

Risk factors for the incidence of rectovaginal fistula and the size of rectovaginal fistula in the urogynecology and reconstruction polyclinic of Dr. Soetomo general academic hospital in 2016-2020

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SUMMARY

AUTHORS' CONTRIBUTION: (A) Study Design · (B) Data Collection · (C) Statistical Analysis · (D) Data Interpretation · (E) Manuscript Preparation · (F) Literature Search · (G) No Fund Collection

Introduction: Rectovaginal fistula is a complication that is often caused by obstetric trauma, but currently rectovaginal fistula is more often caused by non-obstetric complications. Risk factors such as age, parity, fetal weight, history of malignancy, history of infection, history of gynecological surgery can increase the possibility of rectovaginal fistula in patients who suffer from it. With patient characteristics that are different from other countries, this study aims to describe the risk factors associated with the size of rectovaginal fistulas that form at RSUD Dr. Soetomo Surabaya, Indonesia.

Methods: This type of research is descriptive observational with a retrospective research design. The risk factors examined in this study were age, parity, fetal weight, history of malignancy, history of infection, and history of gynecological surgery.

Results: In this study, 27 cases were obtained consisting of 6 obstetric cases and 21 non-obstetric cases. In patients under 30 years of age, medium-sized rectovaginal fistulas (100.0%). The majority of patients were multiparous (66.7%) who had medium-sized rectovaginal fistulas. And most of them (80.0%) had normal fetal weight with medium-sized rectovaginal fistulas. In patients with a history of malignancy, the majority (84.6%) had medium-sized rectovaginal fistulas. Of the patients with a history of infection, 2 patients (100.0%) had medium-sized rectovaginal fistulas. And quite a lot of patients with a history of gynecological surgery (76.9%) had medium-sized rectovaginal fistulas.

Conclusion: Risk factors for rectovaginal fistula sufferers at Dr. Soetomo is a woman under 30 years old, has primiparous or multiparous parity, and has a fetus with a normal weight. Most patients also had a history of malignancy and a history of gynecological surgery, and very few had a history of infection. The majority of rectovaginal fistulas formed from various existing risk factors are medium size (0.5–2.5 cm).

Keywords: Rectovaginal fistula; Obstetric fistula; Non-obstetric fistula

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INTRODUCTION

Rectovaginal fistula is an abnormal channel connecting the rectum and vagina, originating from the rectum and extending into the vagina. This abnormal channel forms due to a gap between the rectum and vagina, allowing gas and feces to pass from the rectum to the vagina. The gap arises when the integrity of the wall is compromised through inflammation, infection, or neoplastic processes occurring in the rectum or vagina. Consequently, adjacent tissues or organs on the walls of the rectum or vagina experience erosion, forming an abnormal connection [1].

Conditions associated with rectovaginal fistula exhibit abnormal symptoms such as foul-smelling discharge, pain or dyspareunia, clear fecal discharge during diarrhea, and bleeding. Continuous passage of gas and feces widens the fistula diameter, containing bacteria and substances harmful to the body, leading to irritation and infection in the vagina and urinary tract [1]. Despite some symptoms being mild, managing fistula requires consideration of various factors, including diameter, length, etiology, and location.

The etiology underlying fistula formation determines the assessment, management, and prognosis methods. Rectovaginal fistula formation commonly results from complications of underlying diseases, injuries, and surgeries [1]. According to the Urogynecology Update II book from the Indonesian Urogynecologic Reconstruction Association in 2015, the majority of rectovaginal fistulas stem from obstetric trauma or difficult childbirth, resulting in necrosis of the rectovaginal septum, third and fourth-degree perineal tears, forming an abnormal channel connecting the rectum and vagina. Additionally, Crohn's disease and ulcerative colitis contribute to 9% of rectovaginal fistula causes, with the severity of Crohn's disease correlating with an increased incidence of fistulas. Surgical trauma to the anorectal and vaginal areas also triggers rectovaginal fistulas. Other causes include gynecologic malignancies or cancers in the rectum, cervix, vagina, and uterus, fecal impaction, vaginal dilation, viral and bacterial infections, and sexual violence. Managing rectovaginal fistula often requires surgical intervention as spontaneous closure is unlikely. Surgical procedures for rectovaginal fistula patients reach 99%, with a success rate of 70-97% in the first operation. However, if the first surgery fails, success rates decrease

to 40-85%. Despite a success rate of 70-97%, there's still a risk of recurrence during vaginal delivery. Therefore, women with a history of rectovaginal fistula are advised to opt for cesarean section deliveries [2].

