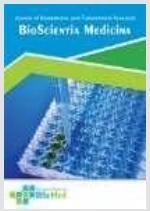
eISSN (Online): 2598-0580



Bioscientia Medicina: Journal of Biomedicine & Translational Research

Journal Homepage: www.bioscmed.com

Navigating a Complex Extraction: A Case Report on the Colonoscopic Management of Dual Rectal Foreign Bodies and a Proposed Treatment Algorithm

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ARTICLE INFO

Keywords:
Case report
Colonoscopy
Endoscopic extraction
Management algorithm
Rectal foreign body

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All authors have reviewed and approved the final version of the manuscript.

https://doi.org/10.37275/bsm.v9i9.1392

A B S T R A C T

Background: The management of retained rectal foreign bodies (RFBs) constitutes a significant and escalating challenge in clinical practice. While general management principles exist, there is a paucity of literature detailing the specific biomechanical and pathophysiological complexities of cases involving dual, large-bodied foreign bodies of differing materials. The optimal instrumentation and the role of adjuvant maneuvers in these specific scenarios remain under-reported. **Case presentation:** A 60-year-old male presented with a three-day history of rectal pain and acute urinary retention after inserting a plastic bottle (18 cm x 7 cm) and a silicone dildo (20 cm x 6 cm) into his rectum. An initial attempt at manual extraction under sedation failed. The patient was subsequently managed under general anesthesia with a successful colonoscopic extraction. A 10-mm toothed alligator jaw grasper, used in conjunction with synchronized external abdominal compression, proved critical for retrieving both objects sequentially. The total procedural time was 60 minutes, and the patient was discharged after a 3-day hospital stay without complications. **Conclusion:** This case provides powerful validation for colonoscopic extraction as a safe, effective, and definitive minimally invasive technique for complex, high-lying RFBs when manual methods fail. It highlights the indispensable role of general anesthesia for achieving complete pelvic floor relaxation and the biomechanical superiority of specific retrieval tools. The successful outcome underscores the value of a systematic, stepwise management algorithm that prioritizes patient safety and minimizes the need for surgical intervention.

1. Introduction

The impaction of foreign bodies within the rectum represents a unique and increasingly prevalent challenge at the intersection of emergency medicine, gastroenterology, and colorectal surgery.[1] Historically relegated to the footnotes of medical literature as clinical curiosities, retained rectal foreign bodies (RFBs) have emerged as a significant clinical entity, demanding a sophisticated and systematic approach from attending clinicians. An RFB is defined as any object, introduced into the rectum via the anal canal, that becomes lodged and cannot be voluntarily expelled or retrieved by the patient.[2] The epidemiology of this condition, as tracked by national surveillance systems, indicates a clear and sustained increase in incidence over the past decade. Data from the United States National Electronic Injury Surveillance System, for instance, revealed a rise in emergency department visits for RFBs from 1.2 per 100,000 persons in 2012 to 1.9 per 100,000 in 2021.[3] These figures, while informative, likely represent a significant underestimate of the true prevalence, as they only capture patients who seek formal medical care and do not account for cases managed at home or those where patients are too embarrassed to present to a hospital. The demographic profile of these patients is

remarkably consistent across numerous studies, showing a strong male predominance, with reported male-to-female ratios ranging from 6:1 to as high as 30:1. While the average age of presentation is typically in the fifth decade of life, cases are reported across the entire adult age spectrum, from young adults to the elderly.[4]

The etiology of RFBs is overwhelmingly linked to sexual gratification and autoerotic stimulation.[5] The objects utilized are limited only by human imagination and vary widely in size, shape, and material composition. Commonly reported items include sex toys such as dildos, vibrators, and anal beads; household objects like bottles, cans, and lightbulbs; and food items such as cucumbers, carrots, and sausages. While sexual exploration is the primary driver, other motivations exist. These include accidental insertions, such as a patient falling on an object; psychiatric conditions, where insertion may be part of a delusional schema; assault; and, in rare cases, attempts to conceal illicit drugs or other contraband, a practice known as "body packing." Each of these etiologies carries different implications for management and patient counseling.[6]

The clinical presentation of a patient with an RFB is heterogeneous and depends largely on the size and shape of the object, the duration of retention, and the presence of any associated complications. Some patients with small, smooth, and recently inserted objects may be entirely asymptomatic.[7] However, the majority present with a constellation of symptoms, the most common of which is rectal pain, resulting from the distension of the rectal wall and spasm of the surrounding pelvic floor musculature. Tenesmus, the feeling of incomplete evacuation, is also a frequent complaint. Bleeding, typically minor, can occur from superficial mucosal abrasions sustained during insertion or removal attempts. More significant symptoms, such as acute urinary retention, as seen in the present case, are a red flag indicating a large, impacted object causing a significant mass effect on the adjacent bladder neck and prostate. In the most severe cases, patients may present with signs of complete large bowel obstruction, including abdominal distension, obstipation, and vomiting. The development of fever, tachycardia, and peritoneal signs on abdominal examination signals the most feared complication: perforation of the colorectum, leading to spillage of fecal contents into the peritoneal cavity and subsequent life-threatening peritonitis and sepsis.

