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A Management Algorithm for Retained Rectal Foreign Bodies

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Abstract

Few authors have proposed therapeutic protocols to manage retained rectal foreign bodies (RFBs). All patients with retained RFBs in hospitals across Trinidad and Tobago over 5 years were identified. Hospital records were retrieved and manually reviewed to extract the following data: demographics, history, foreign body retrieved, clinical signs at presentation, management strategy, duration of hospitalization, and morbidity and mortality. There were 10 patients with RFBs over the study period. The annual incidence of this phenomenon was 0.15 per 100,000 population. All patients were men at a mean age of 50.6 years (range: 27-83; *SD* = 15.3) who presented after a voluntary delay of 1.4 days (range: 0.5-2.5; *SD* = 0.7). Only one patient gave an accurate history on presentation, but all eventually admitted to self-insertion for sexual gratification. At presentation, one patient had a spontaneous rectal perforation (10%). The remaining nine patients had attempts at bedside transanal extraction, which was unsuccessful in 89% (8/9) of cases. The RFB was pushed beyond the grasp of forceps, making removal under anesthesia unsuccessful in 62.5% (5/8) cases. These patients required more invasive extraction methods including transanal minimally invasive surgery (1), laparoscopic-assisted advancement with transanal retrieval (1), and open surgery with transmural extraction and anastomoses (3). A management algorithm is proposed for the management of RFBs. Important points in this algorithm are the importance of clinician–patient rapport, early surgical referral, avoidance of bedside extraction in the emergency room, early examination under anesthesia, and the inclusion of emerging therapies such as transanal minimally invasive surgery.

Keywords

rectum, foreign, retained, extraction, sigmoidoscopy

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Introduction

The medical literature contains reports of retained rectal foreign bodies (RFBs) dating back to the 16th century (Gould & Pyle, 1901). Over time, the number of reports has increased and they are no longer considered rarities in modern medical practice. There are three large publications reporting on 87 cases in the United States (Lake et al., 2004), 101 cases in the United States (Barone, Yee, & Nealon, 1983), and 112 cases in Russia (Biriukov, Volkov, An, Borisov, & Dodina, 2000). Otherwise, existing published series comprise small numbers ranging from 8 (Marti, Morel, & Rohner, 1986) to 30 (Ooi et al., 1998) cases.

Most patients present with self-inserted RFBs—still considered a taboo practice. Many reports focus on the unusual occurrence and stunning images of this condition, but few authors have proposed management algorithms for retained RFBs (Cologne & Ault, 2012; Kasotakis, Roedigerb, & Mittalc, 2012). The therapeutic outcomes in a series of patients with retained RFBs were evaluated in an attempt to define a management algorithm for this condition.

Method and Materials

Permission was secured from the local institutional review board to carry out this retrospective study. The

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Table 1. List of Medical Codification and Descriptors Searched.

CPT/ICD code	Code descriptor
CPT 45915	Removal of foreign body under anesthesia
CPT 45999	Unlisted procedure, rectum
CPT 45990	Anorectal surgical exam under anesthesia
ICD-9 Diagnosis 936	Foreign body in intestine and colon
ICD-9 Diagnosis 937	Foreign body in anus or rectum
ICD-9 Diagnosis 938	Foreign body in digestive system—unspecified
ICD-10 diagnosis T18.5	Foreign body in anus and rectum
ICD-10 diagnosis T18-8	Foreign body in other parts of gastrointestinal tract
ICD-10 diagnosis T18-9	Foreign body in alimentary tract, part unspecified
ICD-9 procedure 98	Nonoperative removal of foreign body
ICD-9 procedure 98.0	Removal of intraluminal foreign body from digestive system without incision
ICD-9 procedure 98.05	Removal of intraluminal foreign body from large intestine without incision
ICD-9 procedure 98.05	Removal of intraluminal foreign body from rectum without incision
ICD-9 procedure 49.93	Removal of intraluminal foreign body from anus with incision
ICD-9 procedure 98.20	Removal of foreign body not otherwise specified
ICD-9 procedure 54.19	Laparotomy otherwise not specified
ICD-9 procedure 54.92	Laparotomy and removal of foreign body

