

Review Article



Colorectal and Anorectal Foreign Bodies

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Abstract

Foreign bodies (FBs) in the colon, rectum and anal canal are not unusual. Colorectal Foreign Bodies (CRFBs), whether administered per-anally or swallowed orally, intentionally or unintentionally, bring management challenges to the attending physicians and surgeons. CRFBs are usually seen in the adult patients with perverted sexual or erotic or psychosis, or mental retardation, or in drug smugglers or prisoners, and anorectal FBs (ARFBs) are sometimes seen on accidental or careless swallowing with or without food, or per-anal administration in all age groups. Careless elderly patients with or without visual problems, with or without using artificial dentures are also not unusual victims. Self-administration per-anally with a view to attempting relief from constipation has also been described, especially in adults and elderly people. Many of these FBs can pass with intestinal contents, and may be thus removed with stool without complications. The sharp FBs can penetrate the bowel wall leading to serious consequences, and a relatively large FB can get impacted causing bowel obstruction. The presentation may be straightforward, and sometimes may be exquisitely concealing. The objective of this review article is to understand and share the management strategies which would be very much helpful to all concerned.

Key words: Gastrointestinal Swallowed Foreign Bodies, Per-anal Administration of Foreign Bodies.

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Introduction

Patients with CRFBs (Colo-Rectal Foreign Bodies) commonly appear in the EDs (Emergency Departments) of hospitals as a not uncommon emergency.¹ These are commonly swallowed or introduced per-anally, either intentionally, or accidentally, because of being mentally retarded, or of psychiatric disorders, or by prisoners, or drug smugglers, or by edentulous people using dentures, etc.^{1,2}

In children, FB swallowing is a common phenomenon. 80% of swallowed FBs pass through the alimentary tract without complications.³ About 20% of swallowed FBs may fail to pass through the entire alimentary tract.⁴ The latter group can result in obstruction, gut wall injuries, bleeding, perforation, fistulation, and complications thereof. Less than 1% may cause erosions and perforations, mostly by sharp FBs.^{5,6} Poultry bones and fish bones account for half of the documented perforations of these sharp FBs. The most common sites of perforation are the ileo-cecal region and the sigmoid colon.^{3,7}

A large impacted CRFB (bobbin) removed from the acute curvature of the sigmoid apex by open sigmoid resection is given here in the following Figure 1.

History

The oldest psychological aspects of rectal foreign bodies date from the prehistoric period of ancient Egypt and ancient Greece (as by Haft and Benjamin). The first recorded case of rectal foreign body dates from the 16th century. But the oldest medical journal case report was described first in 1919 (Smiley), though some medical books in 1881 (Poulet) and 1902 (Gant) described the etiologic aspects rectal foreign bodies.^{1,2,8}

Incidence and Epidemiology

Exact reliable precise data about past and current incidence of CRFBs are clearly unknown worldwide. No differences in nationality, caste, color, creed, race and religions have been well described. Rectal foreign bodies may be regularly detected in

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many large hospitals, may be approximating as much as one patient per month in each large hospital. The incidence rate is described to be substantially higher in men than women, the ratio being about 28:1 to 37:1, the reported age range is 16 to 100 years with the median age being 44.1 years, having a standard deviation of roughly about 16.6 years. Many researchers claim that they are most common between 20 and 40 years of age. The widest time lapse between administration of a foreign body and documentation of diagnosis was about 5 years.^{4,9,10}



Figure 1: A large impacted CRFB (bobbin) removed from the acute curvature of sigmoid apex by open sigmoid resection, (source: author ownself).

