Original Article

ISSN (O): 2456-7388; ISSN (P): 2617-5479

Anesthetic Management and Outcome of Non-cardiac Surgery in Ischemic Heart Disease Patients

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Abstract

Background: Ischemic heart disease (IHD) is a leading cause of morbidity and mortality in the world and of perioperative complications in cardiac patients**.** Present study was done with objectives to study common coronary artery disease and their patho physiology, to identify patients at risk through history, physical examination and electrocardiogram, to evaluate the severity of underlying cardiac disease through cardiac testing taking care to minimize expenditure and to perform specialized test only on high risk patients, testing low risk patients increases cost may causes harm by delaying a non-cardiac operation. **Subjects and Methods**: In the present study total 60 patients (37 males & 23 females) having Ischemic heart disease were enrolled in three different groups. The study was carried out at P.D.U. Hospital, Rajkot from October 2006 to October 2008. Patients were divided into 3 different study groups according to type of anesthesia given. Group A included 20 patients received spinal and epidural anesthesia. Group B included 20 patients given peripheral nerve blockade. Remaining 20 patients were included into group C who were given general anesthesia. Various parameters of Cardiac risk index were calculated. **Results**: The shortest procedure in group A and group B was 30 minutes while group C had 40 minutes. The longest surgical procedure in group and group B was 145 minutes while, of the group C was 180 minutes. Prolong and major surgical procedures are more associated with the cardiac complications and mortality. Both the patients expired during surgery had developed cardiac complications. Majority of the patients were belonged to grade III & IV of ASA risk classification. **Conclusion:** High standard of post-operative care including pain relief and continuous ECG monitoring is required to reduce the increased morbity and mortality in susceptible patients. Choice of anesthetic technique depends up on type of surgery, duration of surgery and surgical risk factors of patients.

Keywords: Cardiac Risk Index, Ischemic Epidural Anesthesia, Heart Disease, Spinal Anesthesia.

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Received: 30 December 2020 **Revised: 11 February 2021** **Accepted: 18 February 2021** **Published: 05 June 2021**

Introduction

In General hospital like ours, it is not uncommon to find various medically compromised patients seeking surgical procedures. The coronary artery disease patients contribute sizable proportion of such compromised patients. Based on such fact, we are inspired to initiate a study of clinical nature in such patients.[1] As long as common population does not receive expert cardiovascular surgical management of various diseases, the proportion of such patients seeking non cardiac surgery is likely to remain high. The study of such a kind also provides us best opportunity for clinical assessment during actual anesthetic management. Also we have chance to assess the risk factors based on available data.

Administrating anesthesia to patients with preexisting cardiac disease is an interesting challenge. Most common cause of preoperative morbidity & mortality in cardiac patients is ischemic heart disease. Ischemic heart disease (IHD) is a leading cause of morbidity and mortality in the world and of perioperative complications in cardiac patients.[2] The number of people with coronary artery disease with or without intervention coming for non-cardiac procedures has also increased. IHD is number one cause of morbidity and mortality all over the world. Care of these patients requires identification of risk factors, preoperative evaluation & optimization, medical therapy, monitoring and choice of appropriate anesthetic technique & drugs.[2] Patients with coronary artery diseases undergoing non-cardiac surgery are at an increased risk for peri-operative complications such

as myocardial ischaemia, MI, cardiac failure, arrhythmias, cardiac arrest and increased morbidity and mortality. These complications are much higher in patients with recent MI or unstable angina who require urgent or emergency cardiac surgery.[3–8]

It is true to say that anesthetist is the person who maintains delicate relationship between the two supporting system of ventilation & perfusion, the later being both pulmonary and systemic. By prevention of abnormal PaO_2, $PaCO_2$ and P_H of arterial blood that the anesthetist's role can be best understood, because sympathetic Stimulation is likely to result with low pao_2, high $paCO_2$ low P_H.

