Factors affecting the onset and the degree of post-hysterectomy vaginal vault prolapse

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Abstract

Post-hysterectomy vaginal vault prolapse can affect life quality, and its onset varies. Previous studies have discussed the causes of post-hysterectomy vaginal vault prolapse but have not discussed the causes of the degree. This study aims to explore factors affecting the onset and degree of post-hysterectomy vaginal vault prolapse. A case-control study was conducted for seven years (2015-2022) at a tertiary referral hospital in East Java, Indonesia. Patient medical record data was accessed to find a diagnosis of post-hysterectomy vaginal vault prolapse. The onset was divided into two categories: ≤1 year and > 1 year. The pelvic organ prolapse quantification system measured the degree. The data were analyzed with the Chi-square test. A total of 34 patients were identified. Age influences the onset of post-hysterectomy vaginal vault prolapse ($p<0.05$). Number of living children, history of abortion, ethnic group, contraceptive use, number of marriages, body mass index (BMI), vaginal labor history, sexual status, and operation history did not influence the onset of complaints/appearance of post-hysterectomy vaginal vault prolapse ($p\geq0.05$). Age, number of living children, history of abortion, ethnic group, contraceptive use, number of marriages, BMI, vaginal labor history, sexual status, operation history, and the onset did not differ between grade I-II and grade III-IV patients ($p\geq0.05$). It is necessary to pay attention to the age factor to prevent and detect the emergence of post-hysterectomy vaginal vault prolapse.

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Introduction

Prolapse of the pelvic organs can compromise a woman's quality of life. This condition causes problems with urinary, anorectal, and coitus dysfunction. One case of prolapse is vaginal vault prolapse. Post-hysterectomy vaginal dome prolapse is a condition in which the vaginal cuff descends below a point that is less than 2 cm of the total length of the vagina over the hymen plane.[1] Epidemiological data show that in cases of pelvic floor defects, there are 72% of post-hysterectomy vaginal dome prolapse events associated with cystocele, rectocele, or enterocele.[2] Complaints experienced related to vaginal vault prolapse are when the upper vagina protrudes into or outside the vagina. Symptoms like "something is down" and "pressure in the vagina" are always common complaints.[2] Not all women experience these symptoms, but they often cause pelvic or lower abdominal pain.

In the case of post-hysterectomy vaginal dome prolapse, the support mechanism for the pelvic organs is disturbed, thereby increasing intra-abdominal pressure. This causes the pelvic organs to descend.[3] The cause of post-hysterectomy vaginal dome prolapse is associated with a history of hysterectomy. In gynecology, hysterectomy is one of the most frequently performed operations.[4] After hysterectomy, 3.6 per 1000 people-years require surgical correction of prolapse, and in two-thirds of these cases, there is multicompartment prolapse.[5] About 23% of women with post-hysterec-

tomy vaginal dome prolapse who require apical surgery have undergone a vaginal hysterectomy for pelvic organ prolapse (POP). After hysterectomy, the risk of post-hysterectomy vaginal dome prolapse increases in later years, especially in women with an early diagnosis of POP.[6] This risk increases because aging and obesity are associated with an overall incidence of hip organ prolapse (POP).[4]

The onset of vaginal dome prolapse needs to be studied to prevent the occurrence of a poor prognosis, especially the onset of occurrence at an estimated one year. Research finds that at one year, the incidence is linked to serious complications.[7] Although severity is dynamic and time-dependent, the degree of prolapse associated with the risk of complications will be different and preventable. No studies have addressed the degree of prediction in patients with post-hysterectomy vaginal dome prolapse. If cases are prevented and anticipated properly, prevention efforts can be carried out optimally. The operating time is longer for grade IV than for grade II/III prolapse.[8]

In previous studies, potential risk factors have been studied. Postmenopausal women with surgically managed pelvic floor disorders are at increased risk of developing vaginal dome prolapse after a hysterectomy.[9] Pre-existing pelvic floor defects before hysterectomy are the single most important risk factor for dome prolapse.[2] Pelvic floor surgery was previously the biggest risk factor for developing post-hysterectomy vaginal vault prolapse, with the risk of prolapse repair being 4.7 times higher if a vaginal hysterectomy was performed for prolapse.[10] Prolapse after hysterectomy is a relatively rare complication. Advanced age, obesity, chronic obstructive pulmonary disease, previous genital prolapse surgery, vaginal hysterectomy, and genital prolapse as indications of hysterectomy, and the number of vaginal deliveries ≥2 increase the risk of vault prolapse.[11]

The incidence of vaginal prolapse after hysterectomy is significantly higher in women with a higher number of vaginal deliveries, more difficult deliveries, fewer cesarean sections, complications after hysterectomy, strenuous physical work, neurological diseases, hysterectomies for POP, and/or a family history of POP. Premenopausal women had an average corrected vaginal prolapse of 16 years after the hysterectomy, and postmenopausal women had it for 7 years after the hysterectomy.[12]

Based on the background, this study aimed to explore the factors that influence the onset and degree of post-hysterectomy vaginal dome prolapse.

