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Complications of Button Battery in the Nose and Preventions in Karbala

			
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ABSTRACT

Background: Button battery is most serious condition seen in pediatric patients in the nose. It is commonly seen in 2-4years old. These alkaline batteries are more dangerous due to local destruction with liquefactions necrosis, which leads to septal perforation or adhesion or stenosis so it needs urgent diagnosis and removal to avoid these complications. **Objectives:** To know the complications of foreign body button battery in the nose and the importance of early diagnosis and removal. **Methods:** A prospective study was carried out on 15 patients with button battery in the nose at ENT Department, Al-Hussian Teaching Hospital, Karbala, Iraq during the period January 2014 to January 2016. Patient with another foreign body in the nose is excluded from the study. **Results:** Out of total 15 patients with button battery (BB) foreign body in the nose found 10 patients were boys and 5 patients were girls (M: F=2:1). The age range was 1 to 10 years with a mean age of 4.3 years. Any delay in removal of button battery will result in more complications like septal perforation, saddle nose, adhesion, and stenosis. **Conclusions:** Button battery in the nasal cavity is a dangerous emergency in Otolaryngology department, which need the urgent diagnosis and quick removal to avoid complications and to educate the family to pay attention to their children.

INTRODUCTION

Nasal foreign bodies are generally referred to otorhinolaryngologist with a history of insertion of the foreign body in the nose with purulent foul smelling discharge and epistaxis⁽¹⁾. Button battery is increasingly being used in many electrical devices such as hearing aids, electronic games, watches, digital planner, and new electronic gadgets. Their smooth and shiny appearance makes them quite attractive and interesting to children who eagerly handle them when they are accessible⁽²⁾. Button battery foreign bodies may have a fatal outcome^(3,4). Conversely, they may result in little to no ill effect on the child⁽⁵⁾. Pathological effect of button battery in the nose depends on the location of impaction, duration of mucosal or skin exposure, remaining voltage in the battery, and chemical composition of the battery, alkaline more destructive than others⁽²⁾. Electrochemical content is related to its effect but sometimes it doesn't cause any ill effect⁽⁶⁾. There are five types of button batteries depending on chemical composition, which is manganese, silver, mercury, lithium, and zinc⁽⁷⁾. The vast majority of button batteries today are of the alkaline variety. An alkaline battery is more dangerous causing more tissue damage due to liquefaction necrosis and subsequent tissue destruction.⁽²⁾



PATIENTS AND METHODS

A prospective study was carried out on 15 patients at Department of ENT, Al-Hussian Teaching Hospital, Karbala during the period January 2014 to January 2016 focusing on patient's age, sex, and side of nasal cavity involved, duration of impaction, and follow up for one month, 3 months, and 6 months to see the complications. Patients with other foreign bodies are excluded from this study. Accurate history was taken from parents focusing on the time of insertion, other symptoms like rhinorrhoea, foul smelling discharge, epistaxis. Complete ENT examination by anterior rhinoscopy with a flexible endoscope and plain x-ray of the nose (anteroposterior and lateral views), informed consent form for removal under general anesthesia if the child is uncooperative. Only in one child, the operation was done under local anesthesia with aid of endoscope. Button batteries removed with a cleaning of the nasal cavity with normal saline with debridement and cleaning the site of impaction and the silastic stent inserted for 2 weeks to avoid adhesion and septal perforation.

RESULTS

Out of total 15 patients, 10 (66.7%) were males and 5 (33.3%) were females (M: F=2:1). The

age range was 1 to 10 years with a mean age of 4.3 years. They presented to ENT clinic with duration range from one hour to one week, after clinical examination with aids of an endoscope and plan x-ray to the nose, all showed double ring sign or halo sign in x-ray, which confirms button battery. During removal of foreign bodies, different pictures were noted starting from mild mucosal swelling with ulceration and septal and inferior turbinate necrosis to septal perforation. Septal perforation was noted in 4 children 2 boys and 2 girls, nasal adhesion in 2 boys, saddle nose in one boy, one boy with nasal stenosis, and 7 children without complications 3 girls and 4 boys (Table 1).

DISCUSSION

The first reported case of a button battery foreign body was in 1977 and involved a child who swallowed a camera battery, which lodged in the proximal esophagus⁽⁸⁾. The effect of button battery in the nose depends on duration it remains in situ, site of impaction, size of the button battery, its power and age (whether new or old, as older batteries cause lesser damage due to diminished contents), composition of battery, and absorption of chemical substance⁽⁴⁾. With more advance of technology and production of small size battery for toys incidence of impaction in the nose, ear, and upper gastroesophageal tract will be increased^{9,10}. The duration between impaction of button battery in the nose and removal decide the complication occur such as septal perforation, necrosis of nasal mucosa, nasal synechiae etc. Most common site of leakage from the button battery is the seal⁽¹¹⁾.