Rectovaginal fistula is prevalent among women worldwide, particularly in developing countries. An estimated 50,000 to 100,000 women worldwide are affected by rectovaginal fistula each year. Over 2 million young women are believed to live with untreated rectovaginal fistula in Asia and sub-Saharan Africa [3]. Research indicates that rectovaginal fistula occurs in 1-3 out of 1000 deliveries in West Africa, with similar rates in Kenya. The prevalence of rectovaginal fistula significantly contributes to maternal mortality resulting from dystocia or obstructed labor [4]. The high mortality rate among women with rectovaginal fistula in developing countries is generally due to inadequate healthcare services, difficulty in accessing healthcare, poverty, a shortage of medical personnel, and the perception that childbirth can be managed at home.

Rectovaginal fistula poses a serious threat to women's health, particularly in adolescents. This condition causes discomfort, feelings of isolation, and can reduce the psychosocial and sexual functions of female patients. About 93% of women with rectovaginal fistula experience stillbirths before delivery, and 97% suffer from depression due to mental disturbances. Among these women, at least 54% report a tendency toward suicide. Furthermore, 68% of women have no living children, 54% experience divorce, 13% are estranged from their families, and 41% feel socially ostracized [5]. Therefore, as a medical student, the researcher proposes conducting this study to reduce the incidence of rectovaginal fistula by precisely understanding the underlying factors and characteristics of patients with rectovaginal fistula, using medical records as a source of data from patients with rectovaginal fistula at the Urogynecology and Reconstruction Polyclinic of Dr. Soetomo Regional General Hospital from 2016 to 2020, enabling preventive efforts.

METHODS

This research is a descriptive observational study aimed at depicting health issues within a specific population. The research design used is a retrospective study utilizing the medical records of rectovaginal fistula patients at the Urogynecology and Reconstruction Polyclinic of Dr. Soetomo Regional General Hospital during the period 2016–2020. The research sample includes all rectovaginal fistula patients at the Urogynecology and Reconstruction Polyclinic of Dr. Soetomo Regional General Hospital in Surabaya from January 1, 2016, to December 31, 2020, who meet the inclusion and exclusion criteria. The inclusion criteria were rectovaginal fistula patients attending the Urogynecology and Reconstruction Polyclinic of Dr. Soetomo Regional General Hospital in Surabaya from January 1, 2016, to December 31, 2020, and patients with complete medical records. The exclusion criteria were patients with incomplete or missing medical records. The sampling technique employed in

this study is total population sampling, involving the entire population meeting the research criteria. The study begins with submitting an ethical approval request to the Ethics Committee of the Faculty of Medicine, Universitas Airlangga. Upon approval, the research continues with obtaining permission from the Ethics Committee of Dr. Soetomo Regional General Hospital to process and collect medical record data related to the study. Subsequently, the acquired medical record data will be collected, processed, and analyzed. The processed data will be presented in tables and graphs for analysis, facilitated by SPSS Statistic 26 software. The study is conducted after obtaining approval from the Research Ethics Committee of Dr. Soetomo Regional General Hospital and the Research Ethics Committee of Universitas Airlangga.

RESULTS

The data distribution of rectovaginal fistula patients based on variables is presented in **Tab. 1**. According to the researcher's findings, 6 patients had obstetric factors, and 21 patients had non-obstetric factors. Among patients with obstetric risk factors, 4 patients (66.7%) were under 30 years old, and 2 patients (33.3%) were over 30 years old. Regarding parity, 3 patients (50.0%) were primiparous, and 3 patients (50.0%) were multiparous. No patients (0%) delivered babies with low birth weight, while 5 patients (83.3%) delivered babies with normal weight, and 1 patient (16.7%) delivered babies with a high birth weight. For non-obstetric risk factors, 13 patients (61.9%) had a history of malignancy, and 8 patients (38.1%) did not. Two patients (9.5%) had a history of infection, while 19 patients (90.5%) did not. Regarding a history of gynecological surgery, 13 patients (61.9%) had a history, and 8 patients (38.1%) did not.

Tab. 2. illustrates the distribution of rectovaginal fistula sizes. No cases (0.0%) with a small diameter were observed among obstetric risk factors. Among non-obstetric risk factors, there were 2 cases (9.5%) with a small diameter, 17 cases (81%) with a medium diameter, and 2 cases (9.5%) with a large diameter. When combining both data sets, the results showed 2 cases (7.4%) with a small diameter, 22 cases (81.5%) with a medium diameter, and 3 cases (11.1%) with a large diameter, with a total of 27 samples.

Tab. 3. presents the characteristics of rectovaginal fistula sizes. The overall subjects, totaling 27 patients, had fistula sizes ranging from 0.4 cm to 4.48 cm, with an average size of 1.27 cm, standard deviation of 1.03, and a median size of 1 cm.

Tab. 4. illustrates the characteristics of rectovaginal fistula patients with obstetric risk factors. The age range of subjects with obstetric risk factors was 24 to 41 years, with an average age of 30.17 years, a standard deviation of 6.37, and a median age of 28.50 years. The parity range was 1 to 3 births, with an average of 1.83 births, a standard deviation of 0.98, and a median of 1.50 births. The fetal weight range was 2,500 to 4,150 grams, with an average of 3,206.7 grams, a standard deviation of 531.85 grams, and a median weight of 3,150 grams.

