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COMPARATIVE STUDY BETWEEN MANUAL VACUUM ASPIRATION (MVA) VERSUS DILATATION AND CURETTAGE (D&C) IN FIRST TRIMESTER MISCARRIAGE

Dr. Sidra Azam[1], Dr. Saadia Mir[2], Dr. Naila Khawer[3], Dr. Zoofishan Imran[4], Dr. Mahwish Pervaiz[5], Prof. Dr. Sumera[6]

[1]Khawaja Muhammad Safdar Medical College, Email:sidra.azam94@gmail.com

[2]Khawaja Muhammad Safdar Medical College, Email: saadiamir@ymail.com

[3]Ihsan Mumtaz Teaching Hospital, Email: Drnailakhawer@gmail.com

[4]RLKU Medical College, Email: Zimran195@gmail.com

[5]Khawaja Muhammad Safdar Medical College, Email: Mahwishp91@gmail.com

[6]Khawaja Muhammad Safdar Medical College, Email: Summeraaslam68@gmail.com

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Corresponding Author:

Dr.Sidra Azam, Khawaja Muhammad Safdar Medical College,

Email:sidra.azam94@gmail.com

ABSTRACT

Background: Miscarriage is a serious health problem across all over the world which is affecting 10-20% of pregnancies. The aim of this was study to compare the efficacy of manual vacuum aspiration with dilatation and curettage in first trimester miscarriages.

Methods: It was non-probability consecutive study of 108 women ages between 20 to 35 years, presenting to first trimester with missed miscarriage and gestational age <12 weeks on LMP who were divided into two groups (each 54) group A (D&C) and group B (MVA). This study was conducted at Obstetrics & Gynaecology department, Allama Iqbal Memorial Teaching Hospital and Govt. Sardar Begum Teaching Hospital, Sialkot from June 2024 to December 2024.

Results: Mean age was 28.47 ± 4.02 years in group A and 29.01 ± 3.99 years in group B. In group A, mean BMI was 21.98 ± 1.32 kg/m2 and in group B was

	22.40 ± 1.70 kg/m2. The gestational age ranged from 5–12 weeks. The mean gestational age in group A was 8.23 ± 1.62 weeks and in group B it was 8.51 ± 1.81 weeks. MVA (85.2%) was more effective than D&C (62.9%). Complication rate after procedure was lesser in group B. **Conclusion:** Manual vacuum aspiration is more efficient than dilatation and curettage for handling first trimester miscarriages, providing enhanced safety as an added benefit.

INTRODUCTION

A miscarriage is the spontaneous loss of a pregnancy before 20 weeks of gestation, often before the woman is even aware she is pregnant. Diagnosing a miscarriage can be challenging because early signs and symptoms like bleeding and cramping are not always definitive, and the gestational sac might not be visible on ultrasound. [1] It is most adverse outcome of a pregnancy leading to abortion and evacuation of fetus. The threshold for gestational viability varies between 20 to 28 weeks of pregnancy based on geographic location.[2] The World Health Organization (WHO) characterizes miscarriage as the removal of embryo or fetus which is less than 500 grams in weight, which is approximately equivalent to 22 weeks of gestation. [3] Early pregnancy loss is a frequent medical issue, affecting 10-20% of pregnancies that are clinically recognized.[4] Missed abortion is also referred to as blighted ovum, anembryonic pregnancy, or fetal demise. Women frequently suffer miscarriages and abortions in all over the world.[4] According to WHO, approximately 46 million abortions are carried out each year. About 30% of all maternal deaths happen in South Asia, which account for 28% of the global population and estimates that 13% of these deaths can be attributed to complications related to abortion.[5] Around 890,000 women in Pakistan, aged 15-49 years experience missed or incomplete abortions each year.[6] The traditional management of first trimester pregnancy loss has involved two primary methods first one is dilation and curettage (D&C) performed in a surgical setting, which requires skilled personnel, an operating room, and an anesthetist, sometimes for this procedure blood transfusions were also required. Alternative method for treating first trimester missed miscarriage is manual vacuum aspiration (MVA). [7] D&C is commonly used in our context and is believed to be both safe and cost-effective when performed by experienced professionals. However, even with medical advancements, complications arising from unsafe abortions account for 10 to 13% in developing nations.[8] While MVA is considered safe and potential complications such as