Our special aspect is the management of anesthesia in the Cardiac patients, which requires expertise to administer type of anesthesia, local anesthetic drug volume as well as use of inhalation agent & muscle relaxation agent.[3]

Present study was done with objectives to study common coronary artery disease and their patho physiology, to identify patients at risk through history, physical examination and electrocardiogram, to evaluate the severity of underlying cardiac disease through cardiac testing taking care to minimize expenditure and to perform specialized test only on high risk patients, testing low risk patients increases cost may causes harm by delaying a non-cardiac operation.

Subjects and Methods

In the present study total 60 patients (37 males & 23 females) having Ischemic heart disease were enrolled in three different groups. The study was carried out at P.D.U. Hospital, Rajkot from October 2006 to October 2008. Diagnosis of all the cases was confirmed by the physician. Many patients had associated history of hypertension and diabetes mellitus.

Preoperative assessment

In Pre-Operative assessment, all patients were asked for symptoms of cyanosis, chest pain, palpitation, breathlessness, syncope, edema feet, hemoptysis and hemetemesis. Majority of patients showed positive history of chest pain, breathlessness on exertion & edema feet. Detailed history of associated surgical complaints, medical illnesses, hospitalization, any major surgery and drug treatment was taken. History of medications like vasodilators, nitrates, diuretics, anti-arrhythmic, antihypertensive and anticoagulants was obtained. All patients in my study were taking one or more of the above drugs.

Patients were classified according to symptoms, signs, vitals, investigations, ECG changes and type of surgery into New York heart association, American society of anesthesiologist classification, Goldman multi factorial risk index, Lee's revised cardiac risk index and surgical risk classification.

Patients were divided into 3 different study groups according to type of anesthesia given. Group A included 20 patients received spinal and epidural anesthesia. Group B included 20 patients given peripheral nerve blockade. Remaining 20 patients were included into group C who were given general anesthesia.

In general examination, all the patients were observed for tongue, conjunctiva, and nail bed for pallor, sclera for icterus, teeth and mouth opening. Airway examination including mallampatti grading was performed. Hepatojugular reflex, edema feet and JVP were observed for signs of congestive heart failure.

Vital data including temperature, pulse, blood pressure in lying down position and in right arm and left arm were taken. Respiratory rate and rhythm were mentioned. Vital data for preoperative period and then every 5min, 15min, 30min, 45min, 60min, 90, and, 120min. and post operatively after 2hrs. Were noted.

Systemic examination for cardio vascular system, respiratory system and central nervous system was done. All IHD patients were examined in detail for cardiovascular system including apex beat, neck vein engorgement, heart sounds and any foreign sounds. Routine investigations including Hb, RBS, Bl.Urea, S.Creatinine, ECG, Chest X-ray (PA view) and physician reference were performed. Special investigations like S.electrolytes, LFT and 2D Echocardiography were carried out in indicated patients.

Different anesthesia techniques were applied in different patients according to type and location of surgical procedure.

Premedications

I had given tab. Alprazolam (0.25mg) on previous night to allay anxiety associated with surgery. Inj. Glycopyrollate (0.04mg/kg)(0.2mg) was given to all the patients to produce antisialouge effect as well as for its vagolytic property. Inj. Ranitidine (1.0mg/kg) and Inj. Ondansetron (0.08- 0.1mg/kg) were given to prevent intraoperative and postoperative vomiting and acidity. Patients operated under general anesthesia had given Inj. dicloran (75mg) IV. Avoided in patients with high RFT.

Monitoring

Monitoring during anesthesia was simple and with the help of noninvasive techniques.

1. Pulse: rate rhythm and volume
2. Blood pressure
3. Monitoring of lead E C G
4. Respiratory rate regularity

5. SPO2
6. Blood loss and replaced when required
7. Tissue perfusion was clinically measured by temperature of skin, volume of pulse, capillary pulsation
8. Urine output in major surgery

Anesthetic technique

Regional, inhalation and intravenous techniques were all acceptable provided that they were compatible with attainment of the optimal haemodynamic conditions dictated by the specific ischemic heart disease patients.

