

Original Article

A Multidisciplinary Algorithm for Retained Colorectal Foreign Body

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Key Words

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Purpose. Insertion of a foreign body into the anus is considered a taboo practice. Thus, patients with retained rectal foreign bodies may hesitate about seeking medical attention. Although such cases are rare, every proctologist will encounter this type of patient during their career. However, we discover there is a growing number of patients in recent two years.

Methods. We reviewed patients who visited Mackay Hospital between April 2004 and August 2021 because of retained rectal foreign bodies. Data including the patients' age, sex, reasons for foreign body insertion, type of inserted foreign body, location of the inserted foreign body, clinical manifestations, anesthesia method, and method of foreign body removal were collected from electronic medical records.

Results. A total of 21 patients (22 total visits) were included for analysis. Most patients were men, and sex toys and vibrators accounted for most of the retrieved foreign bodies (54.8%). The main reason for rectal foreign body insertion was sexual stimulation or sexual activity (82.0%). Most of the foreign bodies were removed without surgery (77.3%), although some patients needed a laparotomy (18.2%). None of the patients died from the medical intervention.

Conclusion. Although most patients were men, female patients should also be evaluated for retained foreign bodies in the vagina. Furthermore, careful attention should be paid to patients presenting with acute abdominal conditions (e.g., intestinal perforation). Several methods of foreign body removal are available; however, the easiest, quickest, and best option that would not cause harm to the patient should be selected.

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A retained foreign body in the rectum is a rare but potentially life-threatening condition. Whether the insertion was intentional or accidental, the diagnosis and management of this condition require specialized skills and knowledge, as the various shapes and sizes of retained foreign bodies often present a challenge to clinicians.¹ Because insertion of a foreign body into the anus is considered a taboo practice, patients may feel embarrassed about disclosing the details of their condition. Some patients may even at-

tempt to hide the nature of their condition by substituting their radiographs with imaging films from other patients. This can lead to false diagnoses and, ultimately, delays in treatment.²

The recognition of the presence of a rectal foreign body depends on appropriate medical history taking, physical examination, and radiologic evaluation. Because of the patients' fear of being embarrassed, they often need to be repeatedly asked about their condition before they admit to the existence of retained for-

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foreign bodies. A retained rectal foreign body is easily diagnosed with digital rectal examination or imaging studies such as plain radiography or computed tomography (CT). However, the management of rectal foreign bodies requires an individualized approach based on their size, shape, nature, and location in the patient's body, as well as the degree of any associated rectal injury, which can range from mucosal damage to colorectal perforation.³ A variety of retained rectal foreign bodies, including bottles, spraycans, hoses, iron bars, toothpicks, and toys, and their management have been described in the literature.^{4,5} The most important consideration for the physician is to determine the need for evaluating the patient for signs of intestinal perforation. In female patients, the presence of foreign bodies in the vagina should first be determined to avoid unnecessary damage to the rectum. In this study, we aimed to analyze and classify cases of retained rectal foreign bodies encountered in our department through a retrospective review of medical records.

Materials and Methods

We reviewed patients with rectal foreign bodies who presented to the outpatient and emergency departments of Mackay Hospital between April 2004 and August 2021. All patient data, including age, sex, reasons for foreign body insertion, foreign body type, foreign body location, clinical manifestations, anesthesia method, and method of foreign body removal, were retrospectively obtained from electronic records and files. Patients with incomplete data or those with foreign bodies located in sites other than the colon or rectum were excluded from the study. A total of 21 patients were included for analysis. The total number of visits was 22 because 1 patient visited our hospital for a second time, in a different year, for the same reason. All patient data were de-identified to protect the patients' privacy.