Table 1: Summary

Sex	age	site	duration	complication
Boy	3 years	RT	3hours	Nasal adhesion
Boy	1 year	RT	1hour	Mucosal edema
Boy	2 years	LT	6hours	Nasal adhesion
Boy	3 years	RT	3hours	Mucosal edema, ulceration
Girl	2 years	LT	3hours	Mucosal edema, ulceration
Boy	5 years	RT	2hours	Mucosal edema, ulceration
Girl	3 years	RT	2hours	Mucosal edema, ulceration
Girl	5 years	RT	5days	Septal perforation
Boy	3 years	RT	1weeks	Septal perforation
Boy	6 years	LT	24hours	Nasal stenosis
Boy	8 years	LT	3hours	Mucosal edema, ulceration
Boy	10 years	RT	6days	Septal perforation
Boy	4 years	RT	4day	Saddle nose
Girl	3 years	LT	1 week	Septal perforation
Girl	6 years	LT	5hours	Mucosal edema, ulceration

The mechanism of damage occurs through the generation of hydroxide ion at negative pole of battery causing the current through adjusting tissue which acts as anode pole and causes more damage. Alkaline fluid is released which lead to liquefactive necrosis of the tissue and erosion of mucosa and symptom due to alkaline burn⁽¹²⁾. Button battery cause damage by following ways^(11,13) :

1. Electrical burn due to the generation of electrical current between anode and cathode (tissue).
2. Chemical burn due to leakage of alkaline contents.
3. Toxicity due to absorption of chemical contents.
4. Liquefactive necrosis due to leakage of alkaline contents.
5. Pressure necrosis due to impacted foreign body (button battery).

Button batteries can cause mucosal and septal ulceration in 3-6 hours with inferior turbinate necrosis in 24 hours⁽¹⁴⁾. In vitro studies have shown that spontaneous leakage of electrolyte solution occurs when alkaline batteries are exposed to moisture. The leaked alkaline electrolyte solution can penetrate deeply into tissues producing a liquefying necrosis. These results in dissolution of protein and collagen, saponification of lipids, dehydration of tissue cells, and consequential extensive tissue damage⁽¹⁵⁾. Early diagnosis and removal of button battery from the nose are mandatory; the plain x-ray is an important tool to differentiate from other foreign bodies in the nose, which may be organic and non-organic or coin. Button batteries have a distinctive appearance on radiography as they have a bilaminar structure, making them appear as a double ring or halo (double density) on anteroposterior view and a step-off at the separation between the anode and cathode on the lateral view. Small batteries have a more subtle contour, which is hard to detect. When in doubt, repeated X-ray films in different angles are advised to achieve a correct diagnosis⁽¹⁶⁻¹⁸⁾.

Unilateral periorbital pain, headache, swelling of the nose should always include an impacted foreign body in the nose including button battery⁽¹⁹⁾.

In this study 15 patients had nasal button battery, septal perforation was noted in 4 children 2 boys and 2 girls, nasal adhesion in 2 boys, saddle nose in one boy, one boy with nasal stenosis, and 7 children without complications 3 girls and 4 boys due to early visiting to ENT clinic and early removal and this in agreement with other studies^(2,14,20). Therefore, button batteries must be removed from the nose immediately because of the danger of liquefaction necrosis of the surrounding tissue. After removal of the impacted button battery, copious irrigation with the saline solution should be done in order to remove any alkaline precipitates leaked out of the battery⁽²¹⁾. Batteries account for less than 2% of the foreign bodies ingested by children^(7, 22, 23). Over the last two decades, the ingestion of button batteries is, unfortunately, becoming an increasingly common problem faced in the pediatric practice. It is mainly seen in the young children, with a peak incidence between six months and three years⁽²⁴⁻²⁷⁾, and this consistent with our study.

Intranasal stents can be placed to prevent adhesion and synechiae formation due to severe necrosis. Regular follow up of that patient after 1 month, 3 months, and 6 months are essential to avoid these dangerous complications. Since this condition is more common in children, parents should be educated about its potential hazards. Devices using such batteries should be kept out of reach from small children. This is a Picture of the child with button

battery in the nose and after removal.

CONCLUSION:

Button battery in the nose is the hazardous condition as it can cause extensive tissue damage and complications if not removed and diagnosed early. Detailed history and examination should be done, followed by the radiological investigation in posteriorly located foreign bodies. Most effective management is prevention with educations to the parents to keep these batteries out of reach of children.



