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Agents, Techniques, and Complications of Local Anesthesia: Experience in a Tertiary Care Hospital

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Abstract **Original Research Article**

Introduction: Local anesthesia has opened a new door for surgeries recently as a replacement of general anesthesia. The complications of general anesthesia can be minimized using local anesthesia as a substitute. ***Aim of the Study*:** The aim of this study was to evaluate the agents, techniques, and complications of local anesthesia. ***Methods*:** This cross-sectional study was conducted in department of Anesthesiology and Gynaecology, Rangamati Medical College Hospital, Rangamati, Bangladesh, during the period from July 2020 to June 2022. Total 60 patients having different surgeries were included in this study. Lidocaine, Bupivacaine and Chloroprocaine were used for different surgical procedures. 2% lidocaine, 0.5% bupivacaine and 2% chloroprocaine were given along with adrenaline after dilution. After collection of data, statistical analysis was done using SPSS version 22. Numerical variables were expressed as mean and standard deviation, whereas categorical variables were count with percentage. ***Result*:** In this study, mean age was found 56.6 years (SD±4.50 years). Mean hospital stay was 2.2 days (SD±1.4 days). Mean blood loss was 86 mL (SD±26.4 mL). In anterior vaginal wall repair surgery, 5 (23.8%) patients had bleeding and 1 (4.8%) patient had urinary retention. In vaginal correction surgery, 2 (7.7%) patients had nausea, 1 (3.85%) patient had congestive heart failure and 1 (3.85%) patient had superficial thrombophlebitis. In Tension-Free Vaginal Tape surgery, 2 (15.4%) patients had myocardial infarction, 1 (7.7%) had bleeding and 1 (7.7%) had nausea. ***Conclusion*:** Local anesthesia has been successful for different surgical procedures. Though there were very few complications using local anesthesia for anterior vaginal wall repair, vaginal correction and Tension-Free Vaginal Tape surgery.

Keywords: Local Anesthesia, Agents, Techniques, and Complications.

I. INTRODUCTION

A lack of feeling or sensation that is restricted to a specific location of the body is referred to as local anesthesia [1]. Both dentistry and surgeon can employ local anesthetics [2]. The use of local anesthesia has a number of advantages, including a reduction in anesthetic risks, less intraoperative blood loss, and reduced hospital stays [3-7]. The results of individual research looking at the impact of local anesthetics are frequently ambiguous and contradictory [8]. In gynecology, local anesthetic is also employed. The first extensive series of gynecological treatments under local anesthetic carried out in an outpatient clinic was documented by Ferry and Rankin [9] in 1994. They were able to show that treatments including hysteroscopy, vulvar surgery, cervical cone biopsy, and pregnancy termination were acceptable to women when local anaesthetic was used. In numerous obstetric and gynecological operations, paracervical injection has been used for cervical dilation and uterine interventions, according to a recent study [10]. Tension-free vaginal tape (TVT) surgeries with anterior and/or posterior repair were carried out by Jomaa in 2001 while under local anesthetic and sedation [11]. Moore and Miklos successfully combined colpocleisis and TVT in 30 patients in a row in 2003 while the patients were

sedated and under local anesthesia [12]. In a newly released research, Axelson and Bek [4] successfully completed 80 anterior repairs while the patients were sedated and under local anesthetic. Previous reports of 87 consecutive vaginal reconstructive surgeries, including anterior and posterior colporrhapies, enterocele repairs, and colpocleisis, carried out under local anesthetic and sedation with and without concurrent continence repair are available [13]. Although these reports are encouraging, they have only covered a small number of reconstructive procedures. There haven't been any reports of sophisticated vaginal restoration using dermal allograft reinforcement or correcting apical prolapse with vaginal suspension operations. Procaine, 2-Chloroprocaine, Bupivacaine, Lidocaine, and other substances are among the many substances used in local anesthetic [14]. Bupivacaine has a sluggish onset, protracted half-life, and considerable risk for toxicity [15]. 2-Chloroprocaine has a pKa of 9.0, is synthesized in solution with a pH range of 2.5 to 4.0, and has a brief plasma half-life. Reports of CNS toxicity are rare. It is a rapid-onset, short-duration local anesthetic [16]. However, a huge subarachnoid injection of chloropropane during an attempt at epidural anesthesia resulted in significant neurologic impairments [17, 18]. The most often used local anesthetic in the US is lidocaine [19]. Scanlon reported exaggerated neurologic depression of the fetus after epidural lidocaine for cesarean section in the late 1970s [20]. There are very few studies about the agents, techniques, and complications of local anesthesia. Thus, this study was conducted to evaluate the agents, techniques, and complications of local anesthesia.