Results

We analyzed 21 patients with 22 total visits, in-

cluding 21 (95.5%) male patient visits and 1 (4.5%) female patient visits. The median age of the patients was 41.9 years (range, 16-81 years). The analyzed cases of rectal foreign body retention are summarized in Table 1. In 18 cases (82.0%), rectal foreign body retention was related to sexual stimulation or sexual activity; 1 case (4.5%) was related to a sexual assault; 1 case (4.5%) was related to an enema procedure for constipation; and the remaining 2 cases were due to iatrogenic staple retention and accidental ingestion of toothpicks. In terms of symptoms, most patients had

Table 1. Baseline characteristics

	Total times (n = 22)
Age, years (mean)	41.9
Gender	
Male	21 (95.5%)
Female	1 (4.5%)
Reason for insertion	
Sexual stimulation or activity	18 (82.0%)
Sexually assaulted	1 (4.5%)
Self-insertion for enema	1 (4.5%)
Others	2 (9.0%)
Type of foreign body	
Sex toy(s), plastic penis, vibrator	12 (54.8%)
Glass bottle or cup	3 (13.6%)
Plastic bottle	2 (9.0%)
Plastic box of enema	1 (4.5%)
Anastomotic metal ring	1 (4.5%)
Others	3 (13.6%)
Treatment	
EUA	9 (40.9%)
Flexible sigmoidoscope ± colonoscopy	8 (36.4%)
Laparotomy	4 (18.2%)
Laparoscopy	1 (4.5%)
Anesthesia	
LA or none	3 (13.6%)
SA	6 (27.3%)
IVG	7 (31.8%)
ETGA	6 (27.3%)
Complication	
Perforation	1 (4.5%)
Non perforation	21 (95.5%)
Hospitalization	
Yes	9 (40.9%)
No	13 (59.1%)

Note: EUA, examination under anesthesia; LA, local anesthesia; SA, spinal anesthesia; IVG, intravenous general anesthesia; ETGA, endo tube general anesthesia; ER, emergency room; OPD, outpatient department.

vague rectal pain and lower abdominal pain, whereas a few patients had difficulty in defecation. Some patients had no perceivable symptoms but were concerned about the foreign body remaining in the rectum. Of these cases, 15 (68.2%) were from the emergency department and 7(31.8%) were from the outpatient clinic.

The most important method of confirming the diagnosis of rectal foreign body retention is abdominal radiography. If the foreign body is not clearly visible on radiography or if the patient has intestinal rupture requiring further treatment, CT should be arranged for further evaluation. In addition to confirming the diagnosis, it is also necessary to determine the size, shape, and location of the foreign body, as well as the possibility of emergency surgery, to choose the treatment method (Fig. 1). In 9 cases (40.9%), the foreign bodies were directly removed through rectal exploration under anesthesia. In 8 other cases (36.4%), the foreign bodies were removed by sigmoidoscopy or colonoscopy. In the remaining 5 cases (22.7%), the retained foreign bodies were removed through exploratory laparotomy or laparoscopy. Surgical removal is usually required when the retained foreign body is dam-

aged and thus can easily cause injury to the intestinal wall, such as perforation; when the object is too large and can easily become lodged; or when the shape of the foreign body makes it difficult to grasp and pull out. Different surgical procedures are available for these cases, and different anesthesia methods are used. In 6 of our cases (27.3%), general anesthesia with endotracheal intubation was adopted. None of the patients died from foreign body retention in the rectum; however, 1 patient had an intestinal perforation. Among the 22 cases, 9 (40.9%) required hospitalization for observation. These patients were discharged after their condition stabilized. Meanwhile, the patients in the other 13 cases (59.1%) were directly discharged home after resting in the recovery room. All demographics of patients with retained colorectal foreign bodies are presented in Table 2.