General anesthesia

20 patients of my study had received general anesthesia. All patients were examined, premedicated and monitored intra operatively as described above. Patients operated for carcinoma breast, pyelolithotomy, craniotomy, exploratory laprotomy, and various laparoscopic surgery had given general anesthesia.

All patients were induced with Inj.sodium pentothal 5 mg /kg. and inj. succinyl choline 1.5 mg/kg. Simultaneous lignocaine (1.5mg/kg) was used to provide haemodynamic stability during laryngoscopy. It can attenuate heart rate, blood pressure, rate pressure product and pressure rate quotient. In some patients, I had used Glyceryl nitrate patch (5 mg) applied on left side of precordium.

All patients were maintained with oxygen, nitrous oxide and sevoflurane as an inhalation agent.Inj. Vecuronium (0.8-1 pa/kg) had given to maintain muscle relaxation during surgery.

Patients were reversed with Inj. neostigmine (0.05 md/kg) and Inj. glycopyrrolate (0.008mg/kg). Use of glycopyrrolate instead of atropine may decrease the likely hood of transient tachycardia.

Inj.bupivacaine (Heavy) (0.5%) intrathecally was given in spinal anesthesia under careful monitoring of blood pressure and pulse rate while in epidural anesthesia, inj. Lignocaine (plain) and inj. Bupivacaine (plain) was given in epidural space through 18G toughy needle.

Precipitous decrease in blood pressure following spinal or epidural anesthesia had been rapidly treated with small doses (5- 10mg) of mephentermine or similar agent to preserve coronary perfusion pressure until sufficient intravenous fluid can be given.

Small doses of ephedrine (5 to 10mg) may be preferable in the presence of bradycarcdia. Marked hypotension had been usually be avoided by prior volume loading.

Complications in general which were encountered during general anesthesia as well as cardiac complication, which were more frequent in patients with IHD were observed in the study. Other complications like hypotension, tachycardia, hypertension and bradycardia were also taken in to consideration.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

In the present study, total 60 patients underwent non-cardiac surgeries in general anesthesia, regional anesthesia or peripheral nerve block with different anesthetic drugs and techniques at P.D.U. hospital Rajkot from oct.2006 to 2008.

[Table 2] shows that mostly lower limb surgeries were performed under spinal anesthesia while abdominal and surface surgeries were under general anesthesia. Only limb surgeries were performed under block anesthesia. The shortest procedure in group A and group B was 30 minutes while group C had 40 minutes. The longest surgical procedure in group and group B was 145 minutes while the of group C was 180 minutes.

[Table 3] 25%patients of Group A, 15% patients of Group B and 30% patients of Group C were taking digoxin. Most of the patients were talking anti-coagulant, anti-ischemic or anti-hypertensive therapy.

Above [Table 6] suggests that prolong and major surgical procedures are more associated with the cardiac complications and mortality. Both the patients expired during surgery had developed cardiac complications.

Discussion

In the present study various ischemic heart disease patients undergoing different elective and emergency surgical procedure under different anesthetic techniques, during October 2006 to October 2008.

In present study table I patient‘s characteristics suggest that patients of IHD are more common in older age group(60-70 yrs) and are less common in younger age group(< 50 yrs) . Patients who were in the weight group (60-80 kg) constituted 70% of IHD patients. Male preponderance is present in group A, group B and group C patients.

[Table 2] showing operative data suggests that 60% of lower limb surgeries and lower abdominal surgeries were performed under spinal and epidural anesthesia, upper limb surgeries

Table 1: Age,sex and weight distribution in Group-A, Group-B, Group-C

Demographic Data										
Groups	**Age**					**Weight**			**Sex**	
	<50 Yr	50-60	60-70	70-80	>80Yr	<50kg	50-80kg	>80kg	Male	Female
Group-A	1 (5%)	4 (20%)	5 (25%)	8 (40%)	2 (10%)	6 (30%)	12 (60%)	2 (10%)	12 (60%)	8 (40%)
Group-B	0 (0%)	4 (20%)	7 (35%)	7 (35%)	2 (10%)	8 (40%)	6 (30%)	6 (30%)	14 (70%)	6 (30%)
Group-C	2 (10%)	4 (20%)	6 (30%)	6 (30%)	2 (35%)	7 (35%)	8 (40%)	5 (25%)	11 (55%)	9 (45%)
Ischemic heart disease shows higher incidence in male sex, 70-80 years of age group and 60 to 80 kg weight group.										

