Original Article

Prevalence of Intrauterine Adhesion after Vacuum Aspiration for Treatment of First Trimester Abortion

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Objective: To study the prevalence of intrauterine adhesion [IUA] in women who underwent vacuum aspiration [VA] for treatment of first trimester abortion and associated factors that correlated with the occurrence of IUA.

Materials and Methods: This prospective study was performed in 81 women who were diagnosed with incomplete abortion, inevitable abortion, embryonic death, blighted ovum, or death fetus in utero at Ramathibodi Hospital between May 2016 and April 2017. All patients underwent VA and office hysteroscopy was performed 12 weeks post-procedure to identify the occurrence of IUA.

Results: IUA were found in 14 women, which accounted for 17.3% of the participants. Most of the patients who had IUA were found to be in stage I (9/14, 64.3%), followed by patients in stage II (3/14, 21.4%) and stage III (2/14, 14.3%). Abnormal menstrual pattern after VA was found to be a statistically significant factor associated with IUA (odds ratio 6, 95% CI 2.95 to 12.55).

Conclusion: IUA occurred in women who underwent VA after first trimester abortion and in those who had a history of abnormal menstrual pattern after VA. Therefore, before performing VA for first trimester abortion treatment, the patients should be informed about the risks of developing IUA.

Keywords: Abortion, Intrauterine adhesion, Vacuum aspiration, Hysteroscopy

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Miscarriage, also called as spontaneous abortion or pregnancy loss, occurs in about 10% to 20% of all pregnancies, 80% of which happens within the first gestational trimester[1]. There are various techniques for the treatment of abortions such as expectant management, medical treatment, and surgical options, the selection of which will depend on the setting and the availability of equipment[2]. Currently, medical evacuation has become more widely used as treatment of abortion however, surgical evacuation is still regarded as the standard and the more frequently preferred method[3]. In the past, sharp curette used to be the technique of choice. However, Vacuum aspiration [VA] has preferably been used and in 2012, the World Health Organization [WHO] recommended VA as the surgical technique of choice for abortion treatment up to the gestational age of 15 weeks[4]. This is because of the higher amount of research comparing the efficacy of VA to sharp curettage indicating a higher complete abortion rate, lower level of possible complications, lower blood loss, lower operative time, lower cost, and shorter duration of hospitalization[5-9]. All of which supports VA as a superior option for first trimester termination. So far, it has been used in many countries, but it is still not widely used in Thailand[7].

Post-traumatic intrauterine adhesion [IUA] is the condition that can occur after spontaneous abortion or curettage. According to statistics, 15% to 37% of cases present with IUA[10-14]. The first recorded case of IUA was in 1894 in Germany by Fritsch[15]. Other case reports were filed in 1927 by Bass[16] and in 1946 by Stamer[17]. In 1948, Asherman described the signs of adhesion in a group of women that experienced intrauterine trauma and presented with symptoms related to abnormal menstruation. He also reported the etiology and the frequency of the condition, referring to it as the Asherman syndrome, while defining the reason for the occurrence of adhesion as part of the healing process following a trauma to the basalis layer of the endometrium[18]. Statistically, 90% of IUA results from pregnancy related curettage. There are also other

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possible factors that can lead to IUA such as infection and inflammation of the uterine lining[19].

IUA related complications include menstrual disorders, dysmenorrhea, pelvic pain, and infertility. In cases of post-IUA pregnancies, there is a chance of recurrent abortion, abnormal placental implantation, or premature labor[20]. Therefore, early detection, treatment, and prevention of IUA is critical, especially for families that plan to have children in the future. For the diagnosis of IUA, there are many methods such as hysteroscopy, hysterosalpingography, ultrasonography, and magnetic resonance imaging [MRI]. Hysteroscopy is the gold standard technique, which is usually used in cases where the occurrence of IUA is suspected (particularly in cases of observable symptoms). However, some cases of IUA have no presentable signs or symptoms, which make detection a challenge.