II. OBJECTIVES

To evaluate the agents, techniques, and complications of local anesthesia in different surgical procedures.

III. MATERIALS & METHODS

This cross-sectional study was conducted in Anesthesiology and Gynecology department of Rangamati Medical College Hospital, Rangamati, Bangladesh, during the period from July 2020 to June 2022. During this period, total 75 different surgeries were done for pelvic organ prolapse and vaginal correction. Out of them, total 60 patients having different surgeries fulfill the inclusion and exclusion criteria and were included in this study. All patients were given local anesthesia prior surgery. Three types of local anesthesia were used which were Lidocaine, Bupivacaine and Chloroprocaine. 2% lidocaine, 0.5% bupivacaine and 2% chloroprocaine were given along with adrenaline after dilution. All patients were follow-up during operation and hospital stay. The study protocol was approved by Ethical Committee of this Institution. An informed written consent of the patients or legal guardians was taken before collecting data. All demographic information and detailed history relevant to the research work were collected from the patients or other family members and from medical record by a structured questionnaire and data collection sheet. After collection of data, all data were checked and cleaned. After cleaning, the data were entered into computer and statistical analysis of the results being obtained by using windows-based computer software devised with Statistical Packages for Social Sciences (SPSS) version 22. After compilation, data were presented in the form of tables. Numerical variables were expressed as mean and standard deviation, whereas categorical variables were count with percentage.

Inclusion Criteria

- All age groups.
- Patients treated with local anesthesia.

Exclusion Criteria

- Patients needed for general anesthesia.
- Patients transferred to another hospital.
- Patients who did not give consent.

IV. RESULT

Total 60 patients were included in this study. Table I shows the demographic characteristics of the study people. In this study, mean age of the study people was 56.6 years (SD±4.50 years). Mean BMI was 22.5 kg/m^2 (SD±4.42 kg/m^2). Mean gravida was 3.9 (SD±1.5). Mean parity was 2.6 (SD±1.6). Mean hospital stay was 2.2 days (SD±1.4 days). Mean blood loss was 86 mL (SD±26.4 mL). Table II shows the surgical techniques. In this study, anterior vaginal wall repair was done in 21 (35%) women, vaginal correction was done in 26 (43.3%) women, and Tension-Free Vaginal Tape was done in 13 (21.7%) women. Table III shows the agents used for local anesthesia. In anterior vaginal wall repair surgery, 2% lidocaine was used in 6 (28.6%) patients and 0.5% bupivacaine was used in 15 (71.4%) patients. In vaginal correction surgery, all patients were given 2% chloroprocaine. In Tension-Free Vaginal Tape surgery, all patients were given 2% lidocaine. Table IV demonstrates the complications of the study people. In anterior vaginal wall repair surgery, 5 (23.8%) patients had bleeding and 1 (4.8%) patient had urinary retention. In vaginal correction surgery, 2 (7.7%) patients had nausea, 1 (3.85%) patient had congestive heart failure and 1 (3.85%) patient had superficial thrombophlebitis. In Tension-Free Vaginal Tape surgery, 2 (15.4%) patients had myocardial infarction, 1 (7.7%) had bleeding and 1 (7.7%) had nausea.

Table-I: Demographic characteristics of the study people (n=60)

Characteristics	Mean±SD
Age (Years)	56.6 ±4.50
BMI (kg/m^2)	22.5 ±4.42
Gravida	3.9±1.5
Parity	2.6±1.6
Hospital stays (days)	2.2±1.4
Blood loss (mL)	86±26.4

Table-II: Surgical techniques (n=60)

Surgical techniques	n	%
Anterior vaginal wall repair	21	35.0
Vaginal Correction	26	43.3
Tension-Free Vaginal Tape	13	21.7

Table-III: Agents used for local anesthesia (N=60)

Agents used	Anterior vaginal wall repair (n=21)	Vaginal Correction (n=26)	Tension-Free Vaginal Tape (n=13)
Lidocaine	6 (28.6%)	0	13 (100%)
Bupivacaine	15 (71.4%)	0	0
Chloroprocaine	0	26 (100%)	0

Table-IV: Complications of the study people (n=60)