Table 2: Incidence of Typesurgery,Durationof surgery and Nature of surgery in Group-A, Group-B And Group-C patients

Operative data												
Groups	**Types Of Surgery**				**Duration of Surgery(hrs)**						**Nature of surgery**	
	Abdo	**Neuro surgery**	**Limb Surger**	**Surfac surgery**	**0-30**	**30-60**	**60-90**	**90-120**	**120-150**	**150-180**	**Electiv**	**Emergency**
Group A	8 (40%)	0	12 (60%)	-	2 (10%)	6 (30%)	8 (40%)	2 (10%)	2 (10%)	0 (0%)	12 (60%)	8 (40%)
Group B	0%	0%	20 (100%)	0	3 (15%)	6 (30%)	5 (25%)	4 (20%)	2 (10%)	0 (0%)	10 (10%)	10 (50%)
Group C	10 (50%)	2 (20%)	-	8 (40%)	-	3 (15%)	1 (15%)	8 (40%)	6 (30%)	2 (10%)	14 (70%)	6 (30%)

Table 3: Distribution of patients according to nature ofpretreatment

No.	Pretreatment	No. Of Patients		
		Group-A	**Group-B**	**Group-C**
1	Anti-hypertensive drugs	10 (50%)	8 (40%)	14 (70%)
2	Anti-ischemic drugs	7 (35%)	12 (60%)	15 (75%)
3	Anti-coagulant drugs	16 (80%)	12 (60%)	14 (70%)
4	Digoxin	5 (27%)	3 (15%)	6 (30%)

were performed under peripheral nerve blocks while lower abdominal, neuro and surface surgeries were performed under general anesthesia. Most of the surgical procedures were completed in 1 to $1^{1/2}$hr. in group A patients while in group B patients maximum surgical procedures were completed within 1 hr while in group C patients surgical procedures were completed within 2 Hrs. Two studies were conducted in 1997 about cardiac events in non cardiac surgery.

There are various predictors for cardiovascular mortality. Obesity and physical activity are important predictors of cardio vascular mortality. There are various predictors published regarding to investigate whether cardiovascular mortality related to obesity could be modified by physical activity. In middle age, obesity was associated with increased risk of cardiovascular death but the association weakened with age. After 70, there was no association between BMI and cardiovascular death. At alt ages, a lower level of physical activity was associated with a higher cardiovascular mortality.[9]

Vatten, lars et al described in European journal of cardiovascular prevention rehabilitation on adiposity and physical activity as predictors of cardiovascular mortality. As women are highly active compensate for obesity than in men so risk was higher in man.[10]

Patients with significant ischemic changes in ECG were advised to go for 2D echo-cardiography. In Patients treated with diuretics and digitalis, preoperative electrolyte levels were estimated. About 60-70 % patients were taking antiplatelet drugs such as aspirin and clopidogrel.

Table 4: Distribution of patients according to Goldman cardiac risk index

No.	Risk criteria as stated in GCRI	No. of patients (Out of 60)	Cardiac Complications	No. Of Patients expired
1.	Age > 70	27	Yes	1
2.	MI within 6 months	32	Yes	-
3.	S_3 gallop or JVP	-	-	-
4.	Aortic stenosis	-	-	-
5.	Rhythm other than sinus Or >5 PVCs/min	5	Yes	-
6.	PO_2<60, PCO_2>50	-	-	-
7.	K<3, HCO_3<20mmol/l	1	1	-
8.	Signs of Chronic liver Disease	1	Yes	-
9.	Intraperitoneal, Intrathoracic & aortic surgeries	4	-	1
Distribution of patients according to GCRI classes				
Class (Points)		**No. of Patients**	**Complications**	
I(0-5)		16	No	
II(6-12)		23	Yes	
III(13-26)		19	Yes	
IV(>26)		2	Expired	
Total		60		

Majority of patients belonged to class II & III GCRI classification.