Note. CPT = current procedural terminology; ICD = international classification of diseases.

work was also carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. Four independent investigators reviewed the admission records from all public hospitals across Trinidad and Tobago over a 5-year period from January 1, 2009 to December 30, 2014. Attempts were made to identify all patients with retained RFBs by searching the emergency department registers, operating room logs, gastroenterology procedural logs, and hospital discharge databases.

The independent investigators identified cases from the hospital databases using relevant current procedural terminology codes and international classification of diseases codes. Searches were conducted for the current procedural terminology/international classification of diseases codes outlined in Table 1. In addition, the diagnosis and procedural logs were scrutinized to identify uncoded cases.

The records of all patients identified with RFBs were retrieved and manually reviewed. Only patients with retained RFBs were included. Patients with records that were duplicated or could not be retrieved were excluded. Patients who presented with repeated clinical encounters were not excluded. Hospital records for patients who self-discharged were not excluded from analysis if they absconded posttreatment.

The following data were retrieved from the hospital records: patient demographics, mechanism of retention, foreign body retrieved, clinical signs at presentation, management strategy, duration of hospitalization, and morbidity and mortality. The data were entered into an Excel worksheet and analyzed with SPSS ver 12.0.

Results

Over the 5-year study period, 10 patients presented to public facilities with retained RFBs. Across the nation, therefore, two cases of retained RFBs were encountered annually. Considering that the population of Trinidad and Tobago was reported to be 1,317,714 persons at the last population census (Cawich, Islam, et al., 2014), the annual incidence of this phenomenon was calculated as 0.15 per 100,000 population per year.

The case details are outlined in Table 2. Interestingly, all patients were men at a mean age of 50.6 years (range: 27-83; *SD* = 15.3; median = 51). These patients voluntarily delayed their presentation to hospital by a mean of 1.4 days (range: 0.5-2.5; *SD* = 0.7; median = 1). At the time of presentation, three (30%) patients did not volunteer any history of a retained RFB, only admitting to it when the objects were seen on radiographs.

Of seven patients (70%) who volunteered a history of a retained RFB on presentation, only one admitted using the object for sexual gratification. The remaining six patients were less forthcoming with their history and initially reported several mechanisms by which the foreign bodies were retained: accidentally sat on the object (1), victims of assault (2), and self-treatment of constipation (3). These six patients eventually admitted to using the objects for sexual gratification after rapport was established with their managing clinicians.

Only one patient (10%) gave details of the object in the rectum—this was the sole patient who divulged his history of using it for sexual gratification. The other patients who refused to accurately relay the mechanism

Table 2. Demographics of Patients With Retained Rectal Foreign Bodies (RFBs).

