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A combined laparoscopic and endoscopic approach for the removal of a gastric foreign body. A case report and review of the literature

BACKGROUND AND AIM: *Foreign bodies that are ingested and will not pass spontaneously through the gastrointestinal tract, need to be removed either endoscopically or surgically. Surgery will be required when endoscopy alone fails to retrieve the foreign body. In this study, we aimed to present our experience with an combined minimal invasive approach for the removal of a gastric foreign body and to review the medical literature on the complexities related to its management.*
METHODS: *We report a successful technique represented by a combined laparoscopic and endoscopic approach for the retrieval of a gastric foreign body. A 51 year old male patient, with a longstanding psychiatric history, who ingested a folded bank card with suicidal purpose, had the foreign body removed using this combined minimal invasive approach. Results: The operating time was 150 minutes, there was no blood loss and no perioperative complications. The patient fulfilled the discharge criteria on the 3rd postoperative day*
DISCUSSION : *The approach for ingested foreign bodies should be considered for each patient independently, depending on the characteristics, location and existence of complications of the retained object.*
Conclusion: This combined minimal invasive technique is safe and feasible, with excellent results for the retrieval of large, non-malleable gastric foreign bodies.

KEY WORDS: Endoscopy, Foreign body, Laparoscopy, Removal

Introduction

Ingestion of foreign bodies is more commonly encountered in children than elderly. For adult patients, ingestion of foreign objects prevails among those with psychiatric disorders, mental retardation, alcohol dependence as well as among those who are detained and are trying to get access to medical facilities [1]. Most of the ingested foreign bodies will pass through the digestive tract uneventfully, for those that will not pass, the endoscopic approach can successfully retrieve them in most cases [2,3].
Surgery is required for a small percentage of cases, when endoscopy fails to retrieve the foreign body (1%-14%)[2-4], when a complication (obstruction, bleeding, perforation) is present or when there are multiple objects or large ones [5,6].
We present our experience with a combined approach of endoscopic and laparoscopic technique, used in order to remove a large intragastric foreign body, after endoscopy alone had failed.

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Material and Methods

A 51 year old male patient, with a longstanding psychiatric history, was admitted because he deliberately ingested a folded bank card with suicidal purpose. Previously, this patient has had an attempt to remove the foreign body endoscopically, which was performed in a different medical department , but the procedure failed.

Initially, we tried ourselves an endoscopic approach, but due to the large size of the foreign body (6/4 cm), rigidity and potential risk of esophageal injury during the extraction, we abandoned the procedure in favor of a combined laparoscopic and endoscopic approach.

The patient was placed in the Lloyd-Davies position. In the operating room, under general anesthesia, flexible upper endoscopy was again repeated to guide the procedure. With the help of endoscopy, we managed to ensure insufflation, detection and control of the foreign body at the level of the gastric antrum. By means of an endoscopic grasping forceps the bank card was positioned against the anterior gastric wall.

The patient then underwent laparoscopy, using a 10 mm umbilical camera port, two working 5 mm ports, placed in both subcostal regions, at the midclavicular line and a subxiphoid 10 mm port, placed for the liver retractor. On the anterior wall of the stomach, at the level of the antrum, we placed two stay sutures (2/0 Prolene) approximately 5 cm apart from each other. Using a Reverdin needle the two stay sutures were passed through the abdominal wall outside. These stay sutures were used to suspend the stomach against the anterior abdominal wall.

Between the two stay sutures we performed a small gastrotomy, approximately 3-4 cm in length, using laparoscopic electrocautery. We inserted a 10 mm port from outside the abdomen through the site of the gastrotomy into the stomach. Through this port, a laparoscopic grasper was introduced into the stomach (Fig. 1).

Fig. 1: Insertion of a 10-mm port through the gastrotomy site into the stomach.