infection, bleeding, uterine perforation, and reduced fertility can occur in up to 10% of women.[9] MVA is effective in 100% of cases, leads to less blood loss, requires less duration of time and hospital stay, and is therefore low-priced.[10] This procedure has been utilized for the last thirty years, initially for incomplete miscarriages, but it is now also applied to missed miscarriages, hydatidiform mole and endometrial sampling. Difficulties or risk factors are infrequent, occurring in less than 2% of cases.[11] Multiple clinical studies have confirmed that MVA is effective and safe. The World Health Organization (WHO) recommends MVA as a preferred method for uterine evacuation.[12] The miscarriage rate is 29 per 1,000 women. Around 197,000 women are annually treated for difficulties following miscarriages in the community healthcare system. 13% of deaths related to maternal health are due to Unsafe abortions.[13] The purpose of this study was to compare the effectiveness of manual vacuum aspiration (MVA) against dilation and curettage (D&C) in women who present to emergency care with first trimester miscarriage.

MATERIALS AND METHODS

Study Setting: It was non-probability consecutive study of 108 women ages between 18 to 35 years, presenting with first trimester missed miscarriage with gestational age <12 weeks on LMP and no signs of septic abortion which were included fever >37.7 °C, purulent vaginal discharge, tachycardia or abdominal distension. Enrolled women divided into two groups: group A (women underwent dilatation & curettage) and in group B (women underwent manual vacuum aspiration). This study was conducted at Obstetrics & Gynaecology, Allama Iqbal Memorial Teaching Hospital and Govt. Sardar Begum Teaching Hospital, Sialkot from June 2024 to December 2024. Dilatation and curettage (D&C) was performed in the operating room under general anesthesia, while manual vacuum aspiration was executed in the examination room with a paracervical block, utilizing the Ipas MVA system, which comprises an aspirator and a cannula. The procedure's completion was verified through ultrasound. Patients who were hemodynamically unstable (determined by clinical assessment) and exhibited any signs or symptoms of infection, had a history of instrumentation, bleeding disorders, molar pregnancies, uterine abnormalities, or experienced severe anxiety were excluded from this study. Data collection was collected after approval from ethical committee of hospital. Informed consent was obtained from the participants. These women were randomly assigned into two groups using a lottery method.

DATA ANALYSIS: Data was entered and analyzed utilizing the Statistical Package for Social Science (SPSS) software version 25.0. Quantitative variables such as maternal age, gestational age, height, weight and BMI was presented as mean and standard deviation for

normal distributive data and median (IQR) for non-normal distributive data. Normality was

	Group A (D&C)	Group B (MVA)	P-value
	n=54	**n=54**	
Age **(years)**	28.47 ± 4.02	29.01 ± 3.99	0.09
BMI **(kg/m^2)**	21.98 ± 1.32	22.40 ± 1.70	0.01*
Socioeconomic status **[n (%)]**			
Low	38	42	0.84
Middle	16	10	
High	-	2	
Gestational age **(weeks)**	8.23 ± 1.62	8.51 ± 1.81	0.21

assessed by using Shapiro-Wilk test. Qualitative variables such as socio-economic status, comorbid (hypertension, diabetes and dyslipidemia) and previous history of abortion were presented as frequency and percentage. Efficacy was compared between groups MVA and D&C by using Chi-square test. Effect modifiers such as age, parity, BMI, socio-economic status, gestational age, hypertension, diabetes mellitus, dyslipidemia and previous history of abortion was controlled through stratification. The significance level was ≤0.05.

