A COMPARATIVE STUDY OF INFUSION OF EPHEDRINE AND PHENYLEPHRINE ON HEMODYNAMIC STABILITY AFTER SPINAL ANESTHESIA IN ELDERLY PATIENTS UNDERGOING LOWER LIMB ORTHOPAEDIC SURGERIES

By

DR. SYED SUFIAN IBRAHIM

Dissertation submitted to the

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VIJAYAPURA, KARNATAKA

In partial fulfillment of the requirements for the degree of

DOCTOR OF MEDICINE

IN

ANAESTHESIOLOGY

Under the guidance of

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DR. SYED SUFIAN IBRAHIM.

ABBREVIATIONS

SA- Spinal Anaesthesia

NIBP- Non invasive blood pressure

BP- Blood pressure

MAP- Mean arterial pressure

HR- Heart rate

PR- Pulse Rate

SpO2- Percentage of oxygen saturation

ECG- electrocardiography

BMI- Body Mass Index

CO- Cardiac Output

ASA- American Society of Anaesthesiologists

0.9% NaCl- Normal Saline

I/V- Intravenous

I/M- Intramuscular

α - Alpha

β - Beta

COMT – Catechol-O-Methyl transferase

MAO – Monoamine oxidase

CABG - Coronary artery bypass graft

p value – probability value

mcg - microgram

mg – milligram

mins – minutes

ABSTRACT

AIM

- To compare infusion of ephedrine and phenylephrine on hemodynamic stability after spinal anesthesia in elderly patients aged 60 years and above undergoing lower limb orthopedic surgeries.

BACKGROUND

• Patients aged 60 years and above undergoing lower limb orthopaedic surgeries commonly experience hypotension post spinal anesthesia

• To overcome this effect and to maintain hemodynamic stability prophylactic infusion of vasopressors like ephedrine and phenylephrine are given

METHODOLOGY

Preliminaries:

● Written informed consent was taken.

● Nil per oral status was confirmed.

- The patients were evaluated with a detailed history, general and systemic examinations in the preoperative room.
- The airway, cardiovascular system and respiratory system were examined. Patients were divided into three groups, GROUP P

(PHENYLEPHRINE), GROUP E (EPHEDRINE), and CONTROL GROUP.

INTRAOPERATIVE

- NIBP, electrocardiography, and pulse oximetry were applied to monitor PR, BP, and SpO2.
- Insertion of 18G IV cannula and infusion of Ringer lactate solution 15ml/kg was administered.
- The patients were positioned to sit. Using a 25 G Quincke spinal needle, a lumbar puncture was done at the L3–4 interface following skin disinfection and 2% lignocaine infiltration.
- Premedication was given with Inj. Midazolam 0.5mg to alleviate anxiety of the patients.
- The groups were administered intrathecally with Inj. BUPIVACAINE Heavy 15mg . Patients were turned to the supine position subsequently and Oxygen 5 L/min was delivered via a face mask.
- The sensory level of blockade after spinal anesthesia was assessed by ice cubes or pinprick 5 mins after intrathecal injection.
- GROUP P received a continuous infusion of 30ml 0.9% NaCl with 250 mcg phenylephrine for 30 mins after spinal anesthesia using a infusion syringe pump.
- GROUP E received a continuous infusion of 30ml 0.9% NaCl with 30 mg of ephedrine for 30 mins after spinal anesthesia using a infusion syringe pump.
- CONTROL GROUP were given an intravenous bolus of inj. mephentermine 6 mg after spinal anesthesia as and when required.

The infusion of treatment medication in Group P and Group E was started immediately after spinal anesthesia.

Non Invasive Blood pressure, heart rate, SpO2, ECG were monitored. Incidence of hypotension, bradycardia and the total dose of vasopressor used intraoperatively were noted.

15 minutes before the subarachnoid block and at intervals of 3, 6, 9, 12, 15, 20, 25, and 30 minutes following the subarachnoid block (spinal anesthesia) were used to record hemodynamic data.

PROTOCOL FOR RESCUE TREATMENT;

If SBP fall was greater than 30% from the baseline, bolus dose of Phenylephrine 50mcg/Ephedrine 5 mg was given according to the group.

If heart rate was less than 50 beats per min Inj. Atropine 0.6 mg I/V was given.

In case of hypertension the ongoing infusion was stopped .

RESULTS

- Age, sex , BMI and ASA Grades are comparable and are statistically insignificant**.**

- The SBP was significantly higher in Group E when compared to other groups at all time intervals after spinal anaesthesia.

- The DBP was significantly higher in Group E when compared to other groups at 3 mins, 6 mins, 9 mins, 12 mins, 15 mins and 25 mins time intervals after spinal anaesthesia

- The MAP was significantly higher in Group E when compared to other groups at 3 mins, 6 mins, 15 mins and 20 mins time intervals after spinal anaesthesia.

- The HR was significantly higher in Group E when compared to other groups and was significantly better at all time intervals after spinal anaesthesia.

- The rescue doses were observed to be statistically insignificant. The rescue doses required in Ephedrine group was less when compared to phenylephrine and control group.

- The number and percentage of Inj. ATROPINE given among all groups were observed to be statistically insignificant. The Inj. ATROPINE was required less in Ephedrine group compared to phenylephrine and control group.

CONCLUSION

The systolic blood pressure (SBP) and diastolic blood pressure (DBP) were better maintained in the ephedrine group than phenylephrine and control group.

The mean arterial pressure (MAP) was significantly higher in all groups but was more effective in ephedrine group.

Heart rate was well maintained and prevention of bradycardia was effectively seen in ephedrine group compared to phenylephrine group.

KEYWORDS

Phenylephrine, Ephedrine, Mean Arterial Pressure, Systolic Blood Pressure, Heart rate

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INTRODUCTION

The elderly aged group people have reduced cardiovascular compensation mechanism which increases the frequency and severity of episodes of hypotension due to sympathetic blockade after subarachnoid block (spinal anaesthesia) significantly.

About one-fourth of surgery patients are elderly, and despite significant medical advancements, they still have chronic illnesses that call for specialized perioperative care.[12]

In elderly patients, regional anesthesia—most often subarachnoid block, or SAB—is favored over general anesthesia due to the potential for many complications and the potential for postoperative disturbance of mental functioning. Yet, the incidence of the related hypotension in the elderly has been estimated to be between 25 and 80%. [12]

Vasopressors are commonly used to correct this hypotension during intraoperative period to maintain organ perfusion.

This study was done with the aim to compare the efficacy of vasopressors phenylephrine and ephedrine in maintaining hemodynamic stability intraoperatively after spinal anesthesia in elderly patients who were undergoing lower limb orthopaedic procedures.

REASON FOR SELECTION OF THIS TOPIC

Hypotension is frequently observed after induction of spinal anesthesia in elderly patients undergoing lower limb orthopedic surgeries.[1]

It is due to reduction of cardiac output and systemic vascular resistance, which raises the possibility of myocardial ischemia. It also lowers middle cerebral artery velocity as a result of compromised cerebral autoregulation during the perioperative phase.[2,18]

The elderly are more likely to have comorbid diseases, which increases their risk of hypoperfusion, which is brought on by hypotension, the primary risk factor for which is hypovolemia.[3, 4]

As crystalloids are frequently ineffective in sustaining blood pressure, their administration can soon result in volume overload and congestive heart failure.[2]

Vasopressors such as phenylephrine and ephedrine can be immediately infused into elderly people to prevent hemodynamic abnormalities following spinal anesthesia.[5]

The alpha-adrenergic agonist phenylephrine is typically linked to reflex bradycardia.[6] It raises blood pressure due to venoconstriction and arterial vasoconstriction. This increases venous tone and venous return (preload), as well as systemic vascular resistance.

Ephedrine is a mixed action (alpha and beta) adrenergic agonist which increases the cardiac output and prevents a decrease in heart rate as it leads to greater venoconstriction than arteriolar constriction and thus improves venous return (preload) and increases cardiac output, Blood pressure and heart rate.

AIMS AND OBJECTIVES

AIM:

- To compare infusion of ephedrine and phenylephrine on hemodynamic stability after spinal anesthesia in elderly patients aged 60 years and above undergoing lower limb orthopedic surgeries.

OBJECTIVES:

PRIMARY:

- To evaluate the effectiveness of prophylactic intravenous ephedrine or phenylephrine infusion on the prevention of hypotension and effect on heart rate in patients aged 60 years and above undergoing lower limb orthopedic surgeries.

SECONDARY:

- No. of rescue doses of ephedrine and phenylephrine given after spinal anesthesia.

REVIEW OF LITERATURE

- **Zunic M et al, 2019**[7] conducted a prospective, randomized, double blind, placebo-controlled study in 2019 to determine the impact of an infusion of phenylephrine or ephedrine given just after spinal anesthesia (SA) on the hemodynamics of older orthopedic patients. The final analysis included 70 patients. After completion of the measurements, the Control (C) group experienced a substantial decrease in mean arterial pressure (MAP) compared to the baseline value. However, the Phenylephrine (P) and Ephedrine (E) groups experienced no significant changes in MAP. After SA, the cardiac index decreased in the control group, remained constant in the P group, and significantly increased in the E group. At the conclusion of the measures, there were significant differences between the C and E groups ($p = 0.049$) as well as between the P and E groups ($p = 0.01$).

- **W. Mon et al, 2017** [8] conducted a randomized, double-blind study to assess the effects of phenylephrine or ephedrine infusions titrated to maintain baseline systolic blood pressure (bSBP) during spinal anesthesia in 40 patients. The results concluded that while both phenylephrine and ephedrine groups were able to achieve good systolic blood pressure, ephedrine increased cardiac output in comparison to phenylephrine. The study determined that phenylephrine was linked to a decrease in the mother's heart rate and cardiac output; however, umbilical cord gases remained higher in the phenylephrine group than in the ephedrine group. Despite maintaining uteroplacental perfusion and systolic blood pressure and cardiac output, ephedrine was linked to a mixed respiratory and metabolic acidosis in the fetus.

- **Asokan A et al, 2021**[9] in a study of 50 patients who were randomized into two groups and of ephedrine and phenylephrine in a comparative study. Vital signs including blood pressure, heart rate, and oxygen saturation were monitored in all parturients for the initial five minutes of the procedure after spinal anesthesia. These vital parameters were then recorded every minute for the next five minutes of the procedure. Records were kept on the prevalence of bradycardia, hypotension, and the need for vasopressors (phenylephrine and ephedrine). To ascertain the newborn outcome, the Apgar score and a blood sample from the umbilical cord were obtained for blood gas analysis. Upon completion of the study, it was shown that the phenylephrine group consumed more vasopressors (92±112 μg) than the ephedrine group (4.8±5.5 mg), with a statistically significant difference.

- **Abbasivash R et al,2016** conducted a randomized double-blind clinical trial on 92 patients aged between 40 and 70 years old, ASA class one and two under hip fracture surgery under spinal anesthesia in two groups of patients receiving ephedrine as the control group and phenylephrine as the experimental group. In MAP, systolic, and diastolic pressures, the frequency of hypotension was considerably reduced in the phenylephrine group 3, 6, and 9 minutes after spinal anesthesia. At different time of study there was no apparent differences in heart rate between the two groups. Lesser vasopressor use was observed in the phenylephrine group. The usage of atropine for nausea and vomiting did not significantly differ between the two groups.

- **Sinha G et al, 2020** [10] conducted a study in which three groups(P, E, M) (n = 20) were randomly assigned to receive intravenous boluses of phenylephrine 100 mcg, ephedrine 6 mg, and mephentermine 6 mg, respectively, following hypotension in a prospective, double-blind, randomized controlled study involving 60 ASA physical status class II patients undergoing elective caesarean section under spinal anesthesia. The phenylephrine group experienced a decrease in mean heart rate subsequent

to vasopressor delivery. All three groups showed a similar overall trend (P = 0.1). The phenylephrine group had a greater prevalence of bradycardia (P = 0.003). It was determined that during the subarachnoid block for a cesarean delivery, the three vasopressors efficiently preserved arterial blood pressure. When compared to ephedrine and mephentermine, phenylephrine significantly lowered heart rate.

- **Simin Atashkhoie et al, 2018** [11] in a randomized, double-blinded study, conducted on 90 pregnant women who underwent spinal anesthesia for an elective cesarean section. Prior to spinal anesthesia, either serum NaCl 0.9% (placebo group) or mixed ephedrine and phenylephrine (study group) were infused over a 15-minute period. Fetal blood gas and hemodynamic parameters were noted. The study group reported less bradycardia and hypotension after spinal anesthesia, according to the findings. Inotropes and vasopressors were required more frequently in the placebo group for treating hypotension, nausea, and vomiting. Study had shown that prophylactic low-dose infusions of phenylephrine and ephedrine prior to spinal anesthesia for cesarean sections reduce the incidence and severity of hypotension in mothers, reduce nausea and vomiting, reduce the requirement for antiemetic medication, and raise the Apgar score of neonates

- **Saru singh et al, 2014**[12] conducted a randomized comparative study, in which 100 patients were randomly allocated to receive ephedrine 30 mg intramuscularly 10 mins before the administration conducted of spinal anaesthesia in Group I and preloading with 500 ml of polygeline 3.5% intravascularly over 10 mins prior to subarachnoid block in Group II. Patients in both groups were closely monitored for pulse rate, systolic blood pressure, hypotension, requirement of rescue therapy and adverse effects. It was concluded that the incidence of hypotension and requirement for rescue therapy was statistically less in Group I compared with Group II ($P < 0.05$). Heart rates were better maintained in Group I than Group II, with few hemodynamic adverse effects in both groups. Ephedrine 30 mg given

intramuscularly in elderly patients was more effective for the prevention of post-subarachnoid block hypotension.

- **Fabrice Ferre et al, 2016**[13] conducted a prospective, randomized, double-blind, and placebo-controlled study on 54 patients above 60 years of age who underwent elective lower limb procedures under spinal anesthesia were included in the study. Patients were randomly assigned to either the control group C (0.9% isotonic sodium chloride solution) or group P (100-µg/mL phenylephrine solution at 1 mL/min after spinal anesthesia). Group P's MAP was better than Group C's. Group P had a higher percentage of patients without hypotension (cumulative survival) (P=.04). Prophylactic phenylephrine infusion was found to be an effective means to lessen spinal-induced hypotension in elderly patients. It reduces the number of hypotensive episodes in patients and delays the onset of hypotension when compared to control group.

- **AB Filani et al, 2023** conducted a randomized, double-blind study on patients aged ≥ 65 years undergoing elective lower limb and urological surgeries under subarachnoid block concluded that 19 patients from each of the three groups (A, B, and C) constituting a total of 57 patients ,who were randomly allocated. Following the induction of spinal anesthesia, groups A, B, and C were administered phenylephrine infusions at rates of 50 µg/min, 75 µg/min, and 100 µg/min, respectively. In group A, phenylephrine reduced hypotension without causing any negative side effects. Lastly, they concluded that an infusion of 50 µg/min of phenylephrine prevented elderly individuals from experiencing spinal-induced hypotension without eliciting any of the known side effects, and that an infusion of 50 µg/min caused reactive hypertension.

- **Das Neves et al** [14] in a randomized comparative study in 120 patients found that a prophylactic continuous infusion is better in lowering the risk of hypotension and adverse effects on both the mother and the fetus than a therapeutic phenylephrine bolus dosage.

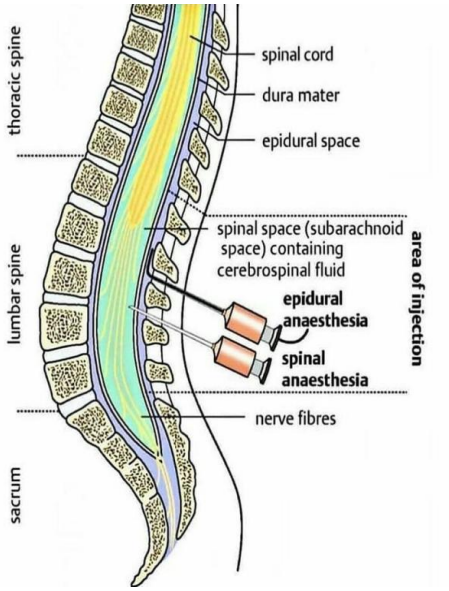
- **Mostafa et al, 2019** [15] in a randomized controlled trial of 62 patients , taken into consideration for the final analysis, with a mean age of 71 ± 6 years. Compared to the phenylephrine group, the norepinephrine group showed higher mean heart rate and cardiac output. Reactive Bradycardia was less common in the NE group than in the PE group. At the end, the study concluded that NE provided better hemodynamic stability than PE, stabilizing heart rate, cardiac output, reactive bradycardia, and hypertension.

CLINICAL ANATOMY

SPINAL ANAESTHESIA:

Spinal anaesthesia is a technique wherein a local anesthetic is administered into the subarachnoid space, temporarily inhibiting nerve impulse transmission.

