International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 3, March 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.3.2025.178

ORIGINAL RESEARCH

A study on outcome of patients with proven coronary artery disease detected on work up for surgery along with significant non coronary cardiovascular diseases

[1]Dr. Ravi Chandra Basavaraj Jaraganahalli, [2]Dr. Amar B R, [3]Dr. Bhanuprakash Malleshappa Hiriyur

[1]Assistant Professor, Department of Surgery (CTVS), Siddaganga Medical College and Research Institute, Bengaluru Honnavar Highway, Tumkur, Karnataka, India
[2]Assistant Professor, Department of Neurology, Siddaganga Medical College and Research Institute, Siddaganga Medical College and Research Institute, Bengaluru Honnavar Highway, Tumkur, Karnataka, India
[3]Assistant Professor, Department of Cardiology, Siddaganga Medical College and Research Institute, Bengaluru Honnavar Highway, Tumkur, Karnataka, India

Corresponding Author
Dr. Bhanuprakash Malleshappa Hiriyur
Assistant Professor, Department of Cardiology, Siddaganga Medical College and Research Institute, Bengaluru Honnavar Highway, Tumkur, Karnataka, India

Received: 22 Jan, 2025 Accepted: 23 Feb, 2025

ABSTRACT
The risk of stroke increases with age and doubles for each decade after age 55 years. Framingham data estimate the 10-years probability of stroke at 11 percent in men age 65 and 7 percent for women age 65. At age 80, the probability increases to 22 and 24 percent for men and women, respectively. After age 85 years, women are at greater risk than men. On admission the vital data of the patients were recorded in accordance with the patient proforma. History was recorded, clinical examination findings charted. Pre operatively these patients had recording of blood sugar and blood pressure and entries made in the patient proforma data sheet and measures were taken for the control. Biochemical investigations were done including electrolytes and blood gases. Lipid profile was part of the work up. 43% of Aorto Iliac post-operative patients developed paralytic ileus. These patients improved with optimum electrolytic & fluid management. Electrolyte imbalance was the major cause for this condition, which was seen in about 45% of post-operative patients, followed by metabolic acidosis in 20% of patients. Adverse cardiac events occurred in 20% of the post-operative patients in which half of them developed low cardiac output. Death occurred in 13 patients. All of these were seen in patients who underwent lower limb revascularization.
Key words: Outcome, coronary artery disease, PAD

INTRODUCTION

Stroke is the third leading cause of death and is the most common cause of disability in the United States.
The risk of stroke increases with age and doubles for each decade after age 55 years. Framingham data estimate the 10-years probability of stroke at 11 percent in men age 65 and 7 percent for women age 65. At age 80, the probability increases to 22 and 24 percent for men and women, respectively. After age 85 years, women are at greater risk than men [1].
Carotid artery stenosis is responsible for approximately 25 percent of stroke and atrial fibrillation for approximately 15 percent. Although transient ischemic attacks (TIAs) signal a high short-term risk of stroke, 70 percent of strokes are first events leading to increasing emphasis on primary prevention.
Non modifiable risk factors for stroke include age, sex(men > women), race/ethnicity (African Americans > Caucasians) and a family history of stroke.
Modifiable risk factors for non-cardio embolic ischemic stroke or TIA in the elderly are hypertension, smoking and passive smoking, hyper lipidemia, lack of physical activity, inadequate treatment of atrial fibrillation, carotid artery disease, and HF. Diabetes confers additional risk. Sleep apnea has recently been identified as a potentially modifiable risk factor, as has estrogen administration to postmenopausal women [2,3].

