Clinical and Experimental Health Sciences

Should We Remove the Alkaline Batteries, Which Are Got Caught in Upper Gastrointestinal Segment Immediately?

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ABSTRACT

There have been many publications indicating that especially alkaline batteries are used in adults who attempt suicide by ingesting foreign objects. In our study, a convict patient of 45-years of age has been taken to the emergency service of our hospital after ingesting 12 alkaline batteries of AA type for suicide. The patient had chronic depression and epilepsy. After identification of foreign objects in patient's stomach corpus by means of performed examination, direct graphy and tomography, the patient has been hospitalized in the general surgery service for follow up. After a follow up of 6 hours, the patient has been taken under upper gastrointestinal endoscopy and 10 alkaline batteries of AA type have been taken out from abdomen with the help of endoscope, although 2 alkaline batteries have passed the Treitz ligament. In the upper gastrointestinal endoscopy, generalized erythema and ulcerations have been determined in stomach corpus. The remaining 2 alkaline batteries have been taken out from the abdomen by natural ways. While studies have advised us to wait for 48 hours in cases of battery swallowing, the literature information which has changed in 2018, advises us not to wait for 48 hours, if possible, to remove it immediately. We wanted to present you that removing the alkaline batteries out of the abdomen by endoscopy in the centres having upper gastrointestinal endoscopy, is healthier for the patient and supports the literature, as the pathology, which may occur in stomach within this 48-hour period, may progress.

Keywords: Alkaline battery, foreign object, ingestion.

1. INTRODUCTION

Ingesting foreign objects constitutes a significant part of admissions to emergency services, particularly for children. Ingestion of alkaline batteries and similar foreign objects by adults is particularly for the purpose of suicide (1). Close follow up is necessary in patients applying to the emergency service due to ingestion of alkaline battery, as the batteries contain alkaline solutions, and they may cause severe complications such as perforation and fistula, as a result of liquefaction necrosis (2). Response regarding patients' interaction periods with alkaline battery, symptoms, localizations, and complications, must be carried out without delay. Treatment approach for ingested alkaline batteries vary depending on the placement of the battery. Batteries remaining in oesophagus must immediately be removed endoscopically; because mucosal damage may occur within one hour, and full-thickness injury may occur within four hours (3). The approach of 'if the battery is in the stomach, you may wait' has changed in the recent literature (4). In this study, we demonstrated the importance of presence of endoscopy units at health care centres for patients who have ingested alkaline batteries.

2. CASE PRESENTATION

A 45-year old male patient was taken to our emergency service from the prison, because he has committed suicide by ingesting foreign object (12 pieces of AA type alkaline battery). There was tenderness in abdomen epigastric region during the examination of the patient. Defence and rebound findings did not exist. Any features were not determined in rectal touch. The patient had chronic depression and epilepsy. The patient was using olanzapin 10 mg 1x1 and venlafaksin 75 mg 1x1 regularly. The patient did not have nausea and vomiting. The laboratory findings were as follows: White Blood Cell (WBC):6.47x10^3/µL; Hemoglobin (HGB):13.9 g/dL; Hematocrit (HCT):40.2 %; Platelet (PLT):226x10^3/µL; C-Reactive Protein (CRP):0,7 mg/dL; Glucose:88 mg/dL; Ure:29 mg/dL; Creatinine:0.79 mg/dL; Blood Urea Nitrogen (BUN):14 mg/dL; Lactate dehydrogenase (LDH):32 U/L; Aspartate transaminase (AST):9 U/L; Alanine transaminase (ALT):19 U/L; Direct Bilirubin:0.27 mg/dL; Creatine kinase:43 U/L; Amylase:49 U/L; Sodium (Na):138 mmol/L; Potassium (K):4.3 mmol/L; Chlorine (Cl):99 mmol/L. Electrical heart radiography of the patient was determined as ordinary. No features were determined in PA chest radiography. There