Etiology

Causes of CRFBs include accidental swallowing small objects (including small coins, buttons, batteries, fish-bones, meat-bones, metallic pins, cocktail sticks, pieces of different thicknesses of metallic wires or strings, drugs in protective bags, etc.) in all age groups, including children, psychiatric patients, prisoners, drug smugglers and abusers, intentional administration per-anally by smugglers, and, occasional forceful administration orally or through anus by criminals, etc. Retained rectal foreign bodies are often inserted for the purpose of erotic gratification or perverted sexual assault. Self-administration is sometimes detected in Psychiatric patients. Elderly patients of 60 to 80 years old may insert foreign body as irrational self-treatment of fecal impaction, or prostatic massage. Such institutionalized patients as prisoners or psychiatric patients may keep knives, weapons, or drugs in their rectums to attack others like guards, caregivers, or other prisoners, or patients or abusers⁵. Rectal foreign bodies in children commonly indicates sexual abuse. Such objects as batteries, bottles, toys, bulbs, fruit, vegetables, aerosols, caps, metallic and wooden objects may be detected as ano-rectal foreign bodies.^{1,5,11,12}

Classification and types of Colorectal and Anorectal Foreign Bodies

Colo-Rectal Foreign Bodies may be typified in varied ways. E.g., depending on their location, they can be arbitrarily classified as colonic (in the caecum, or ascending colon, or right colic flexure, or transverse colon, or left colic flexure, or descending colon, or sigmoid colon, etc.), or rectal (Upper rectal or lower rectal) & anorectal. Usually, these are retained in narrower parts as impacted FB, or when they pierce the bowel wall not being moved further by peristalsis, or being impacted by sphincters, etc. Per-anally administered FBs may be moved proximally by reverse peristalsis until they get impacted somewhere like apex of the sigmoid colon, depending on the characteristics of the FBs, etc. Anorectal FBs may produce edema in sphincteric region after administration.^{1,8,13,14}

Foreign bodies may also be classified as either voluntary or involuntary and as sexual versus or non-sexual (Table 1).^{9,15,16}

Table 1. Showing an arbitrary form of classification of foreign bodies

- A. Voluntary or Involuntary
- B. Sharp, pointed or blunt
- C. Sexual Vibrators, dildos, and other variety of objects
- D. Rape or assault
- E. Non-sexual Packing of illogical illicit drugs in the rectum
- F. For mental patients, children:
 - a). Ingestion of bones and plastics, pipes, bottles, wooden objects, coins, etc.,
 - b). per-anal self-administration
 - c). administration by criminal offenders

The above classification gives an impression about the characteristics of injury the patient may get because of the FB. The wide types of shapes and sizes define the spectrum of traumas, explains the expected safest extraction techniques. This classification also describes the easiness of gripping the FBs. Easy-to-grip FBs include such small sharp objects as bones and the erotic such phallic objects as dildos, candles, vibrators, fruits and vegetables, etc. Contrariwise, difficult-to-grip FBs include jars, spheres, containers, light bulbs, and bottles, etc.^{2,10,17}

Pathophysiology

Such swallowed foreign bodies as small bones of fish or meat, small pieces of metallic flexible threads of different sizes, shapes, and thicknesses, or small metallic or plastic screws or screw threads (less than 2 cm size), or tooth-picks, pieces of aluminum strips of medicinal products may travel through upper and middle gastrointestinal tracts (GITs), including such narrow lumen or sharp bent areas as the upper and lower esophageal sphincters the pylorus, Treitz's ligament, the terminal ileum, the ileocecal valve, the colonic flexures, the sigmoid

apex, and ultimately to get arrested at the level of anorectal sphincters, because of the tonic contractile nature of its sphincters, and the anal canal being the narrowest physiological region in the alimentary tract, (The anus is often described as being the narrowest patho-physiological and functional part in the alimentary tract).^{3,18,19} The sustained contracted state of the anal canal plus reflex involuntary spasm of the anorectal sphincters (in response to FB injury in the anorectal mucosal, submucosal and muscular layers) strongly prevent them from expulsion by the usual defecation reflex. If fish bones are stuck in the throat, such treatments as swallowing a whole solid food bolus is commonly practiced rather than searching for emergency removal. Then when symptoms of abdominal or anorectal pain, obstruction or perforation-peritonitis or bleeding per rectum become evident, only then a medical advice is sought. Such sharp small FBs as fish or meat bones are commonly incarcerated in the anorectal region. Changing the orientation from the longitudinal to oblique or horizontal position, a sharp FB can penetrate the colorectal wall creating complications thereof.^{5,20,21}

