Ibrahim Card Med J 2025; 15 (2): 38-42


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# Paracervical Block versus General Anesthesia in Patients Undergoing Manual Vacuum Aspiration in the 1st Trimester Abortion

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## ABSTRACT

***Background & objective:*** Incomplete abortion remains a significant contributor to maternal morbidity, particularly in developing countries like Bangladesh. Manual Vacuum Aspiration (MVA) is an effective, lower-cost alternative to traditional surgical evacuation, yet the optimal anesthetic approach remains debated. This study aimed to assess the feasibility, safety, and clinical outcomes of MVA performed under paracervical block (PCB) compared to general anesthesia (GA).

***Methods:*** This comparative study was conducted at the Institute of Child & Mother Health (ICMH), Dhaka, involving 120 women (≤12 weeks gestation) with incomplete abortions. Patients were randomized into two groups (n = 60 each): Group G received MVA under GA (propofol/fentanyl or thiopentone/halothane), and Group P received MVA under PCB (1% lidocaine). Pain was assessed using the Visual Analog Scale (VAS) at baseline and 30 minutes post-procedure. Clinical outcomes, including procedural duration and length of hospital stay, were recorded and analyzed.

***Results:*** Demographic characteristics were comparable between groups ($p > 0.05$). While both groups showed a progressive decline in VAS scores over time, the reduction was significantly more pronounced in Group P, with Group G maintaining higher overall pain intensity throughout the observation period. Notably, Group P demonstrated significantly shorter procedural durations (9.23 ± SD min vs. 12.5 ± SD min, $p = 0.032$) and significantly reduced hospital stays (5.4 ± SD hrs vs. 7.9 ± SD hrs, $p = 0.012$) compared to Group G. No major complications were reported in either cohort.

***Conclusion:*** Manual vacuum aspiration under paracervical block is a safe, efficient, and cost-effective alternative to general anesthesia for first-trimester abortion. Given the shorter recovery times and superior pain reduction post-procedure, PCB should be considered a preferred anesthetic method for MVA in resource-limited settings.

***Keywords:*** Manual Vacuum Aspiration (MVA), Paracervical Block, General Anesthesia, Incomplete Abortion, Visual Analog Scale (VAS).

## INTRODUCTION:

Bangladesh has achieved a remarkable seven-fold increase in its contraceptive prevalence rate (CPR) in less than forty years. Yet, the rate of unintended pregnancy declined only gradually during the period of 1993-2007. A significant number of patients still present to hospitals seeking management of abortion and its complications. Risks of abortion-related morbidity and mortality increase as a result of unintended pregnancies, particularly in countries like Bangladesh where abortion is restricted by law. Despite the widespread availability of family planning (FP) services, 2.8% of all pregnancies result in menstrual regulation (MR) and 1.5% in

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induced abortion.[1] First-trimester abortion remains a critical cause of maternal mortality and morbidity. Incomplete abortion, in particular, is a leading cause of maternal distress in the developing world, where infection and hemorrhage serve as the primary complications. A vital aspect of treating incomplete abortion is the adequate management of pain during uterine evacuation, whether patients undergo dilation and curettage (D&C) with a sharp curette or manual vacuum aspiration (MVA).[2]

Current pain control methods are categorized into local anesthesia, conscious sedation, general anesthesia (GA), & non-pharmacological methods.[3] Current guidelines provide several options for the management of miscarriage: expectant management, medical management with misoprostol, or surgical evacuation.[4-6] While expectant & medical management have efficacy rates of 70–80%, these methods are often less acceptable to women; consequently, 88% of women are managed through surgical methods, primarily electric vacuum aspiration (EVA) under GA.[4] However, MVA has emerged as a safe, effective, and cheaper alternative that requires a shorter hospital stay. Crucially, MVA does not mandate GA and is associated with fewer complications than traditional D&C.[2] Unlike EVA, MVA utilizes a lightweight, quiet, and inexpensive syringe that can be operated under local anesthesia (LA) in a clinic or ward environment. Because it does not require electricity, it is especially useful in emergency settings. Studies have shown MVA to be comparable to EVA in efficacy and complication rates, such as uterine bleeding and perforation.[4] Furthermore, cost analysis data indicates that MVA performed in an ambulatory setting is significantly less expensive than EVA performed under GA.[7] Despite these proven benefits, MVA-LA remains underused in Bangladesh.

