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Original article

Manual vacuum aspiration versus dilatation and curettage for early abortion

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Abstract

Background: The management options for early pregnancy loss are different. There is very little local data available on the risks and benefits of MVA and D&C in the management of early pregnancy failure. The aim of the study was to compare manual vacuum aspiration (MVA) with dilatation and curettage (D&C) in the first trimester spontaneous abortion.

Methods: This study was conducted with antenatal patients with the gestational age of ≤ 12 weeks, who were diagnosed to have experienced inevitable, missed or incomplete abortion. Eligible patients were randomly divided into two groups (MVA group and D&C group) of 100 patients each. In the MVA group, vacuum was created in 60 ml double valve MVA syringe. In the D&C group, the cervix was dilated and evacuated the products of conception with ovum forceps. After evacuation, all the walls were curetted with sharp metal curette to complete the procedure.

Results: The duration of the procedure and hospitalization was significantly lower for the MVA group compared to the D&C group (p< 0.001). The procedure related to uterine perforation/ cervical injury was significantly higher in D&C group compared with that of the MVA group (12% vs 3%) (P=0.016). In the D&C group, the moderate/ sever blood loss was significantly higher than that of the MVA group (70% vas 44%) (P < 0.001). There was a statistically significant difference in pain level post procedure between the two groups (P < 0.001). The cases of incomplete evacuation for both groups were similar, 3% in MVA and D&C groups.

Conclusions: We concluded that MVA is safe, effective, less time consuming, and requires shorter hospital stay. Complications such as uterine perforation, bleeding, cervical injury, and pain during the procedure are much less with MVA as compared to D&C.

Keywords: Abortion, Pain, Pregnancy

Introduction

The word abortion is derived from the Latin word aboriri-miscarry. Abortion is defined as spontaneous or induced termination of pregnancy before foetal viability. The World Health Organisation (WHO) defines abortion as pregnancy termination before 20 weeks of gestation or with a foetus born weighing <500 gram (1). The WHO estimated that 46 million pregnancies end in abortion each year and nearly 20 million of those are thought to be unsafe. About 13% of maternal deaths are due to unsafe abortion (2, 3).

Spontaneous abortion includes threatened, inevitable, incomplete, complete and missed abortion. Various risk factors like advancing parental age, previous miscarriage, maternal diabetes mellitus, overweight, tobacco exposure, radiation exposure and drugs are known to have caused early loss of pregnancy (4-6). Established causes of miscarriage are genetic, uterine anomalies or hormonal deficiency like progesterone deficiency, reproductive tract infections and tissue rejection (7).

The management options for early pregnancy failure can be expectant management, medical management and surgical management. Each has its

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own benefits and risks. Expectant and Medical management require multiple hospital visits. Medical management is becoming increasingly common, but it may not be a feasible option in countries with limited health care resources as it requires careful follow up (8, 9).

First-line surgical management has been dilatation and curettage (D&C) which requires trained personnel, an operating room, and the presence of an anesthetist and sometimes blood transfusion (10). Despite careful and skilled intervention, even in the best hands of complications like hemorrhage, incomplete evacuation, perforation and infection can occur (11). An alternative to surgical method D&C is manual vacuum aspiration (MVA) (11, 12).

MVA, as a means of removing uterine contents, was pioneered in l958 by Yuantai and Xianzhem in China that ultimately led to the technique that became a common and safe obstetric procedure (13, 14). MVA is simple, safe, effective, portable, virtually silent, reusable, and inexpensive. For many years, MVA has been used in many countries as a method of elective medical termination. The WHO recommended MVA for performing a first-trimester termination of pregnancy (2).

MVA is performed under local anesthesia or intravenous sedation, thus avoiding the need for an operating theatre and general anesthesia. MVA seems to be a promising option in low resource settings with large influx of patients. In a developing country like India, where resources are limited, the use of MVA can be a boon for our peripheral health centers. So far, there is very little local data available on the risks and benefits of MVA and D&C in the management of early pregnancy failure. We hypothesize that MVA is comparable to D&C in first trimester spontaneous abortion. To this end, the aim of the present study was to compare manual vacuum aspiration with dilatation and curettage in first trimester spontaneous abortion.

Materials & Methods

This comparative randomized study was conducted after obtaining approval from institutional ethical committee (No.-125-20106-161-209023). The inclusion criteria were: antenatal patients with gestational age ≤12 weeks with the diagnosis of inevitable, missed or incomplete abortion. Patients with septic abortion, uterine anomalies, coagulation disorders, fever or any associated medical complication, patients with molar pregnancy, those with the diagnosis of complete abortion on ultrasound and hemoglobin less than 8 gm /dl were excluded from the study.

The sample size calculation was based on a study conducted by Abd Elzaher et al.,(15). Based on the above study, sample size with 80% power of study and 5% level of significance was 100 patients in each study group. Accordingly, 200 patients were recruited for our study.