Tab. 1. Distribution of rectovaginal fistula patients based on variables.

Obstetric Risk Factor Characteristics	Event (n=6)
Age. n (%)	
<30 years	4 (66.7%)
>30 years	2 (33.3%)
Parity. n (%)	
Primipara	3 (50%)
Multiparous	3 (50%)
Fetal weight. n (%)	
Low	0 (0%)
Normal	5 (83.3%)
Heavy	1 (16.7%)
Obstetric Risk Factor Characteristics	Event (n=6)
History of malignancy. n (%)	
There is	13 (61.9%)
There isn't any	8 (38.1%)
Infection history. n (%)	
There is	2 (9.5%)
There isn't any	19 (90.5%)
History of gynecological surgery. n (%)	
There is	13 (61.9%)
There isn't any	8 (38.1%)

Tab. 2. Distribution of rectovaginal fistula size.

Rectovaginal Fistula Size	Event (N = 6)	%
Obstetric risk factor		
Small (<0.5 cm)	0	0.0%
Medium (0.5–2.5 cm)	5	83.3%
Big (>2.5 cm)	1	16.7%
Non obstetric risk factor		
	Event (N = 21)	%
Small (<0.5 cm)	2	9.5%
Medium (0.5–2.5 cm)	17	81%
Big (>2.5 cm)	2	9.5%
Obstetric risk factor and non obstetric		
	Event (N = 27)	%
Small (<0.5 cm)	2	7.4%
Medium (0.5–2.5 cm)	22	81.5%
Big (>2.5 cm)	3	11.1%

Tab. 3. Characteristic of rectovaginal fistula size.

	n	Mean	SD	Min	Maks	Median
Rectovaginal size with obstetric factor. cm	6	1.75	0.85	1	3	1.56
Rectovaginal size with non obstetric factor. cm	21	1.13	1.05	0.4	4.48	0.8
Rectovaginal size with obstetric factor and non obstetric factor. cm	27	1.27	1.03	0.4	4.48	1

Tab. 4. Characteristics of rectovaginal fistula patients with obstetric risk factors.

Risk factor rectovaginal patients (N = 6)	Mean	SD	Min	Maks	Median
Age. Years	30.17	6.37	24	41	28.50
Parity. birth	1.83	0.98	1	3	1.50
Fetal weight. gr	3.206.7	531.85	2.500	4.150	3.150

In **Tab. 5.** all 4 patients (100.0%) under 30 years old had a medium-sized rectovaginal fistula, and no patients (0.0%) under 30 years old had a large-sized fistula. One patient (50.0%) over 30 years old had a medium-sized fistula, and another patient (50.0%) over 30 years old had a large-sized fistula. The overall total cases were 6, with 5 patients (83.3%) having a medium-sized fistula and 1 patient (16.7%) having a large-sized fistula.

Tab. 6. illustrates that 3 primiparous patients (100.0%) have a medium-sized rectovaginal fistula, and 0 primiparous patients (0.0%) have a large-sized rectovaginal fistula. Meanwhile, among multiparous patients, 2 patients (66.7%) have a medium-sized fistula, and 1 patient

(33.3%) has a large-sized fistula. The overall total cases are 6, with 5 patients (83.3%) having a medium-sized fistula and 1 patient (16.7%) having a large-sized fistula.

Tab. 7. shows that 4 patients (80.0%) with normal fetal weight have a medium-sized rectovaginal fistula, and 1 patient (20.0%) with normal fetal weight has a large-sized rectovaginal fistula. There is also 1 patient (100.0%) with heavy fetal weight having a medium-sized fistula, and no patient (0.0%) with heavy fetal weight has a large-sized fistula. The overall total cases are 6, with 5 patients (83.3%) having a medium-sized fistula and 1 patient (16.7%) having a large-sized fistula.

Tab. 8. indicates that among patients with a history of malignancy, 13 patients, 1 patient (7.7%) with a history of malignancy has a small-sized fistula, 11 patients (84.6%) have a medium-sized fistula, and 1 patient (7.7%) has a large-sized fistula. Followed by patients without a history of malignancy, 8 patients, 1 patient (12.5%) has a small-sized fistula, 6 patients (75.0%) have a medium-sized fistula, and 1 patient (12.5%) has a large-sized fistula. The overall total cases are 21, with 2 patients (9.5%) having a small-sized fistula, 17 patients (81.0%) having a medium-sized fistula, and 2 patients (9.5%) having a large-sized fistula.

Tab. 9. shows that among patients with a history of infection, 2 patients, no patient (0.0%) with a history of infection has a small-sized or large-sized fistula, and 2 patients (100.0%) have a medium-sized fistula. Followed by patients without a history of infection, 19 patients, 2 patients (10.5%) have a small-sized fistula, 15 patients

(78.9%) have a medium-sized fistula, and 2 patients (10.5%) have a large-sized fistula. The overall total cases are 21, with 2 patients (9.5%) having a small-sized fistula, 17 patients (81.0%) having a medium-sized fistula, and 2 patients (9.5%) having a large-sized fistula.