The pathophysiology of RFB impaction and its sequelae is a fascinating interplay of anatomy, physiology, and physics.[8] The rectum's capacious vault can accommodate large objects, but its anatomical curves, particularly the acute anterior angulation at the rectosigmoid junction, create a natural point of impaction. Once an object passes this junction, the powerful reflex spasm of the internal and external anal sphincters creates a one-way gate, preventing egress. This is compounded by a powerful physical phenomenon known as the proximal vacuum effect. The bowel wall seals around the circumference of the object, and as the proximal colon continues to absorb air and fluid, a negative pressure gradient is created, effectively sucking the object further into the bowel. This combination of anatomical barriers, sphincter spasm, and negative pressure makes self-extraction nearly impossible and frustrates many initial medical attempts at removal. If the object remains in place, its constant pressure on the delicate rectal mucosa can exceed capillary perfusion pressure, leading to ischemia, edema, ulceration, and eventual full-thickness necrosis and perforation.

The diagnostic pathway must be executed with efficiency and sensitivity. The cornerstone is a meticulous history, obtained in a private, non-judgmental environment.[9] The clinician must seek to identify the type, number, and material of the objects, the time of insertion, and any attempts at removal. A focused physical examination is then performed, with the primary goal of assessing for an acute abdomen. If peritonitis is suspected, all other diagnostic steps are secondary to immediate surgical consultation. In a stable patient, a digital rectal examination can assess the location and characteristics of the object. Plain

abdominal radiography is the essential imaging modality, used to confirm the diagnosis and, most importantly, to rule out pneumoperitoneum. A computed tomography (CT) scan is generally reserved for cases with equivocal findings, suspected abscess formation, or when dealing with radiolucent or sharp objects, where the risk of perforation is high. Management of RFBs is a stepwise process, guided by the principle of using the least invasive effective technique. Options range from simple manual extraction at the bedside for low-lying objects to extraction under anesthesia in the operating room, to advanced endoscopic techniques, and finally, to laparoscopic or open surgery. The choice of strategy is dictated by the object's characteristics and the clinical status of the patient.

While the general principles of RFB management are well-established, the existing literature often lacks the granular detail required to guide clinicians through particularly complex scenarios.[10] There is a notable paucity of reports that provide a deep, analytical dive into the unique pathophysiological and biomechanical challenges presented by cases involving multiple, large foreign bodies of differing material properties. The specific fluid dynamics of a "dual-chamber" vacuum effect, as is hypothesized in this case, have not been thoroughly explored. Furthermore, while various endoscopic tools are described, there is a lack of comparative analysis detailing why certain instruments fail and others succeed based on their specific engineering and the characteristics of the object. Finally, the critical, synergistic role of adjuvant maneuvers, such as synchronized external abdominal compression, in facilitating difficult endoscopic extractions remains an under-reported and under-analyzed technical pearl. Therefore, the primary aim of this study is to address these gaps by providing an exceptionally detailed case report and a comprehensive analytical discussion. We aim to: 1) Present a narrative, step-by-step account of the successful management of a complex dual RFB case. 2) Provide a deep, evidence-based analysis of the unique pathophysiology and biomechanics at play. 3) Critically evaluate the clinical decision-making process at each step of the patient's journey. 4) Offer a robust, modernized, and evidence-based management algorithm that can serve as a practical guide for clinicians. Through this multi-faceted approach, we intend to provide a valuable educational resource that enhances the understanding and improves the management of these challenging clinical presentations.

2. Case Presentation

A 60-year-old married male with a Body Mass Index (BMI) of 28.1 kg/m² presented to the emergency department of Dr. Kariadi General Hospital. The initial clinical encounter found the patient in visible distress, complaining of severe, constant rectal pain and a complete inability to urinate for the preceding three days. The triage team, recognizing the potential severity of the situation, moved him to a private examination room to facilitate a more comfortable and confidential consultation. After establishing a professional rapport and assuring the patient of confidentiality, he disclosed the sensitive details of his predicament. He explained that three days prior, during a period of self-exploration, he had inserted a plastic bottle, followed by a large silicone dildo, into his rectum. His subsequent, frantic attempts at self-extraction had been entirely unsuccessful and had only served to exacerbate his pain and sense of panic. He confirmed the ability to pass flatus, a crucial detail suggesting the absence of a complete bowel obstruction, but had not had a bowel movement since the incident. His medical history was unremarkable, with no prior surgeries, significant cardiovascular or respiratory comorbidities, or known psychiatric conditions. A comprehensive physical examination was then immediately performed to assess his clinical stability and to characterize the nature of the abdominal and rectal findings. The pertinent details of the patient's history and initial clinical assessment, which painted a picture of a hemodynamically stable patient with a clear history of a retained RFB with localized abdominal signs and a palpable object on

rectal examination, are summarized in Figure 1.

The findings from both laboratory analysis and radiographic imaging collectively create a cohesive clinical picture that was instrumental in formulating a safe and effective management strategy. The initial laboratory workup offered crucial insights into the patient's systemic physiological response to the retained foreign bodies. Hematological analysis revealed a white blood cell (WBC) count of 11.2 x 10^9/L, a value that is slightly elevated above the normal range. This mild leukocytosis was further characterized by a neutrophilic predominance of 78%. Scientifically, this finding is interpreted as a classic sign of the body's innate immune system responding to stress or insult. The presence of foreign bodies, even without infection, can induce a localized inflammatory cascade, leading to the mobilization of neutrophils and a subsequent rise in the total WBC count.

Figure 1. Patient presentation summary.