There are many techniques that are currently available for the treatment of abortion. VA, being one of the treatments, might minimize the risk of IUA development if it was more widely available and used. The technique could reduce the prevalence of IUA. However, few studies researched the association between IUA and VA. Therefore, the present study aims to determine the prevalence of IUA in women who underwent VA for the treatment of abortion to investigate a possible correlation between the two.

Materials and Methods

In this descriptive prospective study, 91 women who were diagnosed with first trimester abortion at Ramathibodi Hospital, were approached for consent between May 2016 and April 2017. The patients visited either the outpatient department or the emergency department, and underwent uterine evacuation following abortion. The inclusion criteria included pregnant woman with gestational age of 13 weeks or less (confirmed by date of LMP or ultrasound) with a condition of incomplete abortion, inevitable abortion, or embryonic death performed either by techniques of manual VA or electric VA, according to standard protocol. The present study was restricted to patients who denied history of uterine curettage, with no history of pelvic infection, no previous history of intrauterine surgery, no history of IUD used, and no previous history of endometriosis. The participants were excluded from the study if they did not come for follow-up, did not use a condom as a contraception during the research period, became pregnant before the scheduled hysteroscopy, or experienced complications such as uterine perforation during the procedure.

The procedures were performed under general or local anesthesia, in an aseptic condition. After the procedures, all patients received an oral antibiotic (doxycycline or metronidazole) for seven days as an infection prophylaxis and were discharged from the hospital within approximately 24 hours after the procedure was completed, provided that no complication ensued. The patients were followed up after two weeks to review the pathological results. Each patient was questioned about the number of days they experienced post-operative bleeding, the number of visits to the hospital and possible abnormal symptoms after the evacuation procedure. Pelvic examination was also performed on each patient to determine any detectable complication from the procedure. All patients were advised to use condoms for contraception and alongside being scheduled for a diagnostic hysteroscopy at 12 weeks after abortion. The office hysteroscopy was performed at the outpatient department of the Ramathibodi Hospital by the experienced physicians, using a flexible 3 mm hysteroscope (Olympus and STORZ equipment). The hysteroscope was inserted into the uterine cavity under direct vision. Normal saline was used for the distension of the uterine cavity. No analgesia was used, and no cervical dilation was performed. All the patients were discharged from the hospital after the completion of the procedure, provided that no complication ensued.

The primary outcome measured the prevalence and the extent of IUA, which is based on the American Fertility Society classification[21]. The secondary outcome measured the potential correlation between patient's medical history such as the number of gestations, number of deliveries, number of previous abortions, types of abortion and history of previous cesarean section scarring, with the occurrence of IUA.

All data were analyzed using Stata Statistical Software: Release 14.2 (College Station, TX: StataCorp LP) to determine the odd ratio, the 95% confidence interval [CI] and the p-values. The qualitative variables were described using frequency and percentage, while the quantitative variables were described using mean, standard derivation, median, and min-max. The t-test was used for normal distribution and Mann-Whitney U test was used for abnormal distribution.

The present study was approved by the Research Ethics Committee of the Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Thailand.

Results

Ninety-three women were enrolled into the present

study. The mean age of the participants was 33.5 years, while the mean gestational age was 69.9 days. Fifty-nine percent of the patients were nulliparous, with the main diagnoses being embryonic death and incomplete abortion. All patients that underwent VA had a successful evacuation. No further cervical dilatation was needed, and no immediate complication was found. Twelve women were excluded from the present study, two of which were pregnant resulting from the observation of contraception and 10 refused to undergo hysteroscopy. Hysteroscopy was performed in 81 patients, 12 weeks following abortion. Sixty-seven patients had normal findings, whereas 14 patients had IUA, which accounted for 17.3% of the participants. Out of the IUA positive patients, nine women presented with IUA stage I (64.3%), three women with IUA stage II (21.4%), and two women with IUA stage III (14.3%) (Table 2).

Seven of the 14 women who were investigated for IUA were nulliparous. Most of the women (92.9%) did not have a history of abortion. Only one woman out of the 14 reported single abortion, indicating non-significance between parity, the number of abortions and IUA ($p = 0.334$ and 0.57), respectively. Furthermore, the type of abortion ($p = 0.173$) and the history of previous gynecologic surgery ($p = 0.256$) did not have a significant correlation with the occurrence of IUA (Table 3).