Case	Sex	Age	Insertion mechanism at presentation	Insertion mechanism at discharge	Clinical presentation	Attempted extraction in ER	Outcome of ER extraction	Final extraction method	Object extracted
1	M	57	Self-treatment of constipation	Self-insertion for sexual gratification	Vague rectal pain (did not volunteer RFB history)	Yes	Failed	Laparoscopic advancement and transanal retrieval	Deodorant bottle
2	M	52	Accidentally sat on it	Self-insertion for sexual gratification	Asymptomatic but concerned about RFB	Yes	Failed	EUA and transanal retrieval	Shot glass
3	M	42	Self-treatment for constipation	Self-insertion for sexual gratification	Asymptomatic but concerned about RFB	Yes	Failed	TAMIS	Metal Cuban cigar case
4	M	83	Self-treatment for constipation	Self-insertion for sexual gratification	Vague rectal pain (did not volunteer RFB history)	Yes	Failed	Laparotomy, transmural extraction and repair	Pens × 3
5	M	60	Victim of assault	Self-insertion for sexual gratification	Asymptomatic but concerned about RFB	Yes	Failed	EUA and transanal retrieval	Soda bottle
6	M	35	Victim of assault	Self-insertion for sexual gratification	Asymptomatic but concerned about RFB	Yes	Failed	EUA and transanal retrieval	Toothpaste tube
7	M	55	Acute abdomen–peritonitis	Self-insertion for sexual gratification	Acute abdomen (did not volunteer history of RBF)	No	N/A	Laparotomy transmural extraction and colostomy	Irish potato
8	M	45	Self-insertion for sexual gratification	Self-insertion for sexual gratification	Asymptomatic but concerned about RFB	Yes	Successful	Transanal extraction in ER	Deodorant bottle
9	M	27	Self-treatment for constipation	Self-insertion for sexual gratification	Asymptomatic but concerned about RFB	Yes	Failed	Laparotomy, transmural extraction and repair	Cylindrical perfume canister
10	M	50	Self-treatment for constipation	Self-insertion for sexual gratification	Asymptomatic but concerned about RFB	Yes	Failed	Laparotomy, transmural extraction, and colostomy	Base drumstick

Note. ER = emergency room; EUA = examination under anesthesia; TAMIS = transanal minimally invasive surgery.

of foreign body insertion did not divulge details of the object inserted. Table 1 outlines the object retrieved from these patients.

On presentation, one patient had an acute abdomen with signs of peritonitis on clinical examination. This patient was treated by emergency laparotomy, extraction of the foreign body at the upper rectum, peritoneal toilet, and colostomy. This patient inserted an Irish potato 24 hours before presentation. By the time he presented to hospital, the potato was swollen and turgid after absorbing fluid in the rectum and had perforated the rectal wall. There was a tattered perforation of the upper rectum, minimal fecal contamination localized to the pelvis, and an edematous, unhealthy rectal wall. This prompted the surgeons' decision to close the rectal stump and create a diverting stoma. This patient was eventually discharged from hospital uneventfully after 6 days.

The remaining nine patients had benign examination findings without abdominal tenderness on presentation. The RFBs were detectable on digital rectal examination and/or proctoscopy in the emergency room (ER) in nine patients. In these cases, attempts were made to manually remove the objects in the ER using anal dilators, forceps, and/or proctoscopy—but this resulted in the object being pushed higher into the rectum beyond the reach of the examining finger/instrument in eight cases (89%). These eight patients were taken to the operating room for examination under anesthesia (EUA) but transanal removal was possible in only three out of eight cases (37.5%) with the aide of anal retractors and forceps.

In the remaining five patients (62.5%), the object had been pushed so high that it was no longer within reach to facilitate forceps-assisted transanal extraction. One patient had removal using a transanal minimally invasive surgery (TAMIS) approach, one had laparoscopic-assisted advancement of the object into the rectum with transanal extraction and the rectal wall was opened in the remaining four patients to extract the objects. One of these patients had a subsequent stoma and the other three had primary colonic repair. There were no documented attempts to "milk" the objects distally in these last four cases.

Discussion

The annual incidence of retained RFBs in this setting was 0.13 per 100,000 population. This was similar to that seen in other community hospitals across the globe (Barone et al., 1983; Biriukov et al., 2000; Cologne & Ault, 2012; Coskun, Erkan, Yakan, Yildrim, & Cengiz, 2013; Goldberg & Steele, 2010; Kasotakis et al., 2012; Marti et al., 1986; Ooi et al., 1998), but it differed from that in New York where Lake et al. (2004) reported treating one patient per month in a single institution. Clinicians

Figure 1. Case 10: A smooth, rounded drumstick (arrow) is seen within the rectum.

encountered this condition uncommonly, explaining the heterogeneity in management and reinforcing a need for therapeutic algorithms.