This result strongly suggests a physiological stress response or the early stages of inflammation due to the prolonged rectal distension and mucosal pressure, rather than an established, overwhelming infection. Complementing these findings, the patient's serum chemistry, including electrolytes, blood urea nitrogen (BUN), and creatinine levels, were all within normal limits. This preserved renal and metabolic function is a significant finding, indicating that despite the localized problem and associated pain, the patient was not systemically unwell, dehydrated, or suffering from acute kidney injury secondary to his urinary retention. Concurrently, radiographic imaging provided direct, anatomical confirmation of the clinical suspicion. Plain abdominal radiographs, taken in both anteroposterior (AP) and lateral views, clearly visualized the presence of two distinct foreign bodies within the rectosigmoid region. The primary object was identified as a large, unmistakably bottle-shaped foreign body. Proximal to this, a second, less-defined radiolucent object was also noted, corroborating the patient's history of inserting two separate items. However, the most critical information gleaned from the radiographic investigation was related to the bowel

gas pattern. The analysis definitively showed no free intraperitoneal air. In the context of a potential hollow viscus injury, this is the single most important negative finding. The presence of free air under the diaphragm would be pathognomonic for a full-thickness bowel perforation, a catastrophic event requiring immediate emergency surgery. Its absence, as highlighted in Figure 2, confidently ruled out this life-threatening complication and provided the clinical team with a crucial margin of safety. The diagnostic findings presented in Figure 2 painted a clear and actionable clinical picture. The laboratory results indicated a contained, mild inflammatory response without systemic decompensation. The radiographs confirmed the presence, location, and nature of the dual foreign bodies while, most importantly, ruling out a perforation. Taken together, these findings powerfully supported the clinical decision to pursue a minimally invasive extraction attempt under controlled conditions, rather than proceeding directly to a more morbid surgical laparotomy.

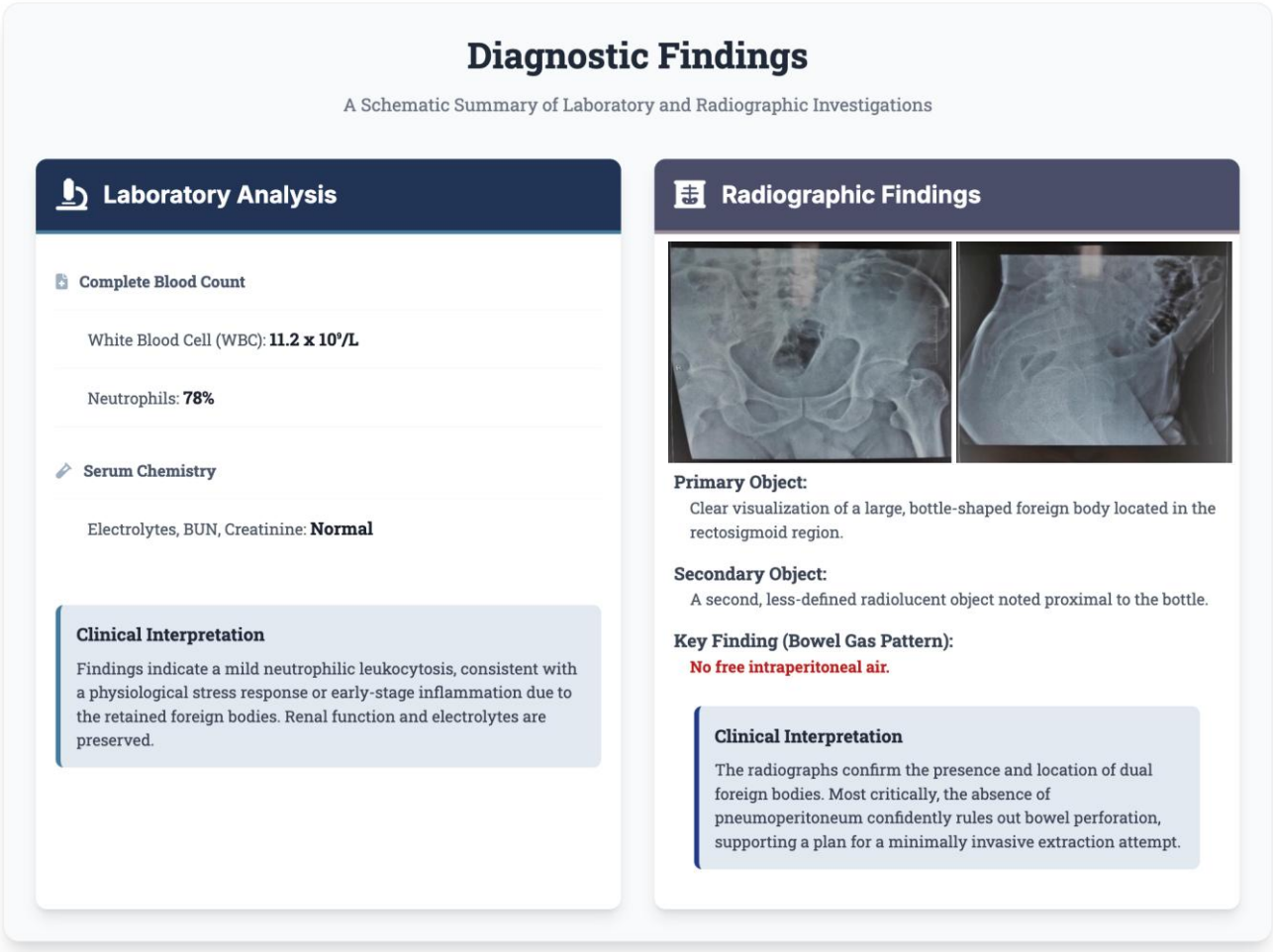

Figure 2. Diagnostic findings.