RESULTS

The age ranged from 20–35 years. A total of 54 patients (in each group) the mean age was 28.47 ± 4.02 years in DNC group and 29.01 ± 3.99 years in MVA group (p=0.09). the mean BMI in group A was 21.98 ± 1.32 kg/m2 and in group B was 22.40 ± 1.70 kg/m2. Most of the patients belonged to low class. The gestational age ranged from 5–12 weeks, the mean gestational age in group A was 8.23 ± 1.62 weeks and in group B was 8.51 ± 1.81 weeks. The mean duration of procedure was 9.87 ± 2.21 minutes in group A and 5.90 ± 3.01 minutes in group B. Most of women who had misarrange were primiparous**. (Table: 1)**

Out of 108, 14 (25.9%) women in group A, and 12 (22.2 %) women in group B had a history of abortion. 19 (35.2%) women in group A, and 21 (38.9 %) women in group B had Diabetes. 22 (40.7 %) women in group A and 20 (37.1%) women in group B had hypertension and 11 (20.4 %) women in group A, 10 (18.5%) women in group B had Dyslipidemia. History of abortion, Diabetes, Hypertension and Dyslipidemia were statistical insignificant in both groups. however, Diabetes, Hypertension were near to significant value (p-value 0.06, 0.08) respectively. **(Table: 2)**

In group A 6 (11.1%) women had Infection, 8(14.8%) had blood loss, 3 (5.55%) had hypovolemic shocks, 2 (3.70%) had Uterine perforation, and only one (1.85%) had Incomplete evacuation while in group B, 2 (3.70%) had Infection, 4 (7.41%) had blood loss and 2 (3.70 %) had Incomplete evacuation. there was no statistically significant difference in both groups except treatment efficacy (p-value=0.04) **(Table: 3)**

Duration of procedure **(minutes)**	9.87 ± 2.21	5.90 ± 3.01	0.33
Parity **[n (%)]**			0.05
Nulliparous	17 (31.6)	18 (33.3)	
Primiparous	24 (44.4)	26 (48.1)	
Multiparous	13 (24.0)	10 (18.6)	

Table 1: General characteristics of patient in both groups

* Indicates the statistically significant with α< 0.05

Table 2: Previous history of risk factors

	Group A (D&C)	Group B (MVA)	P-value
	n=54	**n=54**	
Abortion			
Yes	14 (25.9)	12 (22.2)	0.91
No	40 (74.1)	42 (77.8)	
Diabetes			
Yes	19 (35.2)	21 (38.9)	0.06
No	35(64.8)	33 (61.1)	
Hypertension			
Yes	22 (40.7)	20 (37.1)	0.08
No	32 (59.3)	34 (62.9)	
Dyslipidemia			
Yes	11 (20.4)	10 (18.5)	0.56
No	43 (79.6)	44 (81.5)	

* Indicates the statistically significant with α< 0.05

Table 3: Complications after procedure

	Group A (D&C)	Group B (MVA)	P-value
	n=54	**n=54**	
Efficacy (%)	62.9 (34/54)	85.2 (46/54)	0.04
Infection	6 (11.1)	2 (3.70)	0.21
Hemorrhage >100 ml	8 (14.8)	4 (7.41)	0.08
Hypovolemic shock	3 (5.55)	-	-
Uterine perforation	2 (3.70)	-	-
Generalized peritonitis	-	-	-
Cervical trauma	-	-	-
Incomplete evacuation	1 (1.85)	2 (3.70)	0.33

DISCUSSION

Miscarriages occur in 10 to 20 percent of pregnancies annually in the United Kingdom (UK), resulting in 50,000 hospital admissions. Surgical, medical, or expectant management options

are available for the treatment of first and early second trimester losses.[14] Many women who experience a miscarriage undergo surgical evacuation under anesthesia. MVA can be performed under General anesthesia (GA) as an alternative to traditional electrical vacuum curettage.[15] If a miscarriage is incomplete or if a first trimester termination of pregnancy is necessary, MVA has shown to be both safe and effective for uterine evacuation.