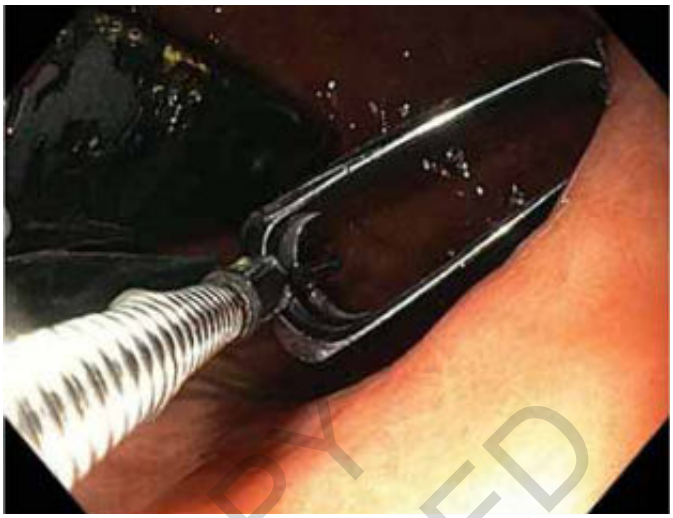

Fig. 2: Endoscopic delivery of the folded bank card to the laparoscopic grasper.

Fig. 3: Rigid folded bank card with a transverse diameter of 6 cm.

Endoscopy provided insufflation and visualization. The folded bank card, secured in the endoscopic grasping forceps, was handed off to the laparoscopic grasping instrument and extracted from the stomach through the gastrotomy site (Fig. 2). The foreign body was placed in an Endobag and retrieved from the abdominal cavity through an incision of 3 cm in length, in the left subcostal region. The gastrotomy site was laparoscopically closed with continuous suture in two layers.

Results

The operating time was 150 minutes, there was no blood loss and no intraoperative complications. Resumption of oral food intake took place on the first postoperative day. There were no postoperative complications, the patient fulfilled the discharge criteria on the 3rd postoperative day. Due to the patient's longstanding psychiatric history, he was maintained under clinical observation until the 7th postoperative day.

Discussion

The management of ingested foreign bodies should be decided for each patient individually, depending on the size, shape, progression, anatomical location of the retained object and the presence of complications.
Ingested foreign objects that fail to leave the stomach within 3 to 4 days should be removed endoscopically if possible or surgically [1].
Endoscopic retrieval is the elective procedure, which will successfully remove the objects in more than 90% of cases [3,5,7,8].
The endoscopic approach is unsuccessful for large and non-malleable objects and can be associated in these cases with esophageal laceration [9]. Larger objects like those longer than 5 cm or wider than 2 cm rarely pass the stomach [5,8]. Surgery is required whenever endoscopy fails to remove the foreign body and when complications occur.
Our patient had two endoscopic attempts that failed to remove the foreign body, a folded bank card, due to its large dimensions (6/4 cm), rigidity and potential risk of esophageal injury during the removal. We proceeded at this point with a minimal invasive technique, a combined laparoscopic and endoscopic approach. This combined minimal invasive approach has been rarely reported in the literature, in less than 10 cases [2,3,5,6,8-13]. The results of these studies demonstrates that this combined technique is feasible and safe with exceptional outcomes (Table I).

