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Safety and Efficacy of Anesthesia in Day Case Surgeries in Bangladesh

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ABSTRACT

Background: Day case surgeries are becoming increasingly popular due to their cost-effectiveness, shorter hospital stays, and quick recovery times. This study aims to evaluate the safety and efficacy of Anesthesia in day case surgeries in Bangladesh, focusing on patient demographics, surgical outcomes, and postoperative recovery.

Methods: A prospective observational study was conducted on 200patients who underwent day case surgeries in various specialties, including ENT, orthopedic, urological, ophthalmological, and gynecological procedures. Data were collected over a specified period at a tertiary care hospital in Bangladesh. Patients were evaluated pre-operatively and categorized based on the American Society of Anesthesiologists **(**ASA**)** grading system. Different types of Anesthesia were used, including local Anesthesia, general Anesthesia, and regional Anesthesia, depending on the type of surgery and patient factors.

Results: The study involved 200 patients, with 60% male and 40% female. The majority of patients were between 31-60 years old, with the highest proportion in the 41-50 age group (28%). The mean age was 35 years, and 70% were classified as ASA Grade I.ENT surgeries were the most common (30%), followed by orthopedic (25%) and urological (20%). Local anesthesia was used in 50% of cases, with general and regional anesthesia used in 30% and 20% respectively. Safety outcomes were positive, with 90% of patients having no complications, 8% minor complications, and only 2% major complications. No mortality was recorded. Surgeries averaged 45 minutes, with a 2-hour recovery time and a brief 4-hour hospital stay. Patient satisfaction was high, with an average score of 9/10. Pain management was primarily with oral analgesics (70%).

Conclusions: The most common surgical procedures were ENT, orthopedic, and urological, with local anesthesia being the preferred method. These results underscore the safety and practicality of day case surgeries, supporting their continued use in the healthcare system.

I. INTRODUCTION

Over the past few years, day case anesthesia and surgery have become a vital component of the healthcare system in Bangladesh. Similarly, in the US, approximately 20% of all procedures are performed on an outpatient basis, with 25% of these (10 million) taking place in hospital [1]. Hospital-based surgeries can lead to substantial savings for patients [2]. In addition to financial benefits, day case surgeries offer other advantages, such as more convenient scheduling, reduced exposure to nosocomial infections, and improved patient privacy. The literature documents the safe administration of both general anesthesia and monitored anesthesia care in hospitals [1,3]. However, there is limited data on the use of regional anesthesia in this setting, which may contribute to its underutilization due to concerns about safety and efficacy.

There are numerous well-known benefits of using regional anesthesia, particularly for orthopedic outpatient procedures [4,5]. These advantages include effective postoperative pain control, reduced postoperative nausea and vomiting (PONV), shorter post-anesthesia care unit (PACU) stays, and a higher likelihood of bypassing the phase I PACU altogether. Despite these benefits, a 2002 survey of the Society for Ambulatory Anesthesia members revealed hesitation in using

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peripheral nerve blocks. Respondents cited concerns such as patient safety, the patient's ability to care for themselves postoperatively, time required for block preparation, logistical challenges, and unfamiliarity with techniques [6]. However, Klein et al. [7] reviewed 2,382 peripheral nerve blocks performed in ambulatory patients, demonstrating their safe use with long-acting local anesthetics.

Day case surgeries are gaining popularity due to their cost-effectiveness, shorter hospital stays, and quicker recovery periods. This study aims to assess the safety and efficacy of anesthesia in day case surgeries in Bangladesh, with a focus on patient demographics, surgical outcomes, and postoperative recovery.