About 90% of patients gave inaccurate histories—not surprising since patients with RFBs are known to be deceptive historians (Cawich et al., 2010; Cawich, Hassranah, et al., 2014; Cawich, Williams, Evans, & Johnson, 2008; Cologne & Ault, 2012; Kasotakis et al., 2012). Patient 7 presented with peritonitis and was not forthcoming even in the face of a life-threatening complication. Eventually, all admitted to autoeroticism after RFB extraction, but it would have been useful to have this information preoperatively when it could have served as a guide to treatment. For example, Patient 10 had a smooth round object that was not retrievable transanally (Figure 1)—in this instance, the surgeons could have performed operative removal earlier.

The importance of an accurate description of the object highlights the need to foster a trusting patient–doctor relationship. This is challenging because most patients are embarrassed to admit that they have engaged in a practice still considered taboo. The patients were all males at a mean age of 50 years. These mature men may be reluctant to divulge their history to younger doctors who are often first responders—especially those of the opposite gender. Clinicians must speak respectfully and candidly with these patients to build a trust-based relationship. Attending clinicians should approach these patients with a nonjudgmental attitude (Cologne & Ault, 2012) and a high degree of respect and professionalism (Cologne & Ault, 2012;

Kasotakis et al., 2012; Safioleas, Stamatakos, Safioleas, Chatziconstantinou, & Papachristodoulou, 2009). Also, taking the time to explain how information will guide management may convince patients to divulge accurate data earlier.

Even in the absence of accurate history, the diagnosis can be made by digital rectal examination, proctoscopy, and plain radiography (Kasotakis et al., 2012; Lake et al., 2004). Radiographs may detect a pneumoperitoneum (Kasotakis et al., 2012) and reveal RFB size, shape, and location (Kasotakis et al., 2012; Lake et al., 2004). This information may identify patients in whom transanal extractions are likely to be unsuccessful. For example, the smooth, solid objects seen in Figures 2 and 3 could not be grasped effectively—and it could be predicted that transanal extraction would be unsuccessful. Sharp objects as seen in Figure 3 should not be removed transanally because they may cause perforations—unless the sharp areas can be effectively covered or controlled. A transabdominal approach via laparoscopy or laparotomy may have been more effective options. Location of the RFB is important because objects in the sigmoid colon are 2.5 times more likely to require operative extraction compared with those in the rectum (Lake et al., 2004). Since important information can be gleaned from plain X-rays, routine radiography is advocated in these patients. Some authorities advocate routine CT scanning for patients who present with RFB >24 hours (Goldberg & Steele, 2010; Kasotakis et al., 2012) but it has not been necessary in the authors' experience.

The 10% incidence of bowel perforation encountered was comparable to that in medical literature, where it is reported to occur in 14.3% (Kouraklis, Misiakos, Dovas, Karatzas, & Gogas, 1997) to 14.7% (Safioleas et al., 2009) of cases. These patients may present with tachycardia, fever, tachypnea, hypotension, abdominal distention, and/or peritonitis. When spontaneous perforation is suspected, no attempt should be made at transanal extraction (Cologne & Ault, 2012). Instead, these patients should be promptly referred to the surgical team for exploration, peritoneal toilet, and control of the perforation. The option for stoma creation versus primary colonic repair is usually an individualized decision based on the amount of contamination, severity of the perforation, state of the injured rectum, and the general state of the patient.

There are many therapeutic options in patients without signs of perforation: manual extraction, endoscopic extraction, TAMIS extraction, laparoscopic or open advancement with transanal extraction, and laparoscopic or open transmural extraction. The myriad of options and low case volumes may make management daunting in these cases.

Many authors advocate attempts at bedside extraction because it is successful in 60% to 75% of cases

Figure 2. Plain radiographs showing a bottle retained in the rectum.

Figure 3. Plain radiograph demonstrating a shot glass retained in the rectum (arrow). The extracted shot glass with sharp edges is shown on the dissection bench (inset).

