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A COMPARATIVE STUDY OF MANUAL VACUUM ASPIRATION (MVA) AND ELECTRICAL VACUUM ASPIRATION (EVA) FOR FIRST Trimester abortion.

Dr Gupteswar Mishra, Dr Sambit Kumar Mohanty , Dr Prabir Kumar Biswal

Assistant professor, department of obstetrics and gynecology, hi-tech medical college & hospital, bhubaneswar.

Assistant professor, department of surgery , Hi-tech medical college and hospital, bhubaneswar.

Junior resident, department of obstetrics and gynecology, hi-tech medical college and hospital, bhubaneswar.

Corresponding author: drgupteswar.mishra@gmail.com , 8249930428

Abstract

BACKGROUND

Unsafe abortion is a neglected women's health issue in India and in many developing nations because maternal mortality and morbidity due to unsafe abortions can easily be prevented when women have access to safe abortion services. We are in a quest of a suitable MTP option for rural India. Electric vacuum aspiration (EVA) succeeded over dilation & curettage as the former is less painful, less time consuming, having lower complication rates and lower maternal mortality. This might serve purpose of remote India to some extent.

Material & method

This work was carried out in Post partum centre and Obstetrics & Gynaecology department, hi-tech Medical College and hospital, bhubaneswar during the period July2021-July2023. The cases were pregnant women <12 weeks of gestation attending OBGYN dept of hi-tech medical college and hospital, bhubaneswar for MTP. A total number of 200 patients were studied; out of which 100 patients underwent MVA and the remaining 100 EVA.

Result

The mean $\pm$ SD blood loss is 40 $\pm$ 10.739 for MVA and 44.88 $\pm$ 11.296 for EVA. Applying independent sample test, the p value is 0.003. hence MVA is associated with statistically significant less blood loss. In the present study, MVA was effective in 97% and EVA 98% cases, thus the two procedure did not show much difference as far as their effectiveness is concerned.

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Conclusion

Manual vacuum aspiration is a safe and effective alternative to traditional electric vacuum aspiration. It is also relatively easy to perform and requires simple training for the health care provider.

Key word: MTP, 1st trimester abortion, MVA,EVA,

Introduction

Unsafe abortion is a neglected women's health issue in India and in many developing nations because maternal mortality and morbidity due to unsafe abortions can easily be prevented when women have access to safe abortion services[1]. Unsafe abortion is defined by the World Health Organization (WHO) as "a procedure for terminating an unwanted pregnancy either by persons lacking the necessary skills or in an environment lacking the minimal medical standards, or both" (WHO 1992)[2]. Worldwide, 42 million pregnancies each year end in abortion, with 19.7 million of these abortions taking place under unsafe conditions; nearly all unsafe abortions (95%) occur in developing countries (WHO 2007)[3]. Of the 6.4 million abortions performed in India in 2002 and 2003, 3.6 million (56%) were unsafe (Duggal and Ramachandran 2004)[4].

We are in a quest of a suitable MTP option for rural India. Electric vacuum aspiration (EVA) succeeded over dilation & curettage as the former is less painful, less time consuming, having lower complication rates and lower maternal mortality. This might serve purpose of remote India to some extent.

In this study we examine the safety and efficacy of Manual vacuum aspiration (MVA) over that of EVA. Looking for a safer device, that could be placed in the hands of P.H.C. medical officer or even a lady health visitor, the MVA technique has evolved. It's working principle being the same as EVA. It carries not only chances of less blood loss, pain, and injuries but also the great advantage of being operated manually and thus can be performed in area where there is no electricity. It is a low tech procedure hence can be operated by primary health care providers.

Material and method

This work was carried out in Post partum centre and Obstetrics & Gynaecology department, hi-tech Medical College and hospital, bhubaneswar during the period July2021-July2023.

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The cases were pregnant women <12 weeks of gestation attending OBGYN dept of hi-tech medical college and hospital, bhubaneswar for MTP. A total number of 200 patients were studied; out of which 100 patients underwent MVA and the remaining 100 EVA. The patients were selected randomly with matching age, gestation age and parity. Informed consents were obtained from all subjects involved. Preoperative analgesia in the form of either paracevical block(PCB) or IM sedation (IMS) inj. pentazocin 30 mg.+ inj.promethazine 25 mg. was given to all patients randomly. Cervical priming with 400 mcg of vaginal misoprostol 3 hours before the procedure was done in all cases. All patients were hospitalised on day care basis for 4-6 hours.

The effectiveness of the MVA procedure was evaluated with respect to time taken for the procedure, blood loss, intra and post operative pain, complication like cervical injury, uterine perforation, excessive bleeding, continuation of pregnancy, post operative complication like incompleteness, bleeding and sepsis. These results were compiled and compared with EVA group.

OBSERVATIONS

Table-1

Distribution pattern according to age

Age in years	MVA (%)	EVA (%)	Total	Percentage (%)
20-29	66	66	132	66
30-39	33	32	65	32.5
>40	1	2	3	1.5
Total	100	100	200	100

In this study, age of the study subjects range from 20-41 years. Most of the study subjects belonged to the age group 20-29 years constituting 66% in both the groups, 32.5% belonged to 30-39 age group while 1.5% of cases were above 40 years.

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Table-2

Distribution of study subjects according to Gravidity/Parity

Gravidity	MVA (%)	EVA (%)	Total	percentage
G1	0	0	0	0
P1	32	28	60	30
P2	42	44	86	43
P3	11	13	24	12
P4	14	13	27	13.5
P5	1	2	3	1.5
Total	100	100	200	

Out of 200 study subjects majority i.e. 43% of the study subjects were secondpara followed by 30% of cases were primipara, 12% thirdpara while 15 % of cases were grandmultipara.

Table-3

Distribution pattern according to gestational age

GA	MVA (%)	EVA (%)	Total	percentage
6-8	34	34	68	34 %
8-10	53	54	107	53.5 %
10-12	13	12	25	12.5 %
Total	100	100	200	100 %

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Out of the 200 study subjects, majority of cases i.e. 53.5%(53% in MVA & 54% in EVA) belonged to 8-10 weeks group, 34 % of cases belonged to 6-8 weeks group while in case of 12.5 % cases the period of gestation was 10-12 weeks.

Table-4

Time required for the procedure in minutes

Procedure	Mean time reqd.	Std. deviation	Std. Error of mean	P value
MVA	8.69	2.444	0.2444	0.003
EVA	7.77	1.830	0.1830	

The mean $\pm$ SD time required for the procedure is 8.69 $\pm$ 2.444 for MVA and 7.77 $\pm$ 1.830 for EVA. Applying independent sample test the p value is 0.003, which is statistically significant. Hence EVA takes shorter time than MVA.

Table-5

Blood loss

Procedure	Mean blood loss in ml.	Std. deviation	Std. Error of mean	P value
MVA	40.21	10.739	1.0739	0.003
EVA	44.88	11.296	1.1296	

The mean $\pm$ SD blood loss is 40 $\pm$ 10.739 for MVA and 44.88 $\pm$ 11.296 for EVA.

Applying independent sample test, the p value is 0.003. hence MVA is associated with statistically significant less blood loss.

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Table-6

Distribution of study subjects according to complication

COMPLICATION	MVA	EVA	P value
I. During procedure			
a. Increased bleeding	0	3	>0.05
b. Uterine perforation	0	0	
c. Cervical injury	0	0	
d. Vasovagal attack	0	1	
II. During follow up			
a. Pain abdomen	2	4	>0.05
b. Excess bleeding	2	2	
c. Incomplete evacuation	3	2	
TOTAL	7	12	

During procedure, there are 3 cases of increased bleeding(managed conservatively) and one case of vasovagal attack in EVA group and no major complication in MVA group. Applying Pearson's chi-square test, the value is 4.082, df=2 and p value >0.05, which is not statistically significant.

During follow up, there were 6 cases of pain abdomen (2 in MVA & 3 in EVA) and 4 cases of excess bleeding (2 cases each in both groups).Incomplete evacuation requiring re-exploration & re-evacuation was seen in 3 cases of MVA group and 2 cases of EVA group. Applying Pearson's chi-square test, the value is 0.802,df=2 and p value >0.05 which is statistically insignificant.

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Table-7

Hospital stay in hours

Procedure	Mean in hours	Std. Deviation	Std error of mean	P value
MVA	4.05	0.219	0.0219	**<0.0001**
EVA	4.64	0.785	0.0785	

The mean ± SD hospital stay is 4.05 ± 0.219 for MVA and 4.64 ± 0.785 for EVA.

Applying independent sample test, the p value <0.0001 which is highly significant.

Table-8

Family planning method adopted

	MVA (%)	EVA (%)	Total	Percentage
Temporary	49	45	94	47%
Permanent	51	55	106	53%
Total	100	100	200	100%

Out of the 200 study subjects, 47 % adopted temporary method like IUCD (CuT380A) and 53 % undergone permanent sterilisation procedure (Laparoscopic tubal ligation).

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Discussion

Table-1 shows distribution pattern according to age. The age of the subjects in this study range from 20 to 41 years. Majority i.e. 66% of both the groups belong to the age group 20 to 29 years. This complies with the age group of MTP acceptors in most reported series. ***Goswami S et al*** [46]in 2005 showed that the majority of cases were from 20-30 years & constituted 57 % of the total cases. ***Kamel H. et al***[71] in 2011 also reported that majority of cases were in the age group of 20-30 years. ***Westfall John M. et al*** [44], also reported that majority of the MTP seekers were from 20-29 years age group(63.6%).This proves that unwanted pregnancies occur during the same time as when planned pregnancies take place. This reflects that MTP is utilised mainly as a mode of birth control by many women in our population.

Table-2 shows the distribution of study subjects according to Gravidity/Parity. Majority of cases (43 %) were 3rd gravid and 2nd para. This is because people were becoming conscious and believing in small family norm, thereby limiting their family size with two children. The next major chunk of cases i.e. 30 % were 2nd gravid 1st para indicating that MTP was being used as a method of birth spacing.15 % cases were grand multiparous. Our findings were found to be comparable to those of several other studies. ***Goswami et al***[46] in 2005 observed that majority i.e. 76% cases were multiparous and 24 % were nulliparous. ***Kamel H et al***[71] in 2011 reported that majority i.e. 90.5% cases were multiparous. ***Sheriar et al***[47] reported that majority i.e. 83.6% were second gravida, 9.7% were grandmultigravida while 6.7% were primigravida. Westfall et al in 1998 observed that majority i.e 46.6% cases were primigravida ,27% were primiparous while 17.3% were secondpara. ***Goldberg et al in 2004***[61] reported that 39% were nulliparous.

Table-3 reflects that the median gestational age during MTP was 8-10 weeks in majority of cases(53.5 %).34% cases have reported at 6 weeks and 12.5 % cases reported at 12 weeks. This finding agrees with that of ***Goldberg et al***[61] where all the women undergoing either EVA or MVA were up to 10 weeks gestational age. ***Westfall et al***[44] studied MVA on 1677 patients where majority were up to 10 weeks gestation with only 10 patients i.e. 0.6% between 10-12 weeks. ***Hemlin and Moller*** [45] studied MVA in patients with gestational age <56 days i.e. up to eight weeks. ***Bird et al*** [62] did a comparative study of acceptability of MVA and EVA on 42 women all were less than 77 days gestation i.e. <11 weeks.

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Table-4 show the mean time required for the procedure in minutes. The mean time required for the MVA procedure was 8.69 ± 2.444 and that for EVA was 7.77 ± 1.830 for EVA with p value is 0.003, which is statistically significant.

Mean time taken in each gestational group was calculated and compared. P value for 6-8 weeks gestational age was 0.322 which is not statistically significant. But for 8-10 weeks and 10-12 weeks gestational age the p values are <0.003 which is statistically significant. Time consumed in repeated emptying of MVA syringe in higher gestational period due to its limited capacity of 60 ml may be a contributing factor for increased time consumption in this procedure. The operating time for MVA was significantly longer than EVA. Similar observations were made by ***Wen J et al***[73] in BJOG 2007 in the meta analysis of 10 studies with a gestational age of less than 50 days and by ***Nasira Tasnim et al***[42] in 2011 (Operating time (min) mean ± SD 10.71±2.770 for MVA & 9.59±2.880 for EVA, p value < 0.01).However ***Kamel H et al***[71] in 2011 reported that there is no significant difference between MVA & EVA in time taken for performing either procedures. ***Dean G et al in 2003***[64] reported that there was no statistically significant differences between MVA & EVA in procedure time. ***Goldberg AB et al***[61] in 2004 showed that procedure times similar for MVA and EVA. ***Edelman A et al***[66] reported that the mean procedure times were 5.7 and 6.9 minutes, respectively, with electric vacuum curettage and manual vacuum aspirator.

Table-5 demonstrate that the mean blood loss is 40.21 ± 10.73 ml in MVA vs. 44.88 ± 11.29 ml in EVA group. This is not clinically important and both procedures are associated with very low blood loss but it is statistically significant with p value <0.003. There was no case of major haemorrhage requiring blood transfusion. In MVA group increased bleeding(>60 ml) was observed in 5 cases which belonged to 10-12 weeks GA where as in EVA group 3 cases from 8-10 weeks and 4 cases from 10-12 weeks had increased bleeding during the procedure. Similar observation were made by ***Goldberg et al***[61] who found that although blood loss was apparently lower with MVA, the difference between estimated blood loss of 35 ml and 42 ml was not clinically important and both procedures were associated with very low blood loss i.e. 35.4 ± 16.8 ml and 41.6 ± 18.2 ml. However their p value was <0.001 which was statistically significant. ***Nasira Tasnim et al in 2011***[42] found that the l mean ± SD blood loss was 62.08±32.190 in MVA and 75.71±35.532 in EVA ,the P value being < 0.008. Similar observations were also made by ***Helen K. et al*** [71]in 2011, blood loss was more in EVA but it was not statistically significant.

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Table-6 demonstrates that the complications during the procedure are rare except for 3 cases of increased bleeding and one case of vasovagal attack in EVA group. There was no case of major haemorrhage requiring blood transfusion. There was no major complication during the procedure in MVA group. Applying Pearson's chi-square test, the **p value >0.05,** which is not statistically significant.

During follow up at 7 days, lower abdominal pain(6 cases) was the commonest complaint, noted in both procedures followed by increased bleeding(4 cases) which was found more in association with those who had immediate Cu-T insertion. The **p value >0.05** which is statistically insignificant.

Westfall et al in 1998[44] reported minimal complication in MVA procedures for elective abortion (8 repeat aspirations (0.5%), 12 infections (0.7%),1 uterine perforation (0.06%)). ***Hemlin J et al in 2001***[45] comparing MVA with EVA for elective abortion reported minimal complication (2 repeat aspirations (2.0%),2 infections (2.0%)). ***Dean G et al in 2003***[64] comparing MVA with EVA for first trimester elective abortion showed that there was no statistically significant differences between groups in complications. ***Goldberg AB et al***[61] in 2004 comparing MVA and EVA for first trimester abortion reported that there was overall, no difference in rate of uterine reaspiration with MVA or EVA. **D*alton VK et al***[69] in 2006 reported minimal complications in MVA (3 repeat aspirations (3%), 2 post-procedure infections (2%),1 unplanned hospital admission (resolved before intervention needed) (0.9%)). ***Edward S et al in 2007***[70] comparing 89 MVA in outpatient clinic with 68 EVA in OR for treatment of early pregnancy loss showed minimal complications (1 fever (temp >101.4ºF) (2%),3 emergency hospital visits on same day of treatment (5%)). ***Helen Kamel et al in 2011***[71] reported that there was no significant difference in complication.

Incomplete evacuation was noted in both procedures for which reexploration and evacuation had to be done. 3% of MVA and 2% of EVA had incomplete evacuation (p value >0.05 is statistically insignificant). In the present study MVA was effective in 97% and EVA in 98% cases as 3% and 2% respectively of the 2 groups required reevacuation for incompleteness. Thus the two procedures did not show much difference as far as their effectiveness is concerned.

MVA safety and Efficacy

Author	Year	Number	Gestational Age	Efficacy

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Edwards & Carson[68]	1997	1,530 MVA	<6	99%
Creinin MD[26]	1997	2,399 MVA	<6	99%
Hemlin & Moller[45]	2001	91 MVA	<8	98%
Westfall et al[44]	1998	1677	< 10 weeks	99.5 %
Nasira Tasnim et al[42]	2011	176 (106 MVA+70 EVA)		89.6%MVA & 91.4% EVA
Nozer Sheriar et al[47]	2007	1686 MVA	< 12	97%
Das CM et al[72]	2010	146	<12	88.18%
Helen Kamel et al[71]	2011	200(100 MVA+100 EVA)	<12	98% MVA & 97% EVA

Table-7 reflects that, the mean hospital stay in hours is 4.05 $\pm$ 0.219 for MVA and 4.64 $\pm$ 0.785 for EVA with p value <0.0001 which is highly significant. Similar observation by ***Nasiran Tasnim et al***[42] in 2010 who found that the mean hospital stay was significantly shorter in MVA group 12.26 ±6.97 hrs Vs 19.54±7.59 hrs in EVA group.

Table-8 demonstrates about post abortal contraception method adopted by the study subjects. 47 % of cases adopted temporary method like IUCD(Cu T380A) and 53 % undergone permanent sterilisation procedure(Laparoscopic tubal ligation).Similar observation were found by ***Helen K et al***[42] in 2011. ***Sheriar N et al***[47] in 2007 reported that concurrent tubal ligation or IUCD insertion did not have any effect on the proportion of reported complications.

Conclusion

There was no significant difference in complication rates in both the procedures. In the present study, MVA was effective in 97% and EVA 98% cases,

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thus the two procedure did not show much difference as far as their effectiveness is concerned.

Manual vacuum aspiration is a safe and effective alternative to traditional electric vacuum aspiration. It is also relatively easy to perform and requires simple training for the health care provider.

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