Materials and Methods

Study design, setting, and period

A case-control study was conducted for seven years, from 2015 to 2022, at a tertiary referral hospital in East Java, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia.

Study population, eligibility criteria, and sampling procedure

The study population consisted of patients with a diagnosis of post-hysterectomy vaginal vault prolapse at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia, during the research peri-

Table 1. Patient characteristics.

Variable	Category	Total	Percentage (%)
Age	≤60 years	18	53
	>60 years	16	47
Number of living children	1-2	13	38
	>2	21	62
Abortions	0	27	79
	≥1	7	21
Ethnic group	Javanese	25	74
	Madurese	9	26
Contraceptive use	Yes	13	38
	No	21	62
Number of married	1	31	91
	2	3	9
Body mass index	Normal	13	38
	Overweight-obesity	21	62
Vaginal labor history	<3	10	29
	≥3	24	71
Sexual status	Yes	7	21
	No	27	79
Operation history	Abdominal hysterectomy	24	71
	Vaginal hysterectomy	10	29
Grade of post-hysterectomy vaginal vault prolapse	I-II	16	47
	III-IV	18	53
Type of prolapse	PHVP	5	15
	PHVP and cystocele	10	29
	PHVP, cystocele, and rectocele	17	50
	PHVP and rectocele	2	6
Onset of PHVP	≤1 year	11	32
	>1 year	23	68

PHVP, post-hysterectomy vaginal vault prolapse.

od. The study found 34 patients. The inclusion criteria were complete medical record data and a history of hysterectomy. The exclusion criteria were incomplete medical records.

Variables and measurement

The independent variables in this study were age, number of living children, abortion history, ethnicity, contraceptive use, number of marriages, body mass index (BMI), number of deliveries, and sexual life. The dependent variable is the onset and degree of post-hysterectomy vaginal vault prolapse. This data is divided into two categories, namely ≤1 year and > 1 year. All patients received treatment to prevent post-hysterectomy vaginal vault prolapse. After surgery, the patients were assessed for changes in bowel and bladder function, such as difficulty urinating, constipation, and incontinence. In addition, the patients were assessed for POP at the urogynecology clinic. Suturing the cardinal and uterosacral ligaments to the vaginal cuff at the time of hysterectomy is effective in preventing vaginal vault prolapse after abdominal and vaginal hysterectomy. In this study, the reference diagnosis for vaginal vault prolapse after hysterectomy was studied based on the pelvic organ prolapse quantification (POPQ) assessment. There are six measurement points defined in the POPQ system: Aa, Ba, C, D, Ap, Bp, and three other important points: genital hiatus, total vaginal length, and perineal body. Determination of degrees are grade 0 (no prolapse), grade I (half to the hymen), grade II (to the hymen), grade III (half past the hymen), and grade IV (maximum reduction).[13]

Study instruments and data collection

Data were collected using medical records.

Data analysis

Data were analyzed descriptively using Microsoft Excel (Microsoft, Redmond, WA, USA) and SPSS Statistics version 25 (IBM, Armonk, NY, USA). A statistical analysis was carried out to analyze the factors that influence the onset of post-hysterectomy vaginal vault prolapse. The data were analyzed using the Chi-square test. The variable is said to have significant differences if $p<0.05$.

Ethics approval

An ethical clearance letter was received from Dr. Soetomo General Academic Hospital. Confidentiality was guaranteed by avoiding personal information from participants and using coding.

Results

A total of 34 patients were identified. More than half of patients are over 60 years old, have more than two children, do not use contraception, and have overweight or obese BMI status. Most patients had no history of abortion, had a history of more than three vaginal deliveries, and were not sexually active. Nearly all of the patients were married once. More than half of the patients have a grade of post-hysterectomy vaginal vault prolapse III-IV. More

Table 2. Factors influencing the onset of post-hysterectomy vaginal vault prolapse.