Leonard Corning first used the term "spinal anesthesia" in 1885 to evaluate the influence of cocaine on neurological disorders. He administered a dog with cocaine injection that temporarily paralyzed its hind limbs. He then injected cocaine in a man to carry out a neuraxial block. The patient's legs felt fatigued after taking the second dose, while the first dose had no effect at all. The man had impaired sensibility in his lower extremities after about 20 minutes. Leonard did not describe the free flow of CSF in either scenario, but it is most likely that the man had an epidural and the dog received a spinal anesthesia.



In 1899, a German surgeon named August Bier achieved recognition for being the first to introduce spinal anesthesia. Professor Bier instructed Dr. Hildebrandt, his assistant, to puncture the lumbar region. However, due to dural puncture, Hildebrandt was unable to secure the syringe to the needle, causing a significant amount of spinal fluid to leak out. Hildebrandt volunteered to be the subject for a second try, and they were rewarded with success, even though they were intended to abandon on the study.

August Bier observed that a powerful blow to the tibia with an iron hammer did not cause pain 23 minutes after the spinal injection. After 25 minutes, pulling on a testicle and applying intense pressure were not painfull.

PHYSIOLOGICAL EFFECTS OF SPINAL ANESTHESIA

Autonomic blockade:

The efferent autonomic system with inhibition of neural transmission results in a greater degree of parasympathetic blockade than sympathetic blockade. The parasympathetic outflow is craniosacral, while the sympathetic outflow is thoracolumbar. Neuraxial anesthesia has no effect on the vagus nerve [19]

Effects on Cardiovascular System:

The most important clinical side effects of sympathetic blockade during subarachnoid block are on the cardiovascular system. All at but the lowest levels of spinal blockade, vasodilation occurs. Vasodilation in the venous side is more marked than the arterial side of circulation which results in the pooling of blood in the venous capacitance vessels. This reduction is well tolerated at low levels of

spinal anaesthesia in the circulating blood volume in healthy patients. With increasing level of subarachnoid block , this effect becomes more marked and the venous return becomes gravity dependent. Cardiac output and organ perfusion decline steeply if the venous return decreases too much.

By a modest (100-150 degrees) head down tilt or elevating the legs the venous return can be increased . The cardio-accelerator fibers that leave the spinal cord at T1 to T4 are inhibited at increasing levels of subarachnoid block. In addition to impairing one of the compensatory mechanisms available to maintain the organ perfusion during vasodilation, this is detrimental to patients who depend on higher sympathetic tone to maintain cardiac output (such as during hypovolemia and congestive heart failure).

.

If the spinal block level is not closely monitored or treated, the rate of cardiovascular compromise will accelerate . Although parasympathetic activity at the sinoatrial node still persists, sudden asystole may occur due to lack of sympathetic innervation.

Effects on respiratory system:

The changes in pulmonary function during neuraxial block are typically not significant in healthy individuals. The tidal volume remains unaltered even at high levels of spinal anesthesia. Since hemodynamic resuscitation commonly treats apnea, phrenic nerve block may not occur with total spinal anesthesia. This shows that brain stem hypoperfusion rather than phrenic nerve block is the cause of the problem.

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Effects on Gastrointestinal System:

Predominant parasympathetic activity after neuraxial block causes gastrointestinal hyperperistalsis leading to nausea and vomiting. Hepatic blood flow decreases with reductions in mean arterial pressure from any anaesthetic technique.[19]

Theories of causation of hypotension:

Due to the decreased venous return to the heart and the absence of muscular propulsive forces on the venous system, the cardiac output is reduced.

- Paralysis of vasoconstrictor nerve fibres causes dilation of post arteriolar capillaries and small venules.

- Paralysis of sympathetic cardio-accelerator fibres(T1-T4) leading to subsequent fall in cardiac output and bradycardia.

- Paralysis of the splanchnic nerves, which supply the adrenal glands as sympathetic nerves, leading to a decrease in catecholamines.

- Absorption of the drug into the circulation is more common with extradural than intradural analgesia because of large volume of drugs administered.

- Ischaemia and hypoxia of vital organs.

- Hypovolemia if present may cause fall in blood pressure if central neuraxial blockade is attained.

- Compression of great vessels by tumors within the abdomen.

ADRENERGIC DRUGS

EPHEDRINE

It is an alkaloid which is obtained from Ephedra vulgaris. It is a mixed action (α+β) sympathomimetic drug. It acts indirectly but also has direct action on alpha and beta receptors. The site of action is by exchange diffusion on the membrane noradrenaline (NA) pool.

PHENYLEHPRINE

It is a selective alpha-1 agonist which has very negligible action on beta receptors. It is a direct acting sympathomimetic agent. It is a non-catechol derivative which is not inactivated by COMT and has a longer duration of action compared to other catecholamines.

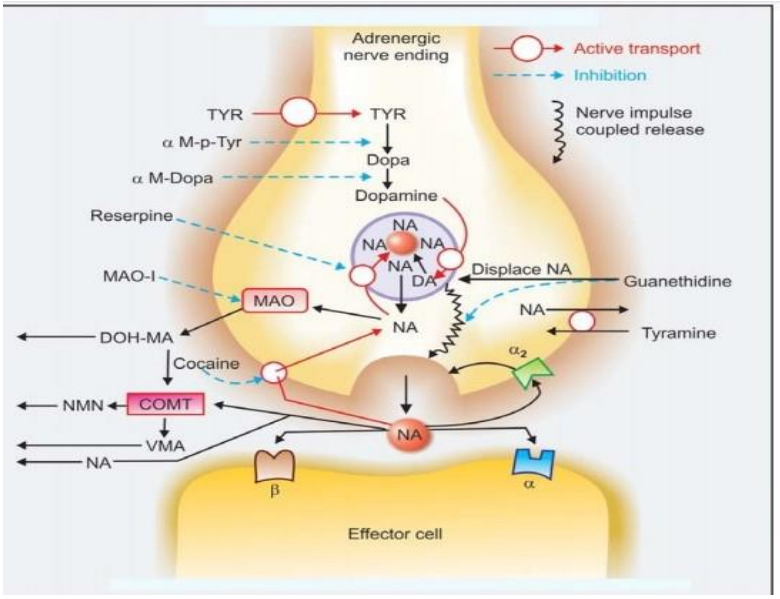
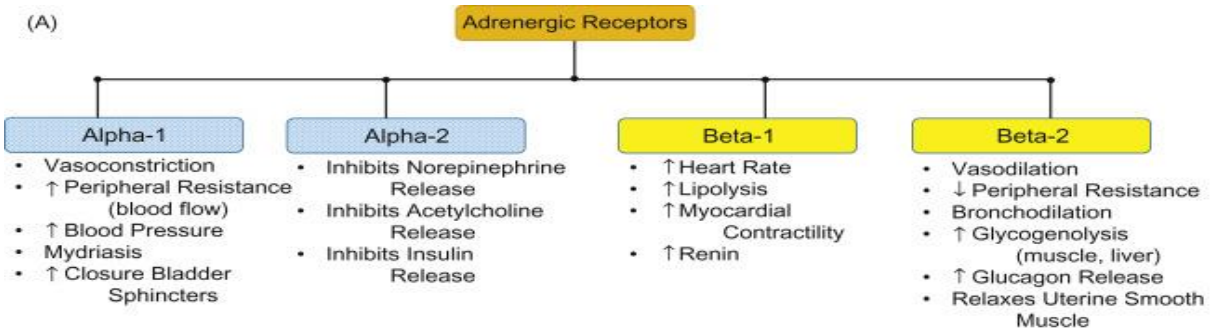


Fig 2.Schematic representation of adrenergic neurotransmission

This figure represents the adrenergic synaptic transmission in the central and peripheral nervous system and at the site of target tissues.



(B)

Alpha-1	Alpha-2	Beta-1	Beta-2
NE > E	E > NE	E = NE	E >> NE
NE = Norepinephrine; E = Epinephrine			

fig 3. Adrenergic receptors and their properties

PHARMACOLOGY OF EPHEDRINE

Structure of Ephedrine

Pharmacokinetics:

It is absorbed through oral, I/V, I/M and subcutaneous route and its oral bio-availability is 85%. It is metabolised in liver by oxidative deamination. The onset of action through intravenous route(few seconds), intramuscular (10-20 minutes) and orally(15-60 minutes).

The duration of action through I/V and I/M is 60 minutes and orally is 2-4 hours which is longer than the catecholamines.The elimination half-life is 3-6 hours and excretion is through urine with high proportion of drug in unchanged form(22%- 99%).

Pharmacodynamics:

It is a direct and indirect sympathomimetic amine. As a direct effect , ephedrine activates the alpha and beta adrenergic receptors.it stimulates alpha-1 causing vasoconstriction and rise in BP. Beta-1 stimulation increases heart rate and force of myocardial contraction thus increasing cardiac output and stimulation of beta-2 adrenergic receptors causes vasodilation and brochodilation.

Uses:

- To treat significant hypotensive episodes post spinal anaesthesia.
- Bronchial asthma, nasal congestion, reversible airway obstruction.
- Nocturnal enuresis.
- Narcolepsy, CNS stimulation, myasthenia gravis.

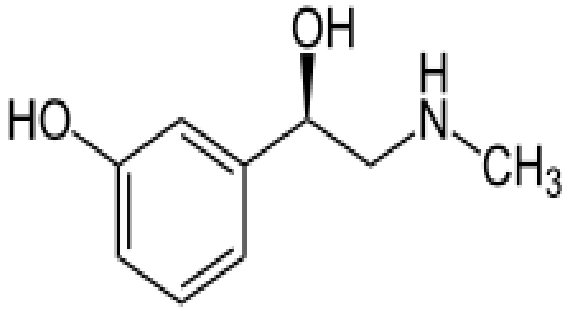
Side effects:

Dizziness, irritability, anxiety, arrhythmias , tachycardia, hypertension, stroke, heart attack, palpitations, restlessness , urinary disturbances .

Contraindications:

Parenteral administration is contraindicated in patients with high BP and ventricular tachycardia. Hyperthyroidism, bradycardia, partial heart block, myocardial disease or severe atherosclerosis, cardiac arrythmias and closed angle glaucoma.

PHARMACOLOGY OF PHENYLEPHRINE



Structure of phenylephrine

Pharmacokinetics:

Its onset is immediate through I/V and I/M (5-10 minutes).

The duration of action is 5-10 minutes(I/V) , 1 hour (I/M).

It is metabolized in the gastrointestinal tract and liver by monoaminase oxidase. Bioavailability is 38% through GI tract and protein binding is 95%.

The elimination half life is 2-3.5 hours.

Pharmacodynamics:

On cardiovascular system it causes a rapid increase in systolic blood pressure and diastolic blood pressure due to an increase in systemic vascular resistance. It decreases the heart rate through baroreceptor response. It improves coronary perfusion and increases pulmonary artery pressure. It does not cause CNS stimulation.

It reduces gastrointestinal, renal, uterine, and cutaneous blood flow and can cause alterations in glucose metabolism.

Uses and Dosage:

- Hypotension secondary to neuraxial blockade or general anaesthesia.
- Therapeutic dose I/V bolus 50-200mcg , may be repeated I/M 2-5mg bolus.
- Intravenous continuous infusion as 1-10 mcg/kg/min solution, rate is titrated to effect.
- It is particularly used in patients with coronary heart disease and in patients with aortic stenosis because it increases coronary perfusion pressure with chronotropic side effects unlike other sympathomimetics.
- Mucosal decongestant (1% solution is directly administered intranasally because intense nasal vasoconstriction precludes significant systemic absorption.

Side effects:

Headache, anxiety, dizziness, insomnia, tremor, hallucinations, confusion, weakness, restlessness, drowsiness, bradycardia, hypertension, dysrhythmias, nausea and vomiting.

Contraindications:

Hypersensitivity, hypertension, hyperthyroidism, patients with MAO inhibitors.

When administered phenylephrine, patients on quinidine, tricyclic antidepressants, or cardiac glycosides are at greater risk to dysrhythmias.

MATERIALS AND METHODS

SOURCE OF DATA

This study was conducted in the Department of Anaesthesiology, "B.L.D.E (Deemed to be University) Shri. B.M. Patil Medical College Hospital and Research center, Vijayapura ". Study was conducted from January 2023 to June 2024.

METHOD OF COLLECTION OF DATA:

Study Design: A randomized comparative study.

Study Period: 1.5 year study from January 2023 to June 2024

SAMPLE SIZE:

Using the G*Power ver. 3.1.9.4 program to calculate sample size, this study needs a total sample size of 174 (for each group of 58, assuming equal group sizes). The MAP(mmHg) for Control (Mean = 90, SD = 12), Phenylephrine (Mean = 85, SD = 12), and Ephedrine (Mean = 84, SD = 9).Therefore, in order to detect a difference in means (t tests - Means: Difference between two independent means (two groups)) with 80% power.

STATISTICAL ANALYSIS:

The data was entered into a Microsoft Excel document, and SPSS (Version 20)—the statistical tool for the social sciences—was implemented to conduct the statistical analysis. The findings were displayed as graphs, counts and percentages, mean, and SD.

The independent sample t-test was used to compare the two groups for continuous variables in normally distributed data.

The Mann-Whitney U test was used for variables that were not normally distributed. To compare categorical variables between the two groups, Fisher's exact test or the Chi-square test were used.

The Kruskal-Wallis test was used for not normally distributed groups, and the ANOVA test was applied if there were more than two groups. It was considered statistically significant if $p<0.05$. All statistics were calculated two tailed.

STUDY POPULATION

This study was done on inpatients undergoing various elective lower limb orthopedic surgical procedures under spinal anesthesia.

INCLUSION CRITERIA:

- Age 60 years and above patients undergoing lower limb orthopedic surgeries.
- ASA Grade I and II

EXCLUSION CRITERIA:

- Infection at the site of injection.
- Uncontrolled hypovolemia.
- Allergy or hypersensitivity to vasoconstrictors.
- Increased intracranial pressure.
- Coagulopathy, sepsis, fixed Cardiac output states, neurological disease.
- Uncontrolled hypertension, hypothyroidism, uncontrolled diabetes, untreated or uncontrolled heart failure, phaeochromocytoma.
- Patients on MAO inhibitors, tricyclic antidepressants, phenothiazine compounds, recent MI, and recent CABG.

This study was started after CTRI Registration (Reg no: CTRI/2023/04/051451) and was carried out in the operation theatre complex of Shri B M Patil medical college hospital and research centre.

METHODOLOGY

PRELIMINARIES

- Written informed consent was taken.
- Nil per oral status was confirmed.

INVESTIGATIONS:

- Complete blood count, bleeding time, clotting time.
- Blood sugars , blood urea and serum creatinine.
- X-ray chest and 2D Echocardiography.
- Serology(HbsAg, HIV, HCV).

PRE-ANESTHETIC EVALUATION

Before taking the patient for surgery, detailed history of underlying medical illness, previous history of surgery, anesthetic exposure, and hospitalization was elicited. General and systemic examination was carried out. Airway , respiratory and cardiovascular system were assessed.

PHYSICAL EXAMINATION:

- The general condition of the patient
- Vital signs -heart rate, blood pressure, respiratory rate.
- Height and weight.
- Examination of the respiratory system, cardiovascular system, central nervous system, and vertebral system.
- Airway assessment by Mallampati grading.
- Patients were divided into three groups, GROUP P(PHENYLEPHRINE), GROUP E(EPHEDRINE), and CONTROL GROUP.

INTRAOPERATIVE:

- NIBP, electrocardiography, and pulse oximetry were applied to record baseline values of PR, BP, and SpO2.

- Insertion of 18G IV cannula and infusion of Ringer lactate solution 15ml/kg was administered.

- The patients were positioned in a sitting posture. Using a 25 G Quincke spinal needle, a lumbar puncture was done at the L3-4 or L4-L5 Interface following skin disinfection and 2% lignocaine infiltration.

- Premedication was given with Inj. Midazolam 0.5mg to alleviate anxiety of the patients.

- The groups were administered intrathecally with Inj. Bupivacaine Heavy 15mg. Subsequently, patients were turned to the supine position and Oxygen 5 L/min was delivered via a facial mask.

- The sensory blockade level of spinal anesthesia was assessed by ice cubes or pinprick 5 mins after intrathecal injection.

- GROUP P received a continuous infusion of 30ml 0.9% NaCl with 250 mcg phenylephrine for 30 mins immediately after spinal anesthesia using a infusion syringe pump.

- GROUP E received a continuous infusion of 30ml 0.9% NaCl with 30 mg of ephedrine for 30 mins immediately after spinal anesthesia using a infusion syringe pump.

- CONTROL GROUP received an intravenous bolus of Inj. mephentermine 6 mg after spinal anesthesia as and when required.

- The infusion of treatment medication in Group P and Group E was started immediately after spinal anesthesia.

- Non Invasive Blood pressure(NIBP), heart rate, and SpO2 were monitored . Incidence of hypotension, bradycardia and the total dose of vasopressor used intraoperatively were noted.