DOI: 10.69605/ijlbpr_14.3.2025.178

The diagnosis of TIA is made following a spell of neurological impairment lasting less than 24 hours that is produced by ischemia in a discrete vascular territory in the brain. The diagnosis is usually based on clinical history alone. Neurological deficits will not be present unless there has been prior stroke or disease. Diagnosis of significant carotid disease is usually made in the presence of a stenosis greater than 70 to 80 percent defined by noninvasive imaging with Doppler ultrasound, magnetic resonance angiography or less frequently with CT^ angiography. Carotid bruits may or may not be present and carotid disease may be asymptomatic. A lopsided face, weak arm and garbled speech are the most common warming signs of stroke. The Face, Arm, Speech, Time (FAST) mnemonic can help identify patients with a potential stroke. Rapid triage to neuroimaging for diagnosis and selection of appropriate therapy is advised. The brain Attack Coalition advocated establishment of both primary stroke centers and comprehensive stroke centers to care for patients with complex stroke types, severe deficits, or multiorgan disease. Pharmacological thrombolysis with recombinant tissue plasminogen activator (rt-PA) is recommended for selected patients with ischemic stroke with a measurable neurological deficit [4].

Secondary and primary prevention is targeted at modifiable risk factors. Evidence-based recommendations are for antiplatelet therapy in patients with prior stroke, TIA or myocardial infarction and anticoagulation in high-risk patients such as those with stroke on aspirin or with atrial fibrillation. Carotid artery interventions should be considered for patients with severe lesions or symptomatic disease. Clinical trails with limited numbers of elderly and very elderly have also demonstrated that LDL cholesterol reduction with statins reduces the risk of stroke in patients with cardiovascular disease (CVD) or major CVD risk factors. The benefit of LDL-C reduction on prevention of stroke is less clear in the elderly and aggressive lipid lowering has not been investigated. Smoking cessation and avoidance of second-hand smoke, weight control, limited alcohol intake and increased activity are part of a preventive strategy. Primary prevention with low-dose aspirin is recommended for women at high risk, as is avoidance of estrogen therapy [2].

Aspirin reduces the long-term risk of stroke, as well as cardiovascular events, after stroke or TIA and is considered standard therapy after a stroke regardless of patient age. The beneficial role of other agents such as the thienopyridine drugs ticlopidine and clopidogrel that inhibit platelet aggregation by blocking platelet adenosine diphosphate receptors is less clear. Clopidogrel has substantially lower rates of hematological side effects compared with ticlopidene. Combined aspirin and clopidogrel have failed to show additive benefit in two large clinical trials but markedly increase moderate and major bleeding. The combination is not recommended [4].

METHODOLOGY

This is a prospective study of patients with proven coronary artery disease detected on work up for surgery along with significant non coronary cardiovascular diseases.

INCLUSION CRITERIA

1. Patients with proven coronary artery disease admitted/complicated with other concomitant cardiovascular disease.
2. Patients detected to have coronary artery disease on work up of non-coronary presentation.

EXCLUSION CRITERIA

Patients without any coronary artery involvement.

This study includes patients who were admitted with symptomatic non coronary disorder and on further work up, they were found to have coronary artery disease. These include patients with carotid stenosis, patients with valvular heart disease and patients with lower limb ischemia.

On admission the vital data of the patients were recorded in accordance with the patient proforma. History was recorded, clinical examination findings charted.

Pre operatively these patients had recording of blood sugar and blood pressure and entries made in the patient proforma data sheet and measures were taken for the control.

Biochemical investigations were done including electrolytes and blood gases. Lipid profile was part of the work up.

Those patients with carotid disease had 4 vessel neck angiogram and coronary angiogram along with routine pre-operative investigations. Those patients detected to have coronary disease were included in the study and planned for surgical procedure. They underwent concomitant surgery or had surgery for the carotid lesion with further intervention of coronary lesion reserved for a later date.

These patients underwent carotid endarterectomy alone or combination of carotid endarterectomy with coronary artery bypass surgery.

During carotid endarterectomy, strict monitoring of intra operative blood pressure was vital for the procedure. In case of combined cabg, the patients had saphenous vein conduit and procedure was performed on cardio pulmonary bypass.

In the post-operative period, again control of blood pressure was critical for the success of the surgery. The intra operative hemodynamic parameters were recorded.

Immediate and long term complications were recorded with regular follow up of these patients.