[Table 3] shows distribution of patients according to nature of pretreatment drugs. Patients with optimized cardio vascular status per operatively by pharmacological treatment have minimal intra operative and post operative complications. Feringa et al has conducted study on Patients with left ventricular dysfunction who are undergoing major non-cardiac vascular surgery are at increased risk of adverse postoperative events. They concluded that the perioperative use of ACE inhibitors, beta-blockers, statins, and aspirin is independently associated with a reduced incidence of in-hospital mortality in patients with left ventricular dysfunction who are undergoing major noncardiac vascular surgery.[11] Karthikeyan G Bhargava B has explained managing patients undergoing noncardiac surgery need to shift emphasis from risk stratification to risk modification.[12]

[Table 4] shows distributions of three groups according to Goldman multifactorial index of cardiac risk classification and the incidence of post-operative complications.

According to criteria's stated in Goldman cardiac risk index, 27 patients were more than age of 70 years and 32 patients had past H/O MI. 5 patient had other than sinus rhythm and >5 VPC per min. 1 patient had s.pottasium less than 3 meq/L and 1 patient had shown signs of chronic liver disease.

[Table 5] shows distribution of three groups according to revised cardiac risk index. As stated in RCRI criteria 32 patients had h/o MI, 27 had h/o angina, 10 had Q wave in ECG while 34 patients were taking nitrates. 22 patients had symptoms s/o CCF and 20 patients had cardiomegaly in chest X-ray PA view. 2 patients had h/o stroke and one had TIA. 3 patients had raised S.creatinine level while 15 patients had been operated for abdominal surgery.[13]

[Table 6] shows distribution of patients according to surgical risk index. As stated in this risk index patients who were operated for high risk surgeries like emergency surgeries (n= 14), peripheral vascular surgeries (n=6), prolonged surgical procedures associated with large fluid shift and blood loss (n=5) had been associated with intraoperative cardiac complications and 2 mortalities. Emergency surgery is a special case for immediate surgery precludes the time needed to fully evaluate and optimize this patient. In these patients cardiac complications are two to five times more likely to occur.

[Table 7] shows distribution of patients according to ASA physical status grading where majority of the patients were in class III (50%) while 40% were in class IV having two mortalities. Although ASA classification was most commonly used There are some important factors not taken in to account are Age> 75 years, complexity of operation, duration of operation and whether disease is incidental or factorial in current iIIness.[14]

Table 5: Distribution of patients according to Lee's revised cardiac risk index

No.	Risk criteria as stated in RCRI	No. of patients out of 60	Cardiac complication	Death
1.	MI	32	Yes	2
2.	Q wave	10	Yes	No
3.	Angina	27	Yes	No
4.	Nitrate drug therapy	34	Yes	1
5.	Positive exercise stress test	-	Not Done	-
6.	History s/o CCF	12	Yes	1
7.	Chest x-ray (cardiomegaly)	20	Yes	1
8.	Stroke	4	No	No
9.	TIA	2	No	No
10.	Insulin treated DM	6	Yes	No
11.	S. creatinine	3	Yes	No
12.	AAA repair, Thoracic, Abdominal surgery	8	Yes	1

Distribution of patients according to classes of RCR.

Class (No. of factors)	No. of patients	Complications
I(0)	22	No
II(1)	26	No
III(2)	10	Yes
IV(3 or more)	2	Expired
Total	60	

Majority of the patients belonged to class I & II of RCRI classification.