- Hemodynamic parameters were noted at 15 mins, 10 mins, 5 mins prior to the subarachnoid block and for 0 mins,3 mins, 6 mins, 9 mins,12 mins, 15 mins, 20 ins, 25mins and 30 mins time intervals after the subarachnoid block (spinal anesthesia).

PROTOCOL FOR RESCUE TREATMENT:

- If SBP fall was greater than 30% from the baseline, intravenous bolus dose of Inj. Phenylephrine 50mcg/Inj. Ephedrine 5 mg was given.

- Inj. Atropine 0.6 mg I/V was administered as a supplement if the heart rate was less than 50 beats per minute.

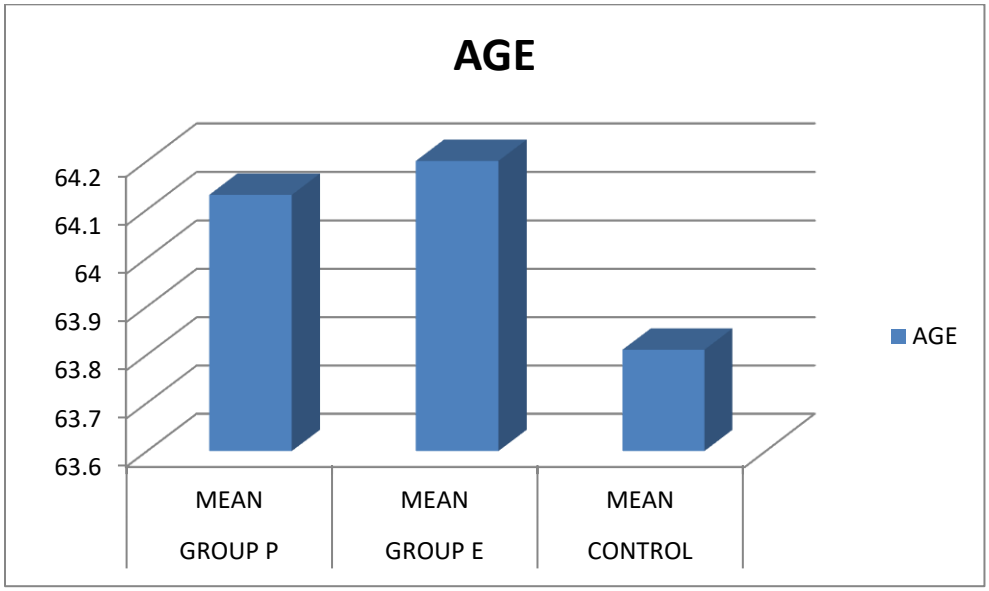
- In case of hypertension the ongoing infusion was stopped .

OBSERVATION AND RESULTS

- The data collected from my study was listed in the Master Chart.
- The total sample size is 174 (58 in each group).
- Group 1 is Phenylephrine (P)group and group 2 is Ephedrine(E) group and Group 3 is Control Group(C).
- P value less than 0.05 is considered as statistically significant.

	GROUP P		GROUP E		CONTROL		KW TEST	P VALUE
AGE	MEAN	SD	MEAN	SD	MEAN	SD		
	64.13	3.68	64.2	4.23	63.81	4.9	1.4002	0.496

TABLE 1- DISTRIBUTION OF AGE

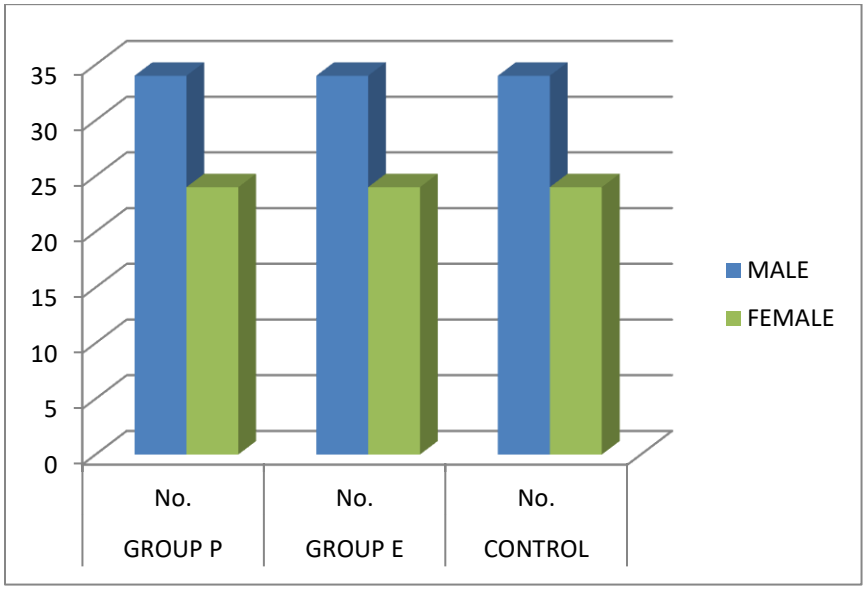


GRAPH 1- COMPARISION OF AGE DISTRIBUTION

Age (years) of patients in Group P, Group E and Control group were assessed using Kruskal-Wallis test. The groups were comparable with p value of 0.496 and it is statistically not significant.

	GROUP P		GROUP E		CONTROL		Chi2 test	p value
SEX	No.	%	No.	%	No.	%		
MALE	34	58.6	34	58.6	34	58.6		
FEMALE	24	41.4	24	41.4	24	41.4	0	1

TABLE 2 – DISTRIBUTION OF SEX

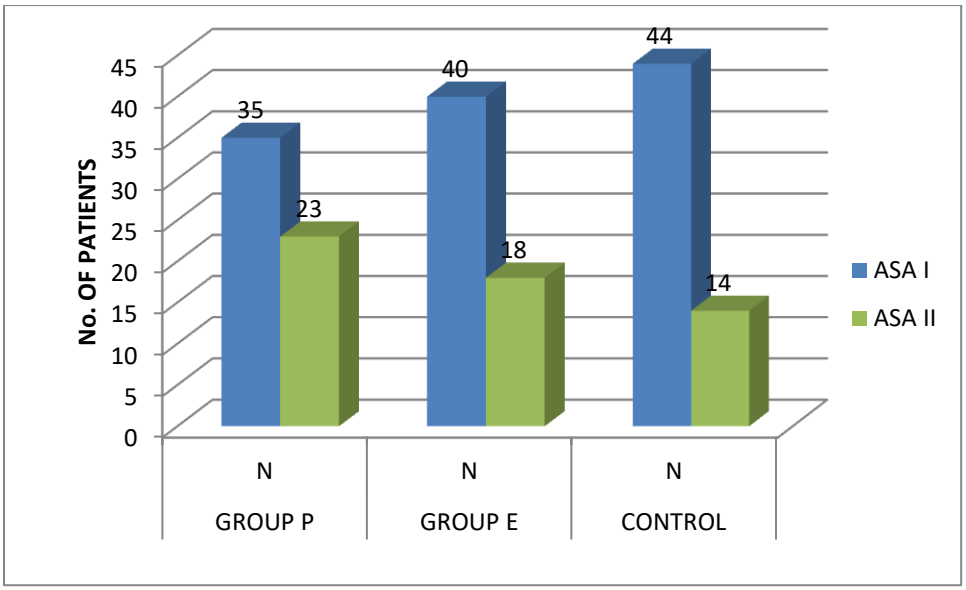


GRAPH 2- DISTRIBUTION OF SEX

Number of Male and Female patients have been compared among groups and evaluated using Chi Square test. The groups were comparable with a p value of 1 which is statistically not significant.

ASA	GROUP P		GROUP E		CONTROL		Chi2 test	p value
	N	%	N	%	N	%		
ASA I	35	60.3	40	69	44	75.9	3.243	0.197
ASA II	23	39.7	18	31	14	24.1		

TABLE 3 – DISTRIBUTION OF ASA GRADES

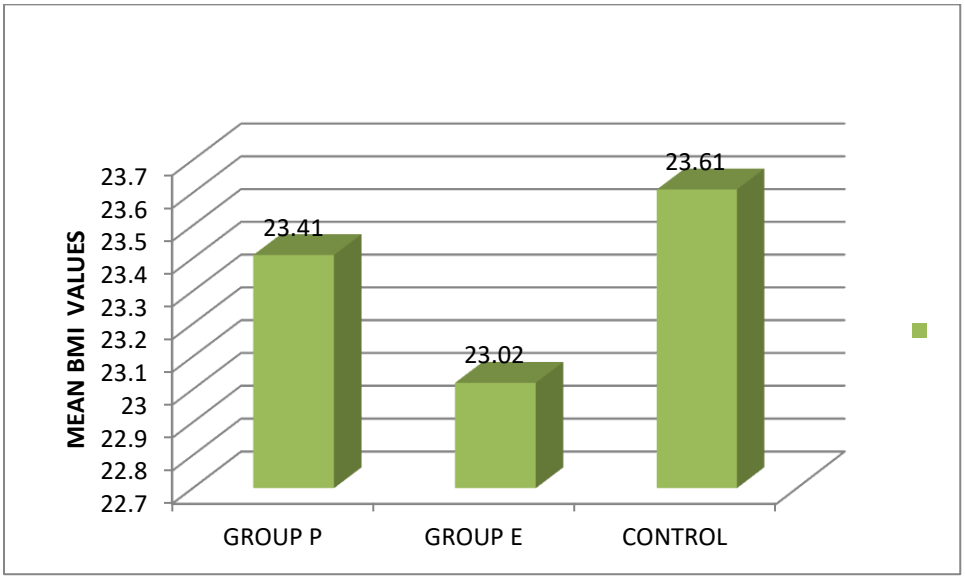


GRAPH 3 – COMPARISON OF ASA GRADES

Number of patients belonging to ASA grades I and II have been compared among all groups and evaluated using Chi Square test. The groups were comparable with a p value of 0.197 and it is statistically not significant.

	GROUP P		GROUP E		CONTROL		KW Test	p value
	Mean	SD	Mean	SD	Mean	SD	2.6045	0.271
BMI	23.41	2.76	23.02	1.69	23.61	1.79		

TABLE 4 – DISTRIBUTION OF BODY MASS INDEX (BMI)



GRAPH 4 – COMPARISON OF BODY MASS INDEX (BMI)

Body Mass Index(BMI) (kg/m^2) among three groups have been evaluated using Kruskal- Wallis test. The groups were comparable with a p value of 0.271 which is statistically not significant.

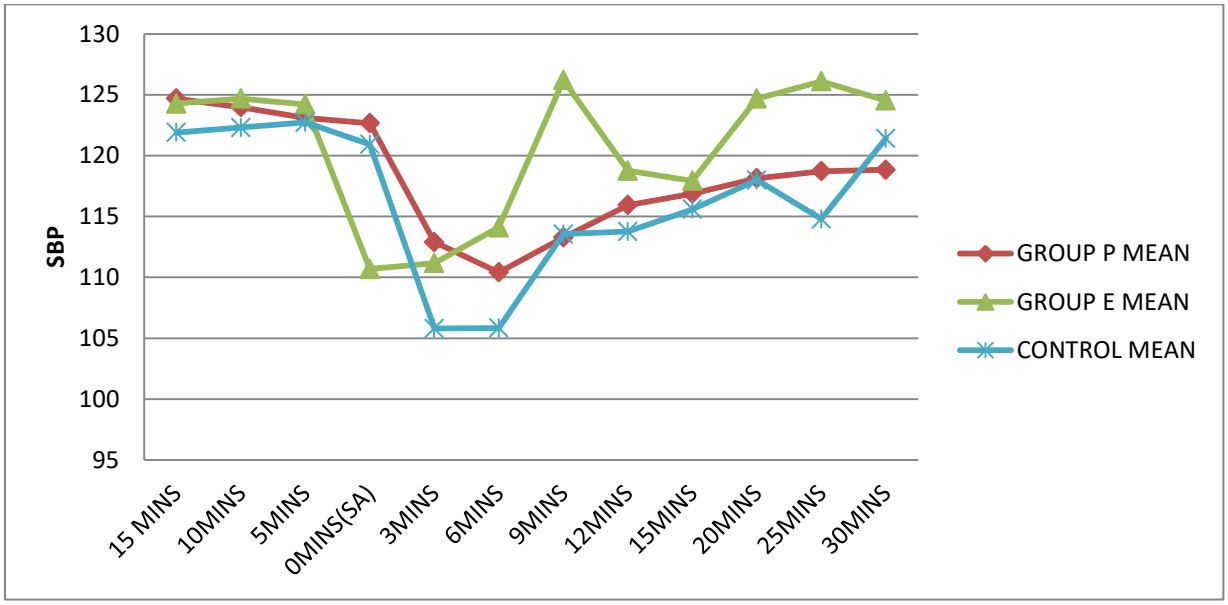
TABLE 5 –DISTRIBUTION OF SYSTOLIC BLOOD PRESSURE (SBP) BEFORE AND AFTER SPINAL ANAESTHESIA

SBP	GROUP P		GROUP E		CONTROL		KRUSKAL WALLIS TEST	P VALUE
	MEAN	SD	MEAN	SD	MEAN	SD		
15 MINS	124.69	6.484	124.28	9.218	121.9	8.522	2.909	0.233
10MINS	123.97	5.601	124.69	8.101	122.31	8.112	2.199	0.333
5MINS	123.1	5.659	124.21	9.266	122.72	8.015	0.906	0.636
0MINS(SA)	122.66	5.25	110.69	10.46	120.93	5.419	52.1	0.001*
3MINS	112.9	9.913	111.17	6.292	105.79	11.262	15.417	0.001*
6MINS	110.41	9.717	114.1	7.093	105.83	8.304	24.764	0.001*
9MINS	113.28	9.564	126.21	9.288	113.55	7.109	55.677	0.001*
12MINS	115.93	8.857	118.76	6.689	113.76	8.69	9.269	0.01*
15MINS	116.88	7.446	117.93	5.791	115.59	6.803	2.711	0.258
20MINS	118.14	6.763	124.69	8.23	118	7.293	25.588	0.001*
25MINS	118.72	5.944	126.1	9.002	114.79	8.41	41.998	0.001*
30MINS	118.83	6.269	124.52	9.302	121.41	7.521	12.025	0.002*

*Statistically significant at 5% level of significance ($p<0.05$)

The mean SBP among Group P, E and C were assessed using Krushkal – Wallis test. A significant p value was obtained[statistically significant data at 5% level of significance($p <0.05$)] for mean SBP at 0 mins , 3 mins , 6 mins ,9 mins, 12 mins , 20 mins and 25 mins after spinal anaesthesia.

GRAPH 5- COMPARISON OF SYSTOLIC BLOOD PRESSURE (SBP) BEFORE AND AFTER SPINAL ANAESTHESIA



The mean SBP at different time intervals were plotted for each group . the mean SBP at induction(0 mins) of spinal anaesthesia was higher in Group P compared to Group E and Control group .The mean SBP was higher in Group E when compared to other groups at 6mins , 9 mins, 12 mins, 15 mins, 20 mins, 25 mins and 30 mins time intervals after spinal anaesthesia which was statistically significant.

TABLE 6 – DISTRIBUTION OF DIASTOLIC BLOOD PRSSURE (DBP) BEFORE AND AFTER SPINAL ANAESTHESIA

DBP	GROUP P		GROUP E		CONTROL		KRUSKAL WALLIS TEST	P VALUE
	MEAN	SD	MEAN	SD	MEAN	SD		
15 MINS	79.76	4.036	77.21	5.681	78.76	6.244	7.054	0.029
10MINS	80.45	4.337	78.76	4.795	79.72	5.65	3.852	0.146
5MINS	80.41	4.538	82.66	6.932	79.38	6.147	5.72	0.057
0MINS(SA)	80.59	4.694	73.03	6.951	77.97	6.012	41.437	0.001*
3MINS	74	7.912	77.21	5.755	72.1	8.853	12.403	0.002*
6MINS	71.66	7.06	75.83	5.141	73.14	6.99	12.293	0.002*
9MINS	73.81	7.473	79.69	5.642	76.9	5.782	20.863	0.001*
12MINS	75.55	7.361	76.97	5.855	75.52	4.817	2.605	0.272
15MINS	76.9	7.314	82.79	7.659	75.07	5.831	33.183	0.001*
20MINS	78.17	5.497	77.17	5.67	79.21	5.415	5.482	0.065
25MINS	78.66	5.46	79.93	5.493	79.14	5.984	3.505	0.173
30MINS	79.48	5.513	77.93	4.709	78.52	6.07	1.159	0.56

*Statistically significant at 5% level of significance ($p<0.05$)

The mean DBP among Group P, Group E and Control group were assessed using Kruskal – Wallis test. A significant p value was obtained[statistically significant data at 5% level of significance($p <0.05$)] for mean SBP at 5 mins before spinal anaesthesia and 0 mins , 3 mins , 6 mins , 9 mins and 15 mins after spinal anaesthesia.

