

Study on Perioperative Management of Blood Pressure and Effects of Anaesthesia in Hypertensive Patients Undergoing General & Orthopaedic Surgery

MUHAMMAD NAEEM¹, FAZAL WADOOD², USMAN ZEESHAN³, FAHAD USMAN⁴, MUHAMMAD BAQIR ALI KHAN⁵, ZULQUERNAIN AHMED ZOAK⁶

¹Consultant Anaesthesiologist, Ayub Teaching Hospital, Abbottabad

²Assistant Professor Anesthesia, Khyber Teaching Hospital, Peshawar

³Assistant Professor Anaesthesia, Abu Umara medical and Dental College, Lahore

⁴Assistant Professor Department of Community Medicine, Sialkot Medical College, Sialkot

⁵Assistant Professor Anesthesia department, Continental Medical College/Hayat Memorial Hospital, Lahore

⁶Medical officer, Rawal General and Dental Hospital, Islamabad

Corresponding author: Fazal Wadood, Email: wadooda3w@gmail.com

ABSTRACT

Background and Aim: During anesthesia, hypertension is the most common additional risk factor that contributes to higher mortality rate. Antihypertension medicine's withdrawal might leads to symptoms such as anxiety, rebound hypertension, myocardial infarction, tachyarrhythmia, angina exaggeration, and sudden death. The present study aimed to assess the perioperative management of blood pressure and effects of anesthesia in hypertensive patients undergoing general and orthopedic surgery.

Patients and Methods: This cross-sectional study was carried out on 162 hypertensive patients in the General Surgery and Orthopedics Units of Khyber Teaching Hospital, Peshawar for the duration from April 2022 to September 2022. Study protocol was approved by institute ethical committee. Patients aged 16 to 70 years of either gender underwent general surgery and orthopaedic surgery were enrolled. The data was acquired during the anesthetist's initial visit to the operated hypertensive patients' 24 hour postoperative period. Antihypertensive medications, hemodynamics, anesthesia drugs, fluid use, and blood loss were main variables noted. Heart rate, systolic blood pressure, and diastolic blood pressure were Intraoperative hemodynamics. SPSS version 27 was used for data analysis.

Results: Of the total 162 hypertensive patients, there were 68 (42%) male and 94 (58%) females. The overall mean age was 58.62±8.4 years. Before surgery, about 119 (73.5%) patients took antihypertensive medication whereas 124 (76.5%) had antihypertensive medication within 24 hours. The most prevalent antihypertensive medication used and most common class during postoperative management was Calcium channel Blockers and Amlodipine. The most prevalent used anesthetic drug use was Bupivacaine. The incidence of Systolic Blood Pressure (SBP) fall and rise was found in 28 and 6 patients respectively. The incidence of Diastolic Blood Pressure (DBP) fall and rise during intraoperative management was 11 and 8 patient respectively.

Conclusion: The present study found that a decreased heart rate in patients who were taking beta blockers consistently. Those who took diuretics had greater DBP and HR at the completion of the procedure. There was no significant change in hemodynamic parameters with any other antihypertensive treatment.

Keywords: Hypertension, General Surgery, Orthopaedic, Hemodynamics

INTRODUCTION

Hypertension is a significant risk factor for various diseases such as heart failure, chronic renal disease, peripheral arterial disease, stroke, and mortality [1-4]. The increasing risk of hypertension during perioperative and postoperative period increases the possibility of hemorrhage, cardiovascular events, and mortality that must be treated on priority basis through cardiac and non-cardiac interventions [5-7]. Perioperative hypertension affects up to 25% of people undergoing major non-cardiac surgery [8]. Perioperative hypertension affects as many as 80% of individuals undergoing heart surgery [9, 10]. The adverse postoperative outcomes associated with hypertensive comorbidities such as cerebrovascular disease, heart failure, occult coronary artery disease, and creatinine serum (> 2.0 mg/dL) [11].

A hypertensive patient might be subjected to everyday stresses such as trauma, surgery, and infection. During interventions, the blood pressure adjustment is vital for surgery execution and to avoid complications. Hypertension is considered additional risk factor in anesthesia [12]. Numerous studies proposed various recommendations regarding the anti-hypertension usage such as intervention to be performed in cases where DBP is 110 mm Hg based on continuous monitoring. Another option is to postpone surgery until the DBP is >100 mmHg, with or without antihypertensive treatment [13, 14]. As a result, there are no standards for antihypertensive drugs used on priority during, or after surgery. Moreover, limited studies have been conducted comparing all types of antihypertensive drugs used during the perioperative period, particularly in patients having general and orthopedic surgery. Therefore, the present study

aimed to assess hypertensive patients' blood pressure and anesthesia effects during general and orthopedic surgery.

METHODOLOGY

This cross-sectional study was carried out on 162 hypertensive patients in the Department of General Surgery and Orthopaedics, Khyber Teaching Hospital, Peshawar for the duration from April 2022 to September 2022. Study protocol was approved by institute ethical committee. Patients aged 16 to 70 years of either gender underwent general surgery and orthopaedic surgery were enrolled. The data was acquired during the anesthetist's initial visit to the operated hypertensive patients' 24 hour postoperative period. Antihypertensive medications, hemodynamics, anesthesia drugs, fluid use, and blood loss were main variables noted. Heart rate, systolic blood pressure, and diastolic blood pressure were Intraoperative hemodynamics. Patients with complications, pregnant women, pheochromocytoma, as well as patients undergoing emergency surgery were excluded. In the patient files, details were obtained about hypertension history, time between the first visit to the anesthetist and the determination of anesthesia fitness, time to control hypertension that was uncontrolled, delays or postponements of surgery resulting from uncontrolled hypertension, and blood pressure recording during the first visit. Additionally, antihypertensive medication continued on the surgery day as well as modifications in antihypertensive treatment during the scheduled surgery. There were falls in SBP (drops) and increases in DBP (rises) noted during intraoperative hemodynamics. An intraoperative ECG (electrocardiogram) was

recorded to determine whether any intervention was required if a change occurred. SPSS version 27 was used for data analysis.