Table 6: (A&B) Distribution of patients according to surgical procedure, associated cardiac complication and death rate

No.	Surgical risk factors as cardiac risk index	No. of patients (Out of 60)	Cardiac complications	Death
Low Risk (<1%)				
1.	Endoscopic surgeries	3	Yes	No
2.	Superficial surgeries	2	No	No
3.	Breast surgeries	3	Yes	Yes
Intermediate Risk (1-5%)				
1.	Intra peritoneal	4	Yes	Yes
2.	Orthopedic	20	Yes	No
3.	Prostate	2	No	No
High Risk (>5%)				
1.	Emergent (elderly)	4	Yes	Yes
2.	Peripheral vascular	5	Yes	No
3.	Prolonged surgical Procedure	3	Yes	Yes
4.	Associated with large fluid Shift/blood loss	4	Yes	Yes

Table 7: Distribution of patients according to the American Society of Anesthesiology Classification

Class	No. of Patients	Complication
I	0	0
II	3	No
III	30	Yes
IV	22	Yes
V	5	Yes
Total	60	-

Majority of the patients were belonged to grade III & IV of ASA risk classification.

Table 8: Distribution of patients according to NYHA classification and associated cardiac complication

Class	No. of Patients	Complication
I	8	No
II	7	Yes
III	28	Yes
IV	12	Yes
V	60	-

Majority of the patients were belonged to NYHA class III & IV.

[Table 8] shows distribution of patients according to NYHA classification where 28 patients fall under class III and 12 in class IV. Patients of both the classes had some intra & post-operative complications with 2 deaths of class IV patients. Thus preoperative cardiac risk assessment is not completed by using single cardiac risk classification. Rather then it must be a multifactorial risk assessment which can actually estimate the cardiac risk associated with non-cardiac surgery in IHD patients. Kareic AA and Rizvon MK have described perioperative cardiovascular escalation. This article covers steps in assessing cardiovascular risk in candidates for non-cardiac surgery, including consideration of patient specific and surgery specific factors.

Effect of G/A, S/A, E/A peripheral nerve blocks on intraoperative and postoperative ECG. Landsberg et al described during the last 20 years, studies using continuous perioperative electrocardiogram (ECG) monitoring in patients at high risk for postoperative cardiac complications have revolutionized our understanding of the pathophysiology, circumstances, timing and possible prevention of perioperative ischemia and postoperative morbidity and mortality.[15]

Inj. Glycopyrollate (0.04mg/kg) was given to all the patients. As the atria of heart are richly innervated by parasympathetic vagal nerve fibers and the SA node is therefore sensitive to muscarinic receptor blockade. It produces moderate tachycardia and it has little effect on blood pressure. Inj. Ranitidine (1.0mg/kg) and Inj. Ondansetron (0.08, 0.1mg/kg) were given to prevent intraoperative and postoperative vomiting and acidity that might be associated with haemodynamic changes such as rise in blood pressure and tachycardia. All patients were induced with Inj.sodium Pentothal and inj. succinyl choline. In patients who were hypovolaemic or had severe cardiac dysfunction, a precipitous and uncompensated fall in cardiac output had occurred after even a small dose of thiopental. Simultaneous injection of Inj.lignocaine was given to provide haemodynamic stability during laryngoscopy. it can attenuate heart rate, blood pressure, pressure product and pressure rate quotient. In some patients, I had used glyceryl nitrate patch (5 mg) on left side of precordium.

N_2O was used for maintenance as it is good analgesic. Vecuronium was chosen as muscle relaxant which was essentially devoid of cardiovascular effects and so more cardio stable. Atracurium is also highly cardio stable but rarely causes hypotension. Reversal of muscle paralysis with standard agents did not appear to have any detrimental effects in patients with CAD.

In the present study induction of general anesthesia lowers systemic BP by 20-30 o/o. Tracheal intubation increases the blood pressure by 20-30 mm Hg with tachycardia and agent such as nitrous oxide lowers cardiac output of 15%. Additionally inhalational, intravenous anesthetics along with muscle relaxants can be detrimental by sensitizing the myocardium to circulating catecholamine. There may be increased risk of ventricular ectopy. D. Micholoudis and A petrou et al described continuous spinal anesthesia/ analgesia for perioperative management of high risk patients. The intraoperative effect of continuous spinal anesthesia observed in abdominal and orthopedic surgery is reported.[11]