Table I - *Characteristics and outcomes of the studies*

	Approach	Failed endoscopic approach	Symptoms and complications of ingested foreign body	Investigations	Foreign body characteristics(type, dimensions)	Intraoperative aspects(time, blood loss, incidents)	Postoperative evolution (complications, hospital stay)
Olson.J (2000)	Endoscopic/ laparoscopic	1	slight fullness sensation	Plain abdominal x-ray	dental bridge sharp,rigid 3.0 /2.3 cm.	70 min 20 ml Noincidents	1 day
Sproule.A (2010)	Endoscopic/ laparoscopic/ open	2	Ambdominal pain	Plain abdominal x-ray	Dental plate Sharp,rigid 4,5/3 cm	No incidents	-
Lanitis.S (2007)	Endoscopic/ laparoscopic	1	Asymptomatic	Plain abdominal x-ray Abdominal ultrasound	two sewing needles	35 min No incidents	1 day
Bhalerao.S (2000)	Endoscopic/ Laparoscopic	0	Hematemesis	Plain abdominal x-ray Abdominal ultrasound	3 metal stents	No incidents	5 days
Iafrati.M (1996)	Endoscopic/ laparoscopic	0	Fever,chills, abdominal pain Perforation, abscess	Plain abdominal x-ray Abdominal ultrasound CT scan	Multiple metallic foreign bodies Tooth brush	No incidents	14 days
Latic. F (2010).	Endoscopic/ laparoscopic	2	Retrosternal pain, dyspahgia, hipersalivation	Oral contrast study with gastrografn	Triungular shape, sharp, rigid foreign body, 4/3 cm.	No incidents	5 days
Wu. C (2008)	Endoscopic/ laparoscopic/ open	1	Ambdominal pain	Plain abdominal x-ray	2 razor blades	No incidents	6 days
Golash. V (2008)	Endoscopic/ laparoscopic/ open	1	Asymptomatic	Plain abdominal x-ray	3 A4 size batteries, broken long handle of the table spoon	No incidents	–

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The laparoscopic approach has some important advantages over the laparotomy that include less postoperative pain, lower requirement for medication (analgesia), a quick recovery and faster return to normal activity, less incisional hernias and better cosmetic results [2,5]. The inability of laparoscopy to localize objects that do not deform the stomach can be overcome by the use of intraoperative endoscopy [5].
The endoscopic approach facilitates localization and retrieval of the foreign bodies by allowing grasping, manipulation and transillumination of the stomach avoiding thus excessive laparoscopic handling of the tissue.
By inserting the laparoscopic port into the stomach and by exerting traction on the stay sutures, suspending thus the stomach against the anterior abdominal wall, we managed to maintain gastric air insufflation and facilitate precise endoscopic transfer of the object to laparoscopic graspers. Removal of the foreign bodies through the gastrotomy site will also avoid possible esophageal lesions that could occur during oral extraction.
With the development of minimal invasive procedures, the combined laparoscopic and endoscopic approach is preferred for selected cases, when flexible endoscopy alone is unsuccessful or too hazardous.

Conclusion

The combined minimal invasive approach that we described is innovative, safe and feasible for the removal of large, non-malleable gastric foreign objects. This technique is an excellent alternative in case of failed endoscopic removal attempt or to laparotomy procedure.

Riassunto

I corpi estranei che vengono ingeriti e non passano spontaneamente attraverso il tratto gastrointestinale, devono essere rimossi endoscopicamente o chirurgicamente. Sarà necessario un intervento chirurgico quando l'endoscopia da sola non riesce a recuperare il corpo estraneo. In questo studio, presentiamo la nostra esperienza con approccio minimamente invasivo combinato per la rimozione di un corpo estraneo gastrico e per rivedere la letteratura medica sulle complessità legate alla sua gestione. Riportiamo una tecnica di successo rappresentata da un approccio laparoscopico ed endoscopico combinato per il recupero di un corpo estraneo gastrico voluminoso. Un paziente maschio di 51 anni, con una storia psichiatrica di lunga data, che ha ingerito una carta di credito piegata a scopo suicidario, e il corpo estraneo è stato rimosso usando un approccio minimamente invasivo combinato.
Il tempo di esecuzione è stato di 150 minuti, non si sono verificate perdite ematiche e complicanze perioperatorie. Il paziente ha soddisfatto i criteri di dimissione al 3° giorno postoperatorio.
In conclusione il tipo di approccio da adottare per la rimozione di corpi estranei ingeriti deve essere considerato per ciascun paziente in modo indipendente, a seconda delle caratteristiche, posizione ed esistenza delle complicazioni dell'oggetto trattenuto.
Questa tecnica minimamente invasiva combinata da noi adottata è sicura e fattibile, con risultati eccellenti per il recupero di corpi estranei gastrici di grandi dimensioni, non malleabili.

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