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Giving Contents From an Unlabelled Plastic Bottle Containing Toxic Substance: A Case Report

تناول محتوى من زجاجة بلاستيكية غير موسومة تحتوي على مادة سامة: تقرير حالة

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Abstract

Accidental exposure to toxic chemicals is a major concern for all of us, particularly for our children. Many households in different parts of the globe store chemicals/drugs right from medicine, toiletries, corrosives, etc. in bottles of various sizes, shapes, and substances. Many a time such bottles are either newly purchased or are empty bottles of previously-stored liquids or other contents. Such used bottles or containers are frequently used for preserving corrosives or household cleaning substances in homes. Such unlabelled or used bottles can become culprits for causing accidental poisoning to anyone, especially children leading to grave harm to their health and safety.

In the present case, a 3-month-old male infant was brought to our pediatric emergency unit with a history of difficulty of breathing, blackening of the tongue, with sudden onset of crying, and inconsolability after being given water from a plastic bottle by his aunt. After a detailed

Keywords: Forensic Science, Zam Zam Holy water, Corrosive acid Poisoning, Infant, Fish mouth appearance, Sulphuric acid.

المستخلص

يمثل التعرض لمواد كيميائية سامة بشكل غير متعمد هاجسًا كبيرًا لنا جميعًا، لا سيما بالنسبة لأطفالنا. فالكثير من الأسر الموجودة في أماكن متفرقة حول العالم تخزن مواد كيميائية أو عقاقير من بينها أدوية ومستلزمات مراحيض ومواد أكّالة وغيرها في قوارير مختلفة الأشكال والأحجام والمواد. وهذه القوارير إما أن تكون مشتراة حديثًا أو قوارير فارغة خاصة بسوائل أو محتويات أخرى خُزّنت في وقت سابق. حيث يشيع استخدام هذه القوارير أو الحاويات المستخدمة من قبل في حفظ المواد الأكّالة أو مواد تنظيف المنازل. لكن تلك الزجاجات غير الموسومة أو المستخدمة من قبل يمكن أن يُوجه إليها أصابع الاتهام بأنها السبب في حدوث تسمم غير متعمد لأي منا، لا سيما الأطفال، ومن ثم الإصابة بأضرار خطيرة تهدد الصحة والسلامة.

بالنسبة للحالة التي بين أيدينا، تم إحضار أحد الأطفال الذكور عمره 3 شهور إلى وحدة طوارئ الأطفال لدينا يعاني من صعوبة في التنفس واسوداد اللسان، حيث شرع في الصراخ وأصيب بحالة من عدم الارتياح بعد قيام عمته بسقيه ماء من قارورة بلاستيكية. بعد إجراء تقييم مفصل للحالة،

الكلمات المفتاحية: علم الأدلة الجنائية، قارورة مياه زمزم المباركة، تسمم بسبب حمض أكّال، طفل، شكل فم سمكة، حمض الكبريتيك.

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assessment, it was found that the infant has a blackish color corrosive injury in and around the mouth involving the anterior half of the tongue, and lips with evidence of trickling drop type corrosive injuries over the right side of the neck and right supraclavicular region. Internally, except for epiglottic edema, no other significant findings were noted. On follow-up examination, the complication was noticed as the process of healing of the corrosive injury in and around the mouth as a fish mouth appearance. Upon investigation, it was found that the infant was sick with fever for which he was given contents from an unlabelled plastic bottle containing battery acid (sulfuric acid, H_2SO_4) thinking it was the water of Zam Zam. Dispensing contents from unlabelled containers can be a potential threat to the lives of children as well as adults.

وُجد أن الطفل أصيب بجرح أكّال أسود اللون في الفم وفي المنطقة المحيطة به التي تشمل النصف الداخلي من اللسان والشفتين مع مشاهدة جروح أكّالة من النوع الذي به قطرات فوق الجانب الأيمن من الرقبة والمنطقة اليمنى فوق الترقوة.

أما داخليًا، فباستثناء الودمة في لسان المزمار، لم يُكتشف أي شيء آخر يمثل خطورة. لكن أثناء إجراء فحص المتابعة، لوحظ حدوث مضاعفات بسبب حدوث عملية التعافي من الجرح الأكّال الموجود في الفم وفي المنطقة المحيطة به الذي يأخذ شكل فم سمكة. وبعد التقصي عما حدث للطفل، وُجد أن الطفل كان مريضًا بالحمى لذلك سُقي محتوى قارورة بلاستيكية غير موسومة بها حمض بطارية (حمض الكبريتيك "H_2SO_4") على اعتقاد أنها ماء زمزم.

