Evisceration caused by the explosion of mobile phone battery: A rare form of domestic accident in a child

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1. Introduction

Domestic accidents are unintentional injuries that happen in or around the house [1]. Ninety-five per cent of infantile deaths in the world are recorded in the developing countries, and about one million of these deaths are caused by traumas [1,2]. Less than half of these infantile deaths are due to domestic accidents [3–5]. Very often, domestic accidents are caused by falls, burns, drownings, poisonings and suffocations [1,3]. These kinds of accidents can exceptionally be source of penetrating abdominal injuries [1,3]. We are reporting an extraordinary origin of childhood domestic accident that provoked a penetrating abdominal injury with bowel evisceration: the explosion of a mobile phone battery; whereas we know that today, there is at least one mobile telephone in almost all the households. This is an uncommon accident that we think can be helpful to the scientific community.

2. Observation

A 7-year-old male child in second grade was admitted to the Emergency Room of the Regional Hospital Center (RHC) of Lomé Commune for abdominal open trauma with bowel evisceration due to a domestic accident.

The child was playing outside the house as the garbage was burning from about 5 m distant. Accidentally, there was an explosion of a mobile phone battery out of the burning garbage. The exploding battery hit the child on the left flank; which lead to an abdominal open trauma with bowel evisceration. The parents covered the bowels with a cloth before immediately taking the child to the emergency of the RHC of Lomé commune, within about 30 min after the trauma.

The child is the second of three sibling brothers, the others of which are alive and healthy. He has never been operated before. He bears no medical tare.

The examination at admission allowed to notice a temperature at 37.5°C. The blood pressure was of 110/70 mm Hg. The pulse rate was 98/minute. The conjunctives were well coloured and non-icteric. The child was fully conscious, with a Glasgow scale at 15 and a eupnoea breathing.

The bowels could be seen at about 50 cm in evisceration (Fig. 1). The evisceration was made by an abdominal injury located on the left flank with bruised sides and oval of about 05 cm from the big axle. The injury was not hemorrhagic. The other part of the abdomen had no specific problem. The examination of the thorax
was normal. The intestinal loops were covered with abdominal compresses soaked in isotonic saline serum and a venous access was taken.

The agent that caused the trauma was brought to the hospital. It was a cubic metallic ball of 05 cm long and 03 cm thick. It was the battery of mobile phone that exploded while it overheated. Fig. 2 shows the battery and its exploded portion.

An urgent blood test: rhesus grouping (groupe O positive rhesus) and hemoglobin rate (11.5/dl) was done. No X-rays test was done.

The parents had to pay the prescriptions before operation started. It is then that 8 h later after his admission, the child benefited from a median laparotomy. Surgical exploration revealed two punctiform perforations of the small intestines at the anti-mesenteric side, separated one from another of about 20 cm. The first perforation was 30 cm away from the ileo-caecale junction. There had been a skin removal that was sticking to the small intestine at 03 cm of the first perforation (Fig. 3). The examination of the other intra-abdominal organs revealed nothing abnormal. Definitely, it was a penetrating abdominal injury with evisceration associated with double bowel perforation.

An excision-suture of the two perforations were conducted. The suture has been performed in separated points of a total at vicryl 4-0. The abdominal cavity was washed with a warm physiological serum. The intestines were washed and reintegrated and a nasogastric tube was placed. The injury was parried and sutured (Fig. 4). The operative wound was closed on an abdominal drain. The postoperative cares have consisted in a bi-anti-biotherapy made of ceftriaxone 1 g/day and of metronidazole 250 mg twice a day associated with paracetamol 300 mg every 6 h.

