Original Research Article

Geriatric Anesthesia: A Prospective Study on the Prevalence of Comorbidities and Associated Challenges in Elderly Surgical Patients in Bangladesh

ABSTRACT

Background: This study is built upon the understanding that ageing is a physiological phenomenon characterized by degenerative changes to organ and tissue structure and function. This physiological process can be seen in the geriatric population's heightened sensitivity to anaesthetic drugs, which often requires reduced dosage for desired clinical results. The complexities of the geriatric population necessitate specialized perioperative care plans to optimize patient outcomes. This study examines the difficulties associated with geriatric anaesthesia, focusing on anaesthesia-related intraoperative and postoperative problems in elderly individuals.
Objective: Geriatric anesthesia necessitates understanding, observing, and managing associated difficulties, risks, and co-existing conditions for optimal patient outcomes.
Methods: This research employs a prospective observational study design and was conducted at the Department of Anesthesia, Sadar Hospital, Chuadanga District, Bangladesh. A sample of 100 patients aged over 60 who received surgical treatments was studied. The patients were evaluated through medical history, physical examination, and necessary investigations were conducted. Data were analyzed using SPSS-25 software.
Results: The study's primary findings were that the most prevalent cardiovascular comorbidity was hypertension (40%), followed by emphysema as the most common pulmonary comorbidity (30%), and epilepsy and seizure disorders were the most common neurological conditions (22%). In addition, the age distribution revealed the majority (60%) of patients fell within the 66-70 years age bracket.
Conclusion: Study underscores geriatric anaesthesia challenges, necessity of tailored care plans, preoperative assessments, and multidisciplinary approach for improved perioperative outcomes.

Keywords: Geriatric Anesthesia, Comorbidities, Postoperative Outcomes, Postoperative Complications

1. INTRODUCTION

Ageing is a physiological phenomena that affects everyone over time and is clinically characterised by degenerative changes to organ and tissue structure as well as their ability to function. Geriatric people are often more responsive to anaesthetic drugs. In most cases, less medicine is needed to get the desired clinical result, and the drug's effects are frequently sustained. Accelerating healing and preventing functional decline are the main goals of perioperative care for the elderly population. [1]

Over the past century, the life expectancy in wealthy nations has improved dramatically. According to some estimates, 20% of the population might be beyond the age of 65 by the year 2050. Many of these senior citizens will have surgery and be sedated. The different difficulties that come with this group of patients must be managed by readmission testing nurses. [2] After surgery, older persons are more likely to experience problems and die. Older people may be more prone than other patients to develop certain syndromes, such as postoperative delirium, long-term cognitive alterations, new dependency on activities of daily living, etc., in addition to organ-based consequences such postoperative myocardial infarction. [3]

By the time they reach the age of 80, older adults have undergone several physiological and anatomical changes, many of which began in the fourth decade of life. In order to improve patient outcomes, customisedperianesthetic care planning is required due to changes in tissue mass and function in key organ systems.During the period of perianesthesia, the elderly patient will continue to present difficulties. [4] The examination of the patient's health state to determine the surgical risk and the forecast of potential consequences while optimising and planning preventative measures are universally acknowledged objectives of preoperative anaesthesia assessment. [5]

The course and effects of surgical interventions in elderly patients are heavily influenced by cardiovascular diseases, respiratory disorders, endocrinopathies, diminishing hepatic functions, variably impaired renal functions, nutritional deficiencies, gastrointestinal tract dysfunctions, cognitive and neuro-behavioral changes, a common practise of polypharmacy, and many other co-morbid diseases. [6] To address these issues, several nations have improved anaesthesia safety by promoting cutting-edge technologies, including brain oxygen monitoring facilities, novel airway devices, ultrasonography and visualisation methods, and anaesthesia depth. [7]

A detailed assessment of the patient's medical state is also necessary in order to adjust the anaesthetic treatment plan to the patient's demands while balancing the need for perfusion of important organs against the stress placed on the heart. Frailty is a multifaceted process that can result in the physiological impacts of ageing and more accurately predicts the risk of perioperative morbidity and death than chronologic age alone [8].

The degree of each system's loss of function varies greatly [9] and depends on a variety of factors, including heredity, lifestyle, and preventative healthcare. Through a thorough history, physical examination, and targeted diagnostic workup, each system of the body should be properly assessed. To create a safe and efficient anaesthetic strategy, it is essential to comprehend the physiology of the patient. [10] This research aims to examine the difficulties associated with geriatric anaesthesia.

Objective

1. To assess the difficulties with geriatric anaesthesia.
2. To observe anesthesia-related intraoperative and postoperative problems in elderly individuals.
3. To determine risk factors for senior patients' perioperative morbidity and death and to emphasise the need of a geriatric-focused preoperative examination.
4. To observe the many co-existing conditions of older individuals who had surgery.

