Original Article

Manual Vacuum Aspiration (MVA) versus Electric Vacuum Aspiration (EVA) in first trimester medical termination of pregnancy (MTP)

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ABSTRACT

Background: Approximately 47000 pregnancy related deaths occur due to complication of unsafe abortion. To correct this Ministry of Health and Family Welfare had appointed the expert group for MTP Act and amend it to enable increased access to safe abortion services for all women. The WHOs preferred methods to safely and effectively terminate pregnancy during the first trimester of pregnancy are vacuum aspiration and medication abortion.

Objectives: To evaluate and compare the efficacy of MVA and EVA in first trimester pregnancy termination.

Methods: Study includes cases of pregnancy with less than or equal to 12 weeks of gestation. After receiving consent, cases allocated in two groups Group A followed Manual Vacuum Aspiration while Group B followed Electric Vacuum Aspiration. Each group contains 75 cases. During these procedures, relation of uterine size, blood loss, post-operative pain score, complications were noted and compared between two procedures.

Results: The average blood loss was significantly higher in MVA group in more than 10 weeks of gestation. MVA is comparatively less painful than EVA. There is no major difference in complications.

Conclusion: MVA is best suited for infra-structure in rural areas and is very useful in poor resource setting hence It is best suited for rural setting, where there is an unmet need for abortion services.

Key words: Manual Vacuum Aspiration (MVA), Electric Vacuum Aspiration (EVA), Medicaltermination of pregnancy

INTRODUCTION

The World Health Organization (WHO) estimates that approximate 210 million of women become pregnant each year, out of those approximately 130 million women deliver live infants and around 42 million abortions occur each year. Nearly 20 million abortions are performed in unsafe conditions or by unskilled providers and result in 8 percent of all pregnancy-related deaths [1].

In India Medical Termination Act MTP act legalized in 1971, so that every women is enable to opt out of an unwanted pregnancy in specific circumstances. It was amended in 2003 to facilitate better implementation and increase access for women especially in the private health sector [2].

Over 40yrs after implementation of liberal MTP Act, unsafe abortions continue to outnumber safe and legal abortions in India. Approximately 6, 20,472 abortions reported in India in 2012, number could be as high as 7 million. In India, 11 million abortions take place annually and around 20,000 women die every year due to abortion related complications [3].

The common causes of unintended pregnancies are lack of access to, or failure to use, a contraceptive method and sometimes failure of the contraceptive method itself. Other reasons may be a pregnancy occurring as a result of sexual coercion or rape and a variety of socio-economic reasons. These lead to high maternal mortality and morbidity contributing to about 9 to 12% of maternal deaths. Even where the services are available, they are underutilized. This is mainly due to lack of knowledge among the community regarding the legality and availability of abortion services, cultural sensitivity, uncompassionate attitude of the provider, hesitancy to avail services from male partner and lack of post abortion care. Also there is lack of awareness and underutilization of family planning services leading to unplanned pregnancies that lead to unsafe abortions forming a vicious cycle.

Unsafe abortion and associated morbidity and mortality in women are preventable. In developing countries, there is poor utilization of recognized facilities and unmet need for an easily available method of early pregnancy termination which is both safe and effective [4].

The WHOs preferred methods to safely and effectively terminate pregnancy during the first trimester of pregnancy are vacuum aspiration and medication abortion [5].
Vacuum aspiration can include manual vacuum aspiration (MVA) or electric vacuum aspiration (EVA).Vacuum Aspiration, the method used for> 97% of pregnancy termination is a safe and effective method of abortion in first trimester of pregnancy.
So, the present study is designed to

1. To compare safety of MVA over EVA in eliminating ovular elements.
2. To compare the frequency of duration of procedure, duration of patients hospitalization, blood loss & complications between MVA & EVA.
3. To evaluate Visual Pain Score following MVA or EVA.

MATERIAL AND METHODS

Sample size: Total 150 (75 =in each group) cases had been covered in study with pregnancy less than or equal to 12 weeks of gestation

Study design: Randomized controlled study (Double blind study)
Randomization technique: Lottery method of randomization.

Study area: Obstetrics and Gynecology Department, GMERS Medical College, Sola, Ahmedabad

Inclusion criteria: All Patients who are with less than or equal to 12 weeks of pregnancy and wanted termination of pregnancy as per MTP Act 1971 were included in the study.

Exclusion criteria:
Pregnancy more than 12 weeks of gestation.
Suspected Ectopic pregnancy.
Molar pregnancy.
Suspected uterine anomalies.
Bleeding disorders
Unwillingness of patient

Ethical clearance: Ethical clearance to conduct the study was obtained from the Ethics clearance board of Sola Civil Hospital, Gujarat.