We encountered two special cases. One case involved an 81-year-old man who underwent low anterior resection and protective enterostomy because of recurrent diverticular inflammation. Anastomotic leakage occurred after surgery. He was discharged from the outpatient clinic for follow-up but still felt slight distending pain in his lower abdomen. After several

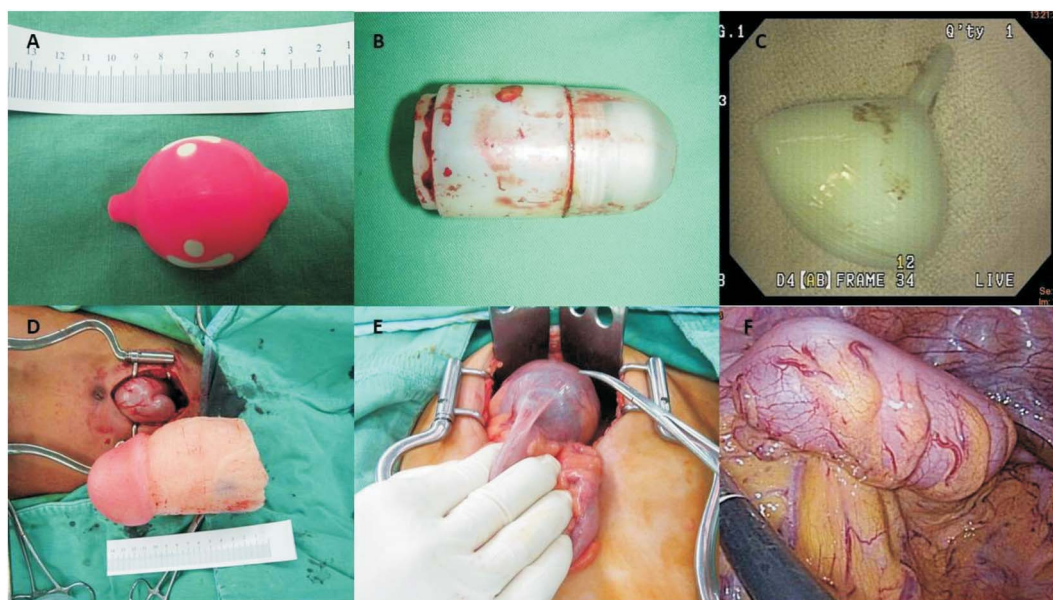


Fig. 1. Photographs showing a variety of extracted rectal foreign bodies. (A) Sexual device (patient 21). (B) Plastic bottle (patient 3). (C) Plastic enema unit (patient 8). (D) Broken plastic penis (patient 13). (E) Bottom of a shattered glass bottle found above the rectosigmoid junction during laparotomy (patient 14). (F) A color pen in laparoscopic view (patient 20).