However, the development of abnormal patterns of menstruation after curettage was found to have a more significant correlation with IUA. Four of the five women that reported post-operative abnormal menstrual flow had IUA, of which two had amenorrhea and were diagnosed with uterine synechia (stage III), and the other two presented with signs of hypomenorrhea compared with their pre-operative menstrual pattern and were diagnosed with moderate adhesion (stage II). One woman without IUA presented with symptoms of metrorrhagia, which was suspected to be caused by infection. The infection was determined through her medical records and a follow-up clinical examination conducted at 12 weeks after VA. After a treatment course of antibiotics, the infection resolved, and her menstrual pattern was recorded as normal again. The outcome indicates that there is a statistically significant correlation between abnormal menstrual pattern after VA and IUA, increasing the risk of IUA development by 6-folds (odds ratio 6, 95% CI 2.95 to 12.55) (Table 3).

Table 1. Demographic characteristics and outcomes

Characteristics	Total (n = 93 cases)
Age (years)	33.5±5.2
Gestational age (days)	69.9±12.2
Parity	
0	48 (59.2)
1	26 (32.1)
2	5 (6.2)
>3	2 (2.5)
Blood loss (ml)	10 (3 to 50)
Operative time (min)	8 (2 to 30)
Days of bleeding directly post-operative (days)	5 (1 to 22)
Days until first period (days)	32.3±7.0

Data are presented as mean ± SD, median (min-max), or n (%)

Table 2. Extent of intrauterine adhesion [IUA]

Outcome	n (%) (n = 14)
Stage I	9 (64.3)
Stage II	3 (21.4)
Stage III	2 (14.3)

Discussion

IUA is a condition that can develop from post-abortion curettage, which is a result of damage to the

Table 3. Patients' characteristic and intrauterine adhesions presented by hysteroscopy

Patients' characteristic	Adhesion, n (%)		*p*-value
	Yes (n = 14)	No (n = 67)	
Parity			0.334
0	7 (50.0)	41 (61.2)	
1	7 (50.0)	19 (28.3)	
2	0 (0.0)	5 (7.5)	
≥3	0 (0.0)	2 (3.0)	
Number of abortion			0.570
0	13 (92.9)	51 (76.1)	
1	1 (7.1)	14 (20.9)	
2	0 (0.0)	1 (1.5)	
3	0 (0.0)	1 (1.5)	
Type of abortion			0.173
Inevitable abortion	2 (14.3)	19 (28.4)	
Incomplete abortion	4 (28.6)	22 (32.8)	
Embryonic death	2 (14.3)	10 (14.9)	
Death fetus in utero	5 (35.7)	13 (19.4)	
Blighted ovum	1 (7.1)	3 (4.5)	
Co-existing risk factor			0.256
No previous surgery	11 (78.6)	61 (91.0)	
Previous C/S x I	3 (21.4)	3 (4.5)	
Previous C/S x II	0 (0.0)	1 (1.5)	
Previous C/S x III	0 (0.0)	1 (1.5)	
Previous gynecologic surgery	0 (0.0)	1 (1.5)	
Menstrual pattern after curettage			0.001*
Normal menstrual pattern	10 (71.4)	66 (98.5)	
Abnormal menstrual pattern	4 (28.6)	1 (1.5)	

* *p*-value <0.05 was assigned as statistically significance

basal layer of the endometrium. The incidence and the severity of adhesion resulting from post abortion curettage depend on several risk factors, one of which is choice of method in post abortion treatment.

The present study investigated the occurrence of IUA in women who underwent VA for the treatment of first trimester abortion. The prevalence of IUA is about 17% and the most extent of IUA was mild (64.3%). Abnormal menstrual pattern after VA was found to be a statistically significant factor associated with IUA, Conversely the number of previous abortion was not associated with increased prevalence of IUA.