GRAPH 6 – COMPARISON OF DIASTOLIC BLOOD PRESSURE (DBP) BEFORE AND AFTER SPINAL ANAESTHESIA

The mean DBP at different time intervals were plotted for each group . the mean DBP at induction(0 mins) of spinal anaesthesia was higher in Group P compared to Group E and Control group .The mean DBP was higher in Group E when compared to other groups at 3 mins, 6 mins, 9 mins, 12 mins, 15 mins and 25 mins time intervals after spinal anaesthesia which was statistically significant.

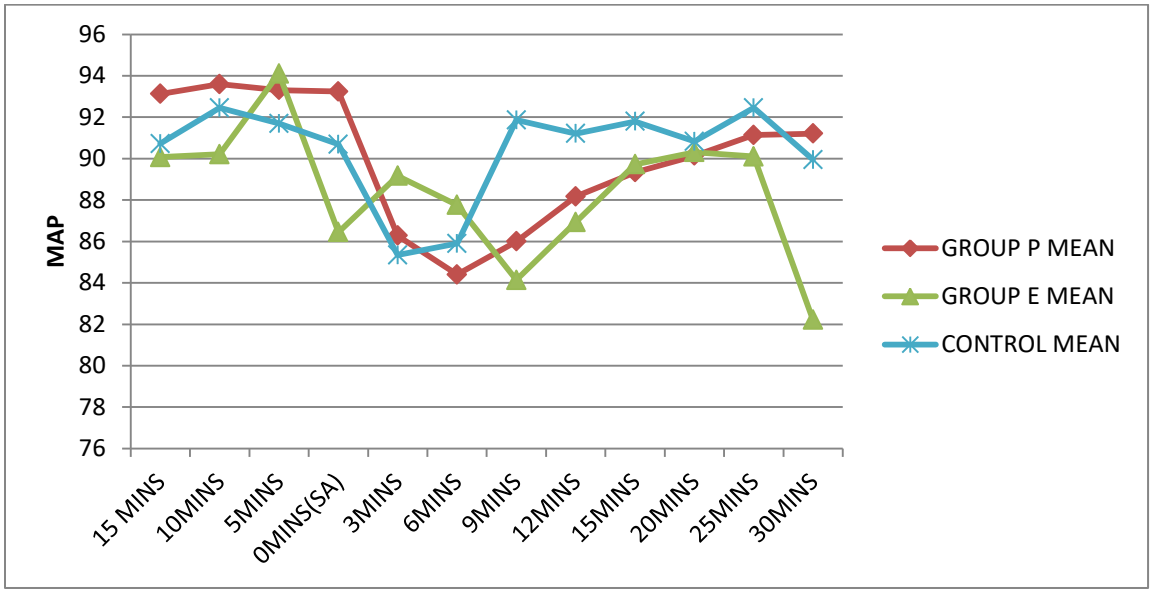
TABLE 7 – DISTRIBUTION OF MEAN ARTERIAL PRESSURE (MAP) BEFORE AND AFTER SPINAL ANAESTHESIA

MAP	GROUP P		GROUP E		CONTROL		KRUSKAL WALLIS TEST	P VALUE
	MEAN	SD	MEAN	SD	MEAN	SD		
15 MINS	93.12	5.743	90.07	6.005	90.72	6.42	3.408	0.182
10MINS	93.59	5.641	90.21	5.991	92.45	5.299	9.851	0.007*
5MINS	93.31	5.462	94.1	7.421	91.69	6.222	1.815	0.404
0MINS(SA)	93.24	5.679	86.45	7.465	90.69	5.384	26.693	0.001*
3MINS	86.28	7.181	89.17	7.177	85.34	9.134	7.873	0.02*
6MINS	84.4	7.903	87.76	5.124	85.9	6.8	8.188	0.017*
9MINS	86	7.823	84.14	2.899	91.86	4.926	54.177	0.001*
12MINS	88.17	7.985	86.93	3.732	91.21	4.912	16.763	0.001*
15MINS	89.34	8.305	89.72	6.127	91.79	5.628	9.832	0.007*
20MINS	90.14	6.301	90.31	5.789	90.83	6.325	0.919	0.632
25MINS	91.14	5.206	90.1	6.011	92.45	5.299	5.533	0.063
30MINS	91.21	5.204	82.21	1.926	89.95	1.572	103.305	0.001*

*Statistically significant at 5% level of significance ($p<0.05$)

The mean MAP among Group P, Group E and Control group were assessed using Kruskal – Wallis test . A significant p value was obtained[statistically significant data at 5% level of significance($p <0.05$)] for mean MAP at 10 mins before spinal anaesthesia and 0 mins , 3 mins , 6 mins , 9 mins , 12 mins, 15 mins and 30 mins after spinal anaesthesia.

GRAPH 7 – COMPARISON OF MEAN ARTERIAL PRESSURE (MAP) BEFORE AND AFTER SPINAL ANAESTHESIA



The mean of MAP at different time intervals were plotted for each group .The mean MAP was significant in all groups , but the mean MAP was higher in control group compared to other groups . The mean MAP was higher in ephedrine group compared to phenylephrine group at 3 mins, 6 mins, 15 mins and 20 mins time intervals after spinal anaesthesia which was statistically significant.

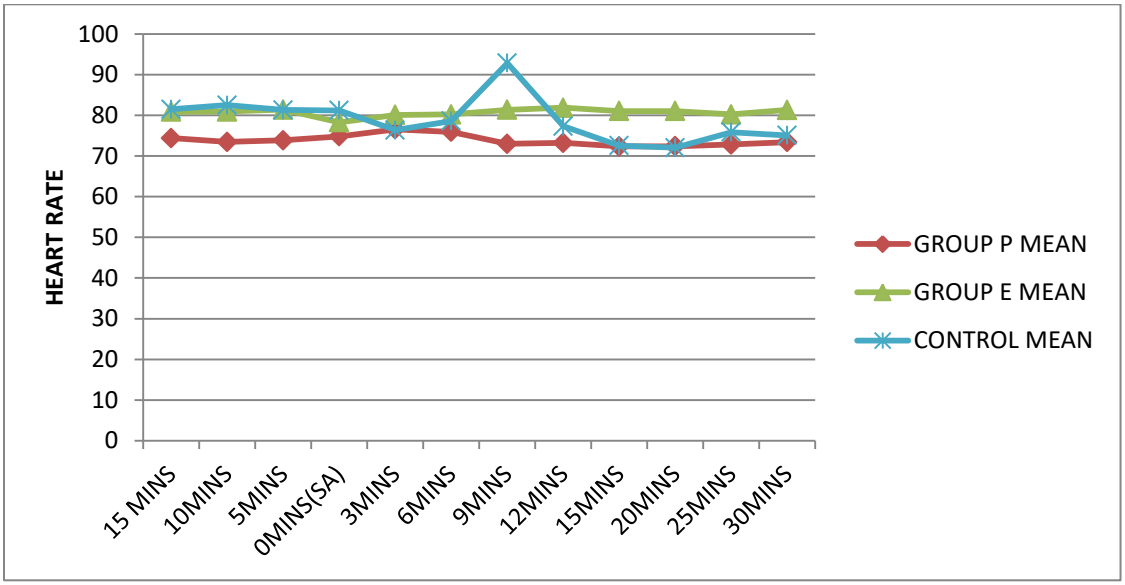
TABLE 8 – DISTRIBUTION OF HEART RATE (HR) BEFORE AND AFTER SPINAL ANAESTHESIA

HR	GROUP P		GROUP E		CONTROL		KRUSKAL WALLIS TEST	P VALUE
	MEAN	SD	MEAN	SD	MEAN	SD		
15 MINS	74.38	8.22	80.86	8.662	81.47	2.879	24.478	0.001*
10MINS	73.45	7.972	80.91	8.585	82.48	2.767	38.165	0.001*
5MINS	73.83	7.798	81.38	8.452	81.29	3.089	34.734	0.001*
0MINS(SA)	74.81	8.159	78.29	8.335	81.19	2.941	28.046	0.001*
3MINS	76.53	10.715	80.1	9.576	76.36	11.105	8.722	0.013*
6MINS	75.93	12.304	80.22	9.793	78.6	9.568	8.511	0.014*
9MINS	72.97	10.364	81.33	8.696	92.84	10.917	68.697	0.001*
12MINS	73.22	9.557	81.86	7.316	77.29	9.722	27.209	0.001*
15MINS	72.33	8.062	81.03	8.572	72.52	8.392	33.083	0.001*
20MINS	72.36	7.873	81.02	8.853	72.02	6.995	35.586	0.001*
25MINS	72.79	6.826	80.22	8.107	75.83	6.261	23.058	0.001*
30MINS	73.38	6.693	81.31	8.876	75.03	7.958	24.668	0.001*

*Statistically significant at 5% level of significance ($p<0.05$)

The mean heart rate (HR) among Group P, Group E and Control group were assessed using Kruskal – Wallis test. A significant p value of <0.014 was obtained [statistically significant data at 5% level of significance ($p <0.05$)] for mean HR at all time intervals before and after spinal anaesthesia.

GRAPH 8 – COMPARISON OF HEART RATE (HR) BEFORE AND AFTER SPINAL ANAESTHESIA



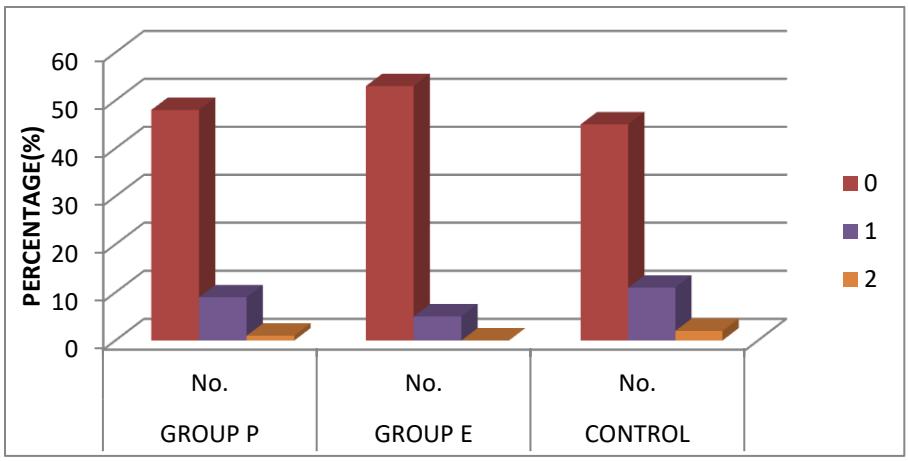
The mean HR at different time intervals were plotted for each group .The mean HR was higher in Group E when compared to other groups and was statistically significant at 3 mins, 6 mins,12 mins,15 mins,20 mins,25 mins and 30 mins of time intervals after spinal anaesthesia.

TABLE 9 – NO. AND PERCENTAGE OF RESCUE DOSES GIVEN IN ALL GROUPS

ESCUE DOSE	GROUP P		GROUP E		CONTROL		CHI SQUARE TEST	P VALUE
	No.	%	No.	%	No.	%		
0	48	82.80%	53	91.40%	45	77.60%	4.911	0.297
1	9	15.50%	5	8.60%	11	19.00%		
2	1	1.70%	0	0.00%	2	3.40%		

The number and percentage of rescue doses of vasopressors given among all groups were assessed using Chi square test. A p value of 0.297 was calculated and observed to be statistically insignificant.

GRAPH 9- COMPARISON OF NUMBER AND PERCENTAGE OF RESCUE DOSES GIVEN IN ALL GROUPS



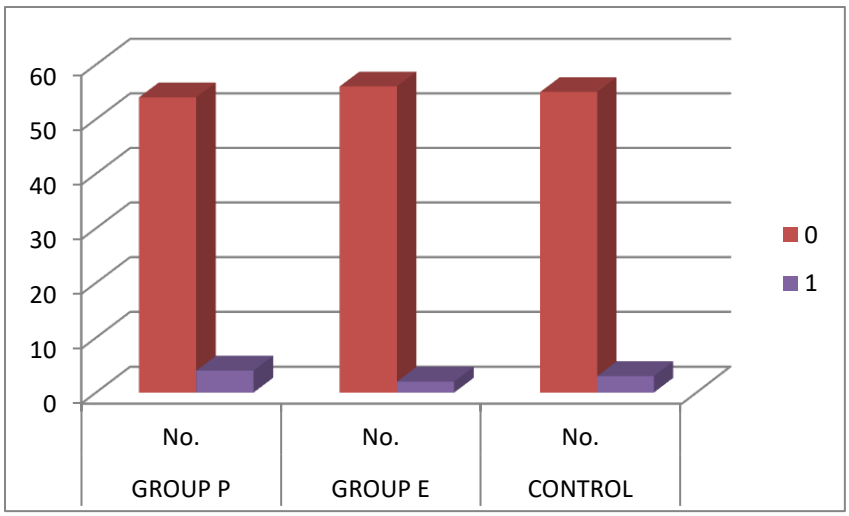
The number and percentage of rescue doses of vasopressors given among all groups were represented graphically and it was observed to be statistically insignificant. The rescue doses required in Ephedrine group was less when compared to phenylephrine and control group.

TABLE 10 – NO. AND PERCENTAGE OF ATROPINE DOSES GIVEN ALL GROUPS

ATROPINE	GROUP P		GROUP E		CONTROL		CHI SQUARE TEST	P VALUE
	No.	%	No.	%	No.	%		
0	54	93.10%	56	96.60%	55	94.80%	0.703	0.704
1	4	6.90%	2	3.40%	3	5.20%		

The number and percentage of Inj. ATROPINE given among all groups were assessed using Chi square test. A p value of 0.704 was calculated and observed to be statistically insignificant.

GRAPH 10 – COMPARISON OF NUMBER OF ATROPINE DOSE GIVEN IN ALL GROUPS



The number and percentage of Inj. ATROPINE given among all groups were represented graphically and it was observed to be statistically insignificant. The Inj. ATROPINE required to treat bradycardia was less in Ephedrine group compared to phenylephrine and control group.

DISCUSSION

Hypotension is frequently observed after spinal block in elderly patients[1] as they have reduced cardiovascular compensation mechanism which increases the frequency and severity of episodes of hypotension due to sympathetic blockade. It increases the risk of myocardial ischemia during the perioperative period and is triggered by a reduction in cardiac output and systemic vascular resistance.[2]

Elderly patients who have a high incidence of coexisting illnesses are at high risk of hypoperfusion, which is due to hypotension, whose primary risk factor is hypovolemia .[3,4] Hypotension has an incidence of 25-80% in the old age patients. Even with brief episodes of uncorrected hypotension, elderly patients are more vulnerable to long-term consequences due to decreased physiologic reserve and a higher incidence of systemic disease, particularly cardiovascular disease [16,17]

Elderly patients with untreated subarachnoid block have lower systolic blood pressure, systemic vascular resistance, and central venous pressure (16). Restoring preload to the heart during spinal block should be accomplished by administering sufficient intravenous fluids (8–10 ml/kg). Adequate preloading prevents decrease in cardiac output and unexpected cardiac arrests but excessive fluid administration can lead to fluid overload and urinary retention. A vasopressor should be administered if the systolic blood pressure declines by more than 25%–30% of baseline or to less than 90 mmHg.

Since vasopressors are known to cause vasoconstriction by increasing systemic vascular resistance eventually to prevent spinal induced hypotension (SIH), they are a better choice to maintain haemodynamics in the elderly patients.

As per the observed results from our study, Phenylephrine 250 mcg/30ml and Ephedrine 30mg/30ml , both were effective in maintaining hemodynamic stability after subarachnoid block. The systolic blood pressure was maintained in GROUP E> GROUP P>CONTROL groups following induction of spinal block. The attenuation of SBP due to sympathetic blockade was more pronounced within the initial 15 mins after spinal anesthesia, which was well optimized by the ephedrine group compared to phenylephrine and control groups.

The diastolic blood pressure(DBP) was observed to be maintained in GROUP E>GROUP P>CONTROL groups. The mean arterial pressure (MAP) was observed to be almost equally maintained in all groups (GROUP P=GROUP E=CONTROL), however the initial drop in MAP after spinal block was better optimized in Ephedrine group.

The heart rate was observed to be effectively maintained in GROUP E> CONTROL GROUP> GROUP P. 4 patients in 58 samples of phenylephrine group were treated with Inj. Atropine 0.6mg intravenously in response to bradycardia , whereas in Ephedrine group only 2 patients had bradycardia. The rescue doses (phenylephrine 50mcg/ephedrine 5mg) to maintain SBP after fall of more than 30% below baseline, was more required in phenylephrine group compared to ephedrine group.

Zunic M et al [7] conducted a study on the influence of ephedrine or phenylephrine infusion administered immediately after spinal anesthesia (SA) on hemodynamics in elderly orthopedic patients. It was observed that cardiac index, mean arterial pressure and heart rate was better in ephedrine group than phenylephrine and control groups. In present study it was observed that systolic blood pressure, mean arterial pressure and heart rate was more effectively maintained in ephedrine group compared to other groups.