Table 2. Demographics of patients with retained colorectal foreign bodies

Patient	Sex	Age (y/o)	Reason provided for insertion	Clinical presentation	Type of foreign body	Modality for diagnosis	Measurements (cm) from anal verge	Anesthesia	Treatment	Year	Source
1	M	37	Sexual stimulation	Asymptomatic but concerned about RFB	Plastic bottle	KUB	15 cm	IVG	Flexible sigmoidoscopy	2004	OPD
2	M	34	Sexual activity	Vague rectal pain	Plastic penis	KUB	30 cm	IVG	Flexible sigmoidoscopy	2008	ER
3	M	50	Sexual stimulation	Anal pain	Plastic bottle	KUB	15 cm	LA	EUA	2009	ER
4	M	30	Accidentally swallowing a toothpick	Acute anal pain for 2 days	Tooth pick	EUA	5 cm	LA	EUA	2010	ER
5	M	27	Sexual stimulation	Vague rectal pain	Vibrator	Pelvis x-ray	10 cm	IVG	EUA	2012	ER
6	M	42	Sexually assaulted	LLQ pain with a palpable mass	Plastic penis	KUB	40 cm (redundant sigmoid colon)	ETGA	Laparotomy	2012	OPD
6*	M	50	Sexual stimulation	Vague rectal pain	Sex toy	KUB	40 cm	SA	Flexible sigmoidoscopy	2020*	ER
7	M	81	Iatrogenic accident	Pelvic abscess developed off and on for weeks	Anastomotic metal ring	CT	20 cm	IVG	Flexible sigmoidoscopy	2013	OPD
8	M	74	Self-insertion for enema	Hard to defecation for days	Plastic box of enema	Flexible sigmoidoscopy	7 cm	None	Flexible sigmoidoscopy	2013	OPD
9	M	36	Sexual activity	Mild low abdominal pain	Drinking glass	KUB	Pelvic cavity	ETGA	Laparotomy + colostomy	2015	ER
10	M	66	Sexual stimulation	Vague rectal pain	Glass bottle	KUB	Low rectum	SA	EUA	2015	OPD
11	M	38	Sexual stimulation	Hard to gas passage	Sex toy	Pelvis x-ray	Pelvic cavity	ETGA	EUA	2016	ER
12	M	47	Sexual stimulation	Vague rectal pain	Large vibrator	KUB	Pelvic cavity	SA	Colonoscopy	2017	OPD
13	M	23	Sexual stimulation	Acute abdominal pain	Sex toy	Pelvis x-ray	Pelvic cavity	ETGA	Laparotomy	2018	ER
14	M	48	Sexual activity	Acute abdominal pain and anal bleeding	Shattered glass bottle	KUB	Pelvic cavity	ETGA	Laparotomy	2018	ER
15	M	30	Sexual activity	Vague rectal pain	Large vibrator	KUB	15 cm	SA	EUA	2019	OPD
16	M	57	Sexual stimulation	Vague rectal pain	Sex toy	Pelvis x-ray	10 cm	IVG	Flexible sigmoidoscopy	2019	ER
17	M	23	Sexual stimulation	Vague rectal pain	Sex toy	Pelvis x-ray	10 cm	SA	EUA	2020	ER
18	M	52	Sexual activity	Perianal pain and itchy sensation	Toothbrush	EUA	15 cm	IVG	EUA	2020	ER
10	M	20	Sexual stimulation	Vague rectal pain	Large vibrator	KUB	15 cm	SA	EUA	2020	ER
20	M	16	Sexual stimulation	Abdominal pain	Two color pens	KUB	15 cm, 25 cm	ETGA	EUA and laparoscopy-assisted	2020	ER
21	F	41	Sexual stimulation	Acute anal pain	Sex toy	Pelvis x-ray	20 cm	IVG	Flexible sigmoidoscopy	2021	ER

Note: M, male; F, female; y/o, years old; RFB, retained foreign body; RUQ, right upper quadrant; LLQ, left lower quadrant; KUB, kidneys, ureters, bladder²¹ radiograph; CT, computed tomography.

* The same patient came back after eight years due to RFB again.

months of outpatient follow-up, he was admitted to the hospital because of persistent fever. Abdominal CT revealed a metal ring foreign body near the anastomotic end and the presence of pelvic abscess. Colonoscopy was later performed, and the foreign body was identified to be the intestinal stapler from a previous surgery, which was successfully removed (Fig. 2). Another case involved a 4-year-old girl who was brought to the outpatient clinic by family members. She complained of an itchy anus and discomfort for several days. Abdominal radiography showed a flat and round object in the pelvis, and a preliminary diagnosis of rectal foreign body retention was made. Thereby, we scheduled a colonoscopy under general anesthesia. After 1 h of colonoscopy, we still could not find the flat and round foreign body. We later reevaluated the anus and vagina and found a flat and round battery (Fig. 3), which was finally removed from the vagina.

Discussion

Patients who visit the hospital because of rectal foreign body retention are rarely encountered. Small



Fig. 3. Radiographic image showing radiopaque retained rectal foreign bodies. A flat and round battery that appears to be located inside the vagina (red arrow).