RESULTS

Of the total 162 hypertensive patients, there were 68 (42%) male and 94 (58%) females. The overall mean age was 58.62±8.4 years. Before surgery, about 119 (73.5%) patients took antihypertensive medication whereas 124 (76.5%) had antihypertensive medication within 24 hours. The most prevalent antihypertensive medication used and most common class during postoperative management was Calcium channel Blockers and Amlodipine. The most prevalent used anesthetic drug use was Bupivacaine. The incidence of Systolic Blood Pressure (SBP) fall and rise was found in 28 and 6 patients respectively. The incidence of Diastolic Blood Pressure (DBP) fall and rise during intraoperative management was 11 and 8 patient respectively. Heart rate, systolic blood pressure, and diastolic blood pressure throughout intraoperative phase are shown in Table-I. Antihypertensive medication profile utilized throughout the perioperative phase are shown in Table-II. A significant association between HR after the completion of anesthesia and the usage of beta blockers and diuretics in the morning are shown in Table-III.

Table-1: Antihypertensive medication profile utilized throughout the perioperative phase

Intraoperative hemodynamics	Value (range)
Heart Rate (BPM)	
Start of anesthesia	90 (56-120)
End of anesthesia	86 (54-130)
SBP (mm Hg)	
Start of anesthesia	136 (82-202)
End of anesthesia	118 (88-156)
DBP (mm Hg)	
Start of anesthesia	86 (42-130)
End of anesthesia	76 (42-102)

Table-2: Antihypertensive medication profile utilized throughout the perioperative phase

Drug class for anti-hypertension	Routine	Surgery day	Postoperative 24 hours
Calcium channel blockers (CCB)	108	97	98
Angiotensin Converting Enzyme Inhibitors (ACEIs)	16	8	12
Angiotensin Receptor Blocker (ARB)	50	25	42
Beta Blocker (BB)	40	24	29
Diuretics	22	10	18
Alpha Blocker (AB)	3	1	2

Table-3: A significant association between HR after the completion of anesthesia and the usage of beta blockers and diuretics in the morning

Beta Blocker Routine	N (%)
Taken	40 (24.7)
Not Taken	122 (75.3)
Diuretics	
Taken	10 (6.2)
Not Taken	152 (93.8)
Beta blockers	
Taken	24 (14.8)
Not Taken	138 (85.2)

DISCUSSION

The present study investigate the management of hypertensive patients undergoing general and orthopaedic surgery and found no differences in perioperative outcomes based on age or gender. Blood pressure stability is influenced by continuous blood pressure presence in chronic hypertension patients underwent general and orthopaedic intervention under general anesthesia. Patients who were consistently monitored for blood pressure had stable hypertension as compared to healthy group patients. Our findings paralleled those of a research done in geriatric patients, where the most commonly given medication classes were CCBs [15]. These findings are consistent with guidelines that advocate CCBs as a

first-line treatment option for individuals with hypertension and diabetes [16].

Previous studies reported that there were potentially higher risk of hemodynamic instability among patients who had higher blood pressure during surgery leading to myocardial ischemia with severe hypotension [17, 18]. Additional intraoperative hypertension risks include intracerebral hemorrhage, and left ventricular failure, aortic dissection, and hypertensive encephalopathy [19].

Those who had previously taken beta blockers or who took them during operation had a lower heart rate at the end of intervention compare to those who had not taken beta blockers. Numerous studies reported that cardio protection is provided by beta blockers perioperatively and individuals who took them should continue during the perioperative period [20-22]. The higher mortality rate and myocardial infarction was significantly associated with beta blocker's removal after first week of surgery [23].

The current analysis found that calcium channel blocker were the prevalent antihypertensive medication used 24 hours after intervention. However, contrasting to Beta blockers, the adverse perioperative have not been protected by CCBs [24]. Nonetheless, CCBs have no deleterious effects throughout the perioperative phase and to be maintained. Another analysis revealed that lower incidence of mortality and MI were associated with CCBs [25].

ACE inhibitors and ARB have been linked to an increased risk of intraoperative hypotension in studies [26, 27]. In addition, a comprehensive study found no advantage to maintaining ARBs and ACE inhibitors in terms of avoiding morbidity, hemodynamic problems, and mortality [28]. ACE inhibitors should be avoided on the morning before surgery, according to various research [29, 30]. Several investigations, however, have revealed insignificant increase in the hypotension incidence in individuals taking ACE inhibitors [32].

Fentanyl was related with larger increases in DBP, which contradicts with Fentanyl's recognized intraoperative hypotension. Inadequate fentanyl analgesia may result in a rise in intraoperative blood pressure. Intraoperatively, buprenorphine was related with greater reductions in SBP. In our investigation, desflurane was related with a greater rate of SBP increases, but it is known to produce hypotension in elderly individuals [33].

Regardless of the kind of operation, hypertensive patients with variables blood pressure entail IV fluids throughout the perioperative retro. Intraoperative fluids may be administered in order to minimize intraoperative hypotension under spinal anesthesia. Nevertheless, no strategy is effective in avoiding hypotension on their own and must be combined with the prudent use of vasopressors [34].

CONCLUSION

The present study found that a decreased heart rate in patients who were taking beta blockers consistently. Those who took diuretics had greater DBP and HR at the completion of the procedure. There was no significant change in hemodynamic parameters with any other antihypertensive treatment.

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