Most women undergoing vacuum aspiration experience significant pain, which clinicians consistently underestimate. Factors such as pre-procedure emotional distress or a gestational age beyond 10 weeks are associated with increased pain, while prior vaginal delivery is associated with less pain. Comparative studies indicate that a paracervical block (PCB) is often preferred over GA, provided a few minutes are allowed for the block to take effect, as it ensures patient satisfaction while avoiding the systemic side effects and costs of GA.[8]

Previous research recommends that for vacuum aspiration before 13 weeks of gestation, a combination of PCB, analgesics, and non-pharmacologic measures typically provides sufficient relief.[9-11] MVA-LA in an outpatient setting has been associated with high levels of patient satisfaction (93%) and is a safe therapeutic option for early missed or incomplete miscarriage. However, limited studies on the said issue have so far been conducted in the context of our population. Therefore, the aim of this study was to assess the feasibility, safety, and clinical outcomes of MVA under paracervical block versus general anesthesia in patients undergoing first-trimester abortion.

## METHODS:

### Study Design and Setting

This comparative study was conducted over a six-month period (October 18, 2019, to April 17, 2020) at the Department of Obstetrics & Gynaecology in collaboration with the Department of Anaesthesiology at the Institute of Child & Mother Health (ICMH), Matuail, Dhaka. The study protocol received formal approval from the Ethical Review Committee (ERC).

### Patient Selection and Randomization

A total of 120 women (≤ 12 weeks gestation) with incomplete abortions scheduled for MVA were recruited. Using a computer-generated randomization schedule, patients were allocated into two groups (n = 60 each):

- Group G: Manual vacuum aspiration under general anesthesia.
- Group P: Manual vacuum aspiration under paracervical block.

Blinding was maintained using the sequentially numbered opaque sealed envelope (SNOSE) technique. Inclusion criteria were women ≤ 12 weeks gestation with incomplete abortion and informed consent. Exclusion criteria included active infections, severe systemic illness, psychiatric disorders, ASA physical status >II, and lidocaine allergies.

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### Procedural Protocol: Group G (General Anesthesia)

Anesthesia was induced using µg/kg of intravenous fentanyl and a bolus of 2.5–4 mg/kg of propofol. For stable cases, anesthesia was maintained via face mask with isoflurane in oxygen. In hemodynamically unstable cases, intubation was performed within 20 seconds using a 7.0 mm ID tube. Following pre-oxygenation, induction was achieved with 5 mg/kg thiopentone and 0.1 mg/kg vecuronium. Maintenance done with $N_2O$ (4 L/min), $O_2$ (2 L/min), and halothane 0.7%. Neuromuscular blockade was reversed with neostigmine (0.04 mg/kg) and atropine (0.01 mg/kg).

### Procedural Protocol: Group P (Paracervical Block)

Patients received oral diazepam 30 minutes prior to the procedure. Following WHO (2015) guidelines, the PCB was administered with 1% lidocaine:

- 2 ml at the 12 o'clock position for tenaculum placement.
- 4 ml each at the 2 and 4 o'clock positions (cervicovaginal junction).
- 5 ml each at the 8 and 10 o'clock positions.

Aspiration was performed before each injection to avoid intravascular entry. Suction and evacuation commenced three minutes after the block was completed.

### Data Collection and Follow-up

Pain was evaluated using a Visual Analog Scale (VAS) before the procedure and 30 minutes post-procedure (0: no pain; 1-3: slight; 4-6: moderate; 7-10: severe). All patients were followed for 7 days. On the 7$^{th}$ day, a routine abdominal ultrasonography (USG) was performed to confirm the completeness of the procedure.

### Statistical Analysis

Data were processed using SPSS, version 17.0. While continuous data were expressed as mean ± SD and analyzed via Student's t-test, categorical data were expressed as frequencies (with corresponding percentages and were compared using the Chi-Square test. A P-value < 0.05 was considered statistically significant at 5% significance level.