W. Mon et al [8] conducted a study to evaluate cardiac output (CO) changes with phenylephrine or ephedrine infusions titrated to maintain baseline systolic blood pressure (bSBP) during spinal anesthesia in 40 parturients and found that ephedrine increased cardiac output compared to phenylephrine and found that phenylephrine was associated with a higher decrease in the maternal heart rate and cardiac output, although the umbilical cord gases were still better than those of the ephedrine group. Despite maintaining vital parameters, ephedrine was associated with a mixed respiratory and metabolic acidosis in the fetus. In present study , phenylephrine was assosciated with higher incidence of bradycardia and decrease in systolic blood pressure.

Asokan A et al[9] conducted study in 50 parturients and concluded that the vasopressor consumption was more in phenylephrine group compared to ephedrine group and ephedrine 6 mg and phenylephrine 100 μg did not differ in their efficacy to manage hypotension during spinal anaesthesia for caesarean delivery and maternal bradycardia was more in the phenylephrine group with equal incidence of fetal acidosis in the study groups

Sinha G et al. in a study observed that the mean heart rate was lower in phenylephrine group. There was higher incidence of bradycardia in the phenylephrine group. It was found that during the subarachnoid block for a cesarean section, the three vasopressors efficiently controlled arterial blood pressure.The heart rate was substantially reduced by phenylephrine as compared to ephedrine and mephentermine.

CONCLUSION

In present study , prophylactic infusion of ephedrine was found to be better vasopressor agent compared to phenylephrine in maintaining hemodynamic stability .

The systolic blood pressure (SBP) and diastolic blood pressure (DBP) were better maintained in the ephedrine group than phenylephrine and control groups.

The mean arterial pressure (MAP) was maintained in all groups but was well maintained in ephedrine group.

Maintenance of heart rate and prevention of bradycardia was effectively seen in ephedrine group compared to phenylephrine group.

Hence, it is concluded that perioperative use of ephedrine as a low dose prophylactic infusion can be used to maintain vital parameters effectively in elderly patients posted for lower limb orthopaedic surgeries under subarachnoid block(SA).

SUMMARY

"A COMPARATIVE STUDY OF INFUSION OF EPHEDRINE AND PHENYLEPHRINE ON HEMODYNAMIC STABILITY AFTER SPINAL ANESTHESIA IN ELDERLY PATIENTS UNDERGOING LOWER LIMB ORTHOPAEDIC SURGERIES".

This study was carried out on 174 patients undergoing Surgery under Spinal Anaesthesia in B.L.D.E(Deemed to be University), Shri B.M. Patil Medical College, Hospital and Research Centre, Vijayapura.

Group P received continuous intravenous infusion of phenylephrine 250mcg in 30 ml normal saline, Group E received continuous intravenous infusion of Ephedrine 30mg in 30 ml normal saline and Control Group received intravenous bolus of inj mephentermine as and when required.

The SBP, DBP, MAP and HR were more effectively maintained in ephedrine group compared to phenylephrine and control groups.

The requirement of rescues doses and Inj. Atropine to treat bradycardia were insignificant and less in ephedrine group compared to other groups.

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SAMPLE INFORMED CONSENT FORM

B.L.D.E(DEEMED TO BE UNIVERSITY) SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE, VIJAYAPURA – 586103, KARNATAKA

TITLE OF THE PROJECT : A COMPARATIVE STUDY OF INFUSION OF EPHEDRINE AND PHENYLEPHRINE ON HEMODYNAMIC STABILITY AFTER SPINAL ANESTHESIA IN ELDERLY PATIENTS UNDERGOING LOWER LIMB ORTHOPAEDIC SURGERIES

PRINCIPAL INVESTIGATOR : Dr. SYED SUFIAN IBRAHIM

Department of Anaesthesiology

B.L.D.E (DEEMED TO BE UNIVERSITY)

Shri. B.M. Patil Medical College and Research Centre, Solapur Road, VIJAYAPURA-03

PG GUIDE : Dr. BASAVARAJ PATIL

ASSOCIATE PROFESSOR

Department of Anaesthesiology

B.L.D.E (DEEMED TO BE UNIVERSITY)

Shri B.M. MPatil Medical College and Research Centre, Sholapur Road, VIJAYAPURA-03

PURPOSE OF RESEARCH

I have been informed that, this study is " A COMPARATIVE STUDY OF INFUSION OF EPHEDRINE AND PHENYLEPHRINE ON HEMODYNAMIC STABILITY AFTER SPINAL ANESTHESIA IN ELDERLY PATIENTS UNDERGOING LOWER LIMB ORTHOPAEDIC SURGERIES". I have been explained about the reason for conducting this study and selecting me/my ward as a subject for this study. I have also been given free choice for either being included or not in the study.

PROCEDURE

I understand that I will be participating in the study "A COMPARATIVE STUDY OF INFUSION OF EPHEDRINE AND PHENYLEPHRINE ON HEMODYNAMIC STABILITY AFTER SPINAL ANESTHESIA IN ELDERLY PATIENTS UNDERGOING LOWER LIMB ORTHOPAEDIC SURGERIES"

RISKS AND DISCOMFORTS

I understand that I/my ward may experience complications during the study and I understand that necessary measures will be taken to reduce complications as and when they arise.

BENEFITS

I understand that I/my wards participation in this study will help in finding out, "A COMPARATIVE STUDY OF INFUSION OF EPHEDRINE AND PHENYLEPHRINE ON HEMODYNAMIC STABILITY AFTER SPINAL ANESTHESIA IN ELDERLY PATIENTS UNDERGOING LOWER LIMB ORTHOPAEDIC SURGERIES".

CONFIDENTIALITY

I understand that medical information produced by this study will become a part of this Hospital records and will be subjected to the confidentiality and privacy regulation of this hospital.

Information of a sensitive, personal nature will not be a part of the medical records, but will be stored in the investigator's research file and identified only by a code number.

The code key connecting name to numbers will be kept in a separate secure location. If the data are used for publication in the medical literature or for teaching purpose, no names will be used and other identifiers such as photographs and audio or video tapes will be used only with my special written permission.

I understand that I may see the photograph and video tapes and hear audiotapes before giving this permission.

REQUEST FOR MORE INFORMATION

I understand that I may ask more questions about the study at any time.

Dr. SYED SUFIAN IBRAHIM is available to answer my questions or concerns.

I understand that I will be informed of any significant new findings discovered during the course of this study, which might influence my continued participation.

If during this study, or later, I wish to discuss my participation in or concerns regarding this study with a person not directly involved, I am aware that the social worker of the hospital is available to talk with me.

And that a copy of this consent form will be given to me for keep for careful reading.

REFUSAL OR WITHDRAWAL OF PARTICIPATION

I understand that my participation is voluntary and I may refuse to participate or may withdraw consent and discontinue participation in the study at any time without prejudice to my present or future care at this hospital.

I also understand that Dr. SYED SUFIAN IBRAHIM will terminate my participation in this study at any time after she has explained the reasons for doing so and has helped arrange for my continued care by my own physician or therapist, if this is appropriate.

INJURY STATEMENT

I understand that in the unlikely event of injury to me/my ward, resulting directly to my participation in this study, if such injury were reported promptly, then medical treatment would be available to me, but no further compensation will be provided.

I understand that by my agreement to participate in this study, I am not waiving any of my legal rights.

I have explained to _____,

the purpose of this research, the procedures required and the possible

risks and benefits, to the best of my ability in patient's own language.

Date:

DR. BASAVARAJ PATIL
(Guide)

DR. SYED SUFIAN IBRAHIM
(Investigator)

STUDY SUBJECT CONSENT STATEMENT

I confirm that DR. SYED SUFIAN IBRAHIM has explained to me the purpose of this research, the study procedure that I will undergo and possible discomforts and benefits that I may experience, in my own language.

I have been explained all the above in detail in my own language and I understand the same. Therefore I agree to give my consent to participate as a subject in this research project.

_____ _____ Date_____

(Participant)

_____ Date_____

(Witness to above signature)

PROFORMA

PATIENT DETAILS:

Name: Date:
Age: IP No.:
Sex:
Address:
Height:
Weight:
BMI:
Ward:
Diagnosis:
Surgical procedure:
Past history:

General physical examination:

Pallor

Icterus

Cyanosis

Clubbing

Lymphadenopathy

Edema

Mallampati Grade

Vital parameters:

Pulse

Blood pressure

Respiratory rate

Temperature

Systemic Examination:

CVS

RS

CNS

PA

Investigations:

Haemoglobin:

TLC:

Platelet count:

Urine routine:

HIV:

HbsAg:

ASA grade:

Group allotted by randomization:

Parameters:

Demographic DATA and hemodynamic measurements	Phenylephrine(P)	Ephedrine(E)	Control (C)
No. of Patients			
Gender(M/F)			
Age			
Systolic Blood Pressure(SBP)			
Diastolic Blood Pressure (DBP)			
Mean Arterial Pressure(MAP)			
Heart rate (HR)			

GROUPS	TIME	SYSTOLIC BLOOD PRESSURE (SBP)	DIASTOLIC BLOOD PRESSURE (DBP)	MEAN ARTERIAL PRESSURE (MAP)	HEARTRATE (HR)	ECG
Phenylephrine (P)	15 min(before SA)					
	10 min					
	5 min					
	0(after SA)					
	3 min					
	6 min					
	9 min					
	12 min					
	15 min					
	20 min					
	25 min					
	30 min					
Ephedrine(E)	15 min(before SA)					
	10 min					
	5 min					
	0 min (after					

	SA)					
	3 min					
	6 min					
	9 min					
	12 min					
	15 min					
	20 min					
	25 min					
	30 min					
Control(C)	15 min (before SA)					
	10 min					
	5 min					
	0 min (after SA)					
	3 min					
	6 min					
	9 min					
	12 min					
	15 min					
	20 min					
	25 min					
	30 min					

GROUPS	**RESCUE DOSES FOR** **(Phenylepherine 50mcg/ Ephedrine 5mg/ mephentermine 6mg bolus)**	**TOTAL**
PHENYLEPHRINE		
EPHEDRINE		
CONTROL		

BIO-DATA OF THE GUIDE

Guide Name : Dr. Basavaraj Patil

Date of Birth: 22/07/1982

Education: MBBS, MD (MP SHAH Medical College, Jamnagar, Gujarat)

Designation: Associate Professor

Department of Anaesthesiology

Teaching: UG Teaching- 13Years

PGTeaching-10 Years

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BIO DATA OF INVESTIGATOR

Name:	Dr. SYED SUFIAN IBRAHIM
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Azadi Ka Amrit Mahotsav

BLDE
(DEEMED TO BE UNIVERSITY)
Declared as Deemed to be University u/s 3 of UGC Act, 1956
Accredited with 'A' Grade by NAAC (Cycle-2)
The Constituent College
SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA

BLDE (DU)/IEC/ 787/2022-23 30/8/2022

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this University met on **Friday, 26th August, 2022 at 3.30 p.m. in the Department of Pharmacology** scrutinizes the Synopsis of Post Graduate Student of BLDE (DU)'s Shri B.M.Patil Medical College Hospital & Research Centre from ethical clearance point of view. After scrutiny, the following original/ corrected and revised version synopsis of the thesis/ research projects has been accorded ethical clearance.

TITLE: "A comparative study of infusion of Ephedrine and phenylephrine on Hemodynamic stability after spinal Anesthesia in elderly patients undergoing Lower limb orthopaedic surgeries".

NAME OF THE STUDENT/PRINCIPAL INVESTIGATOR: Dr.Syed Sufian Ibrahim

NAME OF THE GUIDE: Dr.Basavaraj Patil, **Dept. of Anaesthesiology**

Dr. Santoshkumar Jeevangi
Chairperson
IEC, BLDE (DU),
VIJAYAPURA

Chairman,
Institutional Ethical Committee,
BLDE (Deemed to be University)
Vijayapura

Dr.Akram A. Naikwadi
Member Secretary
IEC, BLDE (DU),
VIJAYAPURA

MEMBER SECRETARY
Institutional Ethics Committee
BLDE (Deemed to be University)
Vijayapura-586103. Karnataka

Following documents were placed before Ethical Committee for Scrutinization.

- Copy of Synopsis/Research Projects
- Copy of inform consent form
- Any other relevant document

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MASTER CHART – GROUP P(PHENYLEPHRINE)