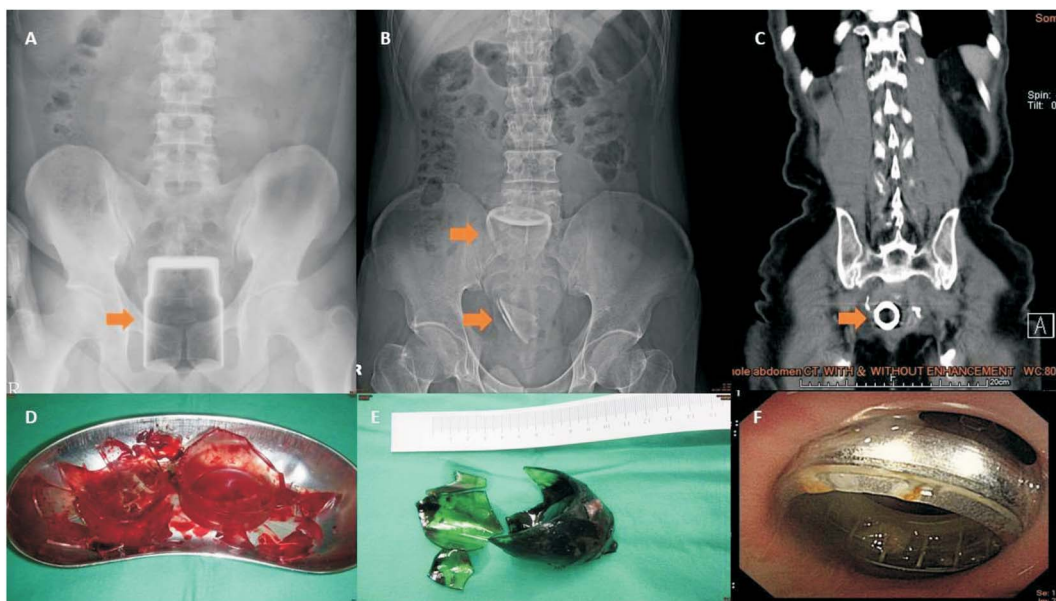


Fig. 2. Radiologic images and extracted objects. (A, D) Intact drinking glass and extracted glass fragments (patient 9). (B, E) Shattered glass and extracted glass fragments (patient 14). (C, F) Metal ring demonstrated on computed tomography and anastomotic metal ring extracted during colonoscopy (patient 7).

foreign bodies usually pass out on their own, and most patients with retained rectal foreign bodies attempt to remove the objects outside the hospital. Patients who seek medical treatment for this condition are mainly in middle adulthood and are predominantly men. In fact, the cases reported in this article mostly involved male patients.⁶ Most cases of foreign body insertion are related to acts of sexual stimulation and gratification, whereas a small number of cases are related to sexual assault.⁷ In elderly patients, a common cause of rectal foreign body retention is fecal impaction due to the insertion of an enema device.⁸ Pediatric patients are relatively rarely encountered and should be investigated for possible links to sexual abuse.⁹

The most important concern in cases of rectal foreign body retention is the risk of intestinal perforation.¹⁰ Large foreign bodies that become retained for a long time after insertion can easily lead to local edema and circulatory disturbances, thereby increasing the patients' health risk.¹¹ A foreign body with a sharp edge or a fragmented foreign body can easily cause intestinal perforation. Depending on the shape and material of the foreign body, it may adhere to the mucous membrane and can be difficult to grasp, or it may be difficult to remove from the proximal bowel because of negative pressure during its removal.

The insertion of a foreign object is also described as a voluntary or involuntary event, in addition to being sexually related.¹² Such cases include insertion of illegal drugs into the body orifices, sexual assault, mental illness, or accidental ingestion of bone fragments in children.⁹ Recognizing the etiology is important because it can provide information about the extent of injury and the type of trauma to the patient. The use of the American Association for Ambulatory Surgeons Rectal Organ Injury Scale is also important for classification and definition. Most injuries secondary to rectal foreign body retention are classified as grade I (partial thickness laceration) or grade II (laceration < 50% of the circumference).^{13,14}

Physicians should avoid discriminatory questions about the patient's medical history and maintain patient privacy. In addition, building trust with the patients is important to encourage them to willingly report their medical history in detail, thereby allowing

prompt and accurate diagnosis.² The primary purpose of the initial evaluation is to determine the type, number, size, shape, and location of the foreign bodies. Detailed physical examination is needed, including abdominal auscultation and palpation, to determine the presence of bowel motility and increased or decreased bowel sounds. When performing a digital rectal examination, special attention should be paid to the risk of injury to the physician's finger from touching sharp foreign objects.