2. METHODS

2.1 Study Design and Setting

This study was designed as a prospective observational study, and was conducted at the Department of Anesthesia, Sadar Hospital, Chuadanga District, Bangladesh. The study duration spanned from November 2021 to October 2022.

2.2 Participants and Sampling

The study subjects comprised of 100 patients who were selected in accordance with pre-determined inclusion and exclusion criteria. Participants were recruited if they were over 60 years of age and had received surgical treatments. Written informed consent was obtained from all participants. Patients with mental illness and those who declined participation were excluded from the study.

2.3 Data Collection

Data collection included a thorough evaluation of all patients through their medical history and physical examination. All necessary investigations were conducted prior to anesthetic and analgesic medication administration, and surgical procedures. Perioperative outcomes were routinely documented. Ethical clearance was obtained from the appropriate ethical committee, and all participant data was treated confidentially and used exclusively for the purposes of this study.

2.4 Data Analysis

Statistical analysis of the results was carried out using Statistical Packages for Social Sciences (SPSS-25) software. Age distribution, cardiovascular comorbidities, pulmonary comorbidities, and neurological comorbidities were documented and analyzed.

2.5 Inclusion Criteria

- Over 60-year-old patients received surgical treatments.
- Those patients who had consented to take part in the trial.

2.6 Exclusion Criteria

- People with mental illness.
- Patients who refused to provide permission to take part in the trial.

3. RESULTS

Age Distribution

The majority of the respondents (60.0%) were in the age range of 66-70 years. Two other age groups accounted for 20.0% each of the total respondents, these were the 60-65 age group and those above 70 years.

Cardiovascular Comorbidities

Hypertension was the most prevalent cardiovascular condition, affecting 40% of the respondents. This was followed by congestive heart failure (20.0%), atherosclerosis (16.0%), coronary artery disease and cardiac arrhythmias (10.0% each), and aortic stenosis (4.0%).

Pulmonary Comorbidities

Regarding pulmonary comorbidities, Emphysema was the most common condition, present in 30% of the respondents, followed by chronic bronchitis (28.0%), pneumonia (22.0%), and lung cancer (20.0%).

Neurological Comorbidities

In terms of neurological comorbidities, epilepsy and seizure disorders were the most prevalent (22.0%), with Alzheimer's disease, Multiple Sclerosis, and Parkinson's disease

each present in 20.0% of the respondents. A slightly smaller proportion of respondents, 18%, had experienced a stroke.

Table 1 presents the age distribution among the respondents of the study, which totaled 100 participants. According to the table, the majority of the respondents (60.0%) were in the age range of 66-70 years. This was three times as many as the two other age groups represented, both of which accounted for 20.0% each of the total respondents. These were the 60-65 age group and those above 70 years.

Table 1: Age distribution among respondents (N=100)

Age (years)	N	%
60-65	20	20.0
66-70	60	60.0
>70	20	20.0

The data in Table 2 provides insights into the distribution of various cardiovascular comorbidities among a sample of 100 respondents. Hypertension was the most prevalent condition, affecting 40% of the respondents, followed by congestive heart failure, observed in 20% of the participants. Atherosclerosis was present in 16% of the individuals. The less frequent cardiovascular conditions were coronary artery disease and cardiac arrhythmias, each found in 10% of the respondents. Aortic stenosis was the least prevalent, with only 4% of the surveyed individuals reporting this condition. This data offers a snapshot of the prevalence and distribution of these comorbidities among the population in this study.

Table 2: Cardiovascular comorbidities were distributed across respondents (N=100).

Comorbid conditions	N	%
Atherosclerosis	16	16.0
Coronary artery disease	10	10.0
Hypertension	40	40.0
Congestive heart failure	20	20.0
Cardiac arrhythmias	10	10.0
Aortic stenosis	4	4.0

Table 3 presents the distribution of respondents according to pulmonary comorbidities, with a total sample size of 100. It reveals that Emphysema was the most common comorbidity among the respondents, with 30% (30 individuals) suffering from this condition. Chronic bronchitis was the next most prevalent, affecting 28% (28 individuals) of the respondents. Pneumonia was reported in 22% (22 individuals) of the surveyed population, while 20% (20 individuals) were diagnosed with lung cancer. It's clear that each of these pulmonary comorbidities represented a significant health challenge for a substantial portion of the respondents.

Table 3: Distribution of respondents according to pulmonary comorbidities (N=100)

Comorbid conditions	N	%
Emphysema	30	30.0
Chronicbronchitis	28	28.0
Pneumonia	22	22.0
Lung cancer	20	20.0

Table 4 provides a distribution of neurological comorbidities among a cohort of 100 respondents. Alzheimer's disease, Multiple Sclerosis, and Parkinson's disease each were found in 20% of the respondents. Slightly fewer respondents, 18%, were found to have had a stroke. Epilepsy and seizure disorders, however, were the most prevalent condition, with

22% of respondents reporting this comorbidity. This indicates a relatively equal distribution of these neurological conditions within the sample, with epilepsy and seizure disorders having a slightly higher representation.