Sl no	PATIENT NAME	AGE	SEX	HEIGHT	WEIGHT	BMI	ASA GRADE	SYSTOLIC BP(mmHg)										DIASTOLIC BP(mmHg)										MEAN ARTERIAL PRESSURE										HEART RATE										ECG	SpO2	RESCUE DOSES	ATROPI
								15 MINS	10 min	5 min	0 min@SA	3min	6 min	9min	12min	15 min	20 min	25 min	30min	15 min	10 min	5 min	0 min@SA	3min	6 min	9 min	12 min	15 min	20 min	25 min	30 min	15 min	10 min	5 min	0 min	3min	6 min	9 min	12min	15min	20 min	25 min	30min				
1	SHARANNA SIDDU	60	F	150	50	22.2	I	130	130	120	130	120	110	110	112	108	112	120	100	80	80	80	80	82	76	76	70	78	78	78	84	84	86	84	88	94	92	88	90	94	88	86	88	78	82	88	84	76	78	88	90	76	78	80	82	N	100	0	0
2	CHETAN	66	M	158	51	20.2	II	130	132	130	130	126	120	124	128	116	118	120	124	80	84	78	80	78	72	80	86	76	78	80	80	90	96	88	92	88	86	88	94	92	88	90	92	88	80	86	80	78	84	82	80	84	75	86	82	N	100	0	0
3	SHIVAL	68	M	158	51	20.2	II	130	128	128	126	118	106	108	118	114	110	110	104	80	80	84	84	80	78	68	78	78	76	78	76	74	92	96	94	90	84	88	80	96	88	88	86	84	88	82	80	82	86	76	75	70	80	92	86	80	82	N	100	0	0
4	ASHWINI DODAMANI	72	F	162	62	23.6	II	130	130	130	133	130	130	140	142	136	148	130	130	80	80	86	84	88	82	90	94	108	100	110	92	94	92	94	96	92	92	106	108	120	110	98	102	88	86	80	84	88	78	90	92	98	98	78	80	N	100	0	0
5	CHINMAY RATHOD	72	M	165	60	22	II	110	120	116	120	120	116	110	116	120	120	110	110	88	82	74	80	78	68	64	70	82	80	70	72	98	98	86	92	90	82	80	82	92	94	84	84	78	80	84	80	88	80	92	80	76	80	82	78	78	N	100	1	0
6	BALAPPA	60	M	170	78	27	I	110	116	116	120	106	106	108	110	120	126	128	116	70	72	72	80	88	70	68	70	80	80	80	84	88	90	90	92	84	88	86	90	94	96	98	96	78	76	74	80	82	80	84	74	70	68	64	70	74	N	100	0	0
7	GANGAVA	66	F	165	56	20.6	II	130	128	128	130	130	110	104	100	106	110	108	118	100	82	82	84	84	70	68	70	74	70	74	74	74	80	108	98	100	100	102	88	84	80	82	80	84	82	92	82	84	80	84	76	74	88	98	72	70	80	80	N	100	0	0
8	GEETA	60	F	160	50	19.5	I	120	126	122	130	108	106	112	118	120	114	120	126	80	84	80	84	64	68	70	72	74	76	80	82	92	96	96	98	70	78	84	82	88	88	92	98	88	86	80	72	70	68	64	68	66	74	76	70	N	100	0	0
9	SUREHA	66	F	162	54	20.6	II	140	138	136	134	120	104	100	112	118	120	122	128	80	82	80	88	80	72	70	74	80	80	84	86	100	104	104	102	96	88	82	84	92	92	96	96	70	72	76	70	68	64	66	70	68	64	68	74	N	100	1	0
10	L BIRADAR	67	M	168	70	24.8	II	126	124	122	120	110	112	116	120	122	118	116	110	80	84	80	82	76	74	78	80	82	72	78	80	92	94	90	94	88	84	86	88	92	94	98	92	92	92	88	80	88	94	86	86	76	74	70	76	74	70	72	N	100	0	0
11	RASULBEE	68	F	163	48	18.1	II	138	136	130	136	120	108	120	126	114	116	126	120	90	88	90	88	80	72	78	80	78	74	82	80	106	108	102	100	92	84	90	92	88	88	94	92	88	86	82	80	84	88	76	72	64	68	70	72	N	99	0	0
12	RAHUL KHEDLEKAR	61	M	172	68	23	I	130	128	130	128	110	104	110	120	109	110	120	122	80	80	82	80	72	70	72	76	70	76	78	80	96	92	94	94	86	82	82	88	88	84	92	94	94	94	80	82	84	80	68	44	68	74	72	76	78	N	100	0	1
13	SANGAMMA TALWAR	62	F	165	60	22	I	120	126	124	122	116	110	116	118	110	122	120	120	82	80	82	80	78	70	74	76	72	82	82	80	94	92	96	92	88	80	86	90	86	92	96	92	82	80	78	76	78	80	82	80	80	82	78	76	82	N	100	0	0
14	BASAVGOUDA	60	M	168	75	26.6	I	120	118	116	118	80	88	104	110	112	120	126	126	80	78	74	72	50	54	66	68	72	80	88	88	92	88	88	86	66	64	70	78	84	92	98	96	68	64	64	66	78	88	72	70	72	64	62	62	78	N	99	1	0
15	RAJESHWARI	63	F	162	58	22.1	I	130	128	126	124	110	100	116	118	120	122	110	114	80	84	84	86	70	70	74	76	80	84	72	74	92	94	92	94	84	82	82	88	92	92	88	88	84	84	82	84	82	84	72	72	70	62	60	58	62	N	100	0	0
16	SANDEEP CHANDU	71	M	170	70	24.2	II	126	124	122	124	108	104	116	118	116	124	126	114	80	80	82	82	70	68	72	74	76	80	80	70	92	92	92	94	92	84	78	82	84	92	92	92	88	84	82	82	84	82	62	52	52	48	78	82	82	80	N	100	1	1
17	SUDHIR JANDAGI	63	M	172	75	25.4	I	116	118	114	116	108	104	110	106	118	120	122	114	70	70	72	74	72	70	72	70	74	82	72	72	80	82	84	84	84	82	82	82	84	94	84	86	72	70	74	72	70	74	64	74	72	74	76	N	100	0	0
18	HEERA RATHOD	62	F	163	58	21.8	I	130	130	126	130	110	112	110	108	110	104	110	124	80	84	72	82	78	70	72	74	72	72	80	80	92	92	84	92	88	82	84	84	84	80	92	92	72	72	74	88	100	104	88	84	82	80	78	70	N	100	0	0
19	LAXMI MAHADEV	66	F	166	60	21.8	II	120	122	126	124	102	100	110	110	116	120	110	114	80	80	82	82	64	68	70	72	72	80	70	72	90	92	92	94	72	78	84	84	92	94	82	84	88	80	88	94	104	98	90	84	82	80	78	74	N	100	0	0
20	NEELAMMA PATIL	64	F	163	62	23.3	I	130	128	126	124	120	110	120	126	130	126	116	110	80	84	84	82	80	82	84	88	98	92	92	78	98	100	102	98	92	96	94	100	110	102	102	94	70	72	78	74	76	64	68	64	62	72	74	70	N	99	0	0
21	DNYANESH MANN	62	M	170	68	23.5	I	110	116	114	118	104	110	104	110	116	110	110	112	70	72	74	76	72	74	75	70	72	80	70	78	84	84	84	84	88	90	92	84	88	86	92	90	78	76	74	70	78	82	82	80	76	86	84	82	N	100	0	0
22	MATHUREWA	64	F	158	55	22	I	130	128	126	124	104	108	116	118	120	120	120	114	80	80	82	80	64	74	70	74	80	84	76	76	108	94	96	94	84	84	82	92	96	88	98	92	82	88	82	84	104	98	80	76	74	76	80	82	N	100	0	0
23	SHIVABALAPPA M	60	M	170	78	27	I	116	118	120	114	110	118	118	118	118	116	124	118	80	76	80	72	76	78	84	86	78	84	82	86	90	88	92	94	88	92	96	94	86	94	92	96	70	72	74	72	68	64	62	64	66	70	64	62	N	99	0	0
24	ANJANA	60	F	165	63	23.1	I	130	128	132	130	110	112	124	126	124	128	130	128	80	80	84	80	76	74	82	84	86	88	90	84	102	100	98	100	88	86	94	96	98	98	102	98	84	82	84	82	84	82	58	48	65	78	82	78	N	100	1	1
25	GOURAMMA	61	F	162	65	24.8	I	120	116	118	120	118	118	122	120	112	110	116	118	84	78	80	84	78	82	80	78	72	78	72	92	94	88	92	96	84	94	92	82	86	88	88	88	88	76	74	72	76	74	82	78	64	62	68	72	N	100	0	0
26	PARSHURAM	65	M	172	78	26.4	II	130	128	134	136	118	116	132	138	132	138	130	124	80	82	82	82	74	76	74	88	84	90	80	82	84	94	96	94	84	84	82	92	92	96	88	90	82	88	82	84	104	98	80	76	74	76	80	82	N	100	0	0
27	HANAMAVVA CHALAVADI	63	F	165	68	25	I	120	124	126	130	116	110	108	110	116	120	120	118	80	80	82	82	76	74	70	72	76	80	78	76	92	92	94	96	86	88	84	86	88	92	88	86	82	84	88	86	84	72	70	64	66	68	72	64	N	100	0	0
28	ARUN	62	M	178	74	23.4	I	130	128	126	124	100	92	108	108	110	126	128	110	86	88	84	86	62	64	78	78	86	84	82	72	102	100	100	98	76	76	88	86	94	96	98	84	66	64	66	64	82	84	86	70	64	62	66	68	N	100	1	0
29	GURUBAI	64	F	160	55	21.5	I	130	130	126	124	122	116	122	118	114	110	110	120	80	84	82	82	82	78	82	76	72	76	82	82	92	96	96	94	98	88	94	88	88	84	96	94	70	72	74	76	68	64	66	70	74	80	68	74	N	100	0	0
30	SANDEEP	62	M	168	70	24.8	I	114	116	112	114	114	112	110	98	104	110	112	112	70	72	78	72	74	76	76	64	76	68	70	72	82	84	82	84	86	88	84	74	88	76	80	86	76	74	76	78	74	72	70	68	64	70	72	72	N	100	0	0
31	LATA YADAV	61	F	165	70	25.4	I	126	124	126	124	100	108	128	130	118	120	122	122	80	84	82	82	84	86	86	90	78	80	82	78	90	94	96	92	94	94	96	102	86	92	94	98	86	76	78	76	78	82	82	70	72	74	76	76	N	100	0	0
32	SAMEEVANI	65	F	160	95	37.1	II	126	128	128	124	100	98	110	116	118	114	118	120	82	84	86	84	58	54	64	74	76	76	74	80	92	96	96	98	68	78	74	86	88	90	86	94	84	86	84	100	104	106	84	88	86	72	80	86	N	100	0	0
33	KARTIK	74	M	180	88	27.2	II	118	116	120	110	116	120	118	120	114	120	114	116	78	72	78	74	78	80	76	82	76	78	84	84	92	82	84	92	92	88	90	96	88	84	88	82	84	66	68	78	80	76	64	66	55	62	62	60	N	99	0	0
34	PRAVEEN	63	M	170	65	22.5	I	120	126	124	122	118	118	120	124	100	110	106	110	82	84	86	84	78	78	80	76	70	74	76	78	92	96	96	96	86	90	94	84	88	88	88	86	68	64	66	64	68	68	67	74	72	70	66	64	N	100	0	0
35	PAVITHRAJ	70	M	168	62	22	II	130	132	134	130	100	102	110	118	122	120	116	96	90	94	88	88	68	70	74	78	78	82	80	78	104	102	102	104	78	82	86	88	90	94	90	98	78	78	80	86	90	104	78	76	74	80	72	76	N	100	0	0
36	MAHANTESH	68	M	166	59	21.4	I	118	120	118	116	120	118	110	104	116	120	124	126	70	70	78	68	80	72	72	68	74	82	80	80	82	88	86	78	92	86	88	78	90	94	96	96	84	82	88	78	76	74	68	74	80	84	82	78	N	100	0	0
37	YASHWANT	65	M	164	60	22.3	II	120	118	114	116	114	110	104	106	118	120	124	122	80	76	78	74	76	74	68	64	72	82	82	92	90	90	88	88	90	78	78	88	92	94	96	98	72	70	68	66	68	72	68	62	64	68	70	72	N	100	0	0
38	NAYA BIDARI	63	F	162	58	22.1	I	130	128	128	126	110	100	112	120	122	110	110	100	80	82	82	80	78	76	78	80	82	78	70	80	92	94	94	90	88	88	90	92	94	88	86	94	82	80	78	76	72	78	68	70	72	74	78	80	N	100	0	0
39	POOPA	62	F	166	60	21.8	I	130	128	126	124	120	122	118	122	116	110	120	124	80	80	80	80	82	84	78	86	80	78	70	82	86	102	100	100	98	98	102	96	98	98	86	94	84	88	86	84	66	68	69	79	62	64	68	64	62	62	64	N	100	0	0
40	KESHAV PATTAR	62	M	160	55	21.5	I	130	128	130	130	104	102	102	108	116	126	130	120	80	82	84	86	68	68	64	80	82	82	80	80	102	102	104	104	80	82	86	96	98	100	98	98	80	82	78	76	74	76	74	76	74	70	76	76	N	100	0	0
41	NOORJAHAN	65	F	158	55	22	II	130	136	138	130	118	116	128	134	130	122	128	120	72	74	78	78	74	76	84	88	86	78	88	80	88	88	88	90	88	92	92	98	98	90	100	98	88	68	64	68	72	70	70	72	74	76	70	74	N	100	0	0
42	VINOD KUMAR	66	M	163	58	21.8	II	130	136	134	136	80	88	98	110	108	110	110	116	80	78	74	76	50	58	62	70	68	72	78	74	92	88	90	90	66	64	74	86	78	84	88	88	82	64	66	68	96	94	72	72	74	76	74	72	N	100	1	0
43	CHANDRAKANTH	68	M	170	70	24.2	I	120	126	134	136	112	100	112	114	116	110	110	124	80	84	82	80	70	70	72	76	74	80	82	86	96	98	96	94	84	86	88	88	90	92	96	98	72	72	74	76	74	80	82	66	68	70	72	74	N	100	0	0
44	BHAGYASHREE	64	F	154	56	23.6	I	132	130	132	134	104	100	98	110	110	122	114	110	88	88	90	94	64	62	54	68	74	80	74	72	104	106	104	108	78	74	68	78	88	92	90	84	70	72	74	76	88	98	90	84	80	76	74	74	N	100	1	0
45	WAGAYA	62	M	162	67	25.5	I	120	122	122	120	116	116	120	124	126	118	120	120	80	84	86	84	74	72	82	82	84	78	80	80	92	94	98	98	88	84	96	98	98	88	92	94	84	82	64	68	70	72	64	62	64	60	62	64	N	98	0	0
46	BHUTAPPA	66	M	170	64	22.1	II	120	116	118	110	110	104	110	108	106	112	114	126	80	80	78	80	72	68	76	66	68	72	72	80	92	92	90	92	88	78	88	76	80	86	86	94	76	74	72	76	74	80	82	82	70	80	82	82	N	100	0	0
47	RATTUR	65	F	156	55	22.5	II	130	128	126	130	114	116	112	110	116	110	110	126	80	82	84	86	70	72	72	70	72	78	80	82	94	96	98	98	90	88	84	82	86	88	92	94	82	82	78	76	74	78	68	76	72	72	70	72	N	100	0	0
48	SANGAYYA	62	M	168	67	23.7	I	126	118	120	118	120	116	114	112	110	110	102	108	78	78	82	76	78	72	72	70	72	70	72	72	88	88	88	92	88	92	92	88	88	86	86	84	80	80	84	82	64	64	68	72	70	68	64	66	68	70	72	N	100	0	0
49	KUMAR	63	M	169	65	22.8	I	118	118	116	120	110	104	106	106	114	116	118	120	78	74	72	78	74	70	68	68	70	72	74	80	88	88	88	92	90	86	80	78	82	84	86	92	80	82	62	62	62	60	64	72	70	66	62	64	64	N	100	0	0
50	MADDIMRA	70	M	172	68	23	II	126	124	122	124	120	124	122	118	126	120	124	118	78	76	78	80	76	76	78	72	76	80	82	76	88	88	88	90	92	90	90	92	98	98	92	96	90	80	82	84	78	76	76	80	76	76	74	80	82	N	100	0	0
51	JAGADISH	74	M	171	75	25.6	II	130	116	120	118	114	108	108	114	116	110	110	122	80	78	82	76	74	70	76	74	74	76	74	80	92	98	96	88	88	88	90	86	90	90	92	96	76	74	76	80	82	78	76	84	80	78	78	74	N	100	0	0
52	DEVENDRA	60	M	160	67	26.2	I	120	126	134	130	100	92	88	92	100	104	106	110	80	82	82	80	70	58	58	62	68	70	72	70	92	94	94	92	84	88	88	72	78	82	84	82	64	66	62	64	66	80	84	92	78	64	62	64	N	100	2	0
53	VEENA	62	F	159	65	25.7	I	130	128	128	130	116	114	112	110	116	120	120	120	80	82	82	82	72	74	70	74	72	76	78	80	92	94	92	96	86	88	82	86	84	88	88	90	72	78	76	76	70	68	72	74	76	70	68	72	N	100	0	0
54	RANGAPPA	63	M	168	56	19.8	I	110	116	114	110	122	100	110	110	104	106	112	114	78	74	76	80	80	72	70	72	70	72	76	74	88	88	88	92	94	86	84	86	82	84	88	88	70	72	74	68	64	72	70	68	64	68	72	74	N	100	0	0
55	SEETHA	60	F	154	66	27.8	I	126	126	124	124	110	124	118	116	114	110	110	120	84	84	82	82	84	78	74	72	76	74	72	80	96	96	94	94	98	90	92	88	88	90	88	92	68	68	64	66	58	54	58	60	62	62	62	64	N	100	0	0
56	VIDYANAND	65	M	161	62	23.9	II	120	122	122	114	98	98	100	104	100	110	110	108	80	82	82	76	60	56	58	62	64	72	72	74	92	94	94	88	72	68	68	78	78	84	86	86	68	68	70	72	74	78	70	78	76	74	80	72	70	N	98	1	0
57	VIJAY	62	F	156	55	22.5	I	126	124	126	124	114	102	110	116	114	112	110	110	80	82	82	82	78	72	76	78	78	76	78	80	92	94	94	94	88	88	88	90	90	92	88	88	76	74	76	74	72	68	72	74	76	70	68	68	64	N	99	0	0
58	SADANAND	68	M	163	58	21.8	II	130	128	122	122	118	126	128	132	128	130	130	122	80	82	82	82	78	74	86	92	84	78	80	82	96	96	98	96	88	88	96	98	100	104	94	94	88	88	84	84	60	52	48	78	82	68	64	64	N	100	0	1