Abdominal radiography is usually the first examination performed, as it allows quickly obtaining important information, including the number, size, and location of the foreign bodies and whether they had caused intestinal rupture. Radiographs tend to reveal metals or high-density objects because these materials are denser than the tissue around the abdomen. However, some objects may be undetectable on radiographs, which does not mean that foreign bodies are not present. In addition to abdominal radiography, standing chest radiography should be performed in all patients with suspected intestinal perforation. If the object cannot be visualized on radiography, a colonoscopy, abdominal ultrasound, or abdominal CT can be used for foreign body evaluation. Blood tests can suggest the presence of intestinal perforation based on inflammatory parameters such as white blood cell count, C-reactive protein level, and erythrocyte sedimentation rate.

After medical history taking and examinations, the method of foreign body removal should be decided. We provide our treatment algorithm for patients with retained rectal foreign bodies in Fig. 4. In patients with acute abdominal symptoms suspected of having intestinal perforation, active parenteral drip supplementation, broad-spectrum antibiotic administration, nasogastric tube decompression, and laparotomy are primarily required. If the patient has stable vital signs, smear-type anesthetics or local anesthesia can be applied at the bedside for anal sphincter relaxation, facilitating the visualization and removal of the foreign body. After transanal extraction we will evaluate the surroundings of colorectal mucosa by flexible sigmoidoscopy. Blind removal of high-risk foreign bodies, such as sharp-edged objects, light bulbs, and

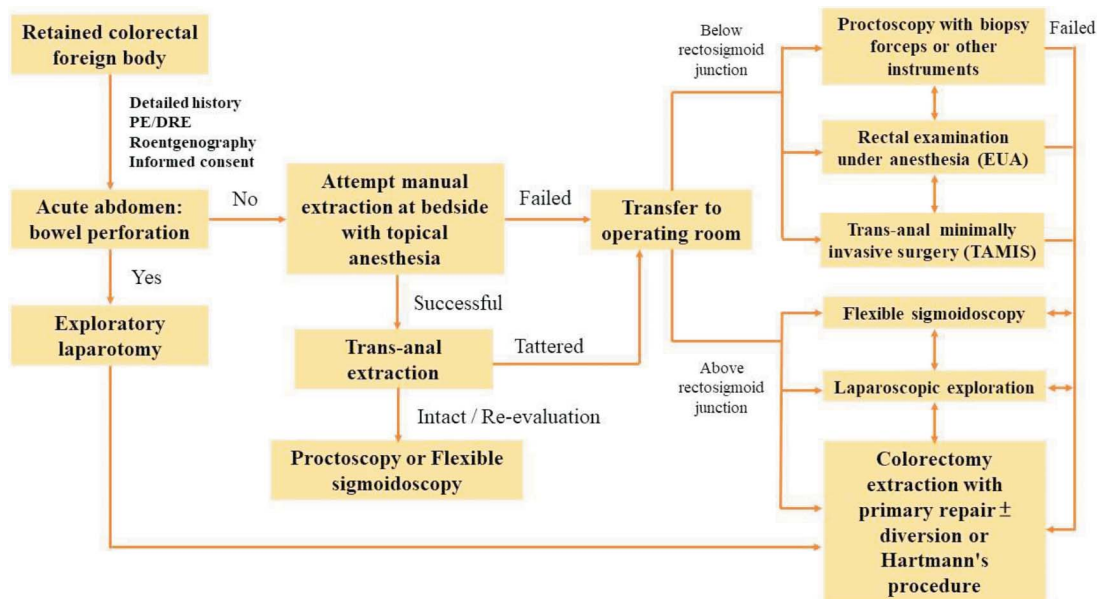


Fig. 4. Treatment algorithm for patients with retained rectal foreign bodies.

glass, is not recommended, as they can crack or shatter and cause rectal injury. A better approach would be to send the patient to the operating room for further evaluations.