Tab. 10. reveals that among patients with a history of gynecological surgery, 13 patients, 1 patient (7.7%) with a history of gynecological surgery has a small-sized fistula, 10 patients (76.9%) have a medium-sized fistula, and 2 patients (15.4%) have a large-sized fistula. Followed by patients without a history of gynecological surgery, 8 patients, 1 patient (12.5%) has a small-sized fistula, 7 patients (87.5%) have a medium-sized fistula, and no patient (0.0%) has a large-sized fistula. The overall total cases are 21, with 2 patients (9.5%) having a small-sized fistula, 17 patients (81.0%) having a medium-sized fistula, and 2 patients (9.5%) having a large-sized fistula.

Tab. 5. Pattern of rectovaginal fistula patients with obstetric factors based on age and fistula size.

Variables			Rectovaginal fistula size		Total	
			Medium (0.5-2.5 cm)	Big (>2.5 cm)		
Year	<30 Year	n (%)	4 (100.0%)	0 (0.0%)	4 (100.0%)	
	>30 Year	n (%)	1 (50.0%)	1 (50.0%)	2 (100.0%)	
Total			n (%)	5 (83.3%)	1 (16.7%)	6 (100.0%)

Tab. 6. Pattern of rectovaginal fistula patients with obstetric factors based on parity regarding fistula size.

Variables			Rectovaginal fistula size		Total	
			Medium (0.5-2.5 cm)	Big (>2.5 cm)		
Parity	Primipara	n (%)	3 (100.0%)	0 (0.0%)	3 (100.0%)	
	Multiparous	n (%)	2 (66.7%)	1 (33.3%)	3 (100.0%)	
Total			n (%)	5 (83.3%)	1 (16.7%)	6 (100.0%)

Tab. 7. Pattern of rectovaginal fistula patients with obstetric factors based on fetal weight regarding fistula size.

Variables			Rectovaginal fistula size		Total	
			Medium (0.5-2.5 cm)	Big (>2.5 cm)		
Fetal weight	Normal (2.5-4.0 kg)	n (%)	4 (80.0%)	1 (20.0%)	5 (100.0%)	
	Heavy (≥ 4.0)	n (%)	1 (100.0%)	0 (0.0%)	1 (100.0%)	
Total			n (%)	5 (83.3%)	1 (16.7%)	6 (100.0%)

Tab. 8. Pattern of rectovaginal fistula patients with non-obstetric factors based on a history of malignancy regarding fistula size.

Variables			Rectovaginal fistula size			Total	
			Small (<0.5 cm)	Medium (0.5-2.5 cm)	Big (>2.5 cm)		
Malignancy history	Yes	n (%)	1 (7.7%)	11 (84.6%)	1 (7.7%)	13 (100.0%)	
	No	n (%)	1 (12.5%)	6 (75.0%)	1 (12.5%)	8 (100.0%)	
Total			n (%)	2 (9.5%)	17 (81.0%)	2 (9.5%)	21 (100.0%)

Tab. 9. Pattern of rectovaginal fistula patients with non-obstetric factors based on a history of infection regarding fistula size.

Variables			Rectovaginal fistula size			Total	
			Small (<0.5 cm)	Medium (0.5-2.5 cm)	Big (>2.5 cm)		
Infection history	Yes	n (%)	0 (0.0%)	2 (100.0%)	0 (0.0%)	2 (100.0%)	
	No	n (%)	2 (10.5%)	15 (78.9%)	2 (10.5%)	19 (100.0%)	
Total			n (%)	2 (9.5%)	17 (81.0%)	2 (9.5%)	21 (100.0%)

Tab. 10. Pattern of rectovaginal fistula patients with non-obstetric factors based on a history of gynecological surgery regarding fistula size.

Variables			Rectovaginal fistula size			Total	
			Small (<0.5 cm)	Medium (0.5-2.5 cm)	Big (>2.5 cm)		
Gynecological Surgery history	Yes	n (%)	1 (7.7%)	10 (76.9%)	2 (15.4%)	13 (100.0%)	
	No	n (%)	1 (12.5%)	7 (87.5%)	0 (0.0%)	8 (100.0%)	
Total			n (%)	2 (9.5%)	17 (81.0%)	2 (9.5%)	21 (100.0%)

DISCUSSION

Distribution of Rectovaginal Fistula Patients in the Urogynecology and Reconstruction Clinic of Dr. Soetomo Surabaya Hospital Based on Age

Patients with obstetric risk factors were found in 6 cases. Based on age groups, the highest proportion of rectovaginal fistula patients was found in those under 30 years old, with 4 cases (66.7%). This aligns with study, which reported a higher risk of obstetric rectovaginal fistula in women under 30. Studies in Nigeria also showed a higher proportion under 30 compared to over 30 [6]. A previous study on 334 obstetric fistula patients found 72.2% in the age range of 25 to 29 years [7]. Age and parity are interconnected, as women mostly experience their first birth under 30. Primiparous women, giving birth for the first time, often experience longer labor [8], increasing the risk of rectovaginal fistula formation. Thus, age and parity are interrelated risk factors for rectovaginal fistula.