MASTER CHART GROUP E(EPHEDRINE)

sl no	PATIENT NAME	AGE	SEX	HEIGHT	WEIGHT	BMI	ASA GRADE	SYSTOLIC BP(mmhg)										DIASTOLIC BP(mmhg)										MEAN ARTERIAL PRESSURE										HEART RATE										ECG	SpO2	RESCUE DOSES	ATROPINE
								15 MIN	10 MIN	5 MIN	0 MIN	5 min	6 MIN	9 min	12 min	15 min	20 min	25 min	30 min	15 min	10 min	5 min	0min(SA)	3min	6 min	9 min	12 min	15 min	20 min	25 min	30 min	15 min	10 min	5 min	0 min	3min	6 min	9min	12 min	15 min	20 min	25 min	30min	N			
1	ARAVIND	61	M	166	70	25.4	I	130	132	130	110	114	112	130	128	116	132	130	130	80	92	92	76	70	70	82	80	92	80	82	80	92	94	104	86	84	92	84	90	102	92	94	84	78	80	81	82	70	92	78	84	80	78	82	78	N	100	0	0
2	BASAVARAJ	72	M	168	70	24.8	II	120	120	120	108	110	112	114	120	118	120	124	122	80	80	78	68	68	68	84	80	78	80	84	80	92	92	90	80	78	80	82	88	92	92	92	82	80	80	80	78	80	90	80	78	80	80	78	80	N	100	0	0
3	PREMA SHIRAAL	70	F	158	50	20	II	130	130	130	120	120	108	132	128	122	130	132	130	80	80	84	78	74	78	82	80	84	80	82	80	92	92	96	96	86	84	82	84	92	92	92	80	86	86	86	72	86	80	86	83	86	86	72	86	N	100	0	0
4	RAMESH	62	F	165	60	22	I	110	112	110	112	118	110	112	110	110	112	122	110	70	74	76	72	72	72	78	70	76	70	78	74	82	84	84	94	92	90	84	88	86	82	84	83	82	82	82	68	82	85	82	78	82	82	68	82	N	100	0	0
5	BHAVANI	64	F	158	65	26	I	120	122	120	116	112	112	122	126	120	122	122	120	70	72	74	68	64	64	74	70	74	70	74	70	82	82	92	94	94	90	82	84	82	82	82	82	80	80	80	74	80	86	80	86	80	80	74	80	N	100	0	0
6	RUKMAIYA	63	F	160	55	21.5	I	140	140	140	120	120	118	146	126	122	140	146	140	80	84	90	76	80	80	84	80	90	80	84	80	94	96	90	92	92	90	84	86	90	94	96	82	82	82	82	78	82	90	82	92	82	82	78	82	N	100	0	0
7	SUNDRA-HUSAIAH	60	F	160	52	20.3	I	110	112	110	98	100	112	116	112	104	112	116	110	80	80	68	54	68	68	70	66	68	78	80	80	94	94	78	68	78	78	84	78	80	94	94	84	78	78	78	74	78	87	78	90	78	78	74	78	N	100	0	0
8	SAVITRI SAJAN	65	F	158	55	22	II	120	120	120	100	108	118	124	120	116	120	124	120	80	80	82	74	84	84	86	80	82	80	86	82	92	94	94	94	96	90	88	90	88	92	94	90	80	80	84	81	78	81	80	81	78	84	81	78	N	100	0	0
9	AVINASH	60	M	170	68	23.5	I	130	130	130	106	114	108	132	130	118	130	132	130	80	82	94	72	80	82	86	80	94	80	86	80	92	92	104	82	92	90	84	86	92	92	92	84	78	78	80	80	80	82	80	85	78	78	80	78	N	100	0	0
10	DHANSINGH	61	M	168	70	24.8	I	130	132	130	100	110	112	130	132	130	132	130	130	80	80	90	78	80	80	82	80	90	80	82	80	94	94	100	90	92	90	84	86	88	94	94	84	83	83	83	78	83	79	83	86	83	83	78	83	N	100	0	0
11	MAHADEVI	68	F	158	50	20	II	110	112	110	80	94	104	114	110	110	112	114	110	70	72	76	50	68	64	74	70	76	70	74	72	82	82	92	64	66	72	82	84	82	82	82	82	87	78	87	84	87	81	80	90	87	78	80	87	N	99	1	0
12	MADIWALAPPA	60	M	170	65	22.5	I	130	130	130	112	114	116	130	124	118	130	130	130	70	74	82	72	80	76	72	70	82	70	72	70	82	84	94	82	92	90	82	94	84	82	94	80	86	86	86	78	86	80	86	87	86	86	84	86	N	100	0	0
13	NANDESH	70	M	168	65	23	II	120	120	120	110	116	118	122	118	118	120	122	120	80	80	80	70	70	78	86	80	80	80	86	80	92	92	92	94	82	84	84	88	92	92	92	83	92	92	92	85	92	83	92	86	92	92	78	92	N	100	0	0
14	KAMALABAI	63	F	156	60	24.7	I	130	128	130	104	104	110	134	122	122	120	134	132	80	82	94	70	80	80	86	80	94	80	86	80	94	94	104	82	92	90	82	86	94	94	94	82	90	90	90	86	90	87	90	82	90	90	83	90	N	99	0	0
15	PRIYANKA	61	F	158	55	22	I	120	122	120	100	110	112	122	118	116	122	122	120	70	70	78	68	70	70	74	70	78	70	74	70	82	82	88	80	82	86	84	90	92	82	82	82	83	76	78	80	90	76	86	76	80	78	76	87	76	N	100	0	0
16	SHANTABAI	74	F	162	60	22.9	II	120	118	120	84	108	110	122	116	110	118	122	120	80	80	80	48	64	64	80	80	80	80	80	80	94	94	94	62	64	70	84	86	92	94	94	84	85	85	85	87	85	86	85	82	85	85	86	85	N	100	1	0
17	SUNANDA	62	F	160	62	24.2	I	120	122	120	114	110	112	122	122	118	122	122	120	70	70	84	74	76	78	72	70	84	70	72	70	82	82	96	82	86	84	80	84	82	82	82	80	86	86	86	82	86	90	86	79	86	86	82	87	N	100	0	0
18	RAGHENDRA	61	M	172	78	26.4	I	120	120	120	100	102	108	120	118	122	120	120	120	78	80	82	72	78	78	82	78	82	78	82	80	90	88	96	82	90	88	84	86	88	90	88	84	90	90	90	86	90	87	90	81	90	90	90	90	N	100	0	0
19	BALASAB	64	M	168	65	23	I	120	118	120	110	110	112	120	120	116	118	120	120	80	80	82	70	80	80	82	80	82	80	82	80	94	94	94	86	94	92	82	86	94	94	94	82	87	87	87	95	88	82	88	80	87	87	78	87	N	100	0	0
20	VISHLAVI	60	F	162	63	24	I	130	130	130	100	108	110	132	132	126	130	132	130	90	88	92	78	80	80	84	80	92	80	84	80	100	100	100	100	94	92	90	84	86	88	100	100	100	100	100	83	92	82	84	76	82	86	82	83	92	82	85	82	N	99	0	0
21	AMMAMMA	69	F	158	56	22.4	II	110	112	110	100	104	110	114	110	110	112	114	110	78	76	74	74	72	72	80	78	74	78	80	82	90	90	90	82	86	86	82	86	90	90	90	80	84	86	84	68	80	85	84	87	86	84	86	85	N	100	0	0
22	VINOD	80	M	168	70	24.8	II	130	130	130	122	108	106	134	132	108	130	134	130	80	80	92	70	74	74	80	80	92	80	80	80	96	96	104	84	88	90	82	88	96	96	96	82	95	95	95	82	84	76	95	86	95	95	90	95	N	100	0	0
23	CHIDANAND	62	M	170	72	24.9	I	140	140	140	120	108	110	140	128	128	140	140	140	90	88	102	74	80	80	94	90	102	90	94	86	104	104	114	90	92	96	88	94	104	104	104	84	76	76	78	86	84	68	76	92	76	76	87	76	N	99	0	0
24	ANKITH	64	M	167	65	23.3	I	120	122	120	112	114	112	122	118	120	122	122	120	70	72	86	72	82	82	70	70	86	70	70	70	84	84	94	88	96	90	84	86	84	84	84	84	68	68	68	55	48	84	68	64	68	68	70	68	N	100	0	1
25	KALAPPA	66	M	169	68	23.8	II	130	128	130	118	116	118	132	126	114	128	132	130	80	84	84	78	70	70	84	80	96	80	84	82	94	94	100	94	92	96	84	88	94	94	94	82	76	76	76	76	78	72	76	76	76	76	76	76	N	100	0	0
26	SHANTA	63	F	160	58	22.7	I	130	130	130	122	120	118	130	130	130	130	130	130	80	82	86	80	76	82	80	94	80	82	80	92	92	100	92	94	90	86	90	92	92	92	80	72	72	72	68	68	94	72	78	72	72	68	72	86	N	100	0	0
27	SABDAM	60	M	170	68	23.5	I	120	122	120	90	108	110	114	110	118	122	124	120	70	74	82	64	70	70	76	70	82	70	82	80	84	84	94	78	82	92	84	88	84	84	84	84	82	94	94	94	76	76	72	94	82	94	94	76	94	N	100	1	0
28	VINOD	61	M	158	51	20.2	I	130	128	130	118	120	118	130	126	114	128	130	130	78	72	84	80	84	84	80	70	84	70	80	82	82	82	96	90	96	90	86	88	82	84	82	82	87	87	87	72	72	94	87	79	87	87	72	87	N	100	0	0
29	MOHAMMED	63	M	162	62	23.6	I	140	138	140	128	124	128	144	128	128	130	144	140	80	80	94	84	82	82	94	80	94	80	84	82	96	96	104	94	96	90	84	90	96	96	96	84	68	68	70	78	78	87	68	81	68	68	94	68	N	100	0	0
30	SANJEEV	62	M	168	70	24.8	I	130	130	130	100	108	118	134	134	118	130	134	130	80	80	96	60	74	76	84	80	96	80	84	80	94	94	110	98	88	90	84	86	94	94	94	84	70	70	70	87	87	70	70	80	70	70	87	70	N	100	0	0
31	HARUN	62	M	164	64	23.8	I	110	112	110	100	102	110	112	110	112	112	122	110	80	84	76	76	72	72	80	80	76	80	80	80	92	92	90	88	84	88	80	86	92	92	92	80	93	93	93	68	70	70	93	83	93	93	68	93	N	100	0	0
32	AYYAPPA	68	M	162	68	22.4	II	130	128	130	98	108	110	130	134	126	128	130	130	80	82	80	62	68	68	72	80	80	80	82	80	94	94	94	76	80	84	84	80	92	92	90	84	85	85	85	70	70	93	85	87	85	85	70	85	N	100	1	0
33	VIKAS	63	M	176	65	21	I	140	140	140	116	110	118	142	128	128	140	142	142	80	80	74	78	78	72	82	80	74	80	82	84	96	96	90	90	90	88	84	88	96	94	96	84	76	76	76	76	76	85	76	86	76	76	93	76	N	99	0	0
34	SHRUTHI	72	F	168	55	19.5	II	120	122	120	108	110	118	120	122	114	122	120	120	80	82	78	78	80	74	84	80	78	80	84	80	92	92	90	90	92	88	82	86	92	90	92	82	90	90	90	72	90	76	90	92	90	90	85	90	N	100	0	0
35	KISHABAI	70	F	156	58	23.8	II	110	112	110	100	104	110	116	108	116	112	116	110	70	74	72	68	70	70	72	70	72	70	72	70	82	82	86	80	82	82	80	78	82	82	82	80	74	74	74	74	76	74	64	74	74	70	74	74	N	100	0	0
36	RAVIKUMAR	64	M	168	64	22.7	I	130	130	130	100	108	110	134	128	120	130	134	130	80	80	80	70	82	80	84	80	84	80	84	80	94	94	88	84	94	90	84	88	94	92	94	83	94	91	91	91	87	91	74	91	88	91	91	86	91	N	100	0	0
37	SOLABAIYA	63	M	170	72	24.9	I	130	128	130	108	106	106	136	122	122	128	136	130	68	78	84	72	82	72	70	68	70	68	78	74	78	78	86	82	82	80	82	80	78	78	78	82	67	67	67	68	67	67	67	85	67	67	82	67	N	100	0	0
38	DEEPAK	62	M	168	66	23.4	I	120	120	120	120	114	110	126	112	116	120	126	120	80	82	80	80	68	74	80	80	80	80	80	80	92	92	92	96	100	98	88	96	92	94	92	83	72	72	72	70	72	72	72	76	72	72	73	72	N	100	0	0
39	ARJUN	67	M	166	58	21	II	110	114	110	110	108	104	114	108	118	114	114	110	70	76	72	72	70	70	74	70	72	70	74	70	84	84	84	94	98	96	84	86	84	84	82	84	80	80	80	93	80	80	80	90	80	80	100	80	N	100	0	0
40	DEEPIKA RATHOD	62	M	167	69	24.7	I	130	130	130	112	110	110	132	122	120	130	132	130	80	84	78	74	82	80	86	80	78	80	86	82	92	92	92	88	94	90	84	86	92	90	92	82	96	96	96	85	104	100	96	74	96	100	92	96	N	100	0	0
41	JYOTI	60	F	160	59	23	I	140	140	140	120	120	118	140	128	134	140	140	140	80	80	76	62	84	80	88	80	76	80	88	84	94	94	90	96	96	92	88	90	94	92	94	84	68	68	68	76	68	68	68	91	68	68	86	68	N	100	0	0
42	SEETA	69	F	159	61	24.1	II	120	124	120	120	102	116	124	120	126	124	124	120	80	80	80	60	70	76	80	80	80	80	80	80	94	94	94	86	92	88	84	88	92	94	94	82	66	66	66	64	60	44	80	70	66	66	83	66	N	100	0	1
43	MEHABOOB	60	M	165	70	25.7	I	110	114	110	100	110	102	112	106	114	114	112	110	70	76	88	72	70	74	72	70	88	70	72	70	82	82	90	86	92	88	84	82	82	84	82	84	71	71	71	74	71	71	71	72	71	71	68	71	N	100	0	0
44	SHIVAPPA	60	M	160	60	23.4	I	130	130	130	126	118	110	128	122	120	130	130	130	78	74	86	74	78	82	74	70	86	70	74	74	82	82	82	82	90	92	88	88	82	84	82	80	79	79	79	91	79	74	79	80	79	79	64	79	N	100	0	0
45	SUMAN MANE	68	F	156	59	24.2	II	130	130	130	100	118	116	130	124	126	130	130	130	80	82	88	70	68	80	82	80	94	80	82	80	92	92	104	84	98	94	88	90	92	94	92	82	74	74	74	67	74	74	74	72	74	74	74	74	N	98	0	0
46	ALLABAKSH	62	M	168	66	23.4	I	120	120	120	100	110	108	122	120	118	120	122	120	80	80	84	76	76	80	84	80	84	80	84	80	92	92	96	86	90	92	84	86	92	94	92	84	86	86	86	72	86	86	86	80	86	86	90	86	N	100	0	0
47	HEMATESH	64	M	170	70	24.2	I	110	114	110	110	108	110	116	112	116	114	116	110	80	80	78	76	74	70	86	80	78	80	86	82	94	94	90	90	88	90	84	88	94	96	94	84	82	82	82	80	82	80	82	96	82	82	88	82	N	100	0	0
48	BASAVARAJ	61	M	166	59	21.4	I	120	120	120	118	116	112	120	116	120	120	120	120	78	72	88	78	82	72	74	70	88	70	74	70	82	82	90	88	96	88	82	84	82	84	82	82	73	73	73	72	73	73	73	71	73	73	84	73	N	100	0	0
49	PANDURANG	60	M	159	60	23.7	I	130	128	130	110	110	110	128	118	122	120	128	130	80	80	78	60	80	78	82	80	78	80	82	80	94	94	92	96	92	94	88	86	94	94	94	80	94	94	94	80	94	80	102	79	94	100	71	102	N	100	0	0
50	RUKMAIYA	66	F	168	58	20.5	II	140	138	140	120	118	140	138	126	130	140	140	140	86	88	88	68	80	80	86	80	88	80	86	80	100	100	100	94	94	90	88	94	100	100	100	82	92	92	92	95	92	100	92	74	92	92	79	92	N	100	0	0
51	SAIBANNA	61	M	156	48	20.1	I	130	128	130	92	112	116	134	124	120	128	134	130	78	76	86	68	70	76	70	70	86	70	70	70	82	82	98	82	82	86	82	84	82	82	82	82	86	86	86	84	86	86	86	78	80	74	86	86	N	100	1	0
52	CHANDRIKA	62	F	166	55	20	I	120	120	120	106	110	110	122	114	114	120	122	120	80	86	82	72	72	80	84	80	82	80	84	80	92	92	94	84	86	84	84	90	92	92	92	83	83	92	83	78	83	86	80	82	84	83	86	83	N	100	0	0
53	SHIVANAGOUDA	60	M	171	65	22.2	I	120	122	120	104	108	106	120	120	112	122	120	120	78	70	80	76	78	80	70	70	80	70	70	72	84	84	84	82	90	92	88	88	84	84	84	84	68	68	68	71	68	71	68	73	68	68	70	68	N	100	0	0
54	DEEPA	61	F	162	60	22.9	I	110	116	110	100	108	108	110	110	116	116	110	110	78	74	72	70	76	76	72	70	72	70	72	70	82	82	82	86	90	90	84	88	82	82	82	80	64	64	64	79	64	79	64	100	64	64	73	64	N	100	0	0
55	LAXMI	63	F	156	53	20.5	I	130	130	130	100	110	118	134	128	122	130	134	130	80	80	84	70	80	80	80	80	84	80	80	80	94	94	96	82	94	90	84	92	94	94	94	84	74	74	74	74	74	74	74	92	74	74	78	74	N	100	0	0
56	RAJESHWARI	69	F	165	62	23.3	II	140	136	140	120	120	130	142	130	128	136	132	140	90	86	90	78	80	84	90	90	90	84	82	100	100	102	90	100	96	90	94	94	100	100	104	84	98	98	98	86	98	86	100	80	98	98	92	98	N	100	0	0
57	MAHESH	70	M	156	59	24.2	II	118	116	118	106	108	106	114	112	110	116	118	118	78	74	76	74	66	80	82	78	76	78	76	78	90	90	88	88	100	86	88	92	90	94	90	78	76	78	80	82	88	82	84	78	80	84	80	86	N	100	0	0
58	MAHANTAPPA	64	M	170	70	24.2	I	120	120	116	114	110	108	110	110	116	110	110	116	70	78	78	74	76	68	78	70	74	70	72	72	84	84	84	90	90	90	88	86	92	90	94	84	74	72	74	83	73	84	73	74	72	76	78	83	N	99	0	0

MASTER CHART GROUP C (CONTROL GROUP)