Complications	Anterior vaginal wall repair (n=21)	Vaginal Correction of Pelvic Organ Relaxation (n=26)	Tension-Free Vaginal Tape (n=13)
Bleeding	5 (23.8%)	0	1 (7.7%)
Congestive heart failure	0	1 (3.85%)	0
Dysuria	0	0	0
Myocardial infarction	0	0	2 (15.4%)
Watery vaginal discharge	0	0	0
Superficial thrombophlebitis	0	1 (3.85%)	0
Urinary retention	1 (4.8%)	0	0
Nausea	0	2 (7.7%)	1 (7.7%)
None	15 (71.4%)	22 (84.6%)	9 (69.2%)

V. DISCUSSION

This current study was conducted to assess the agents, techniques, and complications of local anesthesia in different surgical techniques among 60 patients. In this study, mean age was found 56.6 years (SD±4.50 years). Mean BMI was 22.5 kg/m^2 (SD±4.42 kg/m^2). Mean gravidity was 3.9 (SD±1.5). Mean parity was 2.6 (SD±1.6). Mean hospital stay was 2.2 days (SD±1.4 days). Mean blood loss was 86 mL (SD±26.4 mL). In the study of Miklos JR, *et al.*, [21], the mean estimated blood loss was 153 mL (range 25-500 mL), with 80% of the patients losing less than 200 mL which is not similar to our study and the average hospital stay was 2.1 days (range l-8) which is similar to our study. In this study, anterior vaginal wall repair was done in 21 (35%) women, vaginal correction was done in 26 (43.3%) women, and Tension-Free Vaginal Tape was done in 13 (21.7%) women. In this study three types of local anesthesia were used. In anterior vaginal wall repair surgery, 2% lidocaine 4-7mg/kg along with adrenaline was used in 6 (28.6%) patients and 0.5% bupivacaine 2mg/kg along with adrenaline was used in 15 (71.4%) patients. In the study of Axelsen SM, *et al.*, [4], three to five millilitres of bupivacaine 5 mg/ml with adrenaline 5 µg/ml was used for local anaesthesia injected into the mucosa of the vagina. In our study for vaginal correction surgery, all patients were given 2% chloroprocaine 11-14mg/kg along with adrenaline. In the study of Miklos JR, *et al.*, [21], most patients received 5-10 mg of IV diazepam or 100 µg of IV midazolam hydrochloride preoperatively. Vaginal wall defects were noted and the defect of immediate interest was then injected submucosally with 1% lidocaine with 1:100,000 epinephrine. Buchsbaum GM *et al.*, [6] used a mixture of 2% nesacaine and 0.5% bupivacaine 2mg/kg for local anesthesia. In our study, Tension-Free Vaginal Tape surgery, all patients were given 2% lidocaine 4-7mg/kg along with adrenaline. In the study of Moore RD *et al.*, [12], Patients received intravenous sedation (monitored anesthesia care) and local anesthetic infiltrate with 0.25% lidocaine with epinephrine (1:400,000). In this study there were some complications after surgery. In anterior vaginal wall repair surgery, 5 (23.8%) patients had bleeding and 1

(4.8%) patient had urinary retention. In the study of Axelsen SM, *et al.*, [4], among 83 patients, seven patients (8.4%) suffered from complications postoperatively including the patient readmitted, (one with urinary retention, four with bleeding, and two with haematoma of the vaginal wall). In vaginal correction surgery, 2 (7.7%) patients had nausea, 1 (3.85%) patient had congestive heart failure and 1 (3.85%) patient had superficial thrombophlebitis. In the study of Miklos JR, *et al.*, [21], among 20 patients, one patient suffered a perforated uterus, without sequela, during D&C before a LeFort colpocleisis. Two patients with postoperative complications required hospital stays longer than 4 days; one experienced fluid overload from congestive heart failure, and the other developed superficial thrombophlebitis. In Tension-Free Vaginal Tape surgery, 2 (15.4%) patients had myocardial infarction, 1 (7.7%) had bleeding and 1 (7.7%) had nausea. In the study of Moore RD *et al.*, [12], postoperatively one patient suffered a myocardial infarction and congestive heart failure, and required a hospital stay of 12 days.

VI. LIMITATIONS OF THE STUDY

In our study, there was small sample size and absence of control for comparison. Study population was selected from one center in Rangamati, so may not represent wider population. The study was conducted at a short period of time. The sampling was retrospective and there was no random allocation, so there is risk of selection bias.

VII. CONCLUSION AND RECOMMENDATIONS

Local anesthesia has been successful for different surgical procedure. Though, there were very few complications using local anesthesia for anterior vaginal wall repair, vaginal correction and Tension-Free Vaginal Tape surgery. Thus, using local anesthesia for different surgical procedures is recommended. Further study with larger sample size and combination of agents of local anesthesia is needed.

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