Distribution of Rectovaginal Fistula Patients in the Urogynecology and Reconstruction Clinic of Dr. Soetomo Surabaya Hospital Based on Parity

In this study, the author found an equal number of primiparous and multiparous cases. Out of 6 samples, 3 cases (50.0%) were primiparous and 3 cases (50.0%) were multiparous. This is consistent with a previous study (45.8% primiparous). However, previous study stating that fistulas occur more often in primiparous women due to various factors, such as the duration of labor, healthcare facilities, low-quality antenatal services, and early marriage [9].

Distribution of Rectovaginal Fistula Patients in the Urogynecology and Reconstruction Clinic of Dr. Soetomo Surabaya Hospital Based on Fetal Weight

Based on fetal weight, the majority proportion found was normal fetal weight in 5 cases (83.3%), followed by heavy fetal weight in 1 case (16.7%), and no cases were found with low fetal weight (0.0%). Similar results were obtained in 2015 at Dr. Cipto Mangunkusumo National General Hospital (RSCM) Jakarta, where 76.5% of obstetric fistula cases were caused by normal fetal weight (2.5 kg - 4.0 kg), while fetal weight in the heavy category (≥ 4.0 kg) was 17.6%, and only 5.9% had low fetal weight (< 2.5 kg).⁹ However, another study categorized fetal weight as less than 3.5 kg and more than 3.5 kg, finding that most had fetal weight above 3.5 kg. Large fetal weight causes prolonged or delayed labor due to the fetus's head being larger than the mother's pelvic size [10]. However, normal fetal weight also does not rule out the possibility of rectovaginal fistula risk. Episiotomy and assisted delivery using forceps and/or vacuum also play a role in increasing the risk of severe perineal lacerations [11].

Distribution of Rectovaginal Fistula Patients in the Urogynecology and Reconstruction Clinic of Dr. Soetomo Surabaya Hospital Based on a History of Malignancy

Among patients with non-obstetric risk factors, 21 cases had a history of malignancy. Non-obstetric risk factors may include a history of malignancy, infection, and gynecological surgery. Based on a history of malignancy, 13 cases (61.9%) were found, while 8 cases (38.1%) had no history of malignancy. This finding aligns previous study stating that gynecological cancer is one of the main causes of rectovaginal fistula. This is supported by radiotherapy, often the primary choice in treating cancer. A study in Poland stated that radiotherapy treatment for cervical carcinoma patients can cause rectovaginal fistula formation at a rate of 0.3–6%. Another study found that the combination of radiation therapy and hysterectomy can increase the risk of rectovaginal fistula 5 to 10 times. Radiation exposure to the anorectal and vaginal areas can result in long-term tissue inflammation. This inflammation can trigger the formation of rectovaginal fistula [12].

Distribution of rectovaginal fistula patients in the urogynecology and reconstruction clinic of Dr. Soetomo Surabaya Hospital Based on a History of Infection

Based on the history of infection, only a few patients were identified, specifically 2 cases (9.5%), while 19 cases (90.5%) had no history of infection. Similar results were found in a study of 79 rectovaginal fistula patients in Paris, where 2 cases (3%) had an etiology related to infection, specifically diverticulitis in the large intestine [13]. Diverticulitis is an infection that occurs in protruding pouches in the large intestine called diverticula. Intestinal infection leads to inflammation and abscess formation that extends and ruptures, causing erosion in surrounding organs and the formation of a fistula [1]. Another study stating that infections in the anus and rectum are rare risk factors for rectovaginal fistula patients. The low incidence of infection as a risk factor for rectovaginal fistula patients at Dr. Soetomo Hospital aligns with another study in Jakarta in 2015, stating that infection in the form of ulcerative colitis is a rarely occurring risk factor for rectovaginal fistula [9]. However, this differs from a previous study where 27% of rectovaginal patients at St Mark's Hospital, London, were caused by infections such as anorectal sepsis, Bartholin gland sepsis, and ulcerative colitis. The occurrence of non-obstetric fistulas due to infection is very rare, so they are rarely the subject of scientific publications [14].

Distribution of Rectovaginal Fistula Patients in the Urogynecology and Reconstruction Clinic of Dr. Soetomo Surabaya Hospital Based on a History of Gynecological Surgery

Based on a history of gynecological surgery, the researcher found a significant number (61.9%) of patients who had undergone previous gynecological surgery.

