Research in Health Science
ISSN 2470-6205 (Print) ISSN 2470-6213 (Online)
Vol. 11, No. 2, 2026
www.scholink.org/ojs/index.php/rhs

Original Paper

Systematic Diagnosis and Treatment Management of Vaginal Foreign Bodies in Prepubertal Girls: Experience with 120 Cases of Vaginoscopy

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Received: March 18, 2026 Accepted: April 21, 2026 Online Published: May 6, 2026

doi:10.22158/rhs.v11n2p14 URL: http://dx.doi.org/10.22158/rhs.v11n2p14

Abstract

Objective: *To develop a systematic diagnosis and treatment management strategy for vaginal foreign bodies (VFBs) in prepubertal girls and to evaluate the core clinical value of vaginoscopy in this approach.* ***Methods:*** *A retrospective analysis was conducted on clinical data of 120 prepubertal girls with vaginal foreign bodies admitted to our hospital from January 2015 to December 2024. The systematic management pathway was summarized in four key components: risk identification, imaging evaluation, minimally invasive intervention, and health education.* ***Results:*** *All girls successfully underwent diagnostic vaginoscopy using a hysteroscope under intravenous anesthesia, and the foreign bodies were smoothly removed. No serious postoperative complications occurred. This systematic management pathway achieved whole-process quality control from accurate diagnosis and non-invasive treatment to effective prevention.* ***Conclusion:*** *A systematic diagnosis and treatment management system based on hysteroscopy/vaginoscopy offers significant advantages for vaginal foreign bodies in prepubertal girls, including high diagnostic accuracy, minimal trauma, few complications, and excellent long-term outcomes. It is worthy of clinical promotion and application.*

Keywords

Prepubertal girls, Vaginal foreign body, Systematic management, Hysteroscopy, Vaginoscopy, Pediatric gynecology

1. Introduction

Vaginal foreign body (VFB) in prepubertal girls is a special and not-to-be-neglected emergency in pediatric gynecology. Due to the immaturity of the genital organs in young girls—thin vaginal epithelium, few rugae, and poor natural defense mechanisms—retained foreign bodies can easily lead to infection, bleeding, ulceration, vaginal adhesions, and even fistula formation. However, the special age of onset (commonly seen in children aged 3–8 years during the cognitive development period), difficulty in obtaining a clear history, and the occult and diverse clinical manifestations make this condition prone to missed diagnosis, misdiagnosis, or improper management that can cause serious complications [1-4].

Traditional methods such as rectoabdominal bimanual examination or blind grasping have low diagnostic rates and carry the risk of aggravating injury or causing hymenal rupture. Therefore, establishing a standardized, efficient, and humanized systematic diagnosis and treatment management strategy has become an urgent clinical need. Hysteroscopy, especially vaginoscopy using an ultra-thin hysteroscope, provides an ideal technical platform because it requires no vaginal dilation, does not damage the hymen, and allows direct visualization [5].

This paper describes the specific content and clinical value of this systematic management pathway based on our experience with 120 cases.

2. Construction and Practice of the Systematic Diagnosis and Treatment Management Pathway

This management pathway covers four core steps from admission to follow-up, forming a closed-loop management system.

2.1 Step 1: High-risk Identification and Precise History Taking

This is the first and most important step, aiming to quickly identify suspected cases from complex information.

Symptom alert system: A system of five major warning signs was established: abnormal vaginal discharge, unexplained bleeding, abnormal urination behavior, local discomfort signs, and specific avoidance behaviors. Particular attention should be paid to recurrent “infantile vulvovaginitis,” behind which an undiscovered foreign body may be hidden.

Communication and interviewing skills: Avoid directly asking the child “Did you put something inside yourself?” A caring, indirect questioning approach should be used. Ask the parents: “Has your child recently played with very small toys or stationery? Have you noticed her hiding small objects?” For the child, use gamified communication, such as “Let’s help the little ‘bad guy’ that the baby doesn’t like come out of her body,” to reduce psychological stress.