Clinical Features of CRFBs

The CRFBs produce different, depending on their anatomical locations. An adequate history of swallowing or per-anal administration may be available. There may have abdominal pain, nausea, vomiting, blood in the stool, ano-rectal discomfort, and pain with or without pruritus, tenesmus, features of such complications as perforation-peritonitis, intestinal obstruction, fistulation, infection-sepsis and complications thereof, psychiatric and psychoactive disorders, features of poisoning, shock, etc.^{7,8,22}

Complication of CRFBs^{1,3,5,23-25}

Significant and noteworthy complications are as follows:

- Perforation-peritonitis (acute, subacute and chronic) can occur particularly by sharp or pointed or irregular FBs. FBs with sharp angles, narrow segments, cul-de-sacs and flanges are most commonly responsible for perforations, of which about 75% are in the ileocecal region.²²
- Abdominal, subphrenic, intramural, and intrahepatic abscesses.
- Various types of gastrointestinal, enterocutaneous and entero-urinary fistulas. Colo-vesical, colo-rectal fistulas have been incriminated to be caused by swallowed chicken bones.^{13,14}
- FB migration to nearby organs.²³
- Intestinal obstructions due to Impaction in such locations as the ileocecal valve, sigmoid apex. Colonic flexures, appendix, cecum, and ano-rectal sphincteric levels, etc.²⁴
- Hemorrhages because of erosion of the bowel wall.
- Poisoning due to absorption of exposed, or degraded toxic substances.
- Infection-sepsis, and complications thereof.
- MODS (multiple organic dysfunction syndrome).
- Psychological problems, especially if there is sexual enforcement.
- CRFBs (including button batteries and toy magnets) can rapidly create bowel necrosis, pericolic and anorectal abscesses, perforation-peritonitis, fistulation (e.g., entero-enteric, entero-urinary, entero-vascular, etc.), pseudoaneurysm, volvu-

lus, bowel obstruction, etc., and complications thereof.

- Mortality, following such complications as infection-sepsis, MODS, & MSOF (multi system organ failure).^{9,25,26}

Diagnosis

Diagnosis is to be made by proper history taking, complete physical examination and laboratory investigations including imaging. Diagnosis is usually not straightforward as the history is being hidden by embarrassed or psychiatric patients, and late presentations to the hospitals.^{1,11,12} Exact information of per-anal administration, if available is quite helpful to arrive at a concrete diagnosis. Principal symptoms include anal pain, pruritus, discharge, bleeding, constipation, abdominal pain with or without distension, etc. Other symptoms include dysuria, anal incontinence, tenesmus, diarrhea, multiple failed attempts at removing the FB, and features of sepsis, especially if complicated by perforation and peritonitis (e.g., hypotension, tachycardia and peritonism, pyrexia, nausea, vomiting, bacterial peritonitis, etc.). Cardiovascular collapse may occasionally be found in patients who are being abused for trafficking psychoactive materials which get ruptured inside and absorbed.^{12,26} The risks of rupture and absorption of toxic substances or mucosal injury are directly related to the lag period of time of administration and presentation.^{27,28}

Physical examination specific to CRFBs

Patients' privacy is to be honored and upheld properly, and personally objectionable dishonoring attractive or comical with or without discriminatory conversations are to be totally avoided by the attending physicians, and other health staffs.¹⁰ The approach should be gentle, polite, respectful, friendly, trustworthy with sympathy and empathy. The initial assessment and evaluation are to detect the class, nature, number, site, size, shape of the FB or FBs, the complications and the comorbidities if any. The detailed identity of the object/objects is crucial for undertaking the optimum, or the best management protocol.²⁷ A sincere, careful, elaborate physical examination must be undertaken including abdominal inspection, palpation, percussion and auscultation to determine whether bowel sounds are present, absent, decreased, or increased, especially to evaluate/rule out peritonism, peritonitis, or bowel obstruction, etc. Occasionally, FBs are palpable in the ano-rectal areas. Contusions, lacerations, perforations, hemorrhage, foul smells, discharges of mucous or purulent or hemorrhagic secretions are to be clearly ascertained. Foul smelling fetid discharge commonly indicates anaerobic infection with necrosis, with or without sepsis or perforation or peritonitis.¹⁵ Gentle and careful per rectal digital examination is to be followed as some FBs are sharp or pointed that can injure the patients' gut wall more, or even can injure the examining finger of the physicians.¹⁵ The rectal FB situated at the lower part is usually palpable on per-rectal digital examination. The autonomous spasm of anal sphincters can hinder the per-rectal extraction attempts. If the FB/FBs are not palpable, hemorrhagic finger tips with or without sphincteric spasms are usually suggestive of presence of FB/FBs, provided the history and circumstantial evidences are equally impressive.^{9,10} Clinical features of peritonitis are usually present if perforation occurs above the level of puborectalis sling and peritoneal reflection. If the digital rectal examination findings are negative, proctoscopy or sigmoidos-