Meanwhile, 38.1% of patients did not have such a history. A retrospective study in the United States in 2006 showed similar results, with 82% of non-obstetric fistula cases caused by gynecological procedures. Rectovaginal fistula can form due to post-surgical complications in the vicinity of the vagina and anorectal area [12]. The advancement of reconstructive procedures in the pelvic floor area has led to an increased incidence of rectovaginal fistulas. Procedures such as transanal tumor resection, hemorrhoid surgery using a stapler, STARR (Stapled Trans Anal Rectal Resection), TRANSTAR (Transanal Stapled Resection), and other technically challenging procedures contribute to this increase. Surgical interventions in the anorectal and vaginal areas can cause damage to the thin tissue that separates the rectum and vagina, leading to the formation of a connecting channel between them [15]. Additionally, surgery required for rectovaginal fistula management can even increase the risk of recurrent fistulas [12]. Previous study found that several studies recorded success rates of rectovaginal fistula repair ranging from 50% to 80% after one or more surgical procedures. This implies that 20% to 50% of rectovaginal fistula cases may recur after a previous repair surgery.

Characteristics of Rectovaginal Fistula Size in the Urogynecology and Reconstruction Clinic of Dr. Soetomo Surabaya Hospital

In this study, it was found that out of a total of 27 cases, 2 cases (7.4%) of rectovaginal fistulas had a small diameter, 22 cases (81.5%) had a medium diameter, and 3 cases (11.1%) had a large diameter. These cases included both obstetric and non-obstetric risk factors. Generally, the occurrence of rectovaginal fistula is influenced by various factors, and the size of the fistula formed can vary depending on the underlying etiology or influencing factors. The classification of fistula diameter varies significantly in previous studies. Previous study classified fistula diameters differently, dividing them into < 0.5 cm and ≥ 0.5 cm. They found that 30.5% of rectovaginal fistulas had a size < 0.5 cm, and 69.5% had a size ≥ 0.5 cm. On the other hand, Browning & Whiteside in 2015 classified fistula sizes as < 1.5 cm (small), 1.5–3 cm (medium), and > 3 cm (large). The results of their study showed that the number of small and medium-sized fistulas had not significantly different outcomes.

OBSTETRIC RISK FACTORS FOR RECTOVAGINAL FISTULA INCIDENCE WITH RESPECT TO FISTULA SIZE

Age as a Risk Factor for Fistula Size

In this study, women under 30 years of age had a higher proportion of fistulas, as many women in this age group are in the early stages of their lives as wives and mothers. However, there appears to be variation between countries, with average ages reaching 22 years in Ethiopia and 28 years in Nigeria [16]. Younger maternal age increases the risk of inadequate pelvic growth, leading to an increased risk of

obstructed labor due to fetal disproportion. Additionally, the lack of care during pregnancy and supervision during delivery to detect disproportion in pregnant women leads to prolonged impaction of the fetal presentation in the pelvis. This results in tissue edema, hypoxia, necrosis, and shedding due to prolonged pressure on the soft tissues of the vagina and rectum, leading to fistula formation. However, another study found small-sized fistulas in 33.3% of cases for both age groups (< 30 years and > 30 years), while large-sized fistulas were found in 14.3% of cases in the > 30 years age group (Reisenauer, 2015). In this study, the majority of women under 30 years of age had medium-sized fistulas. This can be explained by the fact that as the age of women increases when giving birth to their first child, the risk of severe perineal lacerations also increases, potentially increasing the risk of large-sized rectovaginal fistulas. Thus, women under 30 generally experience lower perineal lacerations compared to those over 30, resulting in most fistulas formed due to perineal lacerations having a medium size. This is supported by the discovery of large-sized rectovaginal fistulas in women over 30 years old in this study. To reduce the risk factors for rectovaginal fistulas with respect to age, improving prenatal care is essential. Young pregnant women with small pelvic proportions should be referred to a hospital during childbirth to prevent rectovaginal fistulas [16].

Risk Factors of Parity on Rectovaginal Fistula Size

In this study, the majority of fistulas were of medium size, regardless of whether the women were primiparous or multiparous. The results of the study were consistent, showing no cases of small-sized rectovaginal fistulas in both primiparous and multiparous women. The study found that 53.8% of primiparous women had medium-sized fistulas, and 46.2% had large-sized fistulas [17]. Similarly, 57.1% of multiparous women had medium-sized fistulas, and 42.9% had large-sized fistulas. However, previous study showed slightly different results, with small-sized rectovaginal fistulas found in 28.6% of both primiparous and multiparous cases, while other sizes were similar to the results of this study [10]. Obstetric fistulas are significantly associated with perineal rupture. Primiparous women can increase the risk of severe perineal lacerations during vaginal delivery, thus increasing the likelihood of rectovaginal fistulas [18]. Women with very thin perineums, poor tissue conditions, and narrow vaginas are also at high risk of obstetric injuries [19]. However, in multiparous conditions, the occurrence of perineal lacerations is still possible, as the threshold for obstetric injuries can be influenced by various factors, according previous study, including the intensity of the force acting on the affected tissue, the location of obstruction, duration of labor, and the resistance of the affected tissue. Other factors that can also influence are healthcare facility conditions, medical personnel, low-quality antenatal services, and early marriage. The complex interrelation of these factors determines the threshold for injury occurrence. Therefore, the diameter of obstetric fistulas depends on various influencing factors [20].