Methodology:
All clients underwent a thorough detailed History evaluation and complete clinical assessment. A thorough pelvic examination was done to evaluate the size of uterus (in order to co relate with duration of pregnancy), position of uterus, consistency of uterus, to rule out any Pelvic infection, polyp, erosion and to asses any associated condition like fibroid, signs of any reproductive tract infections or sexually transmitted infections. Investigations were done in every patient like Complete Haemogram, Blood Grouping and typing, HIV and VDRL. Confirmation of pregnancy is done with Trans Vaginal Sonography (TVS) to estimate correct gestational age. Ultrasonography was also done to rule out associated pathology, suspected ectopic pregnancy.

After receiving the consent, cases allocated in two groups. Group A followed Manual Vacuum Aspiration while Group B followed Electric Vacuum Aspiration.

As per protocol cervical priming was done with Tab. Misoprost 200 microgram given orally 3 hours prior to surgery. All procedures were done under Para cervical block, sedation, short general anesthesia or spinal anesthesia. Prophylactic antibiotics were given only to those patients who underwent spinal anesthesia or who had associated infections. Both procedures were done in operation theatre. MVA is performed by using a bivalve IPAS aspiration set that can hold vacuum and an appropriate sized flexible cannula (karmans).The vacuum produced in the syringe(25-26 inches/600-650mmhg). EVA is done by the vacuum created in the cannula using electricity source is transferred to uterine cavity. The products of conception are sucked from uterine cavity by electric vacuum of 600-650mm Hg [6,7].Completion of procedure was checked by post-operative ultrasonography which shows empty uterine cavity. The Patient was discharged when she was stable. They instructed to return for follow up after one week or at 6 weeks or one month when first menstruation comes after procedure.

Data collected from both groups was studied & compared using chi square test following parameters are considered.
Age, Parity, Socioeconomic status (low, middle, high income group), time taken for surgery, total blood loss, post-operative pain, blood loss, duration of hospital stay, complications of the procedure in both the groups.
In both groups, the pain was appreciated by patient graded as [6]

Grade 1: Nil, patient is comfortable, no change in facial expression, not complaining of cramping in lower abdomen.

Grade 2: Minimal, patient complaining of mild cramping in lower abdomen, no change in facial expression.

Grade 3: Moderate, No analgesics needed, moderate complaining of cramping in lower abdomen which is tolerable, change in facial expression noted.

Grade 4- Severe, need analgesics, patients were complaining of severe cramping in lower abdomen. Facial expressions indicates severe pain
Blood loss during procedure was measured in milliliter by noting down collection in MVA syringe and suction jar in EVA.

Statistical Analysis

The significance of difference of categorical variables across two groups is tested using Chi-square test or Fisher's exact probability test. P-values less than 0.05 are considered to be statistically significant.

RESULTS

Table 1: Distribution according to duration of procedure

Weeks of gestation	MVA (n=75) Mean ± SD (minutes)	EVA (n=75) Mean ± SD (minutes)	P-value
5-weeks	7.5 ± 5.0	7.5 ± 2.7	0.999
6-weeks	7.0 ± 2.9	6.2 ± 2.2	0.353
7-weeks	8.2 ± 3.5	9.7 ± 8.1	0.529
8-weeks	7.9 ± 3.9	7.5 ± 2.9	0.800
9-weeks	12.0 ± 7.5	6.3 ± 2.5	0.169
≥10-weeks	10.0 ± 3.5	6.3 ± 2.5	0.084
Overall	8.5 ± 4.4	7.7 ± 6.4	0.360

In both the groups for any gestational age, the average duration of procedure did not differ significantly (p>0.05) and the same has been observed in general in study group and control group.

Table 2: Distribution of cases according to the post-operative pain score

Pain score	MVA No. (%) N=75	EVA No. (%) N=75	Total (n=150) No. (%) N=150	P value
Grade 1	48 (64.0)	31 (41.3)	79 (52.7)	<0.05
Grade 2	22 (29.3)	40 (53.4)	62 (41.3)	
Grade 3	4 (5.3)	4 (5.3)	8 (5.3)	
Grade 4	1 (1.3)	0	1 (0.7)	
Total	75 (100)	75 (100)	89 (100)	

(Figures in parenthesis are percentages)

Significant difference has been found in post-operative pain score between study group and control group.

Table 3: Distribution of cases according to the type of post-procedure complications

Complications	MVA (n=12)	EVA (n=5)	Total (n=17)
Perforation	1 (8.3)	0	1 (5.9)
Excessive bleeding	8 (66.7)	2(40.0)	10(58.8)
Laparoscopy	1 (8.3)	0	1 (5.9)
Retained products	5(6.6%)	6(8%)	11 (7.3)
Fever	2 (16.7)	2(40.0)	4 (23.5)
Total	12 (100)	5(100)	17 (100)

(Figures in parenthesis are percentages)

- Of the cases that had complications excessive bleeding was the most common complication in both the study groups. The distribution of incidence of type of post-procedure complication did not differ significantly between two study groups (P-value>0.05).
- In MVA and EVA group the incidence of post procedure complication was 16.0% and 6.7% respectively.