copy or total colonoscopy is to be performed. The integrity of bowel mucosa sometimes needs to be evaluated directly.^{14,29,30}

Diagnostic imaging studies

Some patients are not aware of FB ingestion, and then a high index of suspicion is required to arrive at a diagnosis in all acute abdomen, especially at extremes of ages. Such imaging techniques as plain x-rays, USG (ultrasonography, computed tomography, MRI) are then very much helpful. Stool should be checked for spontaneous expulsion of small CRFBs of the object. Plain x-ray is often worthwhile if there is radio-opaque FB, or such complications as perforations or intestinal obstruction, etc. In selected cases, CT scans, ultrasonogram, endoscopy are also worthwhile. Sometimes, serial radiography is to be done to follow the transit of the FB in the alimentary tract, or to detect other complications, if any. If complicated by anorectal fistulation with or without suppuration, MRI scan is the imaging of choice.^{9,15,18}

Abdominal x-rays are the first imaging to be done. X-rays can locate radio-opaque FBs, including their sizes and numbers. Anteroposterior, lateral and sometimes oblique x-rays are required for more accurate location of FBs. Metallic FBs including pebbles are usually well recognized in x-ray films. Organic substances that are iso-dense with human tissues are not easily recognized.⁹ Failure of x-ray diagnosis does not exclude its presence. Plain x-rays of abdomen with or without chest x-rays are mandatory if features of perforation, peritonitis, with or without intestinal obstruction are obvious. 4-D ultrasonogram, sigmoidoscopy, colonoscopy, CT scan of the abdomen and pelvis, single or double contrast x-rays of the colon and rectum using water soluble contrast may need to be considered, with utmost care so that the hydrostatic pressure of the contrast agents does not increase enough to cause perforation of the bowel wall, if plain x-rays fail to diagnose adequately.^{1,24,29} EUS (Endoscopic ultrasonography) is useful if there are impacted FBs, mucosal or subepithelial lesions. A FB is sometimes seen within a granulomatous lesion. Contrast enhanced CT scan is valuable to detect perforation below the level of peritoneal reflection. Meso-rectal air, perirectal fluid, striations in meso-rectal fat, and thinning of the rectal wall may be seen in cases of extraperitoneal perforation of the rectum.^{1,4,25} Colonoscopy can give excellent views of the segments aiding in diagnosis, and additional advantage of therapeutic extraction of FBs. It often require flexible fiber-optic recto-sigmoidoscopy following extraction to diagnose any colorectal injury/injuries, and also to diagnose additional FBs, if any.^{8,10,30} Such biochemical and hematological inflammatory parameters as differential and total leucocyte counts, CRP (C-reactive protein), the ESR (erythrocyte sedimentation rate), arterial gas analysis, are commonly not routinely advised as an assessment tool, but they may be ordered if there is suspicion of sepsis, perforation or peritonitis, etc. In selected cases, such comorbidities as diabetes, etc. are to be evaluated. Toxicological screening is advised if there are suspected poisoning cases.^{2-4,30}