2.2 Step 2: Stepwise Imaging Evaluation and Decision-making

A stepwise examination protocol is implemented according to the urgency and complexity of the condition.

First-line screening: Pelvic ultrasound is the preferred non-invasive examination. It can detect radiolucent foreign bodies (e.g., plastic, wood) as well as inflammatory reactions, fluid accumulation, or adhesions.

The overall sensitivity, specificity, positive predictive value, and negative predictive value of combined transperineal and transabdominal ultrasound for diagnosing vaginal foreign bodies have been reported as 81%, 53%, 82%, and 51%, respectively [6].

Pelvic X-ray, barium meal, and pelvic CT are highly sensitive for metallic foreign bodies. Barium meal can assess the presence of a rectovaginal fistula, and pelvic CT can evaluate whether adjacent tissues or organs are injured. If a metallic foreign body is highly suspected, pelvic MRI is not recommended.

The following images show vaginal foreign bodies diagnosed using different examination methods.

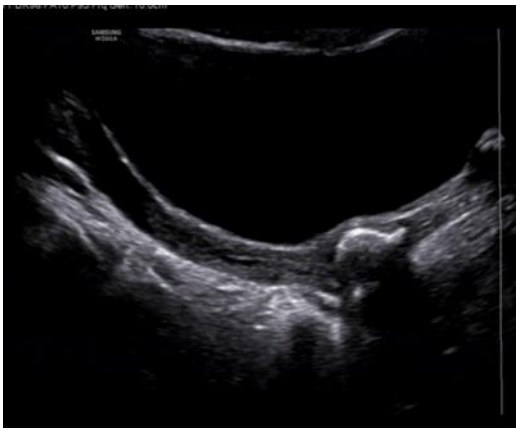

Figure 1. Pelvic Ultrasound (Metal Bell)

Figure 2. Pelvic X-ray (Metal Ball)

Figure 3. Pelvic Barium Meal (Button Battery)

Figure 4. Pelvic CT (Button Battery)

Second-line confirmation and gold standard: When ultrasound highly suggests a vaginal foreign body, or when clinical symptoms are typical (e.g., recurrent abnormal vaginal discharge, vaginal bleeding) but ultrasound or X-ray is not conclusive, hysteroscopy/vaginoscopy should be performed regardless of imaging findings. This technique is the diagnostic "gold standard," achieving a leap from "suspected" to "confirmed" diagnosis, and can also rule out genital tract malignancies [7]. The following images show vaginal foreign bodies as seen under vaginoscopy.

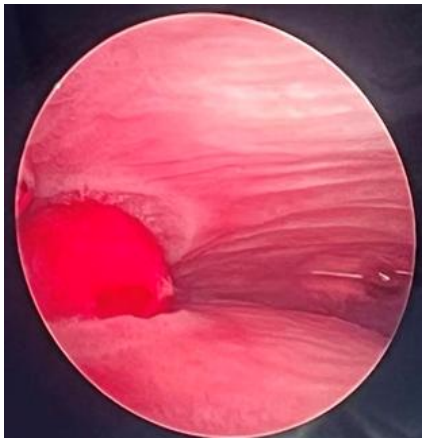

Figure 5. Vaginal Cotton Ball

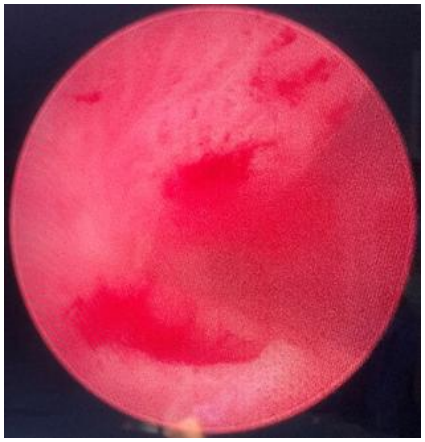

Figure 6. Vaginal Mucosal Injury

2.3 Step 3: Minimally Invasive Intervention and Individualized Surgery under Hysteroscopy

This is the core technical step of the management system.