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were foreign bodies displaying extensive calcification within the abdomen in patient's ADBG (ambulant direct abdomen radiography) (Figure 1). Patient's intravenous contrast-enhanced abdomen tomography was carried out. In the tomography, multiple metallic linear, identical appearances approximately in 1.5 cm thickness were observed in stomach fundus; and they were interpreted as in favour of foreign bodies (Figure 2). The patient was hospitalized in general surgery service after inserting naso-gastric catheter, stopping oral intake, and starting proton-pump inhibitor and fluid, due to the possibility of gastric bleeding in patients who have ingested alkaline battery. Endoscopy preparation of the patient was performed while he was hospitalized in the service. Then, the patient underwent upper gastrointestinal endoscopy. Any pathologies in oesophagus were not determined during the upper gastrointestinal endoscopy, which was carried out under sedation anaesthesia. 10 pieces of AA type alkaline batteries were determined in stomach corpus and fundus (Figure 3). 10 pieces of AA type alkaline batteries were removed out of abdomen with the help of endoscopic snare (Figure 4). Extensive hyperaemia and ulcers were determined in cardia, corpus and fundus in the patient's endoscopy (Figure 5). Any other pathologies were not determined in the examination which was carried out up to the second part of the duodenum. Control ADBG was performed on the patient after the treatment. Two alkaline batteries were determined in intestines during ADBG, there was not free air beneath the diaphragm, which could have been assessed in favour of perforation. There were not any developing complications, so oral intake was initiated. In ADBG, it was seen that alkaline batteries were moving. After 72 hours, the alkaline batteries came out with spontaneous stool. The patient, whose psychiatric consultation was carried out and treatment was adjusted was prescribed a proton-pump inhibitor in tablet form. The patient was called for control endoscopy 2 weeks later. In the upper gastrointestinal endoscopy control, which was performed 2 weeks later, it was observed that the ulcers in the stomach were getting better, hyperaemic areas have recovered.

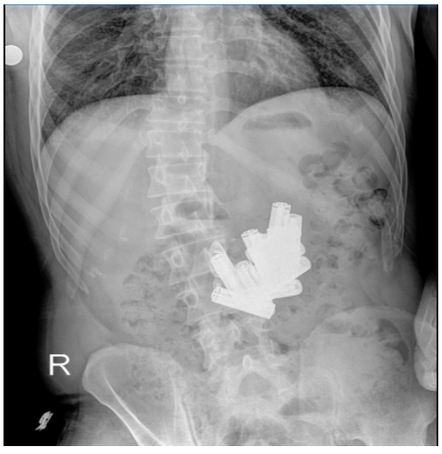

Figure 1. *Foreign bodies displaying extensive calcification within the abdomen in ambulant direct abdomen radiography*

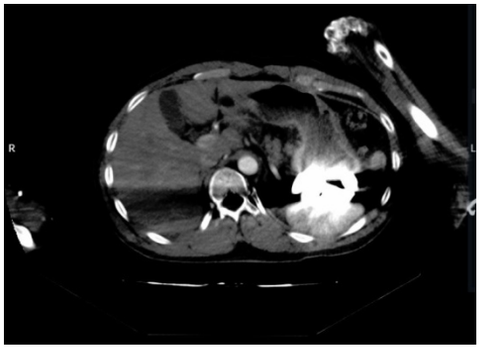

Figure 2. *Foreign bodies observed as multiple metallic linear, identical appearances approximately in 1.5 cm thickness in stomach fundus during abdomen computed tomography*

Figure 3. *10 pieces of AA type alkaline batteries in stomach corpus and fundus during upper gastrointestinal endoscopy procedure*

Figure 4. *10 pieces of AA type alkaline batteries were removed out of abdomen with the help of endoscopic snare.*

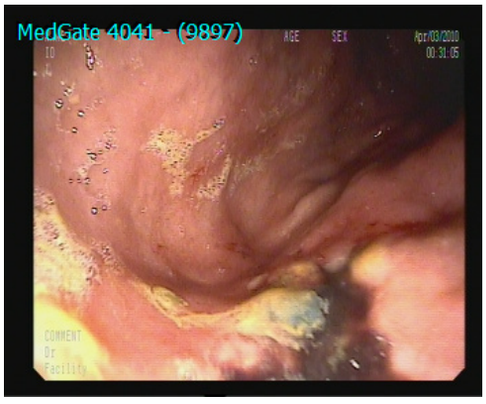

Figure 5. *Extensive hyperaemia and ulcers were determined in cardia, corpus, and fundus during endoscopy.*

3. DISCUSSION AND CONCLUSION

Ingestion of foreign body is a situation faced in adults, mostly in mentally handicapped persons, by mistake, or in those having psychiatric disorders intended for committing suicide. In our case, as the patient was a convict, ingestion of foreign body was intended for committing suicide. In the study conducted by Velitchkov et al., psychosis was determined in 22.9% of 542 adult patients. In the study conducted by Misdrahi et al., it was determined that suicide decision was taken as a result of negative effects of antipsychotic medication incompatibility, ranging between 11-80% (1). As there was an advanced level of depression in our patient, there was combined use of antipsychotic and antidepressant medications.