Table 4: According to neurological comorbidities, respondents were distributed (N=100).

Comorbid conditions	N	%
Alzheimer's disease	20	20.0
Stroke	18	18.0
Multiple sclerosis	20	20.0
Epilepsy and seizure	22	22.0
Parkinson's disease	20	20.0

4. DISCUSSION

The study surveyed 100 participants, mostly aged 66-70 (60%), and found that hypertension was the most common cardiovascular comorbidity (40%), emphysema the most common pulmonary comorbidity (30%), and epilepsy and seizure disorders the most common neurological comorbidity (22%).According to a study, The elderly (≥65 years) population is the fastest-growing part of the population in many parts of the developed world. [11]According to another study, 96.4% of respondents reported that they had cared for a patient aged 65 or older within the last year. [12]Considering the cardiovascular comorbidities, most (20, 40%) of the patients had hypertension, followed by 10 (20%) patients had congestive heart failure, 8 (16%) patients had atherosclerosis, 5 (10%) patients had coronary artery disease, another 5 (10%) had cardiac arrhythmias and 2 (4%) patients had aortic stenosis in this study. Achieving adequate BP control preceding an elective surgical procedure is desirable to ensure hemodynamic stability throughout the perioperative period, since labile heart rate, blood pressure, and volume status are associated with adverse cardiovascular events. Risk reduction strategies for the elderly outpatient involve the optimization of coexisting diseases. To minimize perioperative adverse events in the elderly. [13] Again surgical studies of mild anemia have not shown it to be a risk factor for death unless cardiac disease is present or major blood loss occurs. [14] Regarding pulmonary comorbidities, 15 (30%) patients had emphysema followed by 14 (28%) patients had chronic bronchitis, 11 (22%) had pneumonia, and 10 (20%) patients had lung cancer in the present study. The use of regional anesthesia alone or in combination with general anesthesia can help to avoid airway irritation and leads to reduced postoperative complications. Prophylactic anti-obstructive treatment, volatile anesthetics, propofol, opioids, and an adequate choice of muscle relaxants minimize the risk when general anesthesia is necessary. [15]In terms of neurological comorbidities, most of the patients (11, 22%) suffered from epilepsy & seizure, followed by 10 (20%) suffered from Alzheimer's disease, 10 (20%) had multiple sclerosis, 10 (20%) had Parkinson's disease and 9 (18%) patients had a stroke. A study stated thatdepression of CNS function is intended as a part of anesthesia and this condition is perfectly reversible and transient but as it will be described, several complications may occur, some of these causing serious disability. The methods for detecting CNS dysfunction dictate the ability to recognize some of these conditions. The most common CNS dysfunction after anesthesia is cognitive dysfunction. [16] Several perioperative precautions were taken before the application of medications of anesthesia, such as evaluation of anemia & polycythemia, blood sugar level, and cardiopulmonary exercise testing which were quite similar steps taken as stated in another study. [17] Optimal perioperative care often requires a multidisciplinary approach involving the anesthesiologist, surgeon, primary care physician, and, in selected cases, a geriatrician, subspecialty consultants, nurses, a pharmacist, and various therapists. [18]Importance should be given to age-related pharmacokinetic and pharmacodynamic considerations, effective pain control,

as well as prevention and treatment of hypothermia, fluid and electrolyte imbalance, and postoperative delirium. [19]

4. CONCLUSION

Hypertension was found to be the most prevalent cardiovascular condition, affecting 40% of respondents. This underscores the importance of appropriate management strategies for this condition in the aging surgical population, given its potential to complicate perioperative outcomes. The prevalence of other cardiovascular conditions, including congestive heart failure, atherosclerosis, coronary artery disease, cardiac arrhythmias, and aortic stenosis, points to the multifaceted nature of cardiovascular comorbidities in this population.

Regarding pulmonary comorbidities, emphysema was identified as the most common, affecting 30% of participants, followed closely by chronic bronchitis. These conditions, along with pneumonia and lung cancer, pose considerable challenges to the management of patients in the perioperative period and highlight the need for optimized respiratory care in this population.

Finally, epilepsy and seizure disorders were the most common neurological comorbidities, albeit with relatively equal prevalence of Alzheimer's disease, Multiple Sclerosis, and Parkinson's disease. The near-equal distribution of these neurological conditions within the sample may indicate a broad scope of neurological health challenges within the older surgical population, necessitating comprehensive neurological assessments and management strategies.

ETHICAL APPROVAL

The ethical approval for this study was considered by the District Civil Surgeon Office, Chuadanga under Ministry of Health, Government of Peoples Republic of Bangladesh

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