Variable	Onset post-hysterectomy vaginal vault prolapse				Total	p
	≤1 year		>1 year			
	n	%	n	%		
Age						
≤60 years	7	21	11	32	18	0.046
>60 years	4	12	12	35	16	
Number of living children						
1-2	6	18	7	21	13	0.694
>2	5	15	16	47	21	
Abortion history						
0	10	29	17	50	27	0.558
≥1	1	3	5	15	7	
Ethnic group						
Javanese	6	18	19	56	25	0.595
Madurese	5	15	4	12	9	
Contraceptive use						
Yes	4	12	9	26	13	0.732
No	7	21	14	41	21	
Number of marriages						
1	9	26	22	65	31	0.532
2	2	6	1	3	3	
Body mass index						
Normal	6	18	7	21	13	0.694
Overweight-obesity	5	15	16	47	21	
Vaginal labor history						
<3	5	15	5	15	10	0.675
≥3	6	18	18	53	24	
Operation history						
Abdominal hysterectomy	7	21	17	50	24	0.858
Vaginal hysterectomy	4	12	6	18	10	
Sexual status						
Yes	3	9	4	12	7	0.633
No	8	24	19	56	27	

than half of the patients had a history of abdominal hysterectomy. Patients who have an abdominal history are referred to and treated at the hospital. More than half of the total patients were diagnosed with vaginal vault prolapse, cystocele, and rectocele. More than half of the patients had the onset of post-hysterectomy vaginal vault prolapse for more than one year. Table 1 shows the characteristics of the respondents.

Table 2 shows the statistical test result. Number of living children, history of abortion, ethnic group, contraceptive use, number of marriages, BMI, vaginal labor history, sexual status, and operation history did not influence the onset of post-hysterectomy vaginal vault prolapse ($p \geq 0.05$). Age influences the onset of post-hysterectomy vaginal vault prolapse ($p < 0.05$).

Age, number of living children, history of abortion, ethnic group, contraceptive use, number of marriages, BMI, vaginal labor history, sexual status, operation history, and the onset did not differ between grade I-II and grade III-IV patients. Table 3 shows the factors that influence the degree of post-hysterectomy vaginal vault prolapse.

Discussion

Age influences the onset of post-hysterectomy vaginal vault prolapse. Genital prolapse increases with parity and with age, as shown by a case report of vault prolapse in a 65-year-old woman. Several factors, such as large parity, advanced age, and poor lifestyle, affect the route through which vaginal surgery is used.[14] There is an increasing prevalence of POP in the elderly population. There is a 12% increase in the incidence of severe POP each year, with the incidence increasing or approximately doubling for every decade of life.[2] Higher rates of POP disorders were found in the 6th and 7th decades of life. Women in these decades of life may be at increased risk of reduced quality of life from POP.[15]

The number of living children, history of abortion, ethnic group, contraceptive use, number of marriages, BMI, vaginal labor history, sexual status, and operation history did not influence the onset of post-hysterectomy vaginal vault prolapse. Previous studies have suggested that prior surgery to repair defective pelvic organ supports has been consistently identified as a risk factor for the development of POP. Several other factors are also implicated, including vaginal *versus* non-vaginal delivery for full-term infants, hysterectomy, birth defects, race, lifestyle, and chronic diseases that increase intraabdominal pressure (*e.g.*, chronic constipation, pulmonary disease, and obesity). However, the role of some of these factors is not fully understood.[2]

Age, number of living children, history of abortion, ethnic group, contraceptive use, number of marriages, BMI, vaginal labor history, sexual status, operation history, and the onset did not differ

Table 3. Factors influencing the degree of post-hysterectomy vaginal vault prolapse.

Variable	Grade of post-hysterectomy vaginal vault prolapse				Total	p
	Grade I-II		Grade III-IV			
	n	%	n	%		
Age						
≤60 years	8	24	10	29	18	0.581
>60 years	8	24	8	24	16	
Number of living children						
1-2	7	21	6	18	13	0.885
>2	9	26	12	35	21	
Abortion history						
0	11	32	16	47	27	0.651
≥1	5	15	2	6	7	
Ethnic group						
Javanese	10	29	15	44	25	0.909
Madurese	6	18	3	9	9	
Contraceptive use						
Yes	8	24	5	15	13	0.362
No	8	24	12	35	21	
Number of marriages						
1	15	44	16	47	31	0.483
2	1	3	2	6	3	
Body mass index						
Normal	8	24	5	15	13	0.885
Overweight-obesity	8	24	13	38	21	
Vaginal labor history						
<3	3	9	7	21	10	0.682
≥3	13	38	11	32	24	
Operation history						
Abdominal	13	38	11	32	24	0.427
Vaginal	3	9	7	21	10	
Sexual status						
Yes	4	12	3	9	7	0.684
No	12	35	15	44	27	
The onset of PHVP						
≤1 year	6	18	5	15	11	0.700
>1 year	10	29	13	38	23	

PHVP, post-hysterectomy vaginal vault prolapse.