The intervention began with Phase 1: Pre-Procedure, which established the foundational principles of patient-centered care. The patient was provided with a comprehensive explanation of all management options, ensuring a thorough understanding of the potential risks, such as perforation, and the benefits of pursuing a minimally invasive approach. This crucial step culminated in

obtaining informed consent, which prudently included the possibility of converting to a more invasive open surgery if necessary, ensuring all contingencies were addressed before commencing the procedure. Following this, Phase 2: Initial Attempt (Failed) documents the first therapeutic effort, which lasted 15 minutes. With the patient in the lithotomy position and under conscious sedation, the clinical team attempted a manual extraction using both hands and forceps. As detailed in the figure, this approach was unsuccessful. The failure was attributed to two key biomechanical challenges: the smooth, tapered surface of the foreign body, which offered no secure purchase for grasping, and the significant proximal negative pressure, or vacuum effect, which held the object firmly in place. Critically, the team recognized that persistent forceful attempts carried a high risk of causing mucosal injury or perforation and wisely aborted this approach. The failure of the initial attempt led directly to Phase 3: Definitive Extraction (Successful), a 45-minute procedure that marked a strategic shift in both anesthesia and technique. The patient was repositioned into the left lateral decubitus position, optimal for endoscopy, and placed under general anesthesia with full neuromuscular blockade to ensure complete relaxation of the pelvic floor and anal sphincters. The colonoscopic intervention began with initial tool selections—snares and standard forceps—which, like the manual attempt, proved inadequate. The turning point came with the deployment of a specialized 10-mm toothed alligator jaw grasper, which successfully clamped the neck of the bottle. The ultimate success of the extraction relied on a coordinated, synergistic technique combining steady endoscopic traction with synchronized external abdominal compression. This maneuver was instrumental in safely removing both the primary bottle and the second, proximally located dildo in a sequential fashion without incident. The final step, Phase 4: Post-Extraction & Final Inspection, ensured the safety and completion of the procedure. The colonoscope was advanced back into the sigmoid colon for a meticulous final inspection of the mucosa. This confirmed the absence of any iatrogenic injury, such as lacerations, active bleeding, or perforation. The procedure concluded with the measurement of the retrieved objects, quantifying the scale of the challenge: a bottle measuring 18 cm x 7 cm and a dildo measuring 20 cm x 6 cm. Figure 3 narrates a clear progression from a predictable failure to a planned success. It showcases a modern, safety-conscious management strategy that correctly identified the limitations of a basic approach and seamlessly escalated to a more advanced, technically sophisticated, and ultimately successful minimally invasive solution.

The narrative of recovery began on Postoperative Day 1, which was characterized by the rapid return of normal physiological function. The patient remained afebrile and hemodynamically stable, indicating no signs of systemic inflammation or stress following the procedure. A significant milestone achieved on this first day was the removal of the urinary catheter, with the patient subsequently resuming normal voiding. This confirmed the successful resolution of the acute urinary retention that was a primary component of his initial presentation. Furthermore, the patient demonstrated early return of gastrointestinal function by tolerating clear liquids without issue and was encouraged to begin ambulating on the ward, a key step in preventing postoperative complications and hastening recovery. Progress continued unabated into Postoperative Day 2, where the focus shifted from stabilization to preparation for discharge. The patient's diet was advanced to a regular solid diet, which he tolerated well, signifying robust gut function. Importantly, he reported no pain or clinical discomfort, and his vital signs remained stable and afebrile. This excellent clinical status prompted the clinical team to initiate discharge planning, and by the end of the day, the patient was deemed medically fit to return home. Postoperative Day 3 marked the successful completion of the inpatient phase of care. The patient was discharged home in good condition after a total hospital stay of only three days, a testament to the efficiency and low impact of the

endoscopic procedure. To ensure a safe transition to home care, he was provided with detailed instructions for self-monitoring and a follow-up appointment was scheduled, establishing crucial continuity of care. The final and most definitive confirmation of the procedure's success came at the 1-Month Follow-up visit. The clinical assessment at this time revealed a patient who was completely asymptomatic. He reported no issues with pain, bleeding, or incontinence, confirming that the anal sphincter mechanism had not been compromised. Both bowel and bladder function were confirmed to be entirely normal, and a thorough physical examination was unremarkable. This culminated in the optimal clinical outcome: a full recovery with no evidence of any short-term or long-term sequelae. In essence, Figure 4 charts an exemplary recovery trajectory. Each stage, from the immediate return of function to the confirmation of long-term well-being, validates the chosen management strategy as not only effective in resolving the acute problem but also exceptionally safe, allowing the patient to return to normal life quickly and completely.