Risk Factor of Fetal Weight on Rectovaginal Fistula Size

In tropical countries, prolonged labor is the most common cause of fistulas. Obstetric fistulas are often associated with prolonged or delayed labor caused by a fetal head size larger than the mother's pelvis, which is synonymous with a large fetal weight [10]. Fetal weight is one of the significant determining factors for obstetric injuries. The longer the obstructed labor process, the larger the resulting wound, involving the soft tissue of the mother's genital tract and related nerves [21]. Uterine contractions exert prolonged pressure on the soft tissues of the vaginal wall by the fetal head or fetal presentation part, especially at the back of the pubic bone [20]. This causes interrupted blood flow in the surrounding area [10]. Obstructed and ischemic tissues can lead to ischemic necrosis in the soft tissue between the rectum and the vaginal genital tract. The labor process often causes stillbirth, and the necrotic tissues peel away, forming a direct communication channel between the rectum and the vagina [21]. Moreover, fetal weight significantly influences the incidence of severe perineal lacerations of degree 3 and 4, which can also result in necrosis of the rectovaginal septum, especially in large-sized fetuses. Large fetal weight often requires episiotomy. Episiotomy can lead to the occurrence of necrosis of the rectovaginal septum. Additionally, large fetal weight often requires assistance in delivery using forceps and/or vacuum [11]. This can increase the risk of perineal injury up to 10 times compared to deliveries without instruments, subsequently forming an abnormal connection channel between the rectum and the vagina. Obstetric injuries are well-known as a common cause of rectovaginal fistulas, but the number of these factors has decreased due to the reduction in severe perineal injury incidents resulting from the minimal application of episiotomy and operative vaginal delivery [22]. In this study, the dominant fetal weight was normal, with medium-sized rectovaginal fistulas. During the birthing process, the head of a normal-weight fetus will exert normal pressure on the soft tissues of the vaginal wall [20]. Therefore, if a fistula is formed, the most frequently occurring diameters are small and medium.

Risk Factors of Cancer History on Rectovaginal Fistula Size

In developed countries, the cause of rectovaginal fistulas is often non-obstetric, particularly related to gynecological malignancies or cancers affecting the rectum, cervix, vagina, and uterus. Malignancies arising from the surrounding epithelial cells can trigger fistula formation [23]. This includes malignancies and/or exposure to radiation in the genital organs used as an alternative treatment for cancer. Rectovaginal fistulas are observed in 3-13% of cervical cancer patients treated with radiation therapy [24]. On average, fistula formation after radiation initiation occurs at 22 months, with an interval ranging from 3 months to 12 years. The primary issue resulting from radiogenic damage is damage to the rectal wall rather than the vagina [25]. Skin damage caused by prolonged radiation involves

all layers of the skin, including the epidermis, dermis, subcutaneous tissue, and blood vessels. Small arteries may undergo vascular sclerosis, leading to arteriolar narrowing or obliteration, subsequently causing poor tissue perfusion and chronic ischemia. The radiation-affected dermis and subcutaneous tissue are progressively replaced by dense and less elastic fibrotic tissue. After undergoing radiation therapy, patients may experience proctitis, leading to ulcers on the anterior rectal wall, which can ultimately develop into a fistula [24]. A rectovaginal fistula forms when the rectovaginal septum is already significantly weakened, and there is a high-pressure zone on the rectal side [25]. Fistulas resulting from radiation exposure typically form in the middle or upper part of the vaginal wall due to the weakness of the rectovaginal septum. Radiation impacts not only the vagina but also affects the entire rectum, and rectal damage is not limited to the fistula site itself [25]. Radiation-induced fistulas pose a significant challenge due to their difficulty in repair. Fistulas resulting from radiotherapy are challenging to address through local repair due to radiation-affected tissue showing weakness or ischemic fibrosis [22]. In this study, many patients with a history of gynecological surgery had medium-sized rectovaginal fistulas (84.6%). Another study found that all patients with rectovaginal fistulas due to radiation had a diameter larger than 2 cm [25]. The size of the rectovaginal fistula formed depends on the severity of the causative factors. Factors influencing fistula size include cancer stage, duration of radiation therapy, and the received dose [22]. The higher the severity of the cause, the larger the fistula size formed.