(Barone et al., 1983; Cologne & Ault, 2012; Kasotakis et al., 2012; Lake et al., 2004; Rodríguez-Hermosa et al., 2007). Attempts at transanal extraction in the ER failed in 89% of cases in the current review and the objects were inadvertently pushed higher into the rectosigmoid region in 63% after failed extractions—even when the object was documented to be palpable in the ER. Therefore, attempts at extraction in the ER are discouraged, opting instead for early transfer to the operating room for EUA, where the patient can be properly relaxed and there is good lighting and adequate

instrumentation. With this strategy, there was a trend toward better success (43% vs. 12%) compared with attempted extraction in the ER with a conscious patient, poor lighting, and suboptimal instrumentation. The short delay to transfer patients to the operating room for EUA should not lead to any deleterious effects in the absence of a perforation. This would also allow immediate escalation in treatment if extraction at EUA fails. Obviously, patients should be thoroughly counseled and this should include consent for operative intervention if indicated.

Maneuvers such as pudendal nerve blocks (Goldberg & Steele, 2010; Kasotakis et al., 2012; Rodríguez-Hermosa et al., 2007; Sharma, Banka, Walton, & Memon, 2007), spinal anesthetic (Dale, Smith, & Rampaul, 2007; Goldberg & Steele, 2010; Kasotakis et al., 2012; Koornstra & Weersma, 2008; Kurer, Davey, Khan, & Chintapatla, 2010; Nivatvongs, Metcalf, & Sawyer, 2006; Rodríguez-Hermosa et al., 2007), intravenous conscious sedation (Berghoff & Franklin, 2005; Clarke, Buccimazza, Anderson, & Thomson, 2005), reverse Trendelenburg positioning (Cologne & Ault, 2012), and suprapubic pressure (Cologne & Ault, 2012) can be utilized as needed to help the patient relax, decrease anal sphincter spasm, and optimize exposure-improving chances of successful retrieval (Cirocco, 2000; Kasotakis et al., 2012). These adjuncts were not used by ER physicians in the current series and may reflect the clinical practice in a busy ER setting. This strengthens the recommendation for early referral for surgical management and this position is supported by data that surgeons have a higher success rate at transanal extraction than ER physicians (Cologne & Ault, 2012; Lake et al., 2004). In cases where the object is not within the reach of forceps during EUA, some have described using an inflated Foley catheter to pull the object down (Manimaran, Shorafa, & Eccersley, 2009; Safioleas et al., 2009) or extraction with obstetric delivery forceps and vacuum extractors (Feigelson, Maun, Silverberg, & Menes, 2007; Kouraklis et al., 1997; Safioleas et al., 2009), with the proviso that the clinician should be experienced in their use.

If transanal extraction fails, there are two minimally invasive options that may be attempted before exploration of the abdomen. Extraction at flexible sigmoidoscopy has been described where the object is encircled with polypectomy snares (Goldberg & Steele, 2010; Koornstra & Weersma, 2008) or grasped with biopsy forceps (Cologne & Ault, 2012) and delivered transanally. Billi et al. (2010) retrieved objects using inflated endoscopic balloons aided by guide wires and fluoroscopy. Obviously, these options hinge on the availability of endoscopic instrumentation and endoscopic skill sets, and is limited by the RFB nature. This retrieval method requires a protuberant process that can be encircled by the polypectomy snare.

Figure 4. A 12 mm standard trocar inserted in the anus to perform a modified TAMIS technique to extract an RFB.
Note. TAMIS = transanal minimally invasive surgery; RFB = rectal foreign body.