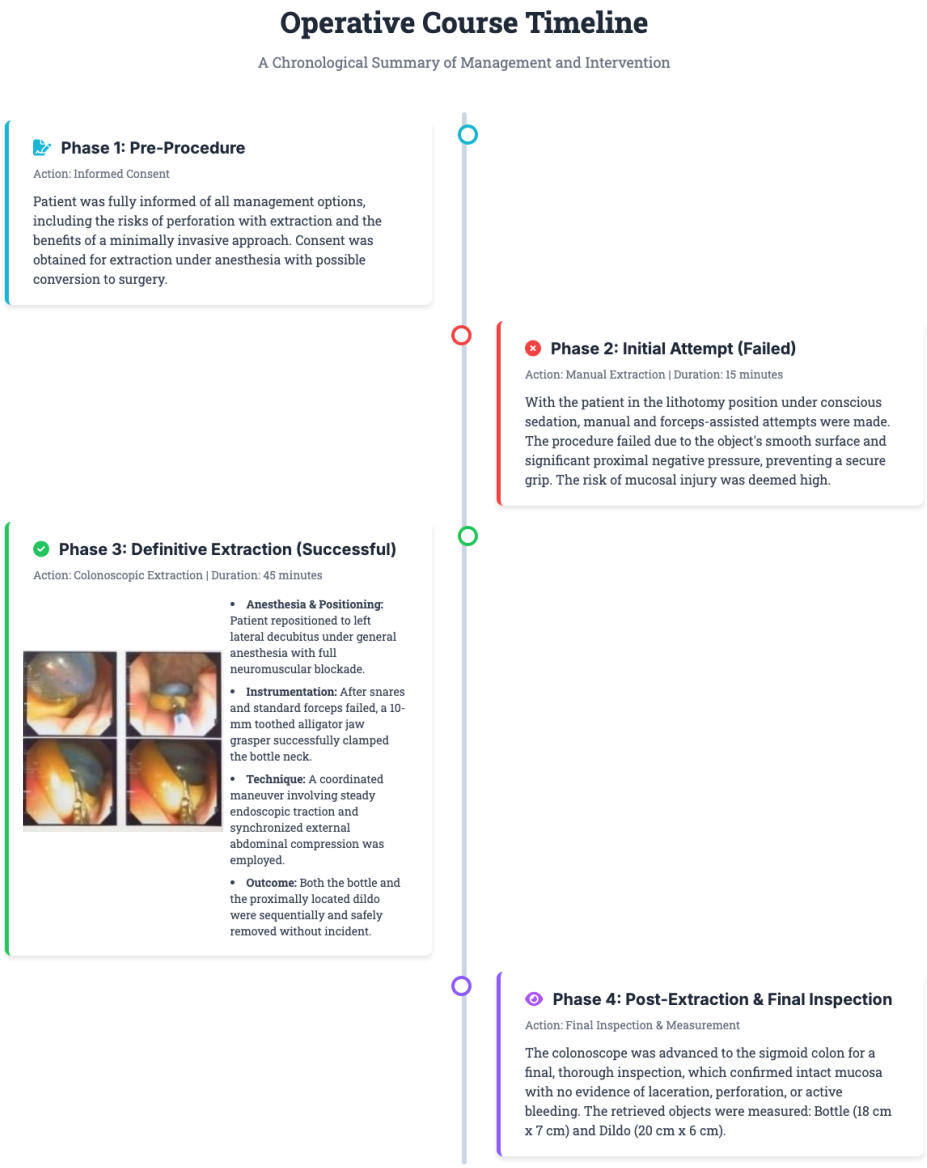

Figure 3. Operative course timeline.

Figure 4. Postoperative recovery and follow-up.

3. Discussion

The successful management of this 60-year-old male with dual, large, retained rectal foreign bodies provides a unique opportunity for a deep, analytical exploration of the complex pathophysiology, biomechanics, and clinical strategies inherent to such cases.[11] This case transcends a simple report; it serves as a practical scaffold upon which to build a more sophisticated understanding of RFB management, moving beyond generalized principles to a granular analysis of the specific challenges encountered and the precise techniques that overcame them. This discussion dissects the intricate interplay of anatomy and physics in this unique dual-object scenario, critically evaluates the clinical and interventional decision-making process, and rigorously justifies a refined management algorithm designed for the modern surgical era. The pathophysiology of a single retained RFB is well-described, involving a combination of anatomical barriers (valves of Houston, rectosigmoid angle), physiological responses (anal sphincter spasm), and physical forces (the proximal vacuum effect).[12] However, the presence of two large objects of differing materials, as in this case, creates a compounded and more complex pathophysiological state that warrants specific analysis. The insertion of the rigid plastic bottle first, followed by the pliable silicone dildo, likely created a unique two-chamber effect within the colorectum. The bottle, measuring 18 cm in length, would have traversed the entire rectum, with its base palpable distally and its neck likely lodged at the acute rectosigmoid junction. This

effectively "plugged" the distal colon. The subsequent insertion of the 20-cm dildo into the space proximal to the bottle created a sealed-off segment of sigmoid colon. This configuration dramatically exacerbates the standard vacuum effect. While the bowel wall proximal to the dildo continued its normal absorptive function, the sealed chamber between the two objects would have also become a site of negative pressure as any trapped air was absorbed, effectively "sucking" the two objects together and pulling the entire complex more firmly into the patient's anatomy. This dual-chamber vacuum is a far more formidable obstacle than a single negative pressure gradient and provides a compelling explanation for the complete failure of both self-extraction and initial manual attempts.[13] Furthermore, the different material properties played a crucial role. The rigid, non-compliant nature of the plastic bottle provided the structural anchor for the impaction. The pliable, high-friction surface of the silicone dildo, however, would have conformed more closely to the mucosal folds of the sigmoid colon, creating a more effective and widespread seal than a second rigid object might have. This likely contributed to the strength of the vacuum and the difficulty in dislodging the complex.[14]

