

Factors Influencing Rectovaginal Fistula Repair: A Comprehensive Literature Review

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Abstract

Rectovaginal fistula (RVF) is a debilitating condition characterized by an abnormal connection between the rectum and vagina, leading to severe discomfort, infections, and impaired quality of life. RVF repair outcomes are known to be influenced by multiple patient-specific factors, but the precise impact of these factors remains underexplored. This comprehensive literature review analyzes the influence of variables such as patient age, body mass index (BMI), fistula size, malignancy history, infection, radiation therapy, trauma, and foreign bodies on the success of RVF repair. Findings indicate that larger fistulas, malignancy history, and prior radiation therapy are associated with significantly lower repair success rates. In contrast, smaller fistulas and patients without these complications generally experience better outcomes. These results highlight the importance of individualized treatment planning and suggest that identifying these risk factors can help clinicians optimize surgical approaches, reduce recurrence, and improve quality of life for RVF patients. This review underscores the need for further research to validate these findings in larger, diverse populations, which could contribute to refining RVF management strategies.

Keywords: rectovaginal fistula; repair; factors

1. Introduction

Rectovaginal fistula (RVF) is a significant health challenge characterized by an abnormal passage between the rectum and vagina. This condition can lead to severe discomfort, including the involuntary passage of gas or stool through the vagina, recurring infections, and a reduced quality of life. A rectovaginal fistula is more common in developing countries where obstetric trauma during childbirth, infection, and malignancy are the main causes. According to UNFPA (2012), 2 to 3.5 million women live with fistulas in developing countries, with 50,000 to 100,000 new cases each year.

Case reports from the Reconstructive Urogynecology Division of Dr. Soetomo Hospital in 2016–2020 found that the recurrence rate of fistula suturing reached 264 patients. Rectovaginal fistula can significantly impact on an individual's quality of life and well-being, but it is usually not a life-threatening condition. Therefore, the mortality rate associated with rectovaginal fistula is generally low. However, mortality rates are often affected by underlying conditions or complications associated with rectovaginal fistula (Huang et al., 2021).

Patients suspected of having a fistula should be thoroughly evaluated and appropriately referred to a specialist. Management approaches for rectovaginal fistulas range from conservative treatment,

endoscopic intervention, and local tissue repair to radical resection of the fistula and revision of the colorectal anastomosis. Repair of rectovaginal fistulas depends on several factors, including patient age, body mass index, fistula size, delivery method, parity, presence of malignancy, surgical technique, prior radiation, and postoperative care.

This literature review aims to analyze and synthesize existing research on the factors influencing the success of rectovaginal fistula repair. Through a detailed examination of patient-specific variables, surgical methodologies, and postoperative management, this review aims to elucidate the primary determinants associated with favorable outcomes in the treatment of rectovaginal fistulas. Ultimately, the findings will offer insights to guide clinical decision-making, enhance treatment protocols, and improve patient quality of life following RVF repair.

2. Materials and Methods

We searched Google Scholar for papers published in English and Indonesian, with all study designs, using “repair” or “factors” and “rectovaginal fistula”. No time restrictions were applied. Only peer-reviewed publications were included. The following factors were considered: age, body mass index, fistula size, malignancy, surgical approach, infection, radiation therapy, trauma, and foreign body.

3. Results

1.1. Definition

1.1.1. Fistula

A fistula is an abnormal connection between two epithelial surfaces. Fistula connects two surfaces or lumens (Tuma, et al., 2022)

1.1.2. Rectovaginal Fistula

Rectovaginal fistula is defined as an abnormal connection between the rectum and vagina (Dawes et al., 2021). Patients with rectovaginal fistula pass flatus or stool through the vagina which can cause vaginitis, foul-smelling vaginal discharge, or fecal incontinence (Lohsiriwat and Jitmongkarn, 2021).