## RESULTS:

### Demographic and Baseline Characteristics

The majority of participants (58.3%) were aged 20–25 years. Most patients were primigravida (59.2%) and categorized as ASA Class I (80.8%). Socioeconomic analysis revealed that 45% belonged to the middle class, and the most common education level was primary (37.5%). The demographic profile was comparable across both groups, with no statistically significant differences in terms of age, gestational age, parity or physical status (p = 0.963, p = 0.589, p = 0.577, and p = 0.814 respectively) (Table I).

**Table I: Demographic and Clinical Profile of Study Participants (n=120)**

| Variable | Group | | p-value |
|---|---|---|---|
| | Group G (n = 60) | Group P (n = 60) | |
| **Age* (years)** | | | |
| 15–20 | 3(5.0) | 4 (6.7) | |
| 20–25 | 36(60.0) | 34(56.7) | |
| 25–30 | 12(20.0) | 13(21.7) | 0.963 |
| >30 | 9(15.0) | 9(15.0) | |
| **Mean ± SD** | 24.2 ± 5.4 | 24.2 ± 5.4 | |
| **ASA Status*** | | | |
| ASA I | 49(81.7) | 48(80.0) | 0.814 |
| ASA II | 11(18.3) | 12(20.0) | |
| **Parity*** | | | |
| Primigravida | 37(61.7) | 34(56.7) | |
| Multigravida | 23(38.3) | 26(43.3) | 0.577 |
| **Gestational age# (weeks)** | 8.2 ± 1.1 | 8.3 ± 0.9 | 0.589 |

Figures in the parentheses indicate the corresponding %; ***Chi-squared Test** ($\chi^2$) was done to analyze the data. #Data were analyzed using **Unpaired t-Test** and were presented as **mean ± SD**.

### Pain Assessment (Visual Analog Scale)

Pain scores were recorded at three intervals. While Group P (Paracervical Block) consistently showed slightly lower mean VAS scores compared to Group G (General Anesthesia), the differences were not statistically significant (p > 0.05) (Table II). Figure 1 illustrates the comparative pain intensity between the two cohorts. While both groups exhibited a progressive decline in Visual Analog Scale (VAS) scores over time, the reduction was significantly more pronounced in Group P. Notably, Group G maintained higher overall pain intensity throughout the observation period.

**Table II: Comparison of VAS Scores Between Groups**

| Timing | Group | | p-value |
|---|---|---|---|
| | Group G (n = 60) | Group P (n = 60) | |
| During Procedure# | 3.87 ± 1.4 | 3.45 ± 1.5 | 0.115 |
| Immediately After# | 2.68 ± 0.95 | 2.57 ± 1.1 | 0.489 |
| 1 Hour Post-Procedure# | 2.89 ± 0.94 | 2.75 ± 1.0 | 0.245 |

#Data were analyzed using **Unpaired t-Test** and were presented as **mean ± SD**.

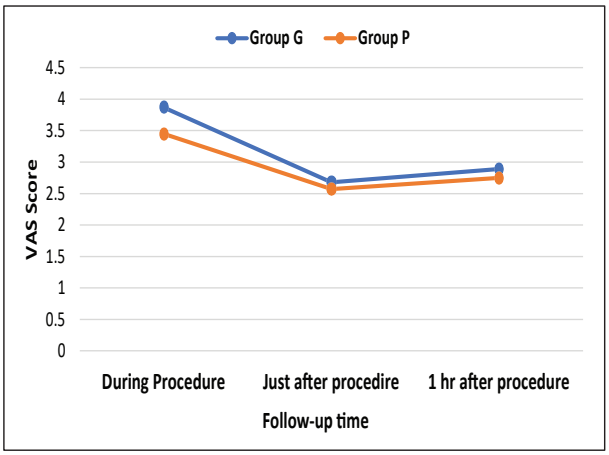


**Figure 1. Comparison of pain intensity between groups during procedure Clinical Outcomes and Complications**

Group P demonstrated superior outcomes regarding procedural efficiency and recovery time. The duration of the procedure was significantly shorter in the paracervical block group (9.23 min vs. 12.5 min, p = 0.032). Similarly, the length of hospital stay was significantly reduced in Group P (5.4 hrs vs. 7.9 hrs, p = 0.012) (Table III).