The postoperative was marked by the resuming of the transit 3 days after the operation. The ablation of the drain and the nasogastric tube were performed at postoperative day 4. The child was discharged at the postoperative day 10, with clinic follow-up after one and three months later. One year back, no complication was noticed.
3. Discussion

The majority of child traumas occur in domestic accidents. Younger children are more often victims of them, perhaps because they spend more time at home than the older children [1,2,4,5]. The lack of active care for children, promiscuity, and life in a deprived environment are the factors that predispose children to traumas through domestic accidents [4]. The child in our case was just playing in the front of the house not far from a burning domestic garbage without parental control. He was thus, surprised by an uncommon accident. Maintaining the environment sound and having a strict control over the children could help to avoid such accidents [3,4]. There are garbage collection organizations which have specific places to drop and incinerate wastes. Measures should be taken so that every household subscribe to these organizations in order to avoid burning wastes at home. Childhood domestic accidents are most often caused by down falls; therefore causing abdominal penetrating injuries [1,3,6,7]. The other causes are burnings, drownings, poisonings, and suffocations [1,3,5,7]. In Africa [7-10], children abdominal traumas occur more often with male children than with females. Blunt abdominal trauma are more frequent than penetrating abdominal trauma. The admission delay at hospitals is variable from less than 2 h to more than 72 h. About 50% of children are admitted 12 h after the accidents. In Togo [10] especially abdominal trauma represents 2.64% of all trauma injuries and 1.11% of hospitalizations in children. Children abdominal trauma are most often caused by public roads and domestic accidents. The other mechanisms are rarer. No case of penetrating abdominal trauma caused by mobile phone battery has ever been reported in the literature yet. In fact, most of the mobile phone batteries are made with lithium-ion, accumulators and the lithium remains in the ionic state due to an insertion device at both negative (in graphite, in general) and positive electrodes. Seemingly, these batteries present a risk of explosion or fire in case they are misused or when their security system fails, because they can heat beyond 80 °C [11]. Although mobile phones are very useful nowadays and almost every household possess one in our country, the management of their damaged batteries must comply with physico-chemical rules. It is also necessary to make a rational and strict management of household wastes in general and in particular, to recycle the mobile phones batteries that are at out of use.

Just as the case of our observation, the most damaged viscera during penetrating abdominal traumas is the small intestines [5,12]. The admission dead line at the emergency for penetrating abdominal injuries varies from less an hour to 16 h [13,14]. Our patient was taken to the hospital within 30 min. This is not usual because it is uncommon for emergency care to be available at any time in our country. The admission period was so short because the place of the trauma is near the hospital (about 5 km). However, the time spent before the care of the patient was relatively long (8 h) contrary to the average time of 3, 4 ± 5–7 h according to researches [13]. Two reasons can explain the delay in this context:

- First, all the necessary of emergency care like drugs and others must be paid by the parents. There is no health care assistance in our country as in the developed countries. When the parents could not buy the materials for the operation on time, medical team must wait them until they pay despite of the serious state of the patient. In fact, in developing countries, there is very often a late management because of the lack of financial means; medical care must totally be paid by the parents. Some of them who have sickness insurance may also be allowed after a long process;
- Second, the power cut (the power relaying generator broke down by coincidence).

This really denotes how poor the working conditions in some hospitals of the developing countries are. It is surprising that nowadays people must take care of health in such unacceptable conditions. We have therefore many challenges to perform the care of traumas: arrangement of the transport from the accident to the hospital to reduce the admission delay, implementation of health care assistance to the management delay and to give health quality care.

No computerized abdominal tomography was done before the operation because of two reasons: On the one hand, it is not available in Lomé Commune RHC and on the other hand, the exorbitant cost of the examination in the centers where it can be done. According to some authors [15], the abdominal scan helps to explore the other intra-abdominal organs, enabling to start exploration directly from the traumatic injury or by doing first the median laparotomy. Referring to the nature of penetrating agent, we proceeded to exploratory laparotomy through median incision and explored the whole peritoneal cavity.

4. Conclusion

The penetrating abdominal injury with evisceration of a child caused by the explosion of a mobile phone battery is rare. Its care does not differ from the care of other penetrating abdominal injuries with evisceration. It can be avoided by keeping the environment healthy and also by the parents’ active care for the children. Henceforth, we need to keep in mind that the batteries of mobile phones that we often use can become dangerous, especially when they come into contact with heat.

References