



## CORONARY ARTERY BYPASS SURGERY IN ELDERLY PEOPLE A INSTITUTIONAL RETROSPECTIVE STUDY

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## ABSTRACT

**Objective:** To Study the prognosis and outcome in elderly people present with coronary artery disease under going coronary artery bypass surgery in our institute. **Methods:** 134 elderly patient who are 65 years and more than 65 years who underwent coronary artery bypass surgery between January 2017 to December 2022 who's datas are collected from our computer stored data and from medical record department in our college and from Tamilnadu chief minister comprehensive health insurance scheme institutional Web site data base. **Results:** 1184 cases of coronary artery bypass surgery done in our institute from January 2017 to December 2022 from this 134(11.3%) cases are elderly patient, mean age 67.6 years (range 65-75 years) highest of 85 years old female operated in this period. The indication for surgery was triple vessel disease in 65 patient(48.5%), double vessel disease in 40 patient(29.8%), single vessel disease in 5 patient, single vessel disease with ventricular septal rupture in 1 patient, left main coronary artery stenosis in 44 patient(32.8%), 12 patient with post coronary stent. Surgical procedure Off pump coronary artery bypass surgery in 108 patient(81%), On pump beating heart coronary artery bypass surgery in 5 patient (3.7%), On pump arrested heart coronary artery bypass surgery in 6 patient(5.35%) with mitral mechanical valve replacement in 1 patient, with aortic mechanical valve replacement in 4 patient. A total of 320 grafts were constructed(mean 2.4 grafts per patient), 35 (26%) of them being arterial only left internal mammary artery harvested and other grafts were great saphenous vein. Post operative average ventilation time 18hrs (range 18hrs to 24hrs), There were 21(15.7%) hospital death and 15(11%) late death in follow up, total 36 (26.8%) death till now. **Conclusion:** intra operative, post operative mortality and morbidity is high in patient present with severe left ventricular dysfunction, coronary artery diseases induced complication and additional comorbidity, however most of patient recovered from post operative cardiovascular lethal or morbid event and on regular clinical follow up

**KEYWORDS :** Elderly people, coronary artery diseases, comorbidity, coronary artery bypass surgery, surgical complication, mortality, follow up

## INTRODUCTION

Coronary artery disease is one of the common cardiac disease treated by cardiac surgeon, and most of the coronary artery disease patient are older adult and the treatment and surgical outcome vary dependent on patient comorbidity and surgical management and with early diagnosis, interventional and medical management the number of elderly people presenting with coronary artery disease had increased.

Our study is retro Prospective study to study prognosis and outcome in elderly people present with coronary artery disease for coronary artery bypass surgery and to study the outcome and prognosis in them dependent on intraoperative and post operative management and follow up.

## MATERIALS AND METHODS

Patients aged 65 years and more than 65 years with coronary artery disease and associated complication undergoing coronary artery bypass surgery between January 2017 to December 2022 in our institute.

And we collected clinical case history, coronary angiography, pre operative and post operative echocardiography, operative notes, post operative intra cardiac unit notes, outpatient follow up records from our institute computer data base, medical record department from our college and hospital, Tamilnadu chief minister comprehensive health insurance scheme institutional Web site data base.

Follow up data were obtained by means of personal in and out patient clinic and telephone interview with the patient or their relative, and the information collected was present health status, chest pain, any history of hospital admissions after surgery, causes of death, any new complication and morbidity developed after surgery.

Statistical analysis was carried out as continuous variable

were expressed as mean value and average and range of total patient present during study and also percentage calculated comparing the occurrence with total patient present during study

## RESULTS

In our institute from January 2017 to December 2022 we had done 1184 cases of coronary artery bypass surgery from this 134(11.3%) cases are elderly patient, out of this 134 cases 29 female(21.6%) and 105 male(78.4%), mean age 67.6 years (range 65-75 years) highest of 85 years old female operated in this period, And the patient present with old age comorbidity like uncontrolled Diabetic mellitus where 84 patient (62.7%) and patient with Hypertensive 74 patient (55.2%).

From personal history out of 105 male there were 