ومن ثم يمكننا القول بأن تناول أي محتوى من أي حاوية غير موسومة يمكن أن يشكل تهديدًا لحياة الأطفال وكذلك الكبار.

1. Introduction

Most accidental poisoning cases occurring at home are due to improper storage of household chemicals [1]. Bottles kept within the reach of children are of major concern in the age group 1-3 years, while unlabelled bottles kept without proper safeguard are a main concern to children of 5-10 years. Poor protocols of storage and labelling can result in accidental ingestion and contact with harmful chemicals [1].

Most of the population in big metropolitan cities live in rented houses or shanties having a single room with a kitchen. So, many of the cooking items, inflammable substances, medicines, toiletries, and edible substances like vinegar, oil and many other harmful or harmless substances or liquids are kept beside each other. As per traditions and customs of many religions or sects, there is a practice of giving what they believe is holy water to a new-born baby or ill person. The water may come from the Ganges, the Zam Zam well, or other sources, and may be used for various purposes. [2]

We present a case of accidental corrosive poisoning by sulphuric acid which was preserved in an unlabelled bottle. The acid was mistaken for Zam Zam water and was given to a child to drink. This case highlighted the rarity of such an occurrence and detailed the pattern of corrosive injuries in the child. Furthermore, we attempted to review the available literature in this aspect.

2. Case History

A 3-month-old healthy, well-nourished infant male was brought to our tertiary health care centre with a sudden onset of blackening of the tongue and mouth. The child also had difficulty in breathing. After examining the infant and recording a detailed history from the relative, a clinical confirmation of injury due to accidental ingestion of a corrosive substance was made. The resulting injury due to the corrosive substance was blackish in color on the mucosal surfaces of the mouth, lips, right supraclavicular region and on neck folds. [3] [Figure-1].

Ultra sonography revealed severe epiglottic edema with no esophageal or upper digestive tract perforation. In anticipation of airway compromise, an elective intubation was performed, and the child was kept on a ventilator. Blood investigation was suggestive of severe acidosis (PH 7.20, base excess-4, Hco3 12, anion gap-10mEq/L), which was managed with adequate fluid hydration and antibiotic therapy. Regarding electrolyte, we no-

Figure 1- A: *Corrosive Injury blackish in color on lips, tongue, mouth and surrounded by redness;* **B & C:** *Corrosive Injury blackish in color on right supraclavicular region, lips, mouth and tongue and on right supraclavicular region just lateral to neck;* **D:** *Redness on right lateral and back side of neck with corrosive injury on right scapular region surrounded by redness;* **E:** *Fish mouth appearance due to healing of corrosive injury;* **F:** *Repair of mouth after plastic surgery of fish mouth appearance due to corrosive injury.*

ticed hypokalemia (3.0 mEq/L) and hypocalcemia (1.8 mmol/l) in this case. Aspirated fluid was sent for toxicological analysis. Parentral nutrition was started on day 5 and continued until the oesophago-gastro-duodenoscopy was performed on day 10. There was no stricture or perforation found during the oesophago-gastro-duodenoscopy procedure, and subsequently an infant feeding tube was used. The child remained in PICU (paediatric intensive care unit) for 20 days, including an initial 7 days of ventilation. The child was seen for a check-up some time after discharge with healed corrosive injuries over the mouth forming a fish mouth appearance with a deformity causing severe restriction of the mouth opening [Figure 1]. Multiple surgeries for release of the strictures were done, and after 5 such surgeries the child had a normal looking oral orifice [Figure-1]. The infant feeding tube was kept for 8 months during the period of multiple plastic surgeries. After 2 months of follow-up and a second plastic surgery operation, an oesophago-gastro-duodenoscopy was performed to rule out any stricture formation.

After 8 months, the infant feeding tube was removed and the child was able to take oral semisolid food. Regarding respiratory assessment, the child was initially intubated, and oxygen saturation and respiration were well maintained. Also, there were no signs of pneumonitis, hence a bronchoscopy was not needed.

On investigation, it was found that sulphuric acid in a fairly concentrated form was kept in a bottle similar to that of bottles used for preserving Zam Zam water (usually a 200-500ml mineral water bottle). The acid was given to the child by the infant's aunt, who mistakenly thought it was Zam Zam water. As the infant was ill, the mother asked her cousin's sister to give Zam Zam water to her infant. An investigation on the source of the sulphuric acid revealed that the father of the victim had brought and stored battery water, which usually contains sulphuric acid, in the bottle. Thus, the misplaced and unlabelled bottle and the inattentive act of giving acid in place of Zam Zam water was the cause of the accidental ingestion.