Approach to the handling of foreign bodies determined in gastrointestinal system may vary depending on the location, type, form of the foreign body, age of the patient, and other findings. Oesophagus constitutes the narrowest part of the digestive tract. Most of the ingested objects are got caught by oesophagus. Most of the foreign bodies reaching to the stomach passes the digestive tract easily. Rarely, they cause complete obstruction or perforation, in such cases surgical intervention is needed. It must be monitored whether they got caught in the anatomically narrowing or angled regions of gastrointestinal system such as the 'C' loop of duodenum, Treitz ligament, and ileocecal valve, or not. While most of the ingested foreign bodies are removed from the gastrointestinal system spontaneously without causing any problems, it is needed to remove 10-20% of them with endoscopy. Surgical intervention is needed only in 1% of the cases, due to the development of obstruction, fistula, and perforation. The important thing in foreign body ingestion is the type of the ingested foreign body. Hard, non-soluble objects, which are eaten or ingested, may cause bleeding, obstruction, and enteric fistulas in the gastrointestinal system (5). In our case, the ingested foreign body was AA type alkaline batteries, and 2 of them passed Treitz ligament, and 10 of them caused ulcers in stomach corpus. The batteries, which passed Treitz ligament, have come out of abdomen spontaneously within 72 hours. 10 pieces of alkaline batteries, which were located in stomach corpus, generated ulcers and erosions. Litovitz et al. noted that there are four types of alkaline batteries which are mercury oxide, silver oxide, manganese oxide, and lithium. There is potassium or sodium hydroxide at levels of 20-45% in all four types. Mercury oxide is one of the most common and dangerous ingredients. Elemental mercury is released by the reduction of mercury oxide in the acidic environment of the stomach, and it may cause hydrargyriasis. When alkaline batteries contact with saline human tissue, sodium hydroxide and chlorine gases are freed, and cause denaturation and necrosis. An alkaline battery cause tissue damage with four mechanisms: 1. Cellular damage due to the dissemination of heavy metals; 2. If the battery faces with bidirectional diffusion of the fluids, in the surrounding fluids; 3. Low-voltage burns which is caused by the exterior electricity production in the battery due to the potential electricity between cathode and anode; 4. Presence of necrosis with the effects of local pressure (6).

One of the most important questions in battery ingestion cases is the timing of endoscopic intervention. In the study conducted by Anderson et al., daily radiography monitoring was recommended. In addition, they suggested that batteries passed the gastrointestinal tract in 85% of the cases, and recommended endoscopic removal procedure after remaining in stomach for 36-48 hours (2). In the study conducted by Çobanoğlu et al., it was determined that ingestion of alkaline battery caused permanent damage in oesophagus, and extensive ulcers were generated, and therefore we support the approach of 'immediate removal of the battery' in order to prevent these complications (7). In the study conducted by Kayıpmaz et al., 3 pieces of AAA type alkaline batteries within the stomach were removed with endoscopic method successfully (8). According to the decision taken by the European Gastrointestinal Endoscopy Community in 2016, carrying out endoscopy within the first 4 hours was found appropriate (9). Litovitz, the author, who reported the largest series in battery ingestion investigated 8648 patients, who have ingested batteries, suggested that it is difficult for the batteries having a diameter over 20 mm to pass from the regions, which are the natural narrowness regions of the body (pylorus, duodenum C loop, ileocecal valve, etc.), so the batteries in such sizes must be removed with endoscope (6). As a result of the study conducted by Anfang et al., Jatana et al., and Litovitz et al., a treatment algorithm was produced by the National Poison Information Centre, regarding the things to be done for the patients admitting for battery ingestion (4,10,11).

According to this algorithm, in case of AA type alkaline battery ingestion, immediate removal out of abdomen by upper gastrointestinal endoscopy is recommended. The former approach of waiting for 36-48 hours generates various ulcers in organs such as stomach and oesophagus, and causes various morbidity and mortality risks due to its complications; therefore, immediate endoscopy is recommended in the updated literature demonstrating the necessity of endoscopy centres.

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