Such patients who had valvular lesions had detailed recording of the presenting complaints and examination findings and these were analyzed.

DOI: 10.69605/ijlbpr_14.3.2025.178

Among these, patients who were of age more than 45 years underwent coronary angiogram as part of work up for cardiac anatomical and functional status. Those patients who had coronary artery disease were included in this study and further work up including biochemical investigations were done.

These patients had planned procedure for the valvular lesion along with coronary revascularization. Intra operative blood gases, electrolytes were monitored and recorded.

In the post-operative period, the duration of mechanical ventilation and inotropic support requirements were recorded. Charting of drain output was recorded during their stay in the intensive care unit.

Regular wound dressings were done and follow up examination finding were recorded.

Patients who presented with lower limb ischemia had, along with recording of detailed history and clinical examination findings, coronary angiogram in those aged 45 years or more. There were also patients with proven coronary and lower limb disease.

These patients were counseled regarding the vascular and coronary condition and explained in detail the proposed vascular procedure for the lower limb in view of the symptomatology and physical findings.

Among the procedures performed, all patients had monitoring of blood pressure, sugar levels and inotropic or vasodilator requirements.

During the post-operative period, recordings were made regarding blood gases, electrolytes, ECG changes, any symptoms or signs suggestive of myocardial infarction. Strict charting of drain output were done and they were recorded.

RESULTS

Table-1: Type of Coronary Lesion

Type of Coronary Lesion	Number	Percentage
Single vessel Disease	24	26.96
Double vessel Disease	17	19.10
Triple vessel Disease	41	46.06
LMCA Disease	07	7.86

Majority of the patients were of triple vessel disease (46%).

Table 2: In TVD Lower Limb Involvement

In TVD lower limb involvement	Number	Percentage
Aorto bifemoral	18	43.90
Aorto unifemoral	15	36.58
BelowInguinal ligament	08	19.51

Aorto iliac disease either unilateral or bilateral, was seen in 80% of patients with triple vessel disease.

Table 3: Site of Lesion in Lower Limb Involvement

	Number	Percentage
Aortic Biiliac	25	31
Aortic Iliac	26	20
Isolated below inguinal unilateral	21	28
Isolated below inguinal bilateral	16	21

Aorto iliac and aorto biiliac lesions together accounted for more than 2/3rd of the patients presenting for surgery with lower limb involvement.

30% of patients presenting with unilateral symptoms had bilateral involvement on workup.

Table 4: Vascular Procedures Performed in Lowed Limb Ischemia

Procedure	Number	Percentage
Aortoiliac endarterectomy	04	5.3%
Iliofemoral endarterectomy	02	2.6%
Aorto bifemoral bifurcation graft	24	32%
Aorto femoral graft	21	28%
Femoropopliteal bypass	24	32%

In patients who underwent various surgical procedures for lower limb vascular involvement the number of procedures were similar with respect to aorto iliac bypass, aorto biliac bifurcation graft and

DOI: 10.69605/ijlbpr_14.3.2025.178

femoropopliteal bypass.
Few patients (8%) underwent endarteractomy with good result.

Table 5: Coronary Artery Disease V/S CAD + associated Cardio Vascular Disease

	Number	Percentage
Total Admission	3145	
Coronary and associated cardiovascular disorders	185	17%
Operative Cases	89	48%

In our study, we found that 17% of patients with coronary artery disease seen during the study period had associated other cardio vascular disease.
Nearly half of them underwent operative procedure. The remaining were either not fit for surgery or opted for medical management due to social and economical factors.

Table 6: Post-Operative Complications in Lower Limb PVD

	Paralytic Ileus	Metabolic Acidosis	Electrolyte Imbalance	Cardiac events
Aorto bifemoral bypass	12	6	18	6
Aortofemoral bypass	10	6	13	4
Femoro Popliteal bypass	01	02	02	-
Total	23	14	33	10

43% of Aorto Iliac post-operative patients developed paralytic ileus. These patients improved with optimum electrolytic & fluid management.
Electrolyte imbalance was the major cause for this condition, which was seen in about 45% of post-operative patients, followed by metabolic acidosis in 20% of patients.
Adverse cardiac events occurred in 20% of the post-operative patients in which half of them developed low cardiac output.

