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ORIGINAL RESEARCH

Comparative evaluation of complications related to manual vacuum aspiration (MVA) and electric vacuum aspiration (EVA) in first trimester abortion

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ABSTRACT

Background: Unsafe abortion remains a critical health issue in India, driven by inadequate contraceptive knowledge and access to safe procedures. Manual Vacuum Aspiration (MVA) and Electric Vacuum Aspiration (EVA) are commonly used methods for first-trimester abortions, each with unique safety and efficacy profiles. Hence the aim of the present study was to compare the safety and efficacy of MVA and EVA in first-trimester abortions. **Methods**: A retrospective study was conducted, over one year, including 100 women with pregnancies under 12 weeks. Patients were randomly divided into MVA (n=50) and EVA (n=50) groups. Clinical outcomes and complications were analyzed using SPSS-20, with significance set at $p < 0.05$. **Results**: The gestational age distribution was similar across groups, with most patients in the 6–9 weeks range. Uterine perforation was higher in EVA (6%) than in MVA (2%). Incomplete evacuation was more frequent in MVA (28%) compared to EVA (20%). Blood loss ≥100 ml was observed in 16% of EVA cases versus 8% in MVA. No complications related to anesthesia or cervical injuries were reported. While EVA showed superior efficacy in evacuation, it was associated with higher risks of perforation and hemorrhage. **Conclusion**: MVA and EVA are effective for first-trimester abortions, with MVA being safer for high-risk patients due to lower perforation and hemorrhage rates, while EVA offers better evacuation efficacy but higher risks of perforation and blood loss. Individualized care and further research are crucial to optimizing clinical outcomes.

Keywords: Manual vacuum aspiration, Electric vacuum aspiration, First-trimester abortion, Maternal health, Unsafe abortion.

INTRODUCTION

Approximately 41.6 million abortions transpire each year, with roughly 19 million (55%) classified as unsafe worldwide (1). Approximately one unsafe abortion occurs for every ten pregnancies, equating to one abortion for every seven live births globally (2). In India, abortion data are severely deficient, as only legally sanctioned abortions are documented. There are 10 to 19 unsafe abortions per 1,000 women (3).

The World Health Organisation (WHO) advocates for the utilisation of suction for abortion and the management of miscarriage during the first trimester, citing safety, efficacy, and a reduced risk of endometrial damage, including Asherman's syndrome(4).

Manual Vacuum aspiration is the optimal technique for terminating a pregnancy under 12 weeks. The Government of India has deemed the MVA procedure safe when conducted within 12 weeks by qualified medical professionals (5).

Induced abortion is among the most commonly executed procedures in obstetrics and is extensively researched (6). Due to several medical and social concerns, abortions are predominantly conducted in outpatient settings (7). Technological advancements, such as highly sensitive urinary pregnancy tests and transvaginal ultrasound, have enabled early surgical abortion to emerge as a safe and effective alternative and complement to medication abortion (4). Vacuum aspiration, the technique employed for over 97% of

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pregnancy terminations, is a safe and successful way for performing abortions within the initial weeks of gestation (8).

This approach is less unpleasant, more cost-effective, readily available, and associated with reduced complication rates compared to typical abortion techniques including dilatation and curettage. The application of MVA has been prevalent worldwide; yet, there is a paucity of local research to validate the efficacy of MVA in comparison to EVA. Therefore, this study seeks to evaluate the efficacy of the MVA procedure in ending pregnancies within the first trimester, in comparison to the EVA.

METHODOLOGY

This retrospective observational study was conducted at Department of Obstetrics and Gyanecology, Muzaffarnagar Medical College, over 18 months to compare the effectiveness and safety of manual vacuum aspiration (MVA) and electronic vacuum aspiration (EVA) in first-trimester abortion cases. A total of 100 women were included, with 50 undergoing MVA and 50 treated with EVA.

Patients above 18 years with pregnancies under 12 weeks were included, while ectopic, molar, septic, or structurally abnormal pregnancies and those with acute infections or a history of abortifacient drug use were excluded. Demographic and clinical data were collected, including obstetric history, hemoglobin levels, and urine analysis.

Abortions were performed under intravenous anesthesia, using either MVA or EVA, following cervical preparation with vaginal misoprostol if required. Procedures involved uterine size confirmation, cervical dilation, and suction using the respective methods. Pain was assessed on a numerical scale (1-10), and patients were monitored postoperatively for complications before discharge. Statistical analysis was performed using SPSS-20 and other software, with significance set at $p < 0.05$.