The total amount of local anesthetic used was 40ml of 1% lignocaine and 20mI of 0.5% of bupivacaine with adrenaline 5mg/ml. postoperatively only one patient was kept in I.C.U. for close observation and monitoring purpose while the remaining patients were sent directly to the wards from the recovery room. There were no complications intraoperatively or postoperatively. The postoperative follow-up of the patients continued for 24-36 hours and the follow-up period was uneventful. By comparing the two anesthetic techniques in the overall population, they found a similar prevalence of patients who had myocardial ischemia and a similar number of ischemic episodes per patient. Episodes of myocardial ischemia were similarly distributed in intraoperative and postoperative periods in both groups. It is relevant that under GA, IHD patients represent most of the population who suffered myocardial ischemia (83%). On the contrary, in the group of patients operated on under LA, the prevalence was equally distributed in the two subpopulations.

Surgeries done under peripheral nerve blocks like under brachial block (50%) and sciatic and femoral nerve blocks (10%) required larger local anesthetic volume compared to other blocks, to decrease the required dose Inj.adrenaline should be added in a proper doses and titrated doses of these drugs should be used. Larger volume may be associated with sedation, myocardial toxicity and myocardial depression. To avoid these side effects, adrenaline had been used be with caution to permit larger doses in combination. intraoperative and postoperative complication in all three group patients. Major complilications encountered were hypotension, hypertension, bradycardia, tachycardia and arrhythmia. 2 patients belong to group C patients had died post operatively.

It was infer that operations managed under peripheral nerve blocks are associated with minimal haemodynamic changes while those operated under regional anesthesia has moderate haemodynamic changes while those operated under general anesthesia also have moderate to severe haemodynamic changes. Weitz H H has done study on perioperative cardiac complications. Although infrequent perioperative cardiac complications are source of major morbidity or mortality, as the population ages, prevalence o (disease increasing. [16]

Post-operative care is as much important as intra operative management. Fluid management, respiration and haemodynamic stability should be considered post operatively.

Thus preoperative assessment of cardiac risk in patients undergoing non cardiac surgery is a challenge to anesthesiologist. A history, thorough physical examination and judicious use of laboratory investigations will supplemented by the data related to the surgical procedures—type, site etc. suffice to assign the categories to patients as low risk, intermediate risk and high risk for surgery. It is important to combine preoperative assessment of cardiac risk with perioperative cardiac risk reduction strategies and optimization of medical treatment to improve patient's long-term cardiac outcome. Therapeutic strategies may be different according to situation. PledicaI treatment may be optimized, surgical procedure and anesthetic management may be modified, or risk / benefit ratio of a surgical procedure should be evaluated differently.

Conclusion

By careful understanding of the ischemic heart disease and knowing circulatory variable affecting the ischemic heart disease we can improve anesthetic management of such patients. Through preanesthetic assessment is essential to know the associated risk factors. Pre-operative treatment with anti-ischemic drugs, anti-hypertensive drugs, digoxin, furosamide reduces the incidence of post-operative CCF. Heavy sedation is necessary and atropine should be avoided in premedication. A good anesthetic technique includes adequate analgesia, oxygenation ventilation and normovolemia. Intra operative monitoring of the vital data pulse, blood pressure, respiratory rate in spontaneous respiration and three limb lead E.G.G. help to detect arrhythmia. Patients managed by peripheral nerve blocks and central neuraxiel blockade has better outcome. High standard of post-operative care including pain relief and continuous ECG monitoring is required to reduce the increased morbity and mortality in susceptible patients. Choice of anesthetic technique depends up on type of surgery, duration of surgery and surgical risk factors of patients.

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How to cite this article: Bhatt KA, Parmar VS, Gohil P, Maru ND. Anesthetic Management and Outcome of Non-cardiac Surgery in Ischemic Heart Disease Patients. Acad. Anesthesiol. Int. 2021;6(1):76-84.

DOI: dx.doi.org/10.21276/aan.2021.6.1.14

Source of Support: Nil, **Conflict of Interest:** None declared.