Equipment selection: A diagnostic hysteroscope with an outer diameter of 2.9～6.0 mm is preferred, combined with low-pressure distension (pressure maintained at 80～100 mmHg) using normal saline as the distension medium to maximize safety and comfort.

Anesthesia plan: Because the vagina is a private and sensitive area, and to reduce discomfort and adverse psychological effects on the child while facilitating foreign body removal and subsequent intravaginal procedures, general anesthesia is recommended.

Surgical principles: Strictly follow the vaginoscopy operating standards. Do not place a speculum; use the scope and distension fluid to naturally distend the vagina. Explore, locate, and gently remove the foreign body under direct visualization using the sheath or micro-instruments (e.g., grasping forceps). For smooth, hard spherical foreign bodies (e.g., metal balls, glass beads), one hand can be placed in the rectum to push the foreign body out of the vagina. After removal, re-enter the scope to comprehensively evaluate the vaginal mucosa for injury, bleeding, or adhesions, completing the integrated diagnosis and treatment process.

Complex vaginal foreign bodies: Complex vaginal foreign bodies may form sinuses and injure adjacent organs such as the bladder, urethra, or rectum. A multidisciplinary team consultation is required, and the foreign body should not be removed blindly via vaginoscopy. A case report described a 13-year-old girl who denied sexual activity and presented with menorrhagia and dysmenorrhea. After poor response to combined oral contraceptives, abdominal ultrasound showed a right adnexal mass. The patient and her mother decided on placement of a levonorgestrel-releasing intrauterine device. During speculum examination, a foreign body was found in the posterior vaginal fornix, densely adherent to the vaginal wall and irremovable. Pelvic CT showed a vaginal foreign body without definite rectal or bladder involvement, so diagnostic laparoscopy was performed. Intraoperatively, the vaginal foreign body was found to have injured the bowel, necessitating conversion to laparotomy with foreign body removal and

bowel repair by a surgeon. The foreign body was a 10-cm shampoo bottle pump head that the girl had inserted into her vagina while bathing two years earlier and could not remove. Therefore, for complex vaginal foreign bodies involving multiple tissues and organs, multidisciplinary consultation and comprehensive evaluation are essential to minimize surgical risks and postoperative complications [8].

2.4 Step 4: Complication Prevention and Systematic Health Education

The endpoint of the management pathway is not the end of surgery but the establishment of long-term health.

Postoperative management: For children with obvious mucosal injury or infection, short-term use of child-safe antibiotics may be considered, and parents should be instructed on proper perineal care.

Health education and prevention system: This is the key to preventing recurrence. We have developed a "parent-child" linked health education model.

For parents: Education includes managing small objects at home, not wearing open-crotch pants, and daily observation of underwear secretions.

For the child: Age-appropriate "body autonomy education" is provided: "Your body has a little house called the 'vagina.' It is very delicate and needs protection, just like your eyes. Nothing should be put inside except when a doctor or your mother helps you clean it."

Literature reports that the occurrence of vaginal foreign bodies in young girls is related to parenting style and the child's social anxiety level. Psychiatric referral is recommended for girls with vaginal foreign body injury [9].

3. Clinical Data and Results

A total of 120 children were included in this study, with a median age of 5 years (range: 2～13 years). The most common symptoms included abnormal vaginal discharge (sudden yellow-green or bloody discharge, possibly with odor), abnormal bleeding (recurrent non-menstrual vaginal bleeding), urinary symptoms (frequent urination, urgency, dysuria), local discomfort (vulvar itching or pain, with the child possibly unconsciously scratching or resisting sitting), and behavioral changes (suddenly refusing diaper changes, crying or twisting during bathing, unexplained anxiety). These symptoms could appear alone or in combination.