Clarke divided foreign bodies into low-level foreign bodies located distal to the rectosigmoid junction and high-level foreign bodies located above the rectosigmoid junction.¹⁵ In our algorithm, foreign bodies distal to the rectosigmoid junction can be removed by a Foley catheter, proctoscopy with biopsy forceps, colonoscopy, rectal exploration under anesthesia, or transanal minimally invasive surgery.¹⁶⁻¹⁹ Foreign bodies located above the rectosigmoid junction are difficult to remove using Kelly or Rochester-Carmalt forceps, as these cannot be bent, and can only be removed by colonoscopy or abdominal surgery. If the process of clipping the foreign body causes damage to the rectum, the procedure for foreign body removal should be changed to exploratory laparotomy as soon as possible. The requirement for an enterostomy depends on the colorectal injury and the degree of inflammation in the abdomen. In female patients, it is impossible to distinguish whether the object is in the vagina or rectum on abdominal radiography. Therefore, an obstetrician or gynecologist should be consulted for exclusion.

In this study, there were no cases of death due to

the removal of retained rectal foreign bodies. Meanwhile, a retrospective study published in Japan in 2015 analyzed 648 patients in 431 hospitals (526 male patients [81.1%] and 122 female patients [18.9%]). Most patients with retained foreign bodies were men in their 60s and women in their 80s. The overall in-hospital mortality rate was 1.2%. In that study, women were more likely than men to experience in-hospital mortality (0.4% vs. 4.8%, $p = 0.001$), perforation and peritonitis (5.2 vs. 12.8%, $p = 0.004$), and sepsis (1.1 vs. 4.0%) due to retained foreign bodies.²⁰

Conclusion

Because rectal foreign bodies are rare, relevant epidemiologic statistics remain scarce. This may also be because of the wide differences in the types of rectal foreign bodies encountered in the clinical setting, precluding the establishment of a complete and unified approach. The patient should be carefully and thoroughly evaluated before choosing an extraction method. For patients without acute abdominal symptoms, transanal extraction should be the first choice. Although most foreign bodies can be removed by colonoscopy or rectal exploration under anesthesia, a few cases may be difficult to remove using these me-

thods and exploratory laparotomy may be required. Several methods of foreign body removal are available. They often can be used interchangeably, depending on local medical resources and multidisciplinary team cooperation. The simplest, quickest, and best option that would not cause harm to the patient should be selected.

Ethical Approval

Written informed consent for publication has been obtained from the patient. Approval from the institutional review board and ethics committee was obtained for the study.

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Competing Interests

None declared.

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None declared.

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原 著

肛門異物的處理方式

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目的 將異物插入肛門往往被認為是一種禁忌的行為，因此直腸異物滯留的患者可能會猶豫就醫。雖然罕見，但是每位直腸外科的醫生在職業生涯中大多會遇到異物滯留的病人。而我們發現近兩年患者的數量持續增加。

方法 我們回顧了從 2004 年 4 月至 2021 年 8 月，因直腸異物滯留困擾來馬偕醫院就診的患者。透過電腦病歷，我們詳細記錄病患的年齡、性別、病患提供的理由、異物類型、異物位置、臨床表現、麻醉方式和異物取出的方式。

結果 本篇一共收錄了 21 位病人，總就診次數為 22 次的資料分析。男性占大宗，取出的物品大多是性玩具和振動器 (54.8%)。直腸異物滯留的原因大多是為了性刺激或是性活動 (82.0%)。大多數的患者來就醫後可以將異物從肛門取出 (77.3%)，但部分病患需要透過剖腹探查 (18.2%) 才能將異物拿出。所有的病患都沒有因為醫療措施的介入而造成死亡。

結論 雖然就診病患大多為男性，但女性患者還需要多留意是否異物殘留在陰道內。除此之外，要仔細注意來診病患是否有急性腹症，包括腸穿孔的狀況。臨床醫師在面對上述診斷的病患時要特別小心。移除異物的方式有很多種，用最簡單、快速、不傷害病患的前提下，就是最好的方法。

關鍵詞 大腸直腸、異物、綜合學科、演算法。