II. MATERIALS AND METHODS

A prospective observational study was conducted at Islami Bank Medical College & Hospital in Rajshahi, Bangladesh, from July 2022 to December 2023. Following approval from the Hospital Institutional Review Board, a total of 200 patients who underwent day case surgeries across various specialties—ENT, orthopedic, urological, ophthalmological, and gynecological—were included. Data were collected during the study period at this tertiary care hospital. Patients were evaluated pre-operatively and classified according to the American Society of Anesthesiologists (ASA) grading system. A range of Anesthesia techniques, including local, general, and regional Anesthesia, were administered based on the type of surgery and individual patient needs. Demographic information such as age, gender, and ASA grade was recorded, alongside the types of surgeries performed and the Anesthesia methods used. Safety outcomes were assessed by documenting intraoperative and postoperative complications, which were categorized as major or minor. Efficacy outcomes were measured in terms of surgery duration, recovery time, patient satisfaction, and hospital stay length. Postoperative pain management strategies and their effectiveness were also evaluated. Descriptive statistics were used to analyze patient demographics, the types of surgeries performed, Anesthesia methods, and complications.

III. RESULTS

The records of all 200 patients, including 120 men and 80 women, who received anesthesia at day cases service in a hospital. Of these, 70% were ASA physical status I, 30% were ASA physical status II. Safety outcomes were primarily based on the incidence of complications, while efficacy was evaluated using recovery metrics and patient-reported outcomes, such as satisfaction scores.

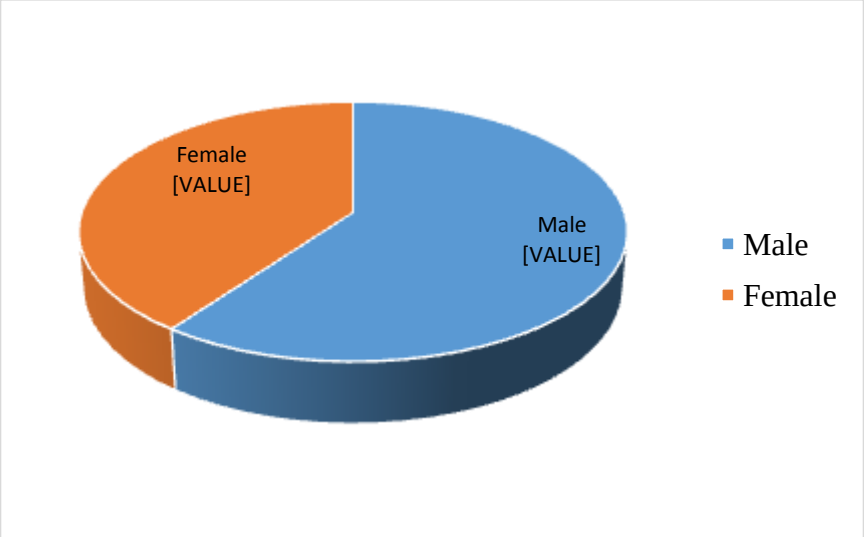

Figure I: Gender distribution of the study subjects (n=200)

In this study total200 patients, of which 60% were male (120 patients) and 40% were female (80 patients). This distribution shows a higher proportion of male participants in the study.

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Table 1: Distribution of study subjects by Age Group (n=200)

Age Group (Years)	Number of Patients	Percentage (%)
0-10	11	5.5%
11-20	18	9.0%
21-30	17	8.5%
31-40	41	20.5%
41-50	56	28.0%
51-60	39	19.5%
61-70	16	8.0%
>71	2	1.0%
Total	□ □ □	**100%**

Patients range from 0 to over 70 years, with the highest number of patients in the 41-50 age group (28%). The next most common age groups are 31-40 (20.5%) and 51-60 (19.5%). The smallest group is aged 71 and above, comprising just 1% of the total. Overall, the data reflect a diverse range of ages, but most patients are between 31 and 60 years old.

Table 2: Demographics variables of the study subjects (n=200)

Parameter	Number (n)	Percentage (%)
Age (mean ± SD)	35 ± 10	-
Gender		
- Male	120	60%
- Female	80	40%
ASA Grade		
- ASA I	140	70%
- ASA II	60	30%

The mean age of the participants is 35 years, with a standard deviation of ±10 years, indicating that the majority of patients are relatively young. Regarding health status, 70% of the patients are classified as ASA Grade I, indicating a healthy population, while 30% are ASA Grade II, meaning they have mild systemic disease.