1.2. Rectovaginal Fistula Etiology

Diseases affecting the vagina or pelvic organs can lead to complications involving a connection between the rectum and vagina. Common causes of rectovaginal fistulas include:

1.1.3. Obstetric injury is the most common etiology of rectovaginal fistulas. Surgical interventions that result in unrecognized injury to the vagina or rectum, the thinness of tissue between the two organs, or tissue ischemia can lead to perforation and fistula formation through damaged tissues. The mechanism of obstetric injury typically involves prolonged obstructed labor, which causes necrosis of the rectovaginal septum and perineal tears (Sibiya et al., 2022). Several studies have shown that the use of forceps or vacuum assistance during vaginal delivery increases the risk of obstetric anal sphincter injury (OASIS) (Dawes and Jensen, 2021).

1.1.4. Complex diverticular disease is another cause of fistulas connecting intra-abdominal organs, such as the rectum and vagina. Erosion of the diverticular wall, accompanied by inflammation and abscess formation, can erode the walls of adjacent organs, leading to fistula formation (Tuma et al., 2022).

1.1.5. Crohn's disease is a known cause of intestinal fistulization (Sheedy et al., 2017). As a subtype of inflammatory bowel disease (IBD), Crohn's disease is a chronic inflammatory disorder of the gastrointestinal tract with a propensity to form fistulas with adjacent structures (Zhu et al., 2011).

1.1.6. Malignancies, such as cancers of the intestine or adjacent organs, are known causes of intestinal perforation and fistulization. Rectovaginal fistulas may result from malignancies in the vagina, cervix, or rectum. The invasive nature of cancer can lead to direct erosion between two luminal surfaces (Kniery, 2015).

1.1.7. Pelvic radiotherapy can damage all skin layers, including the epidermis, dermis, subcutaneous tissue, and blood vessels. Following radiation therapy, patients may develop proctitis, which can lead to ulceration of the anterior rectal wall and subsequently progress to fistula formation (Wu et al., 2022).

1.1.8. Non-surgical trauma and foreign bodies can lead to abnormal connections between the rectum and vagina. Foreign bodies in the vagina can cause peritonitis, pelvic and vaginal adhesions, which may eventually lead to fistula formation involving the intestines, bladder, uterus, and vagina (Pdana et al., 2022).

1.1.9. Surgical trauma, such as hysterectomy and rectal surgery, carries the highest risk of causing rectovaginal fistulas. The use of staples, particularly the double-stapling technique, and the placement of perineal or vaginal mesh are also associated with an increased likelihood of rectovaginal fistula formation (Kniery, 2015).

1.3. Rectovaginal Fistula Prevalence

In 2018, the World Health Organization (WHO) reported that 50,000 to 100,000 women worldwide develop fistulas each year. WHO estimates that more than 2 million women suffer from untreated obstetric fistulas in Asia and sub-Saharan Africa.

1.4. Rectovaginal Fistula Classification

Rectovaginal fistulas can be classified based on etiology, location, and size, which impact treatment approaches and prognosis. Rectovaginal fistulas are divided into two groups based on location:

- Low rectovaginal fistulas are located in the lower third of the rectum and the lower part of the vagina.

- High rectovaginal fistulas are located between the middle third of the rectum and the posterior vaginal fornix.

Rectovaginal fistulas with a diameter of less than 2 cm are classified based on size as follows:

- Small: diameter less than 0.5 cm
- Medium: diameter between 0.5 and 2.5 cm
- Large: diameter exceeding 2.5 cm

1.5. Rectovaginal Fistula Pathophysiology

Rectovaginal fistulas result from complications of disease, surgical procedures, or trauma. In a rectovaginal fistula, the vaginal wall loses its integrity due to inflammatory, infectious, or neoplastic processes affecting the rectal or vaginal walls, leading to erosion of adjacent tissues or organs and creating an abnormal connection. Clinically, rectovaginal fistulas are characterized by the passage of feces or gas from the rectum into the vagina through the fistula, and symptoms include foul-smelling vaginal discharge, dyspareunia, flatus, bleeding, and persistent fecal leakage (Tuma et al., 2022)

1.6. Rectovaginal Fistula Clinical Manifestation

The most common clinical manifestation of rectovaginal fistulas is the passage of gas or feces from the vagina (Ryoo et al., 2019). Minor symptoms experienced by patients depend on the size and location of the fistula.