The second minimally invasive alternative is extraction via TAMIS (Aly, 2014; Cawich, Mohammed, Spence, Albert, & Naraynsingh, 2015; Léonard, Colin, Remue, Jamart, & Kartheuser, 2012). In this procedure, a trocar inserted into the anus creates a seal for insufflation (Figure 4), allowing laparoscopic instruments to be guided across the lumen to gasp the foreign body. The TAMIS approach has three advantages: (a) many surgeons would be comfortable with TAMIS since the skill sets are similar to those used for laparoscopy (Bak, Merriam, Neff, & Berg, 2013); (b) high-quality magnified images allow accurate mucosal inspection and identification of perforations (Aly, 2014); and (c) specialized instrumentation beyond that for laparoscopy is not required—making this an attractive option in resource-poor settings (Cawich et al., 2015).

If transanal extraction at EUA, TAMIS, and sigmoidoscopy fail, abdominal exploration then becomes indicated. The laparoscopic approach is preferred because it brings definite advantages over open surgery (Bak et al., 2013; Berghoff & Franklin, 2005). Open surgery should probably be limited to cases with low rectal perforations, severe contamination, and in instances where the equipment or expertise is unavailable.

Several options exist for abdominal exploration. In the absence of a perforation, the object may be manipulated using transmural pressure to milk the object distally (Berghoff & Franklin, 2005; Cologne & Ault, 2012; Kasotakis et al., 2012; Koornstra & Weersma, 2008; Rispoli, Esposito, Monachese, & Armellino, 2000). The

Figure 5. Plain radiograph showing a retained metal case for a Cuban cigar (arrow). It has obliterated the normal rectal contour and the object is now affected in the rectum.

pressure applied by laparoscopic instruments can stabilize the object to facilitate transanal retrieval (Goldberg & Steele, 2010). Lloyd-Davies position should be utilized to facilitate abdominal exploration while still maintaining access to the anus.

Advancing the foreign body distally is preferred over opening the bowel wall because it avoids peritoneal contamination and anastomotic leaks. However, it may not be appropriate for sharp, pointed objects such as the broken sticks in Case 10, pens in Case 4, or broken glass in Case 2. These objects may cause extraperitoneal perforations that may be difficult to manage (Cologne & Ault, 2012). In these cases, advancement should be deferred in favor of extraction through an incision in the bowel wall.

There are cases in which failure of advancement is predictable. This is largely dependent on the object inserted. For example, transmural pressure may not effectively move smooth and rounded objects (Figure 1), large objects may become affected against the rectal wall (Figure 5), objects that imbibe water may become swollen and affected (Case 7), small objects may not be palpable across the wall to effectively grasp or apply pressure, and hollow objects apposed against the colonic wall may create a vacuum effect that keeps the object firmly in place (Figure 2). In these situations, the success of the advancement method will be reduced. Transperitoneal extraction is then required.

As long as there is no suspicion of extraperitoneal injuries, oral intake can be commenced immediately. Prior to discharge, patients should be counseled on the potential dangers of this activity, including rectovaginal fistulae (Safioleas et al., 2009), anal sphincter injury with incontinence (Crass, Tranbaugh, Kudsk, & Trunkey, 1981; Safioleas et al., 2009), anal strictures (Safioleas et al., 2009), perforations (Kouraklis et al., 1997; Safioleas et al., 2009), rectal bleeding (Lake et al., 2004), and bowel obstruction (Lake et al., 2004). The importance of counseling is put into perspective considering that 10% of patients had presented previously with retained RFBs.

A therapeutic algorithm is presented in Figure 6. It differs from the algorithms proposed by Kasotakis et al. (2012) and Cologne and Ault (2012), who advocated bedside extraction in the ER. Early surgical referral and EUA with no attempt at transanal extraction in the ER is advocated in the current algorithm because this was associated with high failure rates and often advanced the object high into the rectosigmoid region. Additionally, neither previous algorithm considered TAMIS as an option—although it is a feasible option that can be used before transabdominal exploration. Finally, when operative extraction was indicated Cologne advocated laparoscopy, minilaparotomy, or formal laparotomy without preference (Cologne & Ault, 2012). However, we agree with Kasotakis et al. (2012) that laparoscopy should be first-line therapy when abdominal exploration is indicated.