The three-day delay in presentation raises the critical issue of pressure necrosis. The fact that this patient avoided significant mucosal injury or perforation is likely attributable to the broad, smooth surfaces of both objects.[15] Unlike objects with sharp edges or narrow points of contact that concentrate pressure and rapidly exceed capillary perfusion pressure (approximately 30 mmHg), the wide diameter of the bottle (7 cm) and dildo (6 cm) distributed the pressure over a larger surface area of the rectal and sigmoid wall. While this pressure was sufficient to cause mucosal edema and contribute to the impaction, it fortunately remained below the threshold for full-thickness necrosis over the 72-hour period. The patient's BMI of 28.1 kg/m², indicating he was overweight, may have also provided a degree of protective perirectal fat cushioning, though this is speculative. The development of acute urinary retention was a direct and predictable consequence of the sheer volume of the two objects (a combined length of 38 cm), creating a significant mass effect within the pelvis, leading to extrinsic compression of the bladder neck and prostatic urethra.[16]

The management of this patient followed a pathway of deliberate, logical escalation, with each decision point warranting critical justification against viable alternatives. The decision to initially attempt extraction under conscious sedation rather than proceeding directly to general anesthesia (GA) represents a common clinical crossroads.[16] The rationale for attempting sedation first is to potentially avoid the greater physiological stress, risks, and resource utilization associated with GA. However, in a case with known large, multiple, and high-lying objects, the probability of success with sedation alone is exceedingly low due to incomplete sphincter relaxation. The failure of this initial attempt, while predictable, served the important clinical purpose of definitively demonstrating the necessity of GA to both the clinical team and, implicitly, to the patient, thereby justifying the escalation of care. A more aggressive approach might have been to proceed directly to GA, arguing that the initial attempt was futile. However, the chosen stepwise approach is arguably more judicious and defensible in most healthcare systems. The decision to rely solely on plain abdominal radiography, omitting a CT scan, was a sound clinical judgment based on a clear risk-benefit analysis. The radiographs successfully answered the three most critical questions: 1) Was an RFB present? (Yes), 2) Was there evidence of perforation? (No, confirmed by the absence of pneumoperitoneum), and 3) What was the general location and orientation of the object? (Yes, in the rectosigmoid). Given the benign abdominal exam, a CT scan would have offered little additional information to alter the immediate management plan. It would not have changed the need for an extraction attempt under anesthesia. A CT scan would have been mandated had there been any equivocal clinical signs of peritonitis, a history of a sharp or glass object, or if the plain films were

inconclusive. By omitting the CT, the team appropriately avoided unnecessary radiation exposure and healthcare costs. Once the decision for endoscopic extraction was made, the choice of instrument was key. A rigid sigmoidoscope offers the advantages of a wider working channel, allowing for the use of larger, more robust instruments (like obstetric forceps), and better control for objects located in the distal rectum.[17] However, its significant limitation is its limited reach (typically 25 cm) and its rigidity, which makes navigating the rectosigmoid curve challenging and carries a higher risk of perforation if used improperly. A flexible colonoscope, as was used in this case, offers superior maneuverability, allowing the endoscopist to safely navigate the sigmoid colon, visualize the entire field, and approach the objects from an optimal angle. Given that the objects extended into the sigmoid colon, the flexible colonoscope was the superior and safer choice, providing the necessary reach and control to manage the proximal object after the first was removed. The use of CO_2 for insufflation, as opposed to room air, was another subtle but important choice, as CO_2 is absorbed 150 times faster from the colon, leading to rapid deflation post-procedure, reduced patient discomfort from bloating, and a theoretical reduction in the risk of tension pneumoperitoneum in the event of an occult micro-perforation.

The success of the extraction was not a matter of chance but the result of a precise application of biomechanical principles, hinging on the failure of inadequate tools and the triumph of the correct ones. The initial failure of the polypectomy snare and the rat-tooth forceps was a predictable outcome based on their design.[18] A polypectomy snare is designed to encircle a pedunculated or sessile polyp and apply circumferential force for excision. When applied to a hard, conical object like a bottle, the wire loop simply slides off the tapered surface; it cannot generate the necessary static friction or purchase to allow for traction. The rat-tooth forceps, designed for grasping and tearing tissue during biopsy, have small contact points.[18] When applied to the hard plastic of the bottle, these points could not penetrate the material, and the applied grasping force was insufficient to overcome the smoothness of the surface, resulting in slippage. The success of the 10-mm toothed alligator jaw grasper (Boston Scientific Raptor™) lies in its specific engineering. Unlike other tools, its jaws are wide, and lined with sharp, interlocking teeth. When clamped onto the neck of the plastic bottle, these teeth were able to bite into the surface of the plastic, creating multiple points of high friction and a secure mechanical lock. This allowed the endoscopist to translate the pulling force from the instrument handle directly to the object without slippage. This tool is specifically designed for foreign body retrieval, and its success in this case underscores the importance of having such specialized equipment available. The role of external abdominal compression cannot be overstated and represents a key technical pearl.[18] This maneuver succeeded by applying basic principles of physics. Firstly, it acted as a counter-force to the proximal migration of the objects. As the endoscopist pulled, the natural tendency of the mobile sigmoid colon is to stretch and allow the object to move upwards. The assistant's hand, applying continuous pressure on the infraumbilical region (directly over the sigmoid colon), created a physical barrier, preventing this proximal escape. Secondly, the external pressure helped to overcome the powerful vacuum seal. By manually compressing the bowel proximal to the object, the assistant effectively increased the intraluminal pressure in the sealed-off segment, neutralizing the negative pressure gradient and "breaking the suction." Finally, the maneuver helped to straighten the tortuous sigmoid colon, reducing the anatomical angles and creating a more linear path for extraction. This synergy between internal traction and external compression was the defining element that transformed a difficult extraction into a controlled and successful procedure.[19]