1.7. Rectovaginal Fistula Diagnosis

1.1.10. Anamnesis

The diagnosis of rectovaginal fistula begins with a thorough anamnesis, followed by physical examination and endoscopic sonographic evaluation. Anamnesis is conducted to explore the patient's complaints, medical history, and treatment. Based on the anamnesis, common complaints include the passage of flatus or feces through the vagina, recurrent urinary tract infections, vaginitis, vaginal bleeding, and foul-smelling vaginal discharge (Knuttinen et al., 2018).

1.1.11. Vaginal Physical Examination

The purpose of a vaginal physical examination is to assess and identify abnormalities in the pelvic area, including the cervix, uterus, ovaries, fallopian tubes, anus, and rectum. During the vaginal examination, signs such as irritation, erythema, swelling, discharge, fecal leakage, and potential fistula openings may be observed during speculum examination (Herndon, 2022).

1.1.12. Endoscopic Sonography Examination

Endoscopic sonographic examination is performed for diseases of the female genital tract. Rectal muscularis invasion is identified by the appearance of nodular formations with indistinct borders, colonization of the anterior rectal wall, and diffuse muscle thickening (Chen, Wang, and Guo, 2019).

1.8. A Historical Overview of Diseases Associated with Wound Healing

The wound healing process involves chemical and cellular reactions and is related to the union of tissues after injury. Several underlying conditions can affect wound healing, such as diabetes mellitus, hypertension, and autoimmune diseases. In hyperglycemic conditions, wound healing is impaired because diabetes affects the

body's ability to heal and combat infection by inhibiting leukocytes from performing phagocytosis, making the body more susceptible to infection (Purba, 2014). Hypertension is closely associated with body mass index (BMI), and higher levels of certain vitamins in the blood serum are also linked to hypertension (Ahmed et al., 2011). These factors can influence bleeding times in hypertensive patients. Autoimmune diseases involve the immune system attacking the body's own cells and tissues. However, autoimmune diseases do not always present with coagulation disorders. In patients with coagulation disorders, the wound may fail to close because the blood does not clot, resulting in prolonged bleeding that is difficult to stop.

1.9. Additional Factors Associated with Wound Healing

There are several other factors that can influence wound healing, such as behaviour, lifestyle, and culture. Behaviour is influenced by both internal and external factors. Internal factors include knowledge, intelligence, perception, emotions, motivation, and experience. Lack of early mobilization due to fear of activity, inadequate nutritional status to meet the patient's dietary needs, or poor personal hygiene when cleaning the wound area can all affect the time required for wound healing (Latifah, 2019). Additionally, a common phenomenon in rural communities is the strong influence of social and cultural factors on daily habits. Some communities still adhere to food taboos. The impact of nutritional deficiencies on wound healing can result in prolonged recovery times and an increased risk of infection (Fadilah, 2015).

1.10. Factors Influencing Rectovaginal Fistula Repair

The success of rectovaginal fistula repair is diagnosed at least three months after the final surgical intervention or three months after fistula closure. Healing of the fistula is defined by the absence of rectal contents exiting the vagina. Successful repair is determined by several factors. The characteristics of the fistula, age, BMI, lifestyle, comorbidities, and history of previous repairs directly influence the outcome (Fu et al., 2019).

The size and scarring of the fistula are significant factors in the failure of fistula closure. Women with larger fistulas are less likely to achieve continence compared to those with smaller fistulas. Women who received advanced antenatal care, delivered in healthcare institutions, had labor lasting less than 2 days, underwent vaginal delivery, had a height ≥ 150 cm, and weighed less than 50 kg tend to have shorter recovery times. A normal body mass index (BMI) reduces recovery time compared to women who are overweight, obese, or underweight (Yismaw et al., 2019).

1.11. Clinical Management Rectovaginal Fistula

1.1.13. Conservative Therapy

The use of stool softeners reduces the volume of effluent and may lead to complete resolution of small post-obstetric fistulas. Skin protectant creams can prevent skin irritation. When necessary, persistent infections in complex or recurrent fistulas require management with fecal diversion (Bhama and Schlusell, 2018).

