Knotted nasogastric tube in the posterior nasopharynx: A case report
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ABSTRACT
Nasogastric tubes are widely used for enteral feeding and administration of medication but unexpected complications can arise during their insertion or removal. There are no standardized ways of dealing with such complications and the safer methods of insertion available are mostly expensive. We present here a case of knotted nasogastric tube and the different approaches that were used to remove it. A brief review of the literature on nasogastric position confirmation techniques is also presented.

Keywords: nasogastric tube, knot; nasopharynx

INTRODUCTION
The use of a nasogastric tube is a common practice in the management of a critically ill patient for either enteral feeding/administration of medication or stomach decompression. As with every medical procedure, there are complications associated with the insertion or removal of the nasogastric tube. Tracheobronchopleural complications, intravascular complications and enteric complications have all been reported in the literature.¹ Rare cases of knotted small bore and even rarer cases of large bore nasogastric tubes have been reported.²,³ Here, we report a case of nasogastric tube knotting during removal of the tube.

CASE REPORT
A 74-year-old male was admitted for close monitoring in our High Dependency Unit with diagnosis of a transient ischemic attack; his Glasgow Coma Score was estimated to be 11/15. He was breathing spontaneously, saturating 98% on room air, he had a good cough reflex, but was not cooperative to allow for oral feeding and oral
medication administration. All his vital signs were in the normal range and he was started on medical treatment. As a part of his management, a 14F nasogastric tube was inserted through the right nostril. The tube was inserted without difficulty up to the measured length. Hospital guidelines recommend carrying out an initial bedside confirmation and secondary confirmation by thorax X-ray imaging. An initial bedside confirmation was performed by auscultating the epigastric area while injecting 10 ml of air with a disposable syringe into the nasogastric tube and the characteristic sound of air being injected into the stomach could not be heard. It was decided to remove and reinsert the tube. While it was gently pulled out and the first lateral opening was being seen in the nostril, it got stuck inside and could not be removed completely. The oropharynx was examined and the nasogastric tube was not seen. All throughout, the patient was breathing well, without any sign of respiratory distress. The skull X-ray (Figure 1) performed showed the nasogastric tube in the nasopharynx where the tip of the nasogastric tube was seen with a coiled proximal end. The nostril was lubricated with lignocaine gel and another attempt was made to remove the tube by inserting a larger nasogastric tube, but the large tube could not go further and the attempt failed. The nasogastric tube was removed by using artery forceps and fibroscopy (Figure 2); it was pulled out successfully and it was surprising to see that there was a tight knot at the distal end of the nasogastric tube. The nasal septum was intact and there was no choanal malformation observed. Another 14F nasogastric tube was successfully inserted through the left nostril and by the following day, the patient had recovered well and was discharged from our unit to the general ward.

DISCUSSION

A nasogastric tube is commonly used in daily practice, but its usual insertion technique has an element of blindness.1 Complications of nasogastric tube insertion and removal have been reported with a mortality rate of 0.3%4 and among the causes, the rare occurrence of knotting has been previously reported.1,2,5 Different techniques to remove such knotted nasogastric tubes depending on the location of the knot have been reported, for example by cutting and removing the knotted part through the mouth;2,6 passing a larger nasogastric tube over...
or removing the knotted nasogastric tube under fibroscopy. Various other methods and techniques have been recommended for safer insertion of nasogastric tubes but they are expensive and some require specialized care, which prolongs the time of insertion. More emphasis needs to be placed on conducting confirmatory tests (Table 1) before the use of nasogastric tubes. Bedside confirmatory tests and confirmatory chest X-ray should be performed before initial use and when nasogastric tube displacement is suspected. Some reports have placed emphasis on inserting only the measured length but it is worth noting that, in this present case, the knot occurred despite having inserted the measured length of the nasogastric tube. Safe and reliable bedside confirmatory tests have been established however, there is no one definitive test to confirm correct placement of nasogastric tubes; hence, one report recommends the use of capnometry as the most reliable bedside test, while another report recommends the use of pH measurement of gastric aspirate as the first line confirmatory test.

Table 1. List of various bedside confirmatory tests for nasogastric tube placement.

| Bedside confirmatory tests |
|----------------------------|
| Traditional methods (observing for cough, for dyspnea or cyanosis) |
| Auscultation of the epigastrium – "the whoosh test" |
| Visual characteristics of nasogastric tube aspirate |
| Gastric residual volumes |
| Sonography |
| Magnetic devices |
| pH of nasogastric tube aspirate |
| Capnography and colorimetric capnometry |

the knotted tube and removing them together, or removing the knotted nasogastric tube under fibroscopy. Various other methods and techniques have been recommended for safer insertion of nasogastric tubes but they are expensive and some require specialized care, which prolongs the time of insertion. More emphasis needs to be placed on conducting confirmatory tests (Table 1) before the use of nasogastric tubes. Bedside confirmatory tests and confirmatory chest X-ray should be performed before initial use and when nasogastric tube displacement is suspected. Some reports have placed emphasis on inserting only the measured length but it is worth noting that, in this present case, the knot occurred despite having inserted the measured length of the nasogastric tube. Safe and reliable bedside confirmatory tests have been established however, there is no one definitive test to confirm correct placement of nasogastric tubes; hence, one report recommends the use of capnometry as the most reliable bedside test, while another report recommends the use of pH measurement of gastric aspirate as the first line confirmatory test.

CONCLUSION

Ensuring the correct placement and maintaining the patency of nasogastric tubes during use are of paramount importance. Any resistance encountered on nasogastric tube insertion or removal should be dealt with cautiously and prompt action should be taken to check the actual position of the tube. Chest X-ray is still the golden standard for checking correct nasogastric tube placement however, newer techniques which are safer and more cost effective are required for the insertion and removal of nasogastric tubes, which are invaluable tools in the management of critical and disabled patients.

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