REFERENCES:

1. Majumdar A. B., Sengupta A., Paul S. S. A case series of button batteries as nasal foreign bodies among children. *International Journal of Advances in Medicine*. 2014;1(3):273–276.
2. V. Y. Lin, S.J Daniel, and B.C. Papsin. Button battery in ear, nose, upper aerodigestive tract, "International Journal of Pediatric Otorhinolaryngology. 2004;68,4: 473-479.
3. Hamilton JM, Schraff SA, Notrica DM. Severe injuries from coin cell battery ingestions: 2 case reports. *Journal of Pediatric Surgery*. 2009;44(3):644–647.
4. Soerdjbalie-Maikoe V, van Rijn RR. A case of fatal coin battery ingestion in a 2-year-old child. *Forensic Science International*. 2010;198(1–3):e19–e22
5. Litovitz TL. Battery ingestions: product accessibility and clinical course. *Pediatrics*. 1985;75(3):469–476.
6. Thabet MH, Basha WM, Askar S. Button battery foreign bodies in children: hazards, management, and recommendations. *BioMed Research .international volume*. 2013, Article ID 846091:1-7
7. N. Thompson, F. Lowe-Ponsford, T.G.K. Mant, and G.N. Volans. Button battery ingestion: a review, "Adverse drug reaction and acute poisoning Review. 1990; 9 (3): 157-180.
8. D. S. Blatnik, R. J. Toohill, and R. H. Lehman, "Fatal complication from an alkaline battery foreign body in the esophagus," *Annals of Otolaryngology, Rhinology, and Laryngology*. 1977; 86 (5): 611–615.
9. O. Palmer, B. Natarajan, A. Johnstone, and S. Sheikh, "Button battery in the nose: an unusual foreign body," *Journal of Laryngology and Otolaryngology*. 1994; 108 (10): 871–872.

10. D. McRae, D. J. Premachandra, and D. J. Gatland, "Button batteries in the ear, nose and cervical esophagus: a destructive foreign body," *Journal of Otolaryngology*. 1989; 18 (6): 317–319.
11. Bhatia R, Singhal SK, Dass A. Button cell causing a septal perforation in a child. *Clinical Rhinology: An international journal*. 2010; 3 (3): 161-163.
12. Tong MC, Ying SY, Van Hasselt CA. Nasal foreign bodies in children. *Int J Pediatr Otorhinolaryngol*. 1996;35: 207-211.
13. Jarugula R, Dorofaeff T. Oesophageal button battery injuries: thing again. *Emergencies medicine Australia*. 2011;23: 220-223.
14. Alvi A, Bereliani A, Zahtz GD. Miniature disc battery in the nose; a dangerous foreign body. *Clinical Pediatrics*. 1997; 36 (7): 427-429.
15. D. J. Premachandra and D. McRae, "Severe tissue destruction in the ear caused by alkaline button batteries," *Postgraduate Medical Journal* .1990; 66 (771): 52–53.
16. T. Marom, A.Goldfarb, E. Russo, and Roth, "Battery ingestion in children," *International Journal of Pediatric Otorhinolaryngology*. 2010; 74(8): 849–854.
17. D. Yardeni, H. Yardeni, A. G. Coran, and E. S. Golladay, "Severe esophageal damage due to button battery ingestion: can it be prevented?" *Pediatric Surgery International*. 2004; 20 (7): 496-501.
18. G. Srivastava, "Foreign bodies in the oropharynx, gastrointestinal tract, ear, and nose," *Clinical Pediatric Emergency Medicine*. 2010; 11 (2): 81-94.
19. Farrow, Catherine. Button battery exposure: Clinical features and management *Emergency Nurse*. 2001; 8(8): 12-17.
20. R. Higo, Y. Matsumoto, K. Ichimura, and K. Kaga, "Foreign bodies in the aerodigestive tract in pediatric patients," *Auris Nasus Larynx*. 2003; 30 (4): 397–401.
21. Lee H, Kim DH. Nasal septal perforation due to button battery. *J Rhinol*. 2001; 8: 69-72.
22. T. Litovitz and B. F. Schmitz, "Ingestion of cylindrical and button batteries: an analysis of 2382 cases," *Pediatrics*. 1992; 89 (4): 747–757.
23. A. Sheikh, "Button battery ingestions in children," *Pediatric Emergency Care*. 1993; 9 (4): 224–229.
24. L. Samad, M. Ali, and H. Ramzi, "Button battery ingestion: hazards of esophageal impaction," *Journal of Pediatric Surgery*. 1999; 34 (10): 1527–1531.
25. M. C.Uyemura, "Foreign body ingestion in children," *American Family Physician*. 2005; 72 (2): 287–292.
26. A. Arana, B. Hauser, S. Hachimi-Idrissi, and Y. Vandenplas, "Management of ingested foreign bodies in childhood and review of the literature," *European Journal of Pediatrics*. 2001; 160(8): 468–472.
27. W. Cheng and P. K. Tam, "Foreign-body ingestion in children: experience with 1,265 cases," *Journal of Pediatric Surgery*. 1999; 34 (10): 1472–1476.