The management algorithm presented in this paper is designed to be a robust, evidence-based clinical tool that reflects a modern, minimally invasive philosophy. Its structure is defended by both the evidence in the

literature and the practical lessons from this index case. The algorithm's first and most critical decision point is the assessment for an "Acute Abdomen." This aligns with universal surgical principles that any sign of peritonitis mandates immediate resuscitation and surgical exploration (laparotomy or laparoscopy), as the risk of mortality from untreated perforation is absolute. This case, with its benign abdomen, correctly proceeded down the alternative pathway. The next step, "Manual extraction under anaesthesia" after a failed bedside attempt, is a deliberate departure from older algorithms that advocated for prolonged attempts in the emergency room. This change is supported by literature showing high failure rates and increased risk of injury with unanesthetized attempts. The failure of the initial sedated attempt in our patient provides a real-world validation of this principle. The algorithm advocates for moving to the controlled environment of the operating room early.[19]

The choice of flexible endoscopy as the next step after failed manual extraction is based on its high success rate (reported to be 75-95%) and safety profile. Our case provides a direct comparison to other endoscopic techniques reported in the literature. For instance, some reports describe using Foley catheters, passed alongside the object and inflated proximally, to break the vacuum seal and provide traction. While effective, this can be technically challenging and risks catheter rupture. Others have described using endoscopic snares in combination with other graspers. Our case suggests that for hard, smooth objects, a primary approach with a robust, toothed grasper may be more direct and efficient. The "grasper-and-compression" technique we describe is simple, requires no additional complex equipment, and was highly effective. The inclusion of transanal minimally invasive surgery (TAMIS) in our algorithm represents a crucial modern update. TAMIS is an ideal intermediary step for objects that are too large or awkwardly shaped for endoscopic removal but are still located within the rectum.[20] It allows for the use of laparoscopic instruments trans-anally, providing the ability to perform controlled intracorporeal fragmentation or manipulation of an object, thereby avoiding the significant morbidity of a laparotomy. Had the bottle in our case been made of glass, TAMIS would have been an excellent option to encase the object in a specimen bag before fragmentation to prevent mucosal injury from shards. Finally, the algorithm correctly places laparoscopic or open surgery as the final option. This reflects the core tenet of modern surgery: to solve the problem with the least invasive means possible. This case is a testament to the algorithm's effectiveness, as a highly complex problem was resolved at a lower tier of the invasive ladder, successfully avoiding major surgery. The algorithm is also designed to be adaptable. For instance, for a patient with a known sharp object (like glass), a clinician could justifiably bypass the initial steps and proceed directly to a more controlled approach like TAMIS or laparotomy, reflecting the higher a priori risk of perforation.[20]

Figure 5 provides a compelling and scientifically elegant schematic that illustrates the complex pathophysiological cascade initiated by the retention of a dual foreign body in the rectum. It masterfully deconstructs the event from the initial mechanical insult to the resulting clinical, physiological, and cellular consequences, offering a clear rationale for the patient's presentation and the urgency of intervention. The cascade begins with the initial event & mechanical factors, which set the stage for the entire clinical drama. As depicted, the insertion of two distinct objects—a rigid bottle followed by a pliable dildo—is not merely an additive problem but a synergistic one. This creates a complex, multi-component foreign body that is far more challenging to manage than a single object. The significant combined length of 38 cm immediately leads to two critical mechanical issues. First, an anatomical impaction occurs as the objects become lodged at the rectosigmoid junction, a natural point of narrowing and acute angulation in the colon that acts as a physical barrier to both proximal migration and distal expulsion.

Figure 5. Pathophysiological cascade.

Second, the sheer volume of the objects creates a profound mass effect, physically compressing adjacent pelvic structures and laying the groundwork for some of the patient's most distressing symptoms. This initial mechanical event triggers a powerful physiological & clinical response, as the body reacts to the foreign presence. The first reaction is an involuntary anal sphincter spasm. This powerful reflex, designed to maintain continence, becomes counterproductive, creating a high-pressure one-way valve that traps the objects and prevents any chance of spontaneous passage. Simultaneously, a more complex physical phenomenon develops: the dual-chamber vacuum effect. As described in Figure 5, the two objects create a sealed-off chamber within the colon. The bowel wall proximal to the objects continues its normal absorptive function, creating a negative pressure gradient that "sucks" the objects more firmly into place, dramatically exacerbating the impaction. This potent combination of mechanical blockage and physiological response leads directly to the clinical manifestations observed in the patient: severe rectal pain arising from the intense distension and muscular spasm, and acute urinary retention

resulting from the direct mass effect on the bladder neck. The final stage of the cascade, as illustrated in Figure 5, details the cellular & systemic consequences that unfold over time. The sustained pressure exerted by the objects on the delicate rectal wall leads to pressure ischemia, a critical state where the pressure exceeds the capillary perfusion pressure, cutting off blood flow to the tissue. This ischemic tissue then becomes a site of intense inflammation & edema. As the tissue swells, it further tightens the impaction, creating a vicious cycle of increasing pressure and worsening ischemia. This localized inflammatory process does not remain isolated; it triggers a systemic response, which was detected in this patient as a mild neutrophilic leukocytosis. The figure culminates by highlighting the most critical potential complication (Avoided): if this cascade were left uninterrupted, the progressive ischemia would inevitably lead to tissue necrosis (death) and, ultimately, a life-threatening bowel perforation. Figure 5 masterfully illustrates that a retained rectal foreign body is not a static event but a dynamic and evolving pathological process. It demonstrates how a simple mechanical action can trigger a complex cascade of physiological, clinical, and cellular events, each compounding the last, leading the patient toward a state of surgical emergency. Understanding this cascade is essential for appreciating the clinical presentation and the critical importance of timely and effective intervention.