Table 7: Post-Operative Complications in Lower Limb PVD

	Number	Percentage
Wound Dehiscence	10	13.33
Bleeding	25	33.33
Re-exploration	8	10.66

Majority of wound dehiscence occurred in aorto iliac procedure group of patients.
Incidence of post-operative bleeding was nearly similar irrespective of the type of procedure.

Table 8: Post-Operative Complications

Complications	No of Patients	Percentage
Stroke/TIA	4	4.49
Transient renal dysfunction	20	22.47
Post op low cardiac output	06	6.74

Alteration of renal function occurred in a quarter of all patients included in this study.
However it was transient and returned to normal within 2-3 days.
Worsening of cardiac condition was seen in 6 patients in which mortality occurred in 2/3rd of these patients.

Table 9: Mortality

Mortality	No of Patients
Carotid endarterectomy	Nil
Lower limb ischemia	13
Valvular Disease	nil

Death occurred in 13 patients. All of these were seen in patients who underwent lower limb revascularization.

DOI: 10.69605/ijlbpr_14.3.2025.178

Table 10: Cause of Mortality

Cause	Number	Percent
Myocardial infarction	07	53.84
VT/VF	04	30.76
Septicemia	02	15.38

More than half of the deaths were due to post-operative myocardial infarction. Nearly one third due to arrhythmias, indicating that cardiac events are the major cause of death in patients with lower limb revascularization procedures.

DISCUSSION

The plan of management of these patients included further elucidation of comorbid factors, control of diabetes with sliding scale insulin subcutaneous injections, addition of oral hypoglycemic agents whenever necessary, consultation with endocrinologist and dietician, strict diet control in accordance with the diet chart. Also hypertension control was done with combination of diuretics, Beta blockage and Angiotensin Converting Enzyme Inhibitors. Calcium channel blockers were used judiciously whenever necessary.

In the intra operative period these patients are bound to have variations in hemodynamics including heart rate and blood pressure. In the hypertensive patient, intra operative nitroglycerine infusion started just before induction of anesthesia and continued throughout the operative period. Wide fluctuation of blood pressure was observed in the operative period. This infusion was extended into the post-operative period to achieve systolic blood pressure range of 120 millimeter of mercury [5].

When the patient had hypotension, it was managed by fluid therapy and inotropic support in the form of dopamine infusion was instituted. Patients who had hypotension in the pre op period required dopamine and dobutamine inotropic infusion to maintain adequate tissue perfusion and vital organ function.

Management in the post op period consisted of optimizing hemodynamics. Patients who continued to have hypertension had continuous infusion of nitroglycerine and gradually weaned off along with starting oral antihypertensives. The average time to stop NTG infusion was 36 hours [6].

Similarly, those patients who had hypotension in the pre-operative period or episodes of hypotension during the intra operative period had continuation of inotropic support extended into the immediate post-operative period. Dopamine infusion was maintained in these patients to maintain adequate renal perfusion and obtain urine output. The infusion was continued for 2 to 3 days, average of 40 hours, and then tapered off gradually after ensuring good urine output and normal renal parameters of blood urea and serum creatinine.

Patients who had persistent hypotension or unstable hemodynamics had continuation of post-operative elective mechanical ventilation and after ensuring adequate blood gases, electrolytes and acid base balance they were planned for extubation, which was smooth in these patients. The duration of ventilation post operatively, ranged between 4 and 24 hours. The average duration of elective mechanical ventilation was 14 hours [7].

Anticoagulation was instituted in all these patients in the immediate post-operative period with conventional heparin infusion at the rate of 20 units per kg body weight per hour. Strict monitoring of drain output chart was done.