Study Limitations

The main limitations of this study are the retrospective design and small sample size of 10 cases because this does not allow for robust statistical analysis of the data presented.

Conclusions

RFBs are encountered uncommonly, with an annual incidence of 0.13 per 100,000 population in the Caribbean. These patients must be approached with respect in a nonjudgmental fashion to develop good patient–clinician rapport.

A therapeutic algorithm is presented to assist in clinical management. There are changes in the current algorithm, including early surgical referral, avoidance of bedside extraction in the ER, initial attempts at extraction at EUA in the operating room, and the inclusion of emerging therapies such as TAMIS.

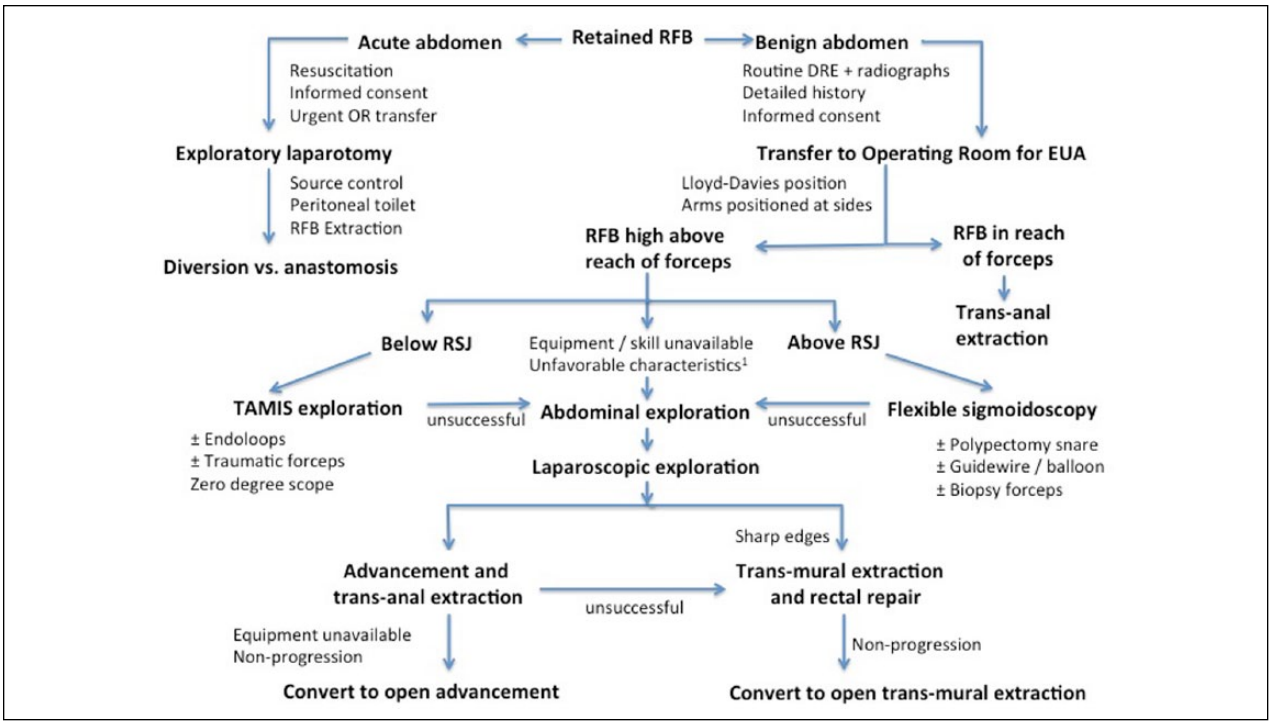

Figure 6. Management algorithm for patients who present with retained rectal foreign bodies (RFBs).
Note. EUA = examination under anesthesia; TAMIS = transanal minimally invasive surgery; RSJ = rectosigmoid junction; DRE = digital rectal exam.

Authors' Note

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