The shortest disease course was 1 hour (the child voluntarily told her parent that she had put a glass bead into her vagina). The longest was 2 years (recurrent bloody discharge; initial pelvic ultrasound showed no abnormality; one year later, worsened bloody discharge led to a repeat ultrasound suspicious for a vaginal foreign body, which was finally confirmed as a metal bell by vaginoscopy). Among them, a 3-year-old child had recurrent dark brown vaginal discharge with odor and was hospitalized in the pediatric gastroenterology department with suspected rectovaginal fistula. Pelvic CT showed a button battery in the pelvic cavity. She was transferred to gynecology, where a rusty button battery was seen under vaginoscopy, with ulceration of the surrounding vaginal wall due to corrosion. The battery was removed with biopsy forceps, and no perforation was found at the ulcer site. The vagina was repeatedly

irrigated with iodophor and then normal saline, and postoperative antibiotics were given to prevent infection.

The types of vaginal foreign bodies in this study were diverse: toy parts, paper balls, cotton wads, stationery parts, button batteries, screws, coins, straws, peanut shells, etc., with materials including plastic, metal, wood, fiber materials, and paper. Even a soft cotton ball, because of the immaturity of the genital organs in young girls could cause vaginal mucosal damage and bleeding when retained, as shown in Figure 5 and Figure 6 above.

All children successfully underwent hysteroscopic vaginoscopy for foreign body removal under general intravenous anesthesia. The average operation time was 15 minutes. Except for a few cases where the foreign body had eroded the vaginal mucosa or adhered to the vaginal wall, causing slight mucosal bleeding during removal, almost no bleeding occurred in the other cases, and no complications such as vaginal or hymenal injury were observed. For children with recurrent abnormal vaginal discharge or bleeding, the vagina was irrigated with iodophor for disinfection followed by normal saline after foreign body removal.

During 12 months of postoperative follow-up, all children had complete resolution of abnormal vaginal discharge, vaginal bleeding, vulvar itching, and local redness, with no recurrence.

4. Discussion

Vaginal foreign body in prepubertal girls refers to the intentional or unintentional insertion of an external object into the vagina. It is a common but easily missed condition in pediatric gynecology. The types of foreign bodies in this study were diverse, including toy parts, stationery, food, and household items. Due to the immaturity of the genital organs in young girls—thin vaginal epithelium, few rugae, and poor natural defense—retained foreign bodies can easily cause infection, bleeding, and vaginal adhesions. If the object is corrosive such as a battery, it may even induce serious complications like a rectovaginal fistula. In addition, children often delay seeking medical care because of fear or inability to express themselves clearly, which requires high clinical vigilance [10,11].

The “systematic diagnosis and treatment management pathway” proposed in this study is advanced because it integrates scattered diagnostic and therapeutic steps into a logical, closely linked organic whole. It is not merely a technical operation but covers the entire process from early warning, mid-term precise intervention, to late-stage health reconstruction. Vaginoscopy/hysteroscopy plays a dual role as the “decision-making core” and “execution core” in this pathway. Its value lies not only in protecting the hymen as much as possible while successfully removing the foreign body but also in providing the final diagnostic confirmation and guiding subsequent treatment. Implementation of this pathway can significantly shorten the time to diagnosis, improve the one-time cure rate, and fundamentally reduce long-term psychological trauma and the risk of disease recurrence.

Although none of the vaginal foreign bodies in this study were caused by sexual abuse, clinical attention should still be paid to such situations, and awareness of protection for young girls and their families

should be strengthened.

5. Conclusion

In summary, establishing and promoting a systematic diagnosis and treatment management pathway with hysteroscopy/vaginoscopy as the core technology is the best strategy to ensure the physical and mental health of children with vaginal foreign bodies. This pathway integrates precise identification, minimally invasive diagnosis and treatment, complication prevention, and scientific prevention, reflecting the inevitable trend of pediatric gynecology toward standardization, humanization, and systematization. It has high clinical value for widespread application.

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