between grade I-II and grade III-IV patients. A clear understanding of the supporting mechanisms of the uterus and vagina is important to make the right choice of corrective procedure and also to minimize the risk of developing post-hysterectomy dome prolapse. Most of the pelvic floor muscles are the levator ani, consisting of the puborectalis, pubococcygeus, and iliococcygeus. Elevation and support of pelvic organs are associated with pubococcygeus and iliococcygeus.[16] The causes of prolapse are multifactorial but are mainly related to pregnancy and vaginal delivery, leading to direct pelvic floor muscle and connective tissue injury. Hysterectomy, pelvic surgery, and conditions associated with sustained episodes of increased intra-abdominal pressure, including obesity, chronic cough, constipation, and repetitive weight lifting, also contribute to prolapse.[17] Several risk factors have been associated with POP, all contributing to the weakening of the pelvic floor connective tissue/collagen, which allows the pelvic organs to prolapse through the vaginal wall.[18] There was a strong negative correlation between type I collagen fiber thickness and the degree of anterior POP.[19] The results of the assessment are different from cases of uterine prolapse. Age, type of delivery, parity, BMI, and degree of uterine prolapse.[20]

There was no relationship between degree and the factors studied in this study. The factor that has not been studied in this study is the history of the disease experienced by women. The Izumoto study found that post-hysterectomy vaginal vault prolapse may develop after bilateral nephroureteral hysterectomy, with recurrence associated with increased intraabdominal pressure from ascites associated with cirrhosis.[3]

Of the many cases encountered in this hospital, post-hysterectomy vaginal vault prolapse is a rare disease, but its treatments are being studied. Non-surgical treatments that are used conventionally, such as exercises for the pelvic floor, are not as effective as surgical approaches for the treatment of third-degree dome prolapse. Prolapse of the vaginal vault after hysterectomy can be treated safely and effectively with abdominal sacral colpopexy using permanent mesh. Due to several risk factors, such as large parity, advanced age, and a poor lifestyle, especially involving exercise to strengthen the pelvic floor muscles, the vaginal surgery route was used, which was found to be effective, and thus the treatment was successful. In conclusion, an individual and unique approach to such rare cases can yield efficacious results.[14] The surgical options for correction of vault prolapse lie between the vaginal and abdominal approaches. The choice of procedure should be based on the patient's age, co-morbidities, previous surgeries, and level of physical and sexual activity. The surgeon's experience influences the choice of surgery. Importantly, greater awareness of pelvic anatomy and technique at the time of the original hysterectomy will significantly reduce the subsequent incidence of prolapse. Satisfactory correction of prolapse of the vaginal vault is a formidable surgical challenge, and many techniques have been described for the correction of this troublesome problem. The goal of prolapse surgery is to restore normal vaginal support while maintaining vaginal capacity and coitus function.[2]

Repair of prolapse is based on the use of natural tissue or synthetic materials. There is no consensus on the mechanism and management of prolapse, but what is accepted by all is the need to properly assess these patients, involve them in management, and agree on the appropriate type of surgery for their particular circumstances.[2] Anterior sacrospinoffixation is an alternative technique for treating apical prolapse of the vagina. This technique is not well known, and surgeons are more used to employing it to approach sessile serrated lesions.[21] The surgical treatment of post-hysterectomy vaginal prolapse of the vaginal vault has been reported in several clinical studies, but most are short-term studies. Reconstructive surgery and colpocleisis have a good medium-term effect on post-hysterectomy vaginal vault prolapse, with good outcomes and few complications. Surgeons are expected to be able to ensure the right surgical procedure based on patient characteristics, degree, and location of prolapse to achieve the best surgical success and minimize damage.[22] Minimally invasive sacrocolpopexy was associated with similar 30-day complication rates, prolonged hospitalization, re-hospitalization, and reoperation compared with non-mesh vaginal surgery for apical prolapse.[23] To assess the adverse impact of post-hysterectomy vaginal vault prolapse on the pelvic floor and the beneficial effects of various types of surgery, the pelvic floor disability index-20 score was used.[24] Increased duration of menopause, longer operative times, longer genital hiatus, and shorter perineal bodies all contribute to relapse.[25]

The limitation of the research is the bias risk that can occur because, using medical records, reporting can be less accurate when compared to prospective studies. Confounding factors have also not been studied in this study.

Conclusions

Age influences the onset of post-hysterectomy vaginal vault prolapse. Number of living children, history of abortion, ethnic group, contraceptive use, number of marriages, BMI, vaginal labor history, sexual status, and operation history did not influence the onset of complaints/appearance of post-hysterectomy vaginal vault prolapse. Age, number of living children, history of abortion, ethnic group, contraceptive use, number of marriages, BMI, vaginal labor history, sexual status, operation history, and the onset did not differ between grade I-II and grade III-IV patients. It is necessary to pay attention to the age factor to prevent and detect the emergence of post-hysterectomy vaginal vault prolapse.

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