RESULT

The initial section in this thesis on the comparative study of MVA versus EVA for first trimester abortion highlights a hospital-based interventional study conducted at the Department of Obstetrics and Gynaecology, Muzaffarnagar Medical College, Uttar Pradesh. The research focused on antenatal patients, specifically those up to or less than 12 weeks of gestation, who sought abortion services at MMCH, Muzaffarnagar. Spanning 18 months, with 12 months dedicated to data collection and 6 months to data compilation, the study recruited a sample size of 100 women. These women evenly divided into two groups of 50, one for each study arm, using simple random sampling. The inclusion criteria ensured that only women within the specified gestational age were considered, aiming to rigorously evaluate the safety and efficacy of both MVA and EVA techniques in clinical settings.

The distribution of gestational age among women undergoing first trimester abortion through (MVA) and (EVA) showed no significant difference, with a p-value of 0.414. Most of both groups were within the 6 to 9 weeks gestational age bracket, constituting 62% of the M group and 70% of the E group.

The analysis of complications associated with (MVA) and (EVA) during first trimester abortions revealed notable differences in outcomes between the two groups. Uterine perforation was common in the EVA group, with 6% of cases (3 instance), compared to only 2% (1 instance) in the MVA group. Thiscontrast was the most striking among the complications recorded. Incomplete evacuation also showed a marked discrepancy, with 28% (14 instances) in the MVA group versus only 20% (10 instances) in the EVA group. Conversely,blood loss of 100ml or more was more frequent in the EVA group, affecting 16% (8 instances) compared to 8% (4 instances) in the MVA group. There were no instances of anesthesia complications or cervical injuries reported in either group, indicating these areas were not significantly impacted by the choice of aspiration method. These findings suggest that while EVA may have a higher risk of uterine perforation and significant blood loss, MVA may be associated with a greater risk of significant incomplete evacuation leading to retained product of conception.

TABLE 1: COMPARISON OF COMPLICATIONS IN MVA vs. EVA

COMPLICATIONS	GROUP M		GROUP E		P-VALUE
	NO. OF PTS	%	NO. OF PTS	%	
Blood loss ≥ 100ml	4	8%	8	16%	0.211
Incomplete evacuation	14	28%	10	20%	
Uterine perforation	1	2%	3	6%	
Anaesthesia complication	0	0%	0	0%	
Cervical injury	0	0%	0	0%	

DISCUSSION

Unsafe abortion poses a significant societal challenge in India, as a considerable percentage of women lack enough education and do not receive contraceptive guidance or safer practices. Consequently, a requirement exists for a technique that is safe, cost-effective, easily learnt, and convenient (4). This study found that the majority of patients were in the 18-25 age group and were primigravida. The current study revealed that the majority of patients in both groups had a uterine size of 7 to 9 weeks (42% in the MVA group and 38% in the EVA group), followed by those

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with a size of up to 6 weeks (32% in the MVA group and 34% in the EVA group), which aligns with the findings of Dutta et al.(9).

The comparative investigation of problems linked to manual vacuum aspiration (MVA) and electronic vacuum aspiration (EVA) for first-trimester abortions reveals significant disparities in their safety profiles. These findings are crucial for clinical decision-making and highlight the necessity of customising abortion techniques to the specific needs and risk factors of each patient.

The most significant discrepancy noted was the increased occurrence of uterine perforation in the EVA group (6%) relative to the MVA group (2%). Dabhi et al. (4) observed comparable outcomes, indicating that uterine perforation occurred solely with electric suction (4%) and not with MVA. In five instances, MVA was converted to EVA due to incompleteness and bleeding, while in one case treated with EVA, incomplete evacuation of the uterine cavity necessitated a repeat surgery. Uterine perforation is a significant complication that may result in additional morbidity, such as infection or the necessity for surgical intervention. The elevated incidence of perforation in the EVA group may be ascribed to the procedural mechanical attributes, including the use of stiff metallic cannulas and augmented suction pressure. This indicates that MVA, utilising more regulated manual pressure and adaptable instruments, may present a safer alternative for those at elevated risk of uterine harm.

The incidence of incomplete evacuation was higher in the MVA group (28%) than in the EVA group (20%). Retained products of conception (RPOC) may result in complications including infection, extended haemorrhage, and the necessity for further surgical procedures. This disparity may result from the diminished suction power in MVA, which may not effectively evacuate the uterine cavity completely. The data indicate that EVA may be more efficacious in attaining full evacuation in some instances; nevertheless, this benefit must be considered alongside the increased risks of other problems. Roy et al. (10) observed a greater failure rate of incomplete abortion in the misoprostol (EVA) group relative to the Manual Vacuum Aspiration (MVA) group, although this disparity did not achieve statistical significance ($p=0.0728$).