4. Conclusion

This case of dual, large retained rectal foreign bodies provides powerful validation for the efficacy and safety of a modern, stepwise, minimally invasive approach. The successful outcome hinged on a cascade of sound clinical judgments: the deliberate escalation from a failed manual attempt to the controlled environment of the operating room; the indispensable use of a general anesthetic to achieve complete pelvic floor relaxation; and the precise application of a biomechanically superior endoscopic tool—the toothed alligator jaw grasper—in synergistic concert with external abdominal compression. This report, through its granular analysis of the unique pathophysiology and biomechanics of a dual-object impaction, affirms that a systematic, patient-centered, and technologically informed strategy can safely navigate even the most challenging presentations, ultimately reinforcing the core principles of modern surgical practice and minimizing patient morbidity.

5. References

1. Athamnah MN, Rabai NA, Al Azzam HSO. Rectal foreign body, an impacted plastic ball: a case report and review of literature. Int J Surg Case Rep. 2021; 87(106404): 106404.
2. Forooghi M, Kamran H, Shahriarirad R. Management of asymptomatic perforation of a pediatric rectal foreign body into the peritoneal cavity retrieved with laparoscopy: a case report and review of the literature. Case Rep Med. 2021; 2021: 5851967.
3. Huang Y, Sarofim M, Cohen-Hallaleh R. Foreign body perforation of a jejunal diverticulum: a rare cause of rectal bleeding. ANZ J Surg. 2021; 91(3): 465–7.
4. Hosni A, Saouli A, Koutani A, Iben Attya Andalousi A, Jroundi L, Laamrani FZ. A rectal foreign body: an unexpected cause of a rectovesical fistula with hematuria. Urol Case Rep. 2021; 36(101596): 101596.
5. Gan DEY, Chan KH, Veerappan P, Sun KJ, Hayati F. Rectal foreign body: a successful removal at the bedside and detailing of a stepwise management. Am J Case Rep. 2021; 22: e930967.
6. Deguchi Y, Sato T. Two cases of rectal foreign body treated by endoscopic transanal removal. Prog Dig Endosc. 2021; 98(1): 128–9.
7. Pang WS, Tan JH, Tan HCL, Tan JKG. Case series of retained rectal foreign body. a Malaysian experience. Malays Fam Physician. 2021; 16(2): 78–82.
8. Sanjay R, Bargee R, Panwar P, Kumar P. Rectal perforation caused by a self-inserted

foreign body: a case report. Int Surg J. 2021; 8(9): 2803.

9. Mizutani C, Matsuhashi N, Jesse TAJIMA Y, Kiyama S, Okumura N, Takahashi T. A case report of rectovaginal fistula associated with a rectal foreign body neglected for as long as 5 years. Nihon Rinsho Geka Gakkai Zasshi (J Jpn Surg Assoc). 2022; 83(11): 1978–82.
10. Mani UA, Bhot F, Sada E. Criminal rectal foreign body insertion. Vis J Emerg Med. 2022; 29(101431): 101431.
11. Amirhom E, Braganza JS, Gowda V, Shah A. Gluteal abscess secondary to rectal perforation due to ingested foreign body: a report of two cases. Cureus. 2022; 14(10): e30745.
12. Nepal A, Maharjan S, Chalise A, Rajbhandari AP. Rectal foreign body: a case report. JNMA J Nepal Med Assoc. 2022; 60(256): 1049–51.
13. Grossi AE de LMT, Rodriguez JER, de Freitas Sousa AA, Machado DAB, de Albuquerque VVML, de Macedo FPPC. Management of unusual rectal foreign body - Case report and literature review. Int J Surg Case Rep. 2022; 94(107051): 107051.
14. Wang K, Wang Y, Cheng Z, Wang H, Wang M, Shen Y. Endoscopic removal of a large rectal foreign body using an endoscopic retrograde cholangiopancreatography guidewire snare. Endoscopy. 2025; 57(S 01): E441–2.
15. Sharon JJ, Devannagoundanur Gurumurthy G, M K, Puranikmath MM. Unintentional retention of rectal foreign body associated with autoerotic practices: a case report. Cureus. 2025; 17(2): e79347.
16. Fan Q, Yu S, Xiong D-H. Intractable diarrhea caused by a rare rectal foreign body. Kaohsiung J Med Sci. 2025; 41(3): e12917.
17. Dhar J, Srinu D, Kumar A, Laroiya I, Samanta J. Successful closure of a large rectal perforation secondary to an unusual foreign body using endoscopic clip and loop technique (king closure). ACG Case Rep J. 2025; 12(4): e01678.
18. Xu L, Ge Y, Li S. Characteristics and outcomes of rectal foreign body: a retrospective analysis of 115 cases. Asian J Surg. 2025.
19. Xie X, BoYuan, Li C, Cao L. Rectal foreign body shaped like an endoscopic clip: Migrated intrauterine devices to the rectum. Dig Dis Sci. 2025.
20. Martínez-Hincapie CI, González-Arroyave D, Ardila CM. Rectal abscess secondary to foreign body insertion: a case report. World J Clin Cases. 2025; 13(18): 103438.