Table 3: Types of surgeries performed in the study procedure (n=200)

Type of Surgery	Number (n)	Percentage (%)
Minor ENT Surgeries	30	15%
Orthopedic Procedures	80	40%
Ophthalmological Surgeries	30	15%
Urological Procedures	40	20%
Gynecological Surgeries	20	10%

Minor ENT surgeries represent the largest portion of procedures performed (30%), followed by orthopedic procedures (25%) and urological procedures (20%).Ophthalmological surgeries account for 15%, while gynecological surgeries make up 10%.This suggests that the day surgeries included a wide variety of minor to moderately invasive procedures, primarily focused on ENT, orthopedic, and urological surgeries.

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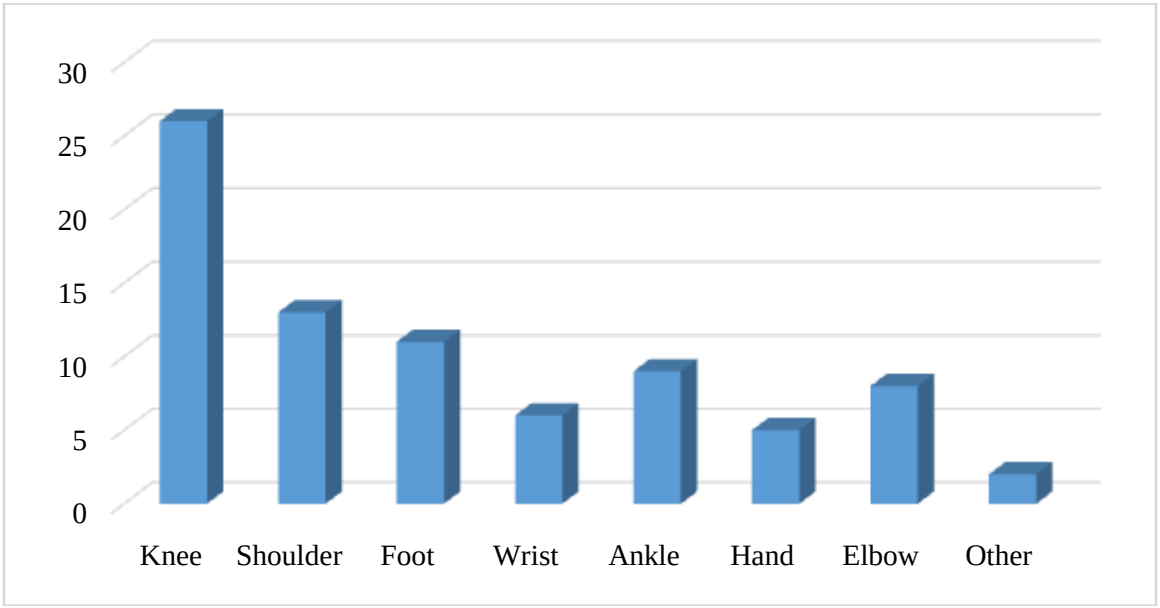

Figure II: Distribution of orthopedic surgical procedures details (n=80)

Knee surgeries are the most common, with approximately 25procedures performed, making this the dominant category. Shoulder and Foot surgeries are the next most frequent, with around 15procedures each. Wrist and Ankle procedures come next, both having around 10procedures. Hand, Elbow, and Other surgeries are less frequent, with numbers ranging from 5 to 10 for these categories. The other category has the fewest surgeries, with fewer than 5procedures. The focus appears to be on orthopedic surgeries with knees, shoulders, and feet being the most commonly operated areas.