The purpose of this study was to improve the safety of the patients with missed miscarriage to reduce the risk of complications. In this study we compared the outcome of manual vacuum aspiration (MVA) versus dilatation & curettage(D&C) in females who came in emergency with first trimester missed miscarriages. MVA was found more effective than D&E in most of cases. The mean age was 28 years, BMI was 22 kg/m^2, gestational age was 8 weeks and most of the patients were primiparous. A study conducted by Singh A, there was no statistical differences were found in the distributions of age, gestational age, BMI, and duration of surgery between the D&C and MVA groups, as in our study.[16] A history of miscarriage, along with pre-existing conditions such as diabetes and high blood pressure (BP), can markedly increase the risk of a missed abortion, as both diabetes and hypertension may adversely affect blood flow to the placenta, potentially compromising fetal growth and resulting in pregnancy loss.[17] In our study, diabetes (p-value = 0.06), hypertension (p-value = 0.08), dyslipidemia (p-value = 0.56), and previous miscarriages (p-value = 0.91) were found to have insignificant results. Both natural and induced abortions frequently occur as results of pregnancy. The association between early pregnancy loss and the subsequent emergence of diabetes and hypertension in women presents inconsistent evidence.[18] In a study, MVA has 100% effectiveness for primigravida, the success rate of MVA was reported to be 97% for multiparous women and 92.85% for grand multiparous women, with the highest efficacy noted for gestational ages of 8-10 weeks at 93%, followed by 11-12 weeks at 92% and 5-7 weeks at 92%.[19] In the MVA group primigravida signified a higher percentage (40%) compared to the D&C group (28%). In contrast, women with multigravida were more commonly found in the D&C group (72%) than in the MVA group (60%).[16] This recommendation was a potential inclination for D&C among women with previous pregnancies. Our results shows that MVA (85.2%) is more effective than D&C (62.9%).

Additionally, another research indicated that the success rate of MVA was 99% in both elective and spontaneous abortion, and its efficacy was comparable to electric vacuum aspiration (EVA).[20] In another study, efficacy was noted to be 85.7% with MVA and in patients with D&C it was 70.3%, while reported more complications in D&C group as compared to MVA method. uterine perforation was the common complications observed in

the D&C group, as 21.4% vs. 0% in MVA, severe anemia as 35.75% vs. 27% in MVA, generalized peritonitis as 7.1% vs. 0% in MVA, hypovolemic shock as 21.6% vs. 7.1% in D&C.[20] Suction evacuation using an electrically operated machine is the preferred method for managing gestational trophoblastic disease.[21] In a study, efficacy was noted as 97.7% with MVA.[22] Complications observed in D&C group were perforation as 2% vs. 0% in MVA, Hemorrhage as 0% vs. 22% in D&C and infection as 0% vs. 6% in D&C. [22] Our results indicated that uterine perforation was found in group A which was 2 (3.70%), and in group B no patient came with this complain. The rate of blood transfusion and infection events did not differ statistically between the D&C and MVA groups, although they were found to be less in the MVA group. [23] According to our study the rate of hemorrhage and infection was higher in D&C group than MVA as [8 (14.8%) v/s 4 (7.41%)], [6(11.1%), 3(3.7%)] respectively. Despite its substantiated success and safety record, manual vacuum aspiration remains underutilized as a substitute for managing uterine evacuation after miscarriages in Pakistan. In resource-constrained countries, MVA could be regularly implemented, thus eliminating the requirement of GA and access to operating theaters.[24]

Conclusion:

Manual vacuum aspiration (MVA) is safe, effective, cost-efficient, time saving, and needs a shorter hospital stay compared to dilation and curettage (D&C). It does not require general anesthesia, and the risk of complications is lower. We recommend more studies for comparing the efficacy of these methods on a larger scale.

Limitation: Sample size and duration of study was limited. Results may be significant by increasing the sample size.

Conflict of interest: None

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