3. Discussion

The tradition of giving holy water to a newborn is common in many religious customs and practices. [3,4] As per Muslim tradition, when death is imminent or a baby is very ill, parents or relatives may wish to administer holy water called Zam Zam [4].

The well of Zam Zam is located in Masjid al-Haram in Mecca, Saudi Arabia, which is the holiest place in Islam. In the present case, the family of the victim were Muslims practising this tradition. Along with the routine medicinal products for treatment of illness, the holy Zam Zam water was also given to the sick child, who was suffering from routine seasonal flu fever.

However, if a bottle in which holy water is stored is used to then store some harmful substances like corrosive acids/alkalis it may result in accidental ingestion. This can cause grievous corrosive acid injuries to anyone, including a newborn baby to whom it is mistakenly given. Such cases can also be misleading and suspected to be child abuse or attempted child poisoning.

All over the world, there have been various circumstances resulting in accidental poisoning in children. Hang YC et al. [5] reported that the most common caustic poisoning in children is due to dumpling alkaline oil, (which is a concentrated alkali used for the processing of dumplings and other traditional foods), as it is sold without childproof containers and proper labels. A study in Jerusalem [6] found a higher incidence of caustic ingestion in Arab children during the pickling season due to the glacial acid (80% conc.) which is used for pickling vegetables preserved in unlabeled, used water bottles or soft drink bottles. Sawalha A et al. [1], in his study of storage and utilization of cleaning products at home in Palestine, found that 20% of respondents were reusing empty containers or bottles of cleaning agents for other purposes, while 26.9% of respondents were storing the cleaning agents in other than the original containers, and 10.2% of respondents used water bottles or soft drink bottles for preserving the cleaning agents. Even a study in a developed country like the United Kingdom [7] found that toilet cleaners and dishwasher products are often stored with minimum safety and are usually stored in used water or soft drink bottles and thus can be the most common reason for pediatric emergencies [8] and accidental corrosive poisoning [9] [Table-1].

Behera C et al. [10] reported a fatal case of accidental sulphuric acid poisoning due to consumption of 50ml of sulphuric acid kept in a plastic bottle in a refrigerator. The literature [11] reports a case of accidental corrosive acid ingestion in a newborn baby instead of Zam Zam water by a paternal grandmother, due to its storage in an unlabelled container in an inappropriate place containing edible substances.

In our case, the alleged bottle of Zam Zam water was found to be unlabelled and not stored properly in the intended place. Rather, instead of Zam Zam water the bottle contained sulphuric acid, which was used in batteries of various automobiles and other utility appliances like inverters, etc. This was due to negligent storage by the father and accidental ingestion after the acid was mistakenly given to the infant by an adult.

In the present case, the pattern of corrosive injury was predominantly mucosal injury to the lips, mouth and tongue. This differs from a study by I Abdulkadir et al. [11], whose findings showed dried blood on the lips, upper gastrointestinal bleeding, and chemical pneumonitis with no mucosal injury to the mouth and tongue. This might be due to a variation in concentration and the quantity of sulphuric acid. In our case, we found predominant corrosive injuries to the mucosa of the mouth and skin. Corrosive injuries over the right supraclavicular region were due to the child spitting the acid, and injuries over the neck folds were due to the dribbling of the acidulated fluid from the angle of the mouth. Complications in the form of a fish mouth appearance were evident due

Table 1- *The types of bottles involved in poisoning.*

Authors	Mechanism of poisoning	Reasons behind the corrosive poisoning
Huang YC Tiawan [4]	Bottles without childproof containers and labeles	Alkaline oil used for processing of dumplings.
Silva Jerusalem [5]	Acid preserved in Unlabeled used water bottles or soft drink bottles	Glacial acid used for pickling
Roy MP Delhi India [7]	Soft drink bottles	Kerosene and household cleaning agents
Swain R Delhi India [8]	Containers and used water bottles	Sulphuric acid
Behera C Delhi India [9]	Plastic bottle	Sulphuric acid
I Abdulkadir [10]	Holy Zam Zam water bottle	Sulphuric acid
Present case	Zam Zam Holy water bottle	Sulphuric acid

to stricture formation by the healing process of the corrosive injury.

Thus, it can be concluded that harmful substances kept in unlabelled, improperly stored bottles can cause accidental poisoning. This is particularly true if given by a person unaware of the contents of such bottles. This may cause grave corrosive injuries to newborns, infants, and children.

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Conflict of Interest

None

Reference

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