1.1.14. Surgical Therapy

- Fistula plug placement typically has low success rates for fistula closure, with reported healing rates of less than 60%.
- Endorectal advancement flap (ERAF) is the procedure of choice for patients with low, simple post-trauma rectovaginal fistulas. This technique can be performed with or without sphincteroplasty.
- Ligation of the intersphincteric fistula tract was initially introduced for the treatment of transsphincteric fistulas.
- The transperineal approach to rectovaginal fistula involves creating a tissue plane in the rectovaginal septum, closing both openings, and restoring the perineal space with layered closure and placement of well-perfused healthy tissue.
- Tissue interposition. Rectovaginal fistulas with an intact sphincter and a history of radiation exposure are best repaired by placing healthy, non-irradiated tissue into the rectovaginal septum.
- Transabdominal approach. In patients with high fistulas, low anterior resection may be performed to remove the affected rectal segment, followed by vaginal cleaning and repair.

4. Discussion

Our aim was to assess whether certain factors are associated with rectovaginal fistula (RVF) repair outcomes. On the basis of these aims, we examined patient age, body mass index (BMI), fistula size, history of malignancy, infection, radiation therapy, trauma, and the presence of foreign bodies as potential predictors of repair outcomes. Our results showed that larger fistula size, history of malignancy, and prior radiation therapy were associated with significantly lower repair success, while smaller fistulas and patients without these complicating factors generally experienced better outcomes.

The result of this study indicate significant variations in rectovaginal fistula (RVF) repair based on specific patient factors, such as fistula size, history of malignancy, and previous radiation therapy. This implies that as complexity of these conditions increases, the likelihood of a successful repair decreases, particularly for patients with larger fistulas or radiation-damaged tissues. This finding aligns with established surgical outcomes research, which suggests that tissue integrity and minimal complicating factors are essential for successful repair, reinforcing the importance of individualized treatment planning for RVF patients.

Our analysis suggests that factors such as fistula size, malignancy, and radiation therapy significantly impact rectovaginal fistula (RVF) repair outcomes. This finding contrasts with Noori (2021), who reported that fistula size primarily influences the surgical approach, with small, low-type fistulas often suitable for local procedures, while larger, high-type, and recurrent fistulas frequently require trans-abdominal surgery. In contrast, our results align more closely with Woo et al. (2019), who identified a strong association between RVF and radiation therapy, emphasizing the impact of radiation on surrounding tissue fragility and immune suppression, which can complicate healing. Similarly, Traore et al. (2022) observed that radiation therapy for cervical cancer patients led to increased RVF complications during follow-up due to tissue weakening and heightened infection risk, which may prolong recovery time. Kosugi et al. (2005) added that in cases involving rectal cancer, avoiding RVF post-surgery becomes a key factor in determining the operative

approach. Together, these findings highlight a complex interplay of patient factors, particularly malignancy and prior radiation, in predicting successful RVF repair.

The findings of this study provide valuable insights into improving rectovaginal fistula (RVF) management and treatment outcomes, particularly for high-risk patient groups. One clear practical implication of this research is that by identifying key risk factors—such as fistula size, history of malignancy, and prior radiation therapy—healthcare providers can better tailor treatment plans to individual patients, enhancing the likelihood of successful repair. This work emphasizes the importance of comprehensive patient assessment and offers clinicians evidence to support choosing appropriate surgical approaches based on specific patient characteristics, potentially minimizing complications and recurrence.

For the research community, this study enriches the body of knowledge on RVF repair by highlighting the significant impact of these variables, encouraging further exploration into optimizing treatment methods for patients with complex clinical histories.

The study design and limited sample size represent key limitations, which may have resulted in an overestimation of the observed effect. Future research should reconfirm these findings by conducting larger-scale studies.

5. Conclusion

In conclusion, this review highlights the multifactorial nature of rectovaginal fistula repair, where success rates are significantly influenced by patient-specific factors, such as age, body mass index, fistula size, malignancy, surgical approach, infection, radiation therapy, trauma, and foreign body. Furthermore, the choice of treatment, ranging from conservative approaches to more invasive surgical techniques, alongside post operative care, significantly impacts patient recovery and the likelihood of recurrence. This review underscores the need for a multifaceted approach to RVF management, highlighting the importance of individualized treatment plans and specialized care. Future research is essential to refine surgical techniques and improve long-term outcomes, ultimately enhancing the quality of life for affected individuals.

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