Four patient who had high abdominal drain output following aorto femoral bypass and three patients who had aorto bi iliac bypass with Dacron bifurcation graft underwent re exploration laparotomy. Six patients had control of bleeding site and closure of laparotomy. They had smooth recovery in the post op period and extubated after 24 hours. The other patient had re exploration and no obvious bleeding site was found. However this patient continued to have high drain output presenting a picture of Disseminated Intravascular Coagulation. The patient received packed cell transfusion, platelets infusion and fresh frozen plasma infusion. PTT and PT with INR monitoring was done and blood products were transfused accordingly. Also the patient had hypotension following re exploration and was started on inotropic support. Unfortunately the patient succumbed and did not respond to best combined management [8].

In the patients who had carotid artery disease, all the patients had carotid endarterectomy and one patient had concomitant CABG as a combined procedure. These patients had monitoring of neurological status and none of them developed any adverse event attributable to central nervous system. Antihypertensive medication were instituted in these patients and followed by post op dual anti platelet therapy with acetyl salicylate 150 mg and clopidogrel 75 mg. They were followed up with frequent Doppler ultrasound study 6 monthly in the initial year and yearly thereafter. No progression of the carotid disease occurred in any of these patients either clinically or on imaging.

With respect to valvular involvement along with coronary artery disease, there were 4 patients. One patient had ischemic mitral regurgitation due to papillary muscle rapture. This patient had mitral valve replacement and coronary bypass with saphenous vein graft. Moderate inotropic support was given pre operatively and continued in the post op period. The recovery was smoothwith these measures and patient was ambulant on the 5th post-operative day. One patient had mitral stenosis with exacerbation of

DOI: 10.69605/ijlbpr_14.3.2025.178

symptoms. He was detected to have double vessel disease on admission and after performing coronary angiogram. This patient underwent combination of mitral valve replacement and cabg. He did not need any specific pre-operative support, the post op recovery was eneventful. Among two other patients, one had supra valvular aortic stenosis, for which the patient was significantly symptomatic and this patient underwent aortic annuloplasty along with venous conduit to distal RCA. The other patient had valvular aortic stenosis and aortic valve replacement was done in this patient along with vein conduit to LAD and RCA.

CONCLUSION

Alteration of renal function occurred in a quarter of all patients included in this study.

However it was transient and returned to normal within 2-3 days.

Worsening of cardiac condition was seen in 6 patients in which mortality occurred in 2/3rd of these patients.

More than half of the deaths were due to post-operative myocardial infarction. Nearly one third due to arrhythmias, indicating that cardiac events are the major cause of death in patients with lower limb revascularization procedures.

REFERENCES

1. Prevalence and Predictors of Concomitant Carotid and Coronary Artery Atherosclerotic Disease. Arie Steinvil *et al*., J Am Coll Cardiol, 2011; 57:779-783, doi:10. 1016/j.jacc.2010.09.047
2. AHA/ACC Guidelines for Secondary Prevention for Patients with Coronary and other Atherosclerotic Vascular Disease: 2006 update.
3. Ischemic mitral regurgitation: mechanisms and echocardiographic classification Eustachio Agricola, Eur J Echocardiogr (2008) 9 (2): 207-221. Doi: 10.1016 /j.euje.2007.03.034
4. Guidelines on the management of valvular heart disease.The Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology. European Heart Journal Volume 28, Issue-2 Pp. 230-268.
5. Patterns of atherosclerosis and their surgical significance. Dr. Bakey *et al*., Annals of Surgery 1985; 201: 115-9.
6. Concomitant cardiac and vascular disease “through the looking glass” Kettenhagen J P *et al*., J Vase Surgery 1985; 2: 499-501.
7. Management of patients with severe co existent coronary artery and peripheral vascular disease. Reis R L *et al*., J thor cardiovac surg. 1977;73:909-18.
8. Simultaneous revascularization for critical coronary and peripheral vascular ischemia. T Carrel *et al*., Annals of thor surg. 1991;52;805-09.