All those who met the inclusion criteria and gave informed written consent were included in the study. The diagnosis was established using a detailed history and examination. Blood group and Rh typing, complete blood count, urine routine examination, urinary pregnancy test and serum βHCG and pelvic ultrasound were also done.

200 patients were randomly divided into two groups (MVA group and D&C group) of 100 patients each by computer generated random number. Both the groups received a single dose of injection ampicillin 1 gram intravenous as prophylactic antibiotic after sensitivity testing. All patients were given intravenous sedation with injection pentazocine 30 mg and injection promethazine 12.5 mg prior to the procedure.

In the MVA group, vacuum was created in 60 ml double valve MVA syringe. The valve was closed by pushing the button inward and forward. The barrel of the syringe was held with one hand and the plunger was pulled back with the other hand, until the arms of the plunger snapped outward at the end of the syringe barrel. The arms of the plunger were kept as far as they could go. The uterus was re-evaluated by bimanual examination. Cervix was cleansed by antiseptic lotion. The size of the cannula was selected (varying from 4 mm– 12 mm) to snugly fit in the cervical canal. Using no touch technique, the cannula was inserted through the cervix towards the fundus of uterus. The syringe was attached to the cannula, and the pinch valves was released allowing the vacuum to get transferred to the uterine cavity. The contents of the uterus were evacuated by using rotary or back and forth movements of the cannula. The appearance of foam or bubbles, the absence of more products getting aspirated, a gritty sensation as the cannula passes over the uterine walls, and a feel of the uterus contracting around the cannula

were considered as signs of completeness of the procedure.

In the D&C group, after cleaning and draping the patient, bimanual examination was performed to determine uterine size and orientation, posterior vaginal wall was retracted with a speculum and the cervix was swabbed with Povidone-iodine (PVP-I). The anterior lip of cervix was held with a Vulsellum Forceps. If required, the cervix was dilated with Hegar dilators. The ovum forceps were introduced and the products of conception were evacuated. After evacuation, all the walls were curetted with sharp metal curette to complete the procedure after which vaginal toileting was done, and a sterile pad was applied. The patient was then shifted comfortably.

The primary outcome measures included the duration of hospital stay, pain during the procedure, and the duration of the procedure. The secondary outcome measures included blood loss during the procedure, incomplete evacuation, and complications such as uterine perforation ad cervical injury.

After the procedure, the patients were transferred to the recovery room. All patients were kept under observation. Vitals charting was done and the patients were observed for bleeding per vaginum and other possible complications. The patient was called after one week for follow-up. The patient's complaint was noted and further management was done accordingly.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 21.0 was used for the analysis. Independent t test was used for quantitative variables. Qualitative variables were compared during Chi-Square test/Fisher's Exact test. A p value of <0.05 was considered statistically significant.

Results

The mean age of participants was 27.9±5.23 years in the MVA group vs 26.6±4.5 years in the D&C group. The commonest indication for the procedure was incomplete abortion in both groups. Fifty seven percent of the abortions in MVA and 53% in D&C were performed for incomplete abortion. The characteristics of participants in terms of age, gestational age, previous undergone abortion, previous undergone lower segment caesarean section, and the procedure were similar for both groups (Table 1).

The mean duration of the procedure was significantly shorter in the MVA group 6.0±2.8 minutes compared with 9.9±2.4 minutes in the D&C group (p< 0.001).

Table 1. Background of participants in both two groups (n=200)

	MVA* n=100 %	D&C** n=100 %	P-value
Age (years), Mean (SD)	27.9 (5.2)	26.7 (4.5)	0.791
Gestation age (weeks), Mean (SD)	9.4 (1.8)	9.3 (1.7)	0.687
Previous abortion			0.172
No	82	74	
Yes	18	26	
Previous LSCS			0.849
1	16	17	
2	84	83	
Indication for procedure			0.160
Missed	33	32	
Incomplete	57	53	
Inevitable	6	14	
An embryonic gestation	4	1	

*MVA: manual vacuum aspiration
** D&C dilatation and curettage

The procedure related to uterine perforation/ cervical injury was significantly higher in the D&C group than in the MVA group (12% vs 3%) (P=0.016). The cases of incomplete evacuation were similar in both groups (3%). In the D&C group, the moderate/ sever blood loss was significantly higher than that of the MVA group (70% vas 44%) (P < 0.001). Most patients with MVA procedure (91%) experienced mild pain, while 24% of patients in the D&C group reported mild pain after the procedure. There was a statistically significant difference in pain level post procedure between the two groups (P < 0.001). The mean stay of hospitalization for participants in the MVA group was 5.5 ± 1.7 hours and those in the D&C group were discharged from the hospital after 8.0 ± 6.9 hours. The mean stay of hospitalization was significantly lower for the MVA group compared to the D&C group (p< 0.001) (Table 2).

