cases, such as the increase in the incidence of alcohol
poisoning3 and psychiatric drug overdose.20 Meanwhile, the

Committee on Safety and the Prevention of Unintentional
Injuries in Childhood of the Asociación Española de Pediatría
(Spanish Association of Paediatrics) has recently published
recommendations for the prevention of poisoning that paede-
tricians must convey to families.11

In spite of these measures, the prevalence of poisoning in
the paediatric age group remains stable or tends to increase,
and, as our study demonstrates, some patients present with
recurrent episodes of poisoning. Targeted interventions are
probably needed at the time of the emergency visit, when
families are aware of the risk of such events and are more
likely to implement recommendations. Emergency paede-
tricians need to allocate time to informing of preventive
guidelines, orally as well as in written form, and to complete
an official injury report.14,15,17 We must not forget that child
abuse may be passed off as unintentional poisoning. Filing
an official report is an act of notification that warns of a
potential risk situation, especially when it comes to recur-
rent events in a single patient. Likewise, the detection in
the PED of a past history of similar episodes reflects that
the patient is at risk and requires the implementation of tar-
geted interventions, such as involving the social work team
at the hospital or local social services.

Our study demonstrates that the introduction of a specific
item on previous episodes in the patient’s electronic health
record helps detect this type of history. It also shows, based
on our findings, that the detection of recurrent episodes of
poisoning was followed by the implementation of specific
measures more frequently in these patients compared to
patients without such history, although there is still room
for improvement, especially when it comes to the filing of
injury reports. Nevertheless, injury reports were completed
in 10% more patients in this group, and we ought to empha-
sise that they should be filed for every case of poisoning.
When it came to the followup after the emergency visit,
we ought to highlight that every case of recurrent self-
poisoning with suicidal intent resulted in the followup of
the patient in the department of child psychiatry, and that
followup of patients with recurrent recreational exposure
with referral to social services, the department of psy-
chiatry or the substance abuse unit improved significantly

<p>| Table 2 | Characteristics of poisoning-related visits in patients with a past history of poisoning by reason for exposure. |
|-----------------------------------------------|</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Unintentional (n = 17)</th>
<th>Recreational (n = 10)</th>
<th>Suicide attempt/abuse (n = 39; 37/2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age (years)</td>
<td>3.2</td>
<td>16.3</td>
<td>15.3</td>
</tr>
<tr>
<td>Female sex</td>
<td>3 (17.6%)</td>
<td>5 (50%)</td>
<td>35 (89.7%)</td>
</tr>
<tr>
<td>Substance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>15 (82.2%)</td>
<td>0 (0%)</td>
<td>39 (100%)</td>
</tr>
<tr>
<td>Household product</td>
<td>2 (11.8%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Alcohol and/or illegal substances</td>
<td>0 (0%)</td>
<td>48 (7.2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Other substances</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Treatment in emergency department</td>
<td>10 (58.8%)</td>
<td>2 (20%)</td>
<td>22 (56.4%)</td>
</tr>
<tr>
<td>Hospital admission</td>
<td>4 (23.5%)</td>
<td>1 (10%)</td>
<td>32 (82.1%)</td>
</tr>
<tr>
<td>Injury report</td>
<td>5 (29.4%)</td>
<td>4 (40%)</td>
<td>10 (25.6%)</td>
</tr>
<tr>
<td>Followup in outpatient services</td>
<td>0 (0%)</td>
<td>5 (50%)</td>
<td>38 (97.4%)</td>
</tr>
</tbody>
</table>

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compared to patients without a documented past history of poisoning.

The main limitation of this study is its retrospective design, as some of the data collected for patients may not have been documented correctly in the emergency department discharge summary. This is demonstrated by the increase observed in the number of cases with a previous history of poisoning after a specific question on the subject was included in the patient history form. Although we attempted to minimise this limitation by reviewing the electronic health records of the hospital and the regional health database for Catalonia, it is possible that the number of patients that actually had repeated episodes in the early period was greater than we calculated. In addition, given that the study was conducted in a single centre with a high level of care that is the regional referral hospital for child psychiatry, the results may not be extrapolated to the general population, and the proportion of patients with previous episodes of poisoning and suicidal intent may have been overestimated.

In conclusion, our study shows that the rate of recurrence of poisoning episodes is considerable, and that the introduction of a specific item in the electronic health records facilitates its detection. Paediatric emergency physicians need not only treat acute episodes of poisoning appropriately, but also strive to provide education at the time that families and adolescents are most vulnerable, ensure the correct followup of the patient, and report potential risk situations to the legal authorities and social services.

Conflicts of interest

The authors have no conflicts of interest to declare

References