



Use of Electromagnetic Principle in the Extraction of Foreign Bodies from the Ear Nose and Throat in Kano, Nigerian

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Abstract

Electromagnetic pull-force is very proficient in extraction of metallic foreign bodies from Ear, Nose and Throat. This device is simple, inexpensive and readily available for use in emergency and elective conditions. This study assessed the usefulness of improvised electromagnetic instruments in extraction of metallic foreign bodies from the Ear, Nose and Throat in Aminu Kano Teaching Hospital Kano, Kano State, Nigeria.

Materials and Methods: This was a 10years (2012-2021) retrospective study that reviewed the medical records of 985 patient who presented to our facility with foreign body in the Ear, Nose and Throat.

Results: The mean age of the patient were 3.2 ± 0.5 with male to female ratio of 1.8:1. A total of 32 (3.2%) metallic foreign bodies were seen and 7 (21.9%) were removed using improvised electromagnet.

Conclusion: This study proves that electromagnet is useful in the extraction of metallic foreign bodies especially when the conventional probe and forceps failed.

Keywords: Electromagnet; Foreign Body; Extraction

Introduction

Electromagnetic principle has been employed for the removal of the metallic foreign bodies since its introduction in 1879 [1]. For a strong magnetic pull-force, larger electromagnets were used for a better foreign body extraction success ratio. Some of these devices were ceiling suspended or mounted on tracts that required powerful electrical motors for positioning. Others were operated by gimballed cranes which were mounted on rails and were usually manually positioned over the patient's head. These large devices were commonly known as "Giant Magnets" [2].

Most of the uses of electromagnetic principle for extraction of foreign body were employed by the ophthalmologist [1-3].

Metallic foreign bodies are relatively common in the ear, nose, throat and tracheoesophageal region.

The use of this agency to remove metallic foreign bodies from other parts of the body is uncommon [4]. ORL Head and Neck Surgeon have also found application of rare earth magnet to remove foreign bodies in the neck, ear, nose and throat to be non-invasive and worth utilizing.

Magnetic telescopic pick up tool was also used to remove button battery from the nasal cavity of a 4yrs old boy [6].

Metallic foreign bodies have been removed from the ear using magnetics [8].

Electromagnet has been used successfully in retrieval of metallic foreign bodies from the ear and nose in our Department.

Methodology

The Medical records of all patients that presented to the department of ORL Aminu Kano Teaching Hospital with foreign bodies in the ear, nose and throat was collected over a 10years period (2012-2021). The result was analysed to determine the number of metallic foreign bodies removed by improvised Electromagnet instruments. The instruments were modified to fit the Ear, Nose and Throat in conjunction with the biotech unit.

Results

Over the studied period 985 patients were seen with foreign bodies in the ear, nose and throat. The age ranges between 2-6 years with a mean age of 3.2 ± 0.5 . Sixty five percent (65%) of them were males with a male to female ratio, M:F 1.8:1. About 56% of those who had metallic foreign bodies were males.

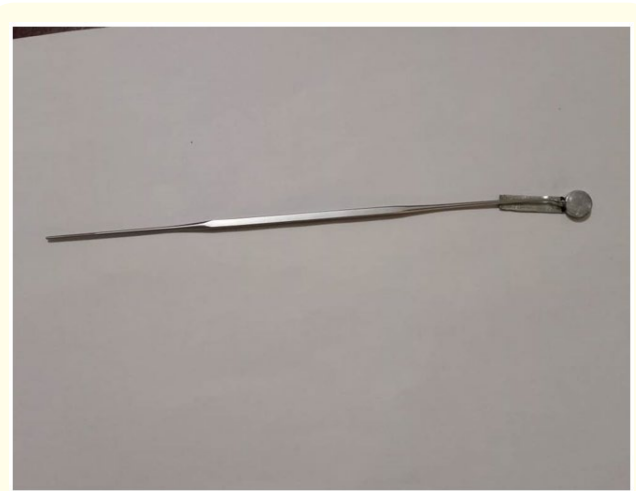


Figure 1: Otologic/Nasal improvised Magnet.

| S/N | Year | No. Of Foreign Bodies in Ear, Nose and Throat Seen | Metallic Foreign Bodies |
|-----|------|--|-------------------------|
| 1 | 2012 | 99 | 3 |
| 2 | 2013 | 74 | 1 |
| 3 | 2014 | 83 | 2 |
| 4 | 2015 | 136 | 5 |
| 5 | 2016 | 90 | 3 |
| 6 | 2017 | 128 | 5 |
| 7 | 2018 | 110 | 4 |
| 8 | 2019 | 126 | 4 |
| 9 | 2020 | 52 | 2 |
| 10 | 2021 | 87 | 3 |

Table 1

A total of 32 metallic foreign bodies were seen under the studied period and 7(21.9%) were removed using electromagnet. Most of the foreign bodies (5 out of 7) were removed in the clinic while 2 were removed under general anaesthesia.

Almost all the cases (4 out 5) removed in the clinic were tried using conventional extraction method, but ended up being successfully removed by magnet.

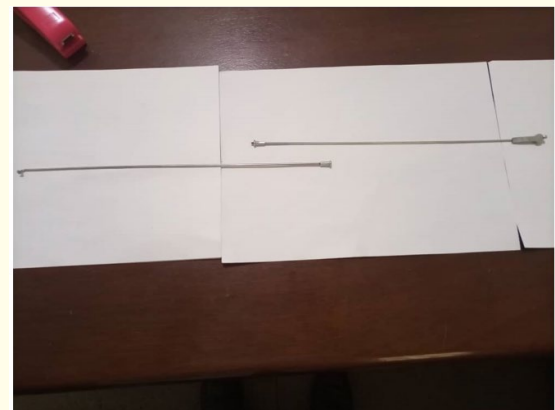


Figure 2a: Throat/Airways improvised Magnets.



Figure 2b: Throat/Airways improvised Magnets.

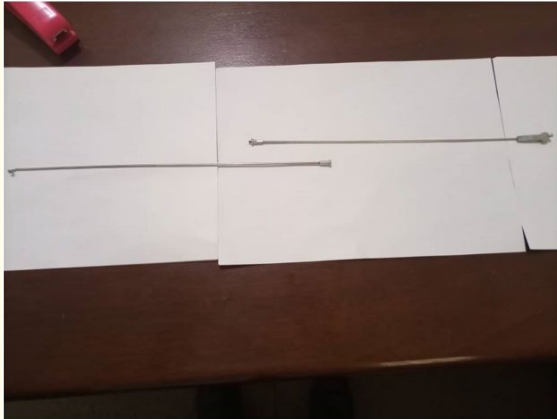


Figure 2c: Throat/Airways improvised Magnets.

Discussion

We modified some electromagnetic objects to achieve safe extraction of FB from the Ears, Nose and Throat.

About 32(3.2%) of the foreign bodies seen in the ears, nose and throat are metallic in the form of disc battery, ear rings, ball bearing, small keys, zip handle etc.

Button batteries are the commonest FB seen in the ear and nose. Ball bearing and ear rings were commonly seen in the tracheobronchial tract and were faced with difficulty extracting especially the ball bearing type, except with the use of specialised forceps.

Electromagnet has been used successfully in extracting metallic foreign bodies from the ears and nose of patient. It has been done with ease and no trauma compared to scooping using Jobson Horne's probe.

Conclusion

Use of Electromagnetic devices adapted to fit the ear, nose or throat was found to be relatively easy to use for extracting metallic foreign objects. This was particularly useful when conventional extraction method was either predicted to be difficult or when it proves to be difficult.

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