Group	PATIENT NAME	AGE	SEX	HEIGHT	WEIGHT	BMI	NSA GRADE	SYSTOLIC BP(mmHg)										DIASTOLIC BP(mmHg)										MEAN ARTERIAL PRESSURE										HEART RATE										ECG	SpO2	RESCUE DOSES	ATROPI
								15 mins	10 mins	5 mins	3 mins(SA)	1min	3 min	6 min	9 min	12 min	15min	20 min	25 min	30 min	15 min	10 min	5 min	0 min(SA)	1min	3 min	6 min	9 min	12 min	15 min	20 min	25 min	30 min	15 min	10 min	5 min	0 min	1min	3 min	6 min	9 min	12 min	15 min	20 min	25 min	30 min	N			
1	SAVITHA K	70	F	160	65	25.4	II	134	132	134	120	120	120	120	105	115	120	115	130	85	90	80	80	78	80	72	70	74	82	88	86	100	96	100	94	94	90	96	94	98	100	96	90	70	80	78	90	64	84	78	78	76	66	78	70	N	100	0	0
2	PRABHAVATI L	90	F	158	48	19.2	I	122	134	122	130	126	90	120	110	116	118	116	122	80	80	80	80	80	64	80	70	72	80	80	80	92	92	92	96	94	76	92	94	86	92	92	90	80	82	80	92	70	68	70	70	82	68	80	68	N	100	1	0
3	VIJAYKUMAR K	60	M	167	68	24.4	I	130	130	130	126	118	110	120	106	110	126	118	120	80	80	80	80	78	70	74	80	70	92	80	80	80	92	94	94	92	92	90	94	84	96	92	94	88	86	88	86	81	68	74	96	62	76	84	86	94	N	100	0	0
4	MAHADEVI	70	F	160	60	23.4	II	120	122	120	120	110	108	120	110	110	118	118	112	70	74	70	70	70	66	80	70	72	74	70	70	84	88	82	100	96	78	88	92	84	84	88	91	82	84	82	78	62	62	106	74	74	68	72	70	N	100	0	0
5	KASTURI S	68	F	165	68	25	II	124	130	124	120	130	110	118	116	110	120	122	124	70	72	70	70	78	70	80	84	82	72	70	70	86	88	86	92	82	88	88	92	96	86	88	89	80	82	80	80	80	70	98	78	79	74	72	78	N	100	0	0
6	PARVATI DHABE	80	F	158	55	22	I	140	138	136	120	90	106	116	116	110	120	120	126	90	92	90	88	90	74	70	74	70	82	92	90	90	104	106	100	92	82	78	106	94	96	104	106	91	90	84	90	86	68	78	96	64	68	62	64	70	N	100	1	0
7	WEEMASHI	61	F	160	68	26.6	I	110	112	110	120	110	110	120	116	116	120	126	114	80	82	80	80	70	70	84	76	78	82	80	80	94	96	94	92	84	88	96	94	90	94	96	93	92	81	92	82	68	76	97	78	76	70	76	78	N	100	0	0
8	SANGAMMA M	63	F	158	56	22.4	I	130	132	130	130	110	98	110	100	110	110	110	104	80	82	84	80	66	68	70	70	72	82	84	84	96	94	94	92	78	78	94	86	98	96	94	89	81	81	82	80	86	70	95	68	60	78	64	66	N	100	1	0
9	NEELAPPA	62	M	170	78	27	I	120	134	120	118	120	106	120	122	116	118	122	122	80	82	80	78	74	80	82	82	80	82	80	80	92	94	92	96	94	96	94	96	86	92	94	90	70	80	78	82	82	76	96	62	70	76	78	76	N	100	0	0
10	SATISH BAPPA	60	M	168	65	23	I	130	130	130	128	110	110	110	118	116	128	118	132	80	84	82	80	66	78	80	80	80	84	82	80	100	96	96	88	78	92	96	94	100	100	96	90	80	82	80	78	80	80	98	78	70	78	76	74	N	100	0	0
11	HARSHA	64	F	158	56	22.4	I	112	112	112	118	120	106	116	124	110	116	108	112	70	72	70	70	70	88	70	80	78	72	70	70	82	86	82	92	82	94	86	84	86	82	86	88	86	88	86	86	81	82	80	96	80	88	76	80	72	N	99	0	0
12	RUHALLA	60	F	165	70	25.7	I	122	130	122	128	110	110	116	124	110	118	124	124	80	80	82	78	70	70	70	82	78	80	82	80	92	94	92	92	82	94	94	96	92	92	94	91	82	84	82	80	78	72	116	90	92	68	64	78	N	100	0	0
13	JAYSHREE B	72	F	165	66	24.2	II	110	116	120	122	116	116	120	116	108	110	116	100	70	80	80	78	70	78	84	78	70	80	80	78	92	94	94	96	92	94	94	96	92	92	94	89	80	82	80	80	82	68	68	60	48	96	80	80	96	N	100	0	1
14	VEENA CHIDANAND	70	F	162	60	22.9	II	120	112	120	118	72	116	118	130	118	118	120	114	80	80	80	80	72	78	78	80	68	80	80	80	92	92	94	96	92	84	92	90	86	92	92	91	82	84	82	86	74	62	96	82	68	72	70	72	N	99	0	0
15	SUNILKUMAR	64	M	168	70	24.8	I	130	132	130	124	76	90	116	124	114	110	124	120	84	88	82	84	48	68	76	80	80	88	82	84	96	98	94	94	58	80	88	98	84	96	98	93	79	81	79	82	64	74	97	80	62	68	79	92	N	100	2	0
16	RAJU TIPPU	62	M	168	70	24.9	I	120	134	120	124	100	108	120	118	124	124	118	122	70	74	78	78	68	70	70	74	78	74	70	78	88	86	84	96	74	86	86	96	98	88	96	89	81	81	82	80	78	78	95	82	74	62	70	68	N	100	0	0
17	DILSHAD	65	F	158	52	20.8	II	130	130	130	116	100	100	110	118	116	116	118	132	80	84	80	80	70	68	76	72	76	74	80	80	92	96	92	96	84	78	96	96	94	92	96	90	80	80	80	82	68	64	96	78	78	74	76	78	N	100	1	0
18	ANIL CHANDU	62	M	172	78	26.4	I	110	112	110	120	110	110	120	108	116	112	110	110	70	70	72	70	70	70	72	70	72	70	70	70	82	84	82	90	86	84	96	86	82	84	90	80	82	80	80	79	62	81	98	62	64	72	68	76	N	100	0	0
19	NARSING	60	M	170	78	27	I	100	100	100	124	102	102	110	118	114	120	118	114	80	82	80	76	76	72	80	70	80	82	80	80	94	96	94	98	96	92	96	91	94	94	96	88	86	88	86	81	80	80	96	74	78	64	78	78	N	100	0	0
20	AKSHITA B	62	F	160	66	25.8	I	116	122	120	118	108	108	116	124	110	98	122	120	72	80	80	72	78	80	70	82	80	80	80	72	82	96	94	88	90	92	96	98	96	92	96	91	82	84	82	78	68	80	106	78	68	78	82	80	N	99	0	0
21	SHANKRPPA	61	M	168	72	25.5	I	112	112	112	118	104	104	108	114	114	100	108	114	72	78	74	72	60	80	70	80	74	78	74	72	92	90	86	92	96	94	90	86	84	82	90	89	80	82	80	80	68	86	98	64	62	68	70	82	N	100	0	0
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23	RAMESH	62	M	168	70	24.8	I	124	130	124	114	110	110	110	120	116	114	124	122	80	72	80	80	74	70	78	74	76	72	80	80	92	86	94	96	86	92	86	96	92	86	96	93	79	81	79	82	82	80	97	68	68	72	68	70	N	99	0	0
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25	HASEENA D	62	F	160	55	21.5	I	110	112	110	126	100	100	108	112	114	120	104	112	70	72	72	70	70	68	70	80	82	72	72	70	82	86	84	84	78	80	86	82	88	82	86	90	78	80	78	82	82	82	96	80	72	68	78	88	N	100	0	0
26	VINAY	66	M	168	68	24.1	II	122	130	122	126	110	110	104	124	110	106	118	110	80	80	80	78	72	70	80	70	70	78	78	80	92	92	94	90	96	88	92	92	92	90	80	82	80	80	79	80	80	82	98	68	68	62	70	88	N	100	0	0
27	SUJATHA TALWAR	63	F	160	58	22.7	I	110	110	120	122	90	90	104	110	110	122	116	120	70	72	72	70	62	60	72	78	72	72	72	70	80	82	84	78	74	74	82	84	96	80	82	88	86	88	86	81	80	78	96	68	62	72	70	64	N	100	0	0
28	ANITA	63	F	165	69	25.3	I	110	112	110	122	100	100	110	114	116	106	100	114	70	74	70	70	70	72	72	72	70	62	74	70	92	86	82	92	84	86	86	98	74	88	86	92	82	84	82	80	86	80	116	96	74	86	82	74	N	100	0	0
29	HUGAPPA B	60	M	170	75	26	I	110	110	110	124	110	110	116	100	108	108	116	130	70	72	70	70	74	78	80	70	72	72	70	70	92	84	82	86	88	84	84	92	84	82	84	89	80	82	80	80	82	86	98	57	78	66	80	78	N	100	0	0
30	SHREEKANTH	62	M	166	65	23.6	I	124	124	124	114	94	100	116	104	100	114	110	122	84	88	88	80	58	72	80	70	74	88	88	84	96	98	100	96	70	84	98	98	92	96	98	91	82	84	82	79	68	82	96	68	64	78	70	64	N	100	1	0
31	PRABHU	69	M	168	72	25.5	II	122	130	118	124	110	110	112	104	110	124	110	132	80	82	80	80	72	70	88	80	58	82	80	80	94	94	94	94	84	84	96	86	96	94	94	93	79	81	79	81	62	80	80	74	78	70	78	72	N	100	0	0
32	CHIDANAND	63	M	169	68	23.8	I	110	112	110	126	100	100	112	110	102	114	110	112	70	70	70	70	78	70	70	80	72	70	70	70	84	86	84	84	86	82	86	96	84	84	86	89	81	81	82	80	74	82	95	98	68	78	78	68	N	100	0	0
33	JAYSHREE	62	F	160	58	22.7	I	110	100	110	110	100	100	104	120	100	110	118	114	78	80	78	78	72	88	78	70	78	80	78	78	90	94	90	96	84	84	94	94	92	90	94	90	80	80	80	80	78	80	96	96	62	64	80	62	N	99	0	0
34	SUBASH	61	M	170	68	23.5	I	136	130	136	122	116	100	114	116	104	122	100	108	84	84	86	82	74	80	70	70	72	84	86	84	92	96	98	92	84	84	96	96	96	92	96	90	80	82	80	86	84	82	66	72	70	74	70	74	N	100	1	0
35	RAVIKUMAR	70	M	158	51	20.2	II	118	112	118	122	100	100	124	110	104	122	104	114	70	72	70	70	72	70	70	82	74	72	70	70	86	84	82	92	88	86	84	96	90	86	84	88	86	88	86	82	78	78	96	90	68	78	80	68	N	100	0	0
36	RAVI	62	M	162	62	23.6	I	130	132	130	136	116	116	116	130	110	116	104	130	90	92	90	88	88	78	70	70	74	78	78	76	102	104	102	96	90	92	92	90	92	102	104	91	82	84	82	80	68	82	106	90	68	68	76	68	N	100	0	0
37	RUDRAPPA	64	M	168	70	24.8	I	124	124	124	116	110	110	106	114	116	116	118	122	80	82	80	80	62	86	74	76	74	78	80	80	92	96	94	92	96	84	96	96	92	92	96	89	80	82	80	82	62	80	98	82	68	78	82	62	N	100	0	0
38	SHIVANAND	62	M	164	64	23.8	I	136	130	136	126	118	100	100	124	110	126	120	132	86	84	84	86	70	70	70	82	78	84	84	86	100	96	96	98	84	84	96	94	96	100	96	91	82	84	82	79	80	80	80	80	70	68	74	70	N	100	1	0
39	NAGAPPA	64	M	161	68	22.4	I	116	112	116	120	100	100	116	116	110	120	116	112	76	78	74	76	80	78	78	70	78	78	74	76	88	88	84	92	94	82	88	96	94	88	88	93	79	81	79	81	68	86	97	82	78	68	78	70	N	100	0	0
40	BAGAVANTI	62	M	168	67	23.7	I	124	120	124	122	104	104	110	100	110	122	110	124	80	80	80	80	84	78	86	72	78	80	80	80	90	92	94	94	92	86	92	84	94	90	92	89	81	81	82	78	68	82	95	78	74	72	78	74	N	100	0	0
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44	SHIVANAND	64	M	160	67	26.2	I	120	134	110	134	104	104	104	110	120	134	116	122	80	80	80	76	74	80	84	72	80	80	80	80	92	92	92	92	84	92	92	88	90	92	92	92	82	84	82	80	68	82	116	86	68	78	82	68	N	100	0	0
45	KASHINATH	60	M	170	65	22.5	I	130	130	130	120	110	100	110	104	116	120	110	110	86	84	84	86	76	68	74	70	68	84	84	86	98	96	96	96	86	88	96	92	92	98	96	89	80	82	80	82	68	78	98	82	62	96	80	62	N	98	0	0
46	SHIVANAND	64	M	168	62	22	I	110	112	110	120	110	110	120	104	120	118	110	112	70	74	76	70	70	74	76	80	72	72	74	70	70	82	84	82	84	88	84	94	96	92	84	90	82	84	82	79	68	68	70	78	80	76	72	80	N	100	0	0
47	UDAY	61	M	166	59	21.4	I	124	136	124	130	90	90	116	80	120	130	100	124	80	80	84	80	50	52	82	74	74	80	84	80	94	92	96	92	82	64	92	84	94	94	92	93	79	81	79	81	64	68	68	70	68	72	70	68	N	100	2	0
48	TULASI	65	F	166	56	20.3	II	124	138	126	118	112	112	120	112	114	118	104	120	84	84	84	70	70	72	72	74	76	84	84	84	94	96	96	96	84	86	96	94	94	94	96	89	81	81	82	80	80	96	60	95	78	68	72	78	78	N	100	0	0
49	MARUTI HANDI	60	M	172	68	23	I	124	112	114	126	100	100	120	104	124	116	104	114	70	78	74	80	80	74	84	68	80	78	74	78	90	90	88	96	86	84	90	92	92	90	92	90	80	80	80	80	80	98	68	96	66	50	68	72	70	N	100	0	1
50	LAXMI	66	F	162	58	22.1	II	130	132	130	124	130	100	114	108	120	124	80	130	80	80	80	80	68	76	80	68	72	80	80	80	92	92	92	88	88	84	92	96	96	92	92	90	80	82	80	80	56	64	98	78	70	72	74	80	N	100	1	0
51	PRASAD	63	M	170	72	24.9	I	120	134	120	128	98	98	124	116	130	118	112	122	80	80	80	76	64	68	80	70	74	80	80	80	92	92	94	92	76	78	92	84	94	92	92	88	86	88	86	86	106	96	96	80	82	82	86	80	N	100	1	0
52	REVAPPA	60	M	167	65	23.3	I	130	130	130	120	100	100	116	110	120	120	104	132	84	84	86	80	70	72	76	72	80	84	86	84	96	96	98	96	92	92	96	92	92	96	98	88	82	84	82	82	98	98	106	86	78	88	82	84	N	100	0	0
53	HASEENA MULLA	70	F	160	56	21.9	II	104	112	114	116	110	110	110	116	116	108	112	110	70	72	70	70	78	74	86	74	78	72	70	70	82	84	82	84	96	98	84	90	92	84	86	89	80	82	80	80	96	96	98	82	80	82	80	78	N	100	0	0
54	NAGAVENTTY	62	M	166	60	21.8	I	120	120	120	120	112	112	118	100	114	120	116	114	80	82	82	80	66	80	70	76	80	82	82	80	92	94	94	94	90	82	94	92	90	92	94	86	80	82	84	82	82	97	106	96	80	86	78	82	N	100	0	0
55	MADHMA	61	F	156	50	20.5	I	140	138	140	126	110	110	100	104	110	126	114	120	92	88	92	80	70	70	80	68	76	80	82	82	92	92	104	100	104	92	92	94	88	92	92	104	100	90	79	81	79	79	81	98	78	82	78	78	80	N	100	0	0
56	NIRMALA	62	F	162	62	23.3	I	110	112	110	114	98	108	104	104	120	114	118	114	70	74	72	70	72	70	70	72	78	74	72	70	82	96	84	96	96	94	96	96	96	92	96	89	81	81	82	81	80	96	95	78	80	78	81	80	N	98	0	0
57	RUKMINA	62	F	162	58	22.1	I	136	136	136	124	110	112	104	114	116	124	110	114	86	84	88	86	74	76	70	74	74	84	88	86	96	96	94	98	84	90	96	84	84	96	92	78	76	72	74	80	76	76	72	76	74	76	74	74	N	100	0	0
58	RADHA	62	F	168	72	25.5	I	100	116	100	122	110	110	118	124	120	122	116	122	80	74	80	80	70	74	80	80	80	74	80	80	92	90	94	86	94	92	94	94	92	90	88	84	74	80	78	82	80	76	78	66	64	50	64	N	98	0	1

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