Table 4: Blood Loss wise comparison of both tequnique

Weeks of gestation	MVA (n=75) Mean ± SD	EVA (n=75) Mean ± SD	P-value
5-weeks	70.0 ± 21.6	56.7 ± 16.3	0.296
6-weeks	59.3 ± 20.5	59.4 ± 25.1	0.983
7-weeks	61.6 ± 25.8	60.2 ± 18.7	0.837
8-weeks	71.4 ± 32.4	62.9 ± 22.2	0.438
9-weeks	64.0 ± 40.1	67.5 ± 27.5	0.877
≥10-weeks	88.9 ± 28.9	55.0 ± 10.0	0.047
Overall	65.9 ± 28.3	60.7 ± 20.9	0.196

(Figures in parenthesis are percentages)

1) In both the groups, the average blood loss did not differ significantly for the cases having gestational age between 5 to 9 weeks.
2) Among the cases that had their gestational age more than 10-weeks, the average blood loss was significantly higher in MVA group compared to the EVA group (P-value<0.05).
3) In general, the average blood loss did not differ significantly between two study groups (P-value>0.05)

Table 5: The distribution of cases studied according to the duration of hospital stay

Hospital stay (hours)	MVA (n=75)	EVA (n=75)	Total (n=150)	p value
Less than 24Hrs	55 (73.3)	60 (80.0)	115 (76.7)	>0.05
More than 24Hrs	20 (26.7)	15 (20.0)	35 (23.3)	
Total	75 (100.0)	75 (100.0)	150 (100.0)	

(Figures in parenthesis are percentages)

The distribution of duration of hospital of stay did not differ significantly between two study groups (p>0.05).In both the groups, higher percentage of cases (73.3% in MVA and 80.0% in EVA) had less than 24-Hrs of hospital stay and smaller percentage of cases (26.7% in MVA and 20.0% in EVA) had more than 24-Hrs of hospital stay.

DISCUSSION

However, in present study, patients with > 9 weeks of gestation in MVA group, the average duration of procedure (10-12min) is more than EVA group. Present study implies that there is no advantage of MVA over EVA in time taken for performing either procedure. In most of cases, procedure was completed within 7 to 10 minutes. This corresponds with the study of Bird et al where it was about take 10 minutes and Goswami Sebanti showed MVA takes 5min and 8min for MTP < 8 weeks and 8-12 weeks respectively.

Table 6: Comparison of findings with other studies

Study Authors	MVA Mean (SD)	EVA Mean (SD)	P value
Present study	8.5 (4.4)	7.7 (6.4)	0.360
Fang AH, Chen QF, Zhou HW, Cheng LN [10] 2004	5.32 (1.28)	5.01 (1.47)	<0.05
Goldberg AB [11] 2004	4.9±3.3	5.0±3.0	>0.05
Dean et al[12] 2003	5.98 (2.84)	5.45(2.95)	
Wen et al [13] 2008	10.71	9.59	p<0.01

Significant difference has been found in level of post of pain felt by patients between two procedures (patients MVA is comparatively less painful than EVA). The finding of our study matches with study conducted by Dean et al [13] in 2003 and does not matches with the study by Das Vanita et al [14] in 2005 & Bird et al [6] in 2001. The reason could be this study includes primed cervix so that the procedure would be less painful during dilation of cervix or during evacuation.

P. D. Blumenthal et al [15] interpreted that the waiting time for MVA procedure was reduced by 52% and total hospital cost reduced by 41% While the duration of stay in hospital is higher in MVA than EVA in our study

Most common complication occurred in present study is excessive bleeding which is slightly more in MVA as compared to EVA group. (66.7% Vs 40%). The study shows all over complication rate in MVA group is 16% versus 6.7% in EVA group. Finding of our study supports the same finding by Das Vanita et al [14], Goldberg AB et al [11], Helen Kamel et al [8] and Shonali Agrawal [16]. This difference could be due to the procedures were done by senior consultants or registrars & residents who had quite and little experience in MVA and EVA

CONCLUSION

In present study, MVA and EVA were compared up to 12 weeks of gestation. Both MVA and EVA are safe & effective in first trimester medical termination of pregnancy. It has advantages for both the physician and the patients. MVA is a promising method as compared to EVA which can be practiced in rural areas where access to medical facilities are limited, high tech instruments are not available, power supply is erratic & the maintenance of instruments not up to mark. Hence, It is best suited for infra-structure in rural areas and is very useful in poor resource setting hence it is best suited for rural setting, where there is an unmet need for abortion services. EVA has also been shown to have equal success rate as of MVA. So both MVA and EVA are safe, easily accessible to women of both rural and urban societies belonging to any socioeconomic status, so more number of MTP can be done in a day at hospital and PHC centre. The clinicians have to make decisions as to which method to use for individual patient with different characteristics.

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