Treatment strategies

Colorectal FB patients if present with acute abdomen, when perforation and peritonitis are suspected need immediate NPO (Nothing Per Oral), intensive parenteral hydration, intravenous

broad spectrum anti-bacterials covering maximal gram positive, gram negative and anaerobic microbes, urinary catheterization, gastrointestinal decompression by frequent nasogastric tube aspiration, followed by exploratory laparotomy and definite treatment as early as practicable. If the patient is relaxed and quiet, one can attempt the extraction per-anally without general anesthesia. Or, it can be attempted successfully with local anesthesia, i.e., by blocking the perianal nerves, with or without conscious sedation. Sometimes spinal anesthesia may be enough. And high up colo-rectal FBs may need general anesthesia with full relaxation, abolishing ano-rectal sphincter spasm and improving the visualization with adequate exposure. Blind attempt to extract colo-rectal FBs is never recommended as that poses high risks of injuring the bowel, and bursting or fragmentation of the FBs. Such FBs as light bulbs, crystal glasses, or that have sharp edges, etc. pose definite risks. Ano-rectal FBs are usually successfully extracted per-anally without causing much harm. And occasionally, failed attempts may cause rectal FBs pushed up towards the rectosigmoid region, wherefrom by reverse peristalsis, it may be further propagated up through the sigmoid colon. Small anorectal FBs can be grasped and extracted usually quite successfully per-anally in the emergency department as an OPD (Outpatient department) procedure. The gloved fingers and anoscopic or proctoscopic instruments are to be lubricated adequately with lignocaine jelly before attempts for extraction. Simultaneous abdominal pressure helps in distal mobilization of rectal FBs. One is to avoid pushing upwards towards the proximal rectum and rectosigmoid junction, while attempting extraction. If per-anal digital extraction is not successful, an anoscope or a proctoscope, a vaginal speculum or a sigmoidoscope is to be used and a Foerster clamp should be used to attempt extraction. The FB is sometimes firmly adherent to the he mucous membrane that prevents FB from being extracted. Negotiating a Foley catheter passed behind the FB, and that is followed with balloon insufflation in order to remove the FB with gentle careful subtle traction. Lot many other techniques have been formulated by many physicians and surgeons for extracting the colorectal FBs, using different instruments that include polypectomy forceps, vacuum extractors, obstetric forceps, dilatation balloons, vaginal spatulas, and plastic cylinders, mouse forceps and snares, etc.²⁰ Causes of per-anal extraction failure includes^{12,13,28}

1. FBs more than four inches long,
2. Hard objects,
3. Sharp objects,
4. Proximally migrated FBs,
5. FBs that are retained for 48 hours or more

Anoscopic or proctoscopic extraction of easily grasped FBs is to follow the following recommendations:

- FB or FBs should be removed with a Kelly or a Rochester clamp.
 - Extraction can be done with local analgesia without anesthesia.
 - Patient should be placed in the Kraske (pocket knife) position
 - Avoidance of lacerations of the mucosa.
- Anoscopy or proctoscopy for difficult-to-grasp FBs should

follow the following recommendations:

- FB or FBs should be removed with either a Foerster clamp or a foreign body clamp.
- Extraction should be done with regional or local anesthesia.
- An anoscope or a rigid proctoscope, a Pratt anal separator may need to be used with a sigmoidoscope or a colonoscope to visualize the FB/FBs.
- Patient should be placed in the lithotomy or lateral position
- Abdominal pressure should be applied through the hypogastric region.

Utmost cautions are to be paid for non-cooperative or anxious patients, when pain is associated with ano-rectal sphincter spasm. This spasm prevents all attempts from withdrawing any FB in the emergency department.^{1,9,22} Breaking the CRFBs by holmium laser, and then removal by fiberoptic or rigid endoscope with or without general anesthesia successfully has been described. Magnets may be used successfully for removal of colorectal metallic foreign bodies; Surgery remains as the last alternative. If the above per-anal removal fails, two minimally invasive per-anal procedures may be advised. They are: 1. the flexible sigmoidoscopy, and 2. the minimally invasive trans-anal surgery. The minimally invasive trans-anal surgery has three advantages: a) many of the surgeons can use it, as because they are acquainted with laparoscopy, and b) the magnified image can show the condition of the mucosa, and c) no other specialized instruments are needed.^{17,29,30}