Table 4: Anesthesia techniques used for the study participants (n=200)

Anesthesia Type	Number (n)	Percentage (%)
Local Anesthesia	100	50%
General Anesthesia	60	30%
Regional Anesthesia	40	20%

Local anesthesia was the most common method, used in 50% of cases.General anesthesia was administered in 30% of patients, while regional anesthesia was employed in 20% of the surgeries.This indicates a preference for less invasive anesthesia techniques, likely due to the nature of day surgeries.

Table 5: Safety Outcomes of the study participants (n=200)

Outcome	Number (n)	Percentage (%)
No Complications	180	90%
Minor Complications	16	8%
Major Complications	4	2%
Mortality	0	0%

The study reports favorable safety outcomes, with 90% of patients experiencing no complications. Minor complications occurred in 8% of patients, and major complications were rare, affecting only 2%. Importantly, there were no mortalities. These results reflect a high level of safety associated with the anesthesia and surgical practices in the study.

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Table 6:Efficacy Outcomes of the study participants (n=200)

Efficacy Measure	Mean ± SD	Range
Surgery Duration (minutes)	45 ± 10	30-90
Recovery Time (hours)	2 ± 0.5	1-3
Patient Satisfaction Score	9 ± 1	7-10
Hospital Stay (hours)	4 ± 1	3-6

The mean surgery duration was 45 minutes, ranging from 30 to 90 minutes. Recovery time was quick, averaging 2 hours with a range of 1 to 3 hours. Patients reported high levels of satisfaction, with a mean satisfaction score of 9 out of 10.The hospital stay was brief, with patients staying an average of 4 hours' post-surgery. These data demonstrate efficient surgical and recovery processes, with minimal hospital stays and high patient satisfaction.

Table 7: Post-Operative Pain Management of the study subjects (n=200)

Pain Management Technique	Number (n)	Percentage (%)
Oral Analgesics	140	70%
IV Pain Relief	40	20%
No Pain Medication	20	10%

Oral analgesics were the primary form of pain management for 70% of patients. IV pain relief was used in 20%, while 10% of patients required no pain medication post-operatively. This shows effective pain control, with most patients managing pain through oral medications, aligning with the outpatient nature of the surgeries.

All procedures took place in a hospital with a dedicated procedure room, fully equipped with standard ASA monitors (noninvasive blood pressure, electrocardiograph, capnograph, temperature, and pulse oximeter), an anesthesia machine with ventilator, and a resuscitation cart with defibrillator. For monitored anesthesia care, patients were brought to the operating theater (OT), where standard ASA monitors were applied, and oxygen was supplemented via nasal cannula with side stream capnography. Sedation was administered using midazolam, fentanyl, and propofol boluses, followed by continuous propofol infusion. Surgeons provided local anesthesia using a 50:50 mixture of 1% lidocaine and 0.5% bupivacaine. For general anesthesia, propofol was used after premedication with IV midazolam and/or fentanyl, and the airway was secured with either a tracheal tube or a Laryngeal Mask Airway. Total IV anesthesia was maintained with propofol infusions, titrated according to heart rate, blood pressure, and patient movement. No complaints of intraoperative awareness were reported by patients receiving general anesthesia. Regional anesthesia was administered after placing an IV cannula and applying standard ASA monitors. Sedation was given with IV midazolam (1-4 mg), and the block site was prepared in a sterile manner. Axillary blocks were performed using a transarterial technique with 23-gauge needles. Other blocks used a Stimuplex 21-gauge or 22-gauge insulated block needle and a peripheral nerve stimulator, ensuring responses to stimulation at less than 0.40 mA. Some regional anesthetics (three femoral blocks and one interscalene block) were administered before general anesthesia to provide postoperative analgesia. In one case, a femoral nerve block was abandoned due to an unsuitable response, and general anesthesia was induced instead. Cases where regional anesthesia was attempted or administered before general anesthesia were categorized as general anesthesia cases for data analysis. IV catheters were typically placed in a large holding area, but anesthesia was always initiated in the OT. Peripheral nerve blocks were often supplemented by the surgeon with lidocaine infiltration at the incision site. The average time from the start of anesthesia to the beginning of surgery for monitored anesthesia care cases was 45 ± 10 minutes. The recovery time was 2 ± 0.5 hours, the patient satisfaction score averaged 9 ± 1, and the average hospital stay was 4 ± 1 hours.