Table 2. Surgical performance of participants in both two groups

	MVA* n=100 n (%)	D&C** n=100 n (%)	P-value
Uterine perforation /cervical injury			0.016
Yes	3	12	
No	97	88	
Incomplete evacuation			1.000
Yes	3	3	
No	97	97	
Blood loss (ml)			<0.001
Low (<50)	66	30	
Moderate (50-100)	34	68	
Sever (≥100)	10	2	
Pain as VAS score			< 0.001
Mild	91	24	
Moderate	8	74	
Severe	1	2	
Duration of the procedure (minutes) Mean (SD)	6.0(2.8)	9.9(2.4)	<0.001
Hospital stay (hours) Mean (SD	5.5(1.7)	8.0(6.9)	<0.001

*MVA: manual vacuum aspiration
** D&C dilatation and curettage

Discussion

This study compared MVA procedure with D&C procedure for the treatment of first trimester pregnancy loss. Our finding showed that the duration of procedure was 6.0 minutes for the MVA group compared with 9.9 minutes for D&C group. Other studies comparing MVA with D&C procedure have reported similar results, 5.9 vs 8.9 minutes (16), 6.3 vs14.3 minutes (15), 6.6 vs 11.07 minutes (17), and 6.5 vs 15.3 minutes (18). All these studies showed that the duration of procedure for MVA was significantly shorter than that of D&C. The possible explanation for this shorter time spent on MVA is due to the simple procedure for the application of MVA syringe and limited capacity of 60 ml.

In addition, patients in the MVA group were kept hospitalized for 5.5 hours, and those in the D&C group were discharged from the hospital after 8.0 hours. A similar trend was observed in two studies (16, 17). However, in other studies, the duration of hospital stay was significantly lower in MVA compared to D&C group, but the duration of hospitalization for D&C was higher compared to the result of our study (15, 19). A possible explanation for the higher duration of hospitalization for D&C could be attributed to routine care of the hospital.

In our study, no uterine perforation was seen in MVA group. This may be attributed to soft, flexible and easy to handle cannula used in MVA as compared to the metal curette in D&C. Two cases in D&C had perforation for which one was managed conservatively, and the other patient underwent exploratory laparotomy for the repair of the perforation. Another study reported that the incidence of uterine perforation was high in D&C group representing 5 cases (10%), while there was only one case (2%) in the MVA group (15). Arif N et al. found that only one patient had uterine perforation, who belonged to suction and curettage group (17). A study reported one case of perforation in each group i.e. MVA and D&C (18), while another study reported no case of perforation in MVA compared to one case in D&C (16).

Gilani et al. also found that there was one case of perforation in D&C and none in MVA (19). In addition, in the present study, the incidence of cervical injury was 3% in MVA and 10% in the D&C group. It was significantly higher in patients undergoing D&C. Abd Elzaher et al. found that the incidence of cervical laceration in the D&C group was 10%, while it was 4% in the MVA group. Salam et al., reported no case of cervical trauma in MVA, whereas there were 4 cases of cervical trauma in the D&C group (18). Farooq et al., reported similar results, there was no case of cervical injury in MVA compared to 2 cases in D&C (16).

Furthermore, 3% of patients in the MVA group had incomplete evacuation, which is similar to 3% of patients in the D&C group. There is a similar result in a study conducted by Suwan et al., 1% in MVA and 1% in D&C group (20). Our study found that blood loss and pain were both significantly lower in the MVA group compared with those of the D&C group. A similar trend was reported by studies from Egypt (15) and Pakistan (18) where blood loss and pain were both lower for the MVA group compared with those of the D&C group. The most likely reason for this difference could be related to the flexibility and appropriate hardness of vacuum aspiration.

Our study has certain limitations. First, the sample size was small. The study was conducted in a single center.

Also, the study was carried out in a tertiary care hospital; thus, hospital bias cannot be ruled out.

Conclusion

We concluded that MVA is safe, effective, less time consuming, requires shorter hospital stay. Complications such as uterine perforation, bleeding, cervical injury and pain during the procedure are much less with MVA as compared to D&C.

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Conflicts of Interest

The authors declare that no conflict of interest.