Risk Factors of Infection History on Rectovaginal Fistula Size

In this study, only a few patients had a history of infection as a risk factor for rectovaginal fistulas. Previous research mentioned above also found very few etiologies of infection associated with rectovaginal fistulas. Compared to obstetric fistulas, occurrences of non-obstetric fistulas due to infection are rare and, therefore, seldom become subjects of scientific publications [14]. Fistulas can form due to infections in the intestines, causing inflammation and the formation of evolving abscesses. These abscesses can then rupture, leading to erosion of nearby organs and the formation of a fistula [1]. Perianal infections and inflammatory bowel diseases should be monitored for the presence of complex or recurrent fistulas [22]. Fistula repair needs to be performed after addressing local inflammation, managing infections, and reducing tissue edema around the fistula. In other cases, fistulas can occur due to the rupture of obstetric scar tissue involving the cervix-vagina and rectum. This rupture can subsequently develop into an infection, causing necrosis in the tissue between the rectum and vagina and forming a rectovaginal fistula [19]. In this study, 2 patients (9.5%) had a history of infection, and all

rectovaginal fistulas formed had a medium size. The size of the fistula formed depends on the influencing factors. The wider the infection area, the higher the risk of fistula severity. The severity level of the infection also plays a crucial role in the fistula area's expansion. Moreover, the longer a patient has an infection, the higher the likelihood of forming larger-sized fistulas.

Risk Factors of Gynecological Surgery History on Rectovaginal Fistula Size

In this study, the majority of patients had previously undergone gynecological surgery, with most having a medium-sized rectovaginal fistula. The diameter formed due to gynecological surgery depends on the severity level of complications caused by the surgical procedure. According to previous research, fistula formation as a complication of gynecological surgery occurs within 6 weeks after the operation, and fistulas usually form unnoticed. In developed countries, fistulas are more associated with gynecological surgery than obstetric causes because obstetric care in these countries has advanced significantly [10]. Surgeries on the anorectal and vaginal areas can cause injuries, resulting in damage to the surrounding tissues. Damage is also suspected due to ischemia and insufficiently thick tissue between the rectum and vagina [1]. Fistulas caused by surgical complications significantly has a less favorable prognosis [22]. Fistulas resulting from gynecological surgery can be caused by repair failure, wound damage, and poor surgical techniques [19]. Fistulas can also originate from a tissue dissection process, from sutures inserted into the affected location. The treatment of rectal cancer with rectal resection can lead to fistula complications that occur after surgery. Rectal invasion in gynecological cancer can also contribute to fistula formation, as evidenced by 28.3% in previous study [22]. Rectovaginal fistulas can also form due to postoperative complications with stapled anastomosis, rectocele repair, hysterectomy, and restorative proctocolectomy with ileum anastomosis [23]. In addition to cesarean section surgery, hysterectomy procedures often become the main cause of non-obstetric iatrogenic rectovaginal fistula formation [14]. Trauma to the rectovaginal septum from pelvic surgery procedures with low anterior rectal resection causes postoperative leakage in the anastomosis area, requiring a complicated procedure because it is challenging to close. Failure in repairing previous fistulas also often contributes to this occurrence because many factors complicate rectovaginal fistula repairs [26]. Therefore, these risk factors significantly affect the skills of surgeons and other healthcare professionals, and well-equipped operating room facilities play a crucial role in reducing postoperative complications [27].

STRENGTH AND LIMITATIONS

The strength of your study lies in its focused investigation of risk factors associated with rectovaginal

fistulas. The inclusion of both obstetric and non-obstetric cases, detailed examination of various risk factors, and clear presentation of results enhance the comprehensiveness and value of the study. The findings contribute to understanding the profile of rectovaginal fistula patients in this specific clinical setting, benefiting healthcare practitioners and researchers. However, this research encounters several limitations. Inadequate and incomplete recording, along with suboptimal storage of medical records by field personnel, leads to unrecorded and incomplete data, significantly reducing the sample size. Additionally, variations in the classification of rectovaginal fistula sizes by previous researchers introduce inconsistencies that may impact the interpretation of relationships with risk factors. The scarcity of prior studies on the correlation between risk factors and the size of rectovaginal fistulas poses challenges in constructing a comprehensive discussion, emphasizing the need for further research in this area.

CONCLUSION

Our study demonstrated that risk factors for rectovaginal fistula sufferers at Dr. Soetomo is a woman under 30 years old, has primiparous or multiparous parity, and has a fetus with a normal weight. Most patients also had a history of malignancy and a history of gynecological surgery, and very few had a history of infection. The majority of rectovaginal fistulas formed from various existing risk factors are medium size (0.5–2.5 cm).

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ETHICAL CLEARANCE

This study had received ethical clearance from the Health Research Ethics Committee Faculty of Medicine Universitas Airlangga (No. 1231/LOE/301.4.2/II/2023) on February 16, 2023.

AUTHORS' CONTRIBUTIONS

Designed the study and drafted the manuscript: HDSS. Collected data and performed background literature review: HDSS. Performed statistical analysis: SKN. Supervised results and discussion: EMK, IH and GH. All authors reviewed and approved the final version of the manuscript.

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CONFLICT OF INTEREST

The authors declared there is no conflict of interest.

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