If subarachnoid spinal block, or epidural block, or general anesthesia is given, the anorectal sphincteric tone and spasm would be remarkably reduced or abolished transiently allowing proper visualization of FB, that substantially may make the FB removal a successful one.²¹ Sometimes endoscopic removal may need minimal incision to overcome the challenges. On failure of manual extraction, extraction under analgesia/anesthesia, or extraction by MITS (minimally invasive trans-anal surgery), or by flexible sigmoidoscopy, laparoscopic or open surgical removal is indicated, the laparoscopic one is preferred. During MIS (minimally invasive surgery), instruments can be used transmurally for distally pushing the FB. Open surgical approach is preserved for colo-rectal perforations, severe contamination of the peritoneal cavity, if having no experience with laparoscopy. If there are mucosal lacerations, edema or erosions, the patient needs to be kept under observation in the hospital for several days.

Discussion

Most of the swallowed FBs, as much as 80–90%, can pass through the digestive tract by themselves without clinical problems. And nearly 10–20% of FBs may require open or endoscopic intervention. Now-a-days, less than 1% of patients need more invasive open surgery.^{4,8} Following the first documented successful endoscopic removal of FBs by McKechie in 1972, endoscopic intervention had gradually become the predominant treatment of choice for gastro-intestinal FBs.¹⁰ Both fiber-optic flexible and rigid endoscopes are being extensively used. Ancillary devices are sometimes used to improve the success rate of removal and reduce the operation-related morbidities. The predisposing factors for swallowing and subsequent perforation, obstruction or impaction are

caused by defective tactile sensation of the palate, sensory malfunction in cases of elderly patients, or patients with cerebro-vascular accidents, past gastric operations allowing the propagation of FBs, achlorhydria (as the foreign body is unaltered by the gastric juice), past intestinal operations leading to causing stricture, stenosis, adhesions, diverticulation etc.²⁴ Hurriedly or excessive eating, or a greediness or voracious desire to eat may be conducive to swallowing of meat bones. Other than perforation induced peritonitis, perforation can cause reactive fibrinous exudates, unusual adhesions, and the FBs may migrate outside the gut lumen to such locations as the peritoneal cavity, hip joint, urinary bladder, liver.²⁰ The length of time from swallowing to presentation may be variable from hours to months, and in uncommon situations to years even, as reported by Yamamoto.^{29,30}

A Japanese study from 2007 to 2010 found that involved 648 patients from 431 hospitals showed that 15 patients had more than one hospital admission with this illness of colorectal foreign bodies (2.3%) with a peak of 4 readmissions. Male female ratio was 4.3:1. The age range for male patients was 60 to 69, and for female patients between 80 and 89 years. They diagnosed a major psychiatric pathology in women as compared to men (8.2% vs 2.7% respectively). The mortality was 1.2%. 44 patients were found to have perforation and peritonitis, out of which one case was iatrogenic. Among the female group of patients, 12.8% had perforations with/without peritonitis and 4% developed sepsis, and 4.8% died, Male patients were treated more by trans-anal extraction than by abdominal operation. General or regional anesthesia were administered to about 73% patients.^{1,2,6} A logistic multivariate regression analysis had shown that the female patients had double the chance of with such poor outcomes as perforations, peritonitis, sepsis, anal or rectal abscesses, as compared to male patients. Ingested foreign bodies could cause perforations as high as 25% of the objects detected in the ano-rectal area.⁷ No definite association between colo-rectal foreign bodies and the human immunodeficiency virus (HIV) infections could be established. Some researchers reported failure of endoscopic removal owing to migration of FBs, when some other procedure is indicated.^{9,10,16}

Prognosis

If well treated timely, mortality is almost nil unless there are life-threatening comorbidities or sepsis. Early removal of FBs is considered to reduce the risks of complications.³⁰

Conclusion

Rectal foreign bodies are not an unknown occurrence in emergency rooms of hospitals. There is a myriad of challenges in managing CRFBs. Advances in avantgarde interventional minimally invasive technology in emergent situations can avoid more invasive procedures, leading to early recovery and return to active life at a low cost. The use of holmium laser can successfully break the hard FBs, making their removal easier and more successful, shortening the intervention time and reducing the chances of such complications as lacerations and bleeding. Moreover, multi-disciplinary approaches are very much vital for the best outcome.

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