References

1. Alves C, Rapp A. Spontaneous Abortion. StatPearls. Treasure Island FL: © 2022, StatPearls Publishing LLC.; 2022.
2. Ganatra B, Tunçalp Ö, Johnston HB, Johnson BR, Jr., Gülmezoglu AM, Temmerman M. From concept to measurement: operationalizing WHO's definition of unsafe abortion. Bulletin of the World Health Organization. 2014 Mar 1;92(3):155. PubMed PMID: 24700971. Pubmed Central PMCID: PMC3949603. Epub 2014/04/05. eng.
3. Sedgh G, Filippi V, Owolabi OO, Singh SD, Askew I, Bankole A, et al. Insights from an expert group meeting on the definition and measurement of unsafe abortion. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics. 2016 Jul;134(1):104-6. PubMed PMID: 27062249. Pubmed Central PMCID: PMC6434901. Epub 2016/04/12. eng.
4. Ammon Avalos L, Galindo C, Li DK. A systematic review to calculate background miscarriage rates using life table analysis. Birth defects research Part A, Clinical and molecular teratology. 2012 Jun;94(6):417-23. PubMed PMID: 22511535. Epub 2012/04/19. eng.
5. Risch HA, Weiss NS, Clarke EA, Miller AB. Risk factors for spontaneous abortion and its recurrence. American journal of epidemiology. 1988 Aug;128(2):420-30. PubMed PMID: 3273482. Epub 1988/08/01. eng.
6. Nybo Andersen AM, Wohlfahrt J, Christens P, Olsen J, Melbye M. Maternal age and fetal loss: population-based register linkage study. BMJ (Clinical research ed). 2000 Jun 24;320(7251):1708-12. PubMed PMID: 10864550. Pubmed Central PMCID: PMC27416. Epub 2000/06/23. eng.
7. Kamel H, Goswami S, Dutta R. Manual vacuum aspiration and elecrical vacuum aspiration-A comparative study for first trimester MTP. J Obstet Gynaecol India. 2011;61(1):53-6.
8. Hamilton-Fairley D, Donaghy J. Surgical versus expectant management of first-trimester miscarriage: a prospective observational study. Problems in early pregnancy: advances in diagnosis and management: RCOG Press London; 1997. p. 277-83.
9. Hurd WW, Whitfield RR, Randolph JF, Jr., Kercher ML. Expectant management versus elective curettage for the treatment of spontaneous abortion. Fertility and sterility. 1997 Oct;68(4):601-6. PubMed PMID: 9341597. Epub 1997/10/28 22:42. eng.
10. Dalton VK, Harris L, Weisman CS, Guire K, Castleman L, Lebovic D. Patient preferences, satisfaction, and resource use in office evacuation of early pregnancy failure. Obstetrics & Gynecology. 2006;108(1):103-10.
11. Ahsan A, Jafarey SN. Unsafe abortion: global picture and situation in Pakistan. JPMA The Journal of the Pakistan Medical Association. 2008 Dec;58(12):660-1. PubMed PMID: 19157315. Epub 2009/01/23. eng.
12. Oliver A, Overton C. Diagnosis and management of miscarriage. The Practitioner. 2014 May;258(1771):25-8, 3. PubMed PMID: 25055407. Epub 2014/07/25. eng.
13. Coombes R. Obstetricians seek recognition for Chinese pioneers of safe abortion. BMJ (Clinical research ed). 2008 Jun 14;336(7657):1332-3. PubMed PMID: 18556303. Pubmed Central PMCID: PMC2427078. Epub 2008/06/17. eng.
14. Pereira PP, Oliveira AL, Cabar FR, Armelin AR, Maganha CA, Zugaib M. [Comparative study of manual vacuum aspiration and uterine curettage for treatment of abortion]. Revista da Associacao

Medica Brasileira (1992). 2006 Sep-Oct;52(5):304-7. PubMed PMID: 17160302. Epub 2006/12/13. Tratamento do abortamento incompleto por aspiração manual ou curetagem. por.

15. Abd Elzaher M, Bedew M. Manual vacuum aspiration: a safe and cost-effective substitute for dilatation and curettage on the surgical management of first-trimester abortion. Am J Sci. 2013;9(6):581-5.
16. Farooq F, Javed L, Mumtaz A, Naveed N. Comparison of manual vacuum aspiration, and dilatation and curettage in the treatment of early pregnancy failure. Journal of Ayub Medical College, Abbottabad: JAMC. 2011 Jul-Sep;23(3):28-31. PubMed PMID: 23272429. Epub 2011/07/01. eng.
17. Arif N, Ahmed RQ, Sheikh NA, Shahid A. Comparison of manual vacuum aspiration with suction and curettage in early loss of pregnancy. JSOGP. 2015;5(4):198-203.
18. Salam R, Neelofer R, Naserullah P. Comparative study of manual vacuum aspiration and dilatation & evacuation for the surgical management of early miscarriages: a randomized controlled trial. Pak J Med Health Sci. 2016;10(1):183-5.
19. Gilani STA, Iftikhar G. Comparison of manual vacuum aspiration and sharp curettage in the treatment of first trimester abortions. PAFMJ. 2014;64(4):541-5.
20. Suwan A, Wonglikhitpanya N. Comparison of efficacy between Manual Vacuum Aspiration and Sharp curettage for the treatment of incomplete abortion. Thai J Obstet Gynaecol. 2009;17(1):43-50.