The prevalence was found to be lower than the previous study conducted by Salzani et al in 2007. Using hysteroscopy, it found IUA in 37.6% of 109 women 3 to 12 months after the abortion curettage[13]. This methodological difference could account for the discrepancies in the findings. In addition, the technique used in post-abortion treatment is also different. The present study used VA, which is expected to cause lower damage to the uterine lining as the pressure applied during the procedure can be controlled, an advantage of VA. Sharp curettage was used in Salzani et al's study[13]. Moreover, in that study, there were missed abortion patients included, which carries a higher risk of tissue necrosis and absorption along with inflammation. Therefore, it may have a significant effect on the development and the severity of IUA.

In contrast, the prevalence of IUA in the present study was higher than Adoni et al's study in 1982, which reported 15% of IUA diagnosed by hysterosalpingography six to eight weeks after missed abortion[22]. This difference could be accounted for from the use of a hysteroscope in the present study to detect IUA, which is more sensitive and has a higher performance than hysterosalpingography, allowing for a more accurate detection of mild degree IUA and registering a higher prevalence.

In terms of the link between IUA and various associated factors, the present study has found that the number of previous abortions, the type of abortion performed, the number of cesarean sections, and a history of gynecologic surgery have no significant statistical association with the prevalence of IUA. This finding contradicts the findings of several previous studies, which may be due to the lower number of participants in the present study, as well as a lower range of participants. Most participants in the present study were either nulliparous or have no history of previous abortions, with only a small number of participants having had a history of one or two previous abortions (with none having had more than three previous abortions). Thus, the present study could not establish a correlation between the listed risk factors and the development of IUA.

After the completion of VA, if the patient experiences a mild form of IUA, there may be no observable signs or symptoms and the adhesion can dislodge on its own during menstruations. On the other hand, if the IUA is moderate to severe, the patients will experience abnormal menstrual patterns as compared to the pre-procedural menstrual pattern. Interestingly, the present study found an association between a disturbance in the menstrual pattern after the treatment of abortion and the prevalence of IUA. This finding is similar to the finding of Westendorp et al in 1998, which found a 40% prevalence of IUA three month after the intervention and in women with menstrual disorders a statistically significant 12 fold increased risk for Asherman's syndrome was reported[23]. As the biological mechanisms, this correlation could result in two different lesions, stenosis or total atresia of the internal cervical os, causing amenorrhea and intrauterine cavity adhesion, causing partial or complete obliteration of the uterine cavity that may be asymptomatic or result in hypomenorrhea, metrorrhagia, and amenorrhea depending on distributions[20].

The strengths of the present study include a prospective and well-controlled study. It is among the few first innovative studies that evaluated the effect of VA and the use of hysteroscopy to evaluate IUA. Moreover, the results were assessed by experienced hysteroscopist and used standardize technique. However, we have no data on the existing uterine pathology prior to the curettage, which might account for the imprecisely higher prevalence.

Conclusion

IUA could occur in women who underwent VA after the first trimester abortion treatment. Therefore, before performing VA, the patients should be informed about the risks of developing IUA. Furthermore, a normal menstrual pattern can nearly rule out the presence of severe IUA. Accordingly, to minimize unnecessary invasive procedures, we recommend hysteroscopy only in post-aspiration patients who develop abnormal menstrual patterns for the early detection of IUA and for proper treatment options.

What is already known on this topic?

There are a lot of benefits of VA over sharp curette

for doing surgical abortion in first trimester pregnancy loss. The evidences show VA has higher complete abortion rate, lower intraoperative complications, lower blood loss, lower cost, and shorter operative time.

In 2012, WHO recommended VA as the surgical technique of choice for abortion treatment up to gestational age less than 15 weeks. However, the data about the occurrence of IUA after VA, which is a long-term complication that can affect future pregnancy, has not been established.

What this study adds?

VA seems to injure less the endometrium than sharp curette. However, this study reveals that IUA can occur after VA, nearly 20% of the time. Therefore, the patients should be informed about the risk of developing IUA before undergoing VA.

Interestingly, this study illustrates that abnormal menstrual pattern after VA especially amenorrhea and hypomenorrhea is an important sign of IUA developing. Therefore, we recommend hysteroscopy should be performed in the patients with abnormal menstrual pattern for detecting IUA.

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Potential conflict of interest

The authors declare no conflict of interest.

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