**Table III: Comparison of Procedural Outcomes and Complications**

| Variable | Group | | p-value |
|---|---|---|---|
| | Group G (n = 60) | Group P (n = 60) | |
| Duration of Procedure# (min) | 12.5 ± 8.4 | 9.23 ± 8.4 | 0.032 |
| Hospital Stay# (hrs) | 7.9 ± 5.4 | 5.4 ± 5.3 | 0.012 |
| Complications | | | |
| Nausea & Vomiting* | 8(13.3) | 3(5.0) | 0.116 |
| Cervical Trauma** | 0(0.0) | 1(1.7) | 0.315 |
| Incomplete Evacuation** | 1(1.7) | 1(1.7) | 1.000 |
| Infection** | 0(0.0) | 1(1.7) | 0.315 |

Figures in the parentheses indicate the corresponding %; ***Chi-squared Test** ($\chi^2$) was done to analyze the data. **Data were analyzed using **Fisher's Exact Test**. #Data were analyzed using **Unpaired t-Test** and were presented as **mean ± SD**.

## DISCUSSION:

The findings of this study validate the effectiveness and safety of Manual Vacuum Aspiration (MVA) under paracervical block (PCB) as a viable alternative to general anesthesia (GA) for first-trimester incomplete abortions. Our demographic data, showing a mean age of 24.2 years and a mean gestational age of approximately 8 weeks, align with similar studies conducted in Bangladesh and internationally.[2,4,12,13]

The primary concern in surgical evacuation is pain management. While GA ensures total intraoperative unconsciousness, it carries systemic risks and necessitates longer recovery. In contrast, our results demonstrate that PCB provides a comparable level of pain control (p > 0.05 across all VAS intervals). Interestingly, although not statistically significant, Group P reported lower absolute pain scores during the procedure. This efficacy is attributed to the blockade of the parasympathetic fibers (S2–S4) innervating the cervix and lower uterine segment.[8]

The most significant advantages of PCB identified in this study were procedural efficiency and resource utilization. The mean duration of the procedure was significantly shorter in the PCB group (9.23 min). This is likely due to the absence of induction and emergence time required for GA. Furthermore, the significantly shorter hospital stay (5.4 hrs in Group P vs. 7.9 hrs in Group G) highlights MVA-LA as an ideal option for outpatient or ambulatory care settings. This reduction in time translates directly to lower healthcare costs and increased bed turnover in high-volume tertiary hospitals like ICMH.

Safety profiles were excellent in both groups. While minor complications like nausea and vomiting were more frequent in the GA group (13.3%) than the PCB group (5%), the overall difference was not statistically significant (p = 0.116). No major complications, such as uterine perforation or severe hemorrhage, occurred in either group. Our success rate for complete evacuation was nearly 100%, consistent with Milingos et al.[14] who reported 95% efficacy.

The results suggest that MVA under local anesthesia is not only safe but also preferred for its

predictability and reduced systemic side effects. It empowers patients with a quicker recovery and offers clinicians a reliable, electricity-independent method for managing miscarriages in resource-limited or emergency settings.[15]

## CONCLUSION:

This study concludes that paracervical block is a highly effective and safe, alternative to general anesthesia for patients undergoing manual vacuum aspiration in the first trimester. While both methods provide adequate pain relief, the paracervical block is significantly superior in terms of reducing procedural time and shortening hospital stay. Moreover, it minimizes the risk of anesthesia-related side effects such as nausea and vomiting, enhancing patient satisfaction.

Given its portability and cost-effectiveness, MVA under paracervical block should be advocated as the primary management strategy for early pregnancy loss in outpatient settings in Bangladesh. This shift in practice could significantly reduce the maternal healthcare burden while maintaining high standards of clinical safety and patient choice.

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