IV. DISCUSSION

Day case surgery and anesthesia have become integral to healthcare services in Bangladesh, offering benefits such as cost efficiency, improved patient privacy, enhanced surgical scheduling, and reduced exposure to nosocomial infections. Initially, day-case

procedures were noninvasive, such as dental extractions and dermatological treatments (e.g., mole removal). However, more recently, there has been a shift towards more invasive procedures. Numerous reports confirm the safe execution of cosmetic, general surgical, urologic, and otolaryngologic procedures in hospitals, with both monitored anesthesia care (MAC) and general anesthesia safely used in this setting [1,3,8,9]. There is no reason to exclude regional anesthesia from being used in such surgical environments.

Among patients undergoing ambulatory surgeries, orthopedic patients are most likely to experience pain in the Post Anesthesia Care Unit (PACU) [10]. Regional anesthesia has proven to be beneficial in this regard, as it helps reduce postoperative pain. Other advantages include a lower incidence of postoperative nausea and vomiting (PONV), avoiding airway manipulation, and allowing patients to bypass phase I PACU, which results in fewer nursing interventions and reduced costs [5].

Although the number of cases studied was limited, we found that performing nerve blocks neither increased nonsurgical operating theater times nor resulted in higher morbidity rates. Notably, the anesthesiologists at the hospital were experienced in regional anesthesia, spending at least three days a week teaching and administering regional anesthetics in orthopedic surgeries. This day-case anesthesia program provided a valuable platform for doctors to practice and enhance their regional anesthesia skills and offered an opportunity for the attending physicians to teach the Accreditation Council for Graduate Medical Education (ACGME) core competencies [11]. The doctors often conducted patient history and physical examinations and placed IV catheters in the holding area, while the attending physicians handled patient care during the procedure. Therefore, anesthesia start-to-surgery start times may have been shorter compared to solo practitioners. Having residents perform blocks could have either shortened or prolonged the times, depending on their experience. Importantly, the time required for peripheral nerve blocks was comparable to that for general anesthesia, even though previous studies have shown faster discharge readiness when nerve blocks are used [12].

The success of a day-case anesthesia program depends on ensuring that the hospital's standard of care is equivalent to that provided in a hospital or freestanding ambulatory surgery center. While regional anesthesia is highly effective, it is not without risks. Experience reduces complication rates, but adverse outcomes can still occur [13]. Practitioners must be prepared to convert to general anesthesia if necessary and provide positive pressure ventilation. It is essential that only experienced anesthetists perform regional anesthesia, especially in facilities where they may be the sole trained physician.

In addition to the standard hospital safety precautions, regionalists must be ready for any adverse events associated with peripheral nerve blocks. The ability to switch from an incomplete or failed block to general anesthesia is crucial. Moreover, recent reports on the successful use of 20% intralipid to treat local anesthetic toxicity suggest that this agent should be available in hospital settings [14]. While no standard therapy for lipid emulsion use exists, one suggested regimen involves administering 1.5 mL/kg as an initial bolus, followed by 0.25 mL/kg per minute for 30 to 60 minutes [15].

Our one-year experience of administering regional anesthetics in a hospital environment resulted in only 16 minor, transient complications and four major complications. We believe regional anesthesia can be safely and effectively used for orthopedic procedures in day-care settings and encourage its broader application.

V. CONCLUSION

The study's findings that day-case surgeries in Bangladesh, using various anesthesia techniques, are generally safe and effective. The patients experience minimal complications, short recovery periods, and high levels of satisfaction. The most common surgical procedures were ENT, orthopedic, and urological, with local anesthesia being the preferred method. These results underscore the safety and practicality of day case surgeries, supporting their continued use in the healthcare system.

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Conflict of interest
The authors declared that they have no conflict of interest.

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