Blood loss of 100 ml or greater was more prevalent in the EVA group (16%) than in the MVA group (8%). Substantial blood loss elevates the risk of anaemia and other haemodynamic problems, potentially requiring prolonged hospitalisation or blood transfusion. The increased blood loss linked to EVA may be attributed to elevated suction pressures and the risk for enhanced uterine damage during the procedure. Conversely, Debbarma et al. (11) observed that during the first trimester, the average blood loss associated with manual vacuum aspiration (MVA) is reduced by 4 ml compared to electric vacuum aspiration (EVA) for gestations of 5 to 10 weeks, but EVA demonstrates a decrease in blood loss by 10 ml for gestations exceeding 10 weeks.

Notably, there were no reported complications related to anaesthesia or cervical injuries in either group, indicating that both techniques are comparatively safe in these respects when executed by proficient practitioners under suitable clinical circumstances. This research endorses the utilisation of both procedures as feasible alternatives for first-trimester abortion, emphasising the reduction of additional difficulties according to patient characteristics. Kerure et al. (6) observed in their study that cervical laceration was absent in all MVA cases, whereas 3% of EVA cases encountered this consequence.

This study highlights the significance of personalised care in selecting the aspiration method. EVA has the benefit of more thorough evacuation, but it entails an increased risk of uterine perforation and considerable haemorrhage. Conversely, MVA has a diminished risk of perforation and haemorrhage, although may lead to elevated rates of incomplete evacuation. Clinical practices and patient counselling must incorporate these results to enhance outcomes and ensure patient safety. Additional research utilising larger sample sizes and randomised controlled trials is necessary to validate these findings and furnish more substantial evidence for clinical guidelines.

CONCLUSION

This study highlights the need for safe, effective, and accessible abortion methods to address unsafe abortions in India. The comparison of MVA and EVA for first-trimester abortions reveals distinct benefits and risks. MVA offers a lower risk of uterine perforation and reduced blood loss, making it safer for high-risk patients, but it has a higher incidence of incomplete evacuation, necessitating careful follow-up. EVA achieves better evacuation efficacy but carries a greater risk of uterine perforation and significant blood loss, requiring additional clinical intervention. Both methods are safe concerning anesthesia and cervical injury when performed by skilled practitioners. Individualized care and informed decision-making are essential for optimizing patient outcomes. Further research with larger trials is needed to provide stronger evidence for clinical practice and improve maternal health outcomes.

REFERENCES

1. Abortion Worldwide: A Decade of Uneven Progress. Guttmacher Institute. 2009;17.
2. WHO. Unsafe Abortion: Global and Regional Estimates of the Incidence of Unsafe Abortion and Associated Mortality in 2003. 2003;14. Available at: https://www.who.int/reproductivehealth/publications /unsafe_abortion/9789241596121/en/.
3. Department of Reproductive Health and Research, World Health Organization. Unsafe abortion; global and regional estimates of the incidence of unsafe abortion and associated mortality. 2008;6. Available at:

DOI: 10.69605/ijlbpr_13.12.2024.152

https://www.who.int/reproductivehealth/publications/unsafe_abortion/9789241501118/en/.

4. Dabhi GC, Patel TS, Chaudhary NJ, Pandya JM. A comparative study between manual vacuum aspiration and electronic suction for surgical treatment of abortion. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2021 Sep 1;10(9):3342-7.
5. Jayashree V, Latha K, Mahalakshmi S. Comparative study between manual vacuum aspiration and dilatation and curettage in the surgical management of early incomplete abortion in RMMCH, Tamilnadu: A randomized controlled trial. Int J Clin ObstetGynaecol. 2018;2:14-8.
6. Kerure SB, Kerure RD, Sagarad SS, Biradar V. A comparative study of manual vaccum aspiration (MVA) & electric vaccum aspiration (EVA) for pregnancy termination of upto 10 weeks gestation. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2013 Jun 1;2(2):199-204.
7. Edelman A, Nichols MD, Jenson J. Comparison of pain and time of procedures with two first trimester abortion techniques preformed by residents and faculty. Am J ObstetGynecol 2001;184;1564-7.
8. Issac LM, Darney P. Early surgical abortion: An alternative to and back up for medical abortion. Am J ObstetGynecol 2000;183:S76-S83.
9. Dutta BK, Samantha S. A comparative study between manual vacuum aspiration and electrical suction in first trimester MTP. New J OBGYN. 2018;4(2):154 7.
10. Tuhin, Roy., Pradip, K., Saha., Sangeeta, Roy. 3. Efficacy of Vaginal Misoprostol Administered for Rapid Management of First Trimester Spontaneous Onset Incomplete Abortion in Comparison to Manual Vacuum Aspiration: A Randomised Clinical Trial. Journal of Clinical and Diagnostic Research, (2023). doi: 10.7860/jcdr/2023/60063.17975
11. Dibakar, Debbarma., J, A, Ray. 1. A comparative study of outcome of first trimester medical termination of pregnancy by manual vacuum aspiration and electric vaccum aspiration. International journal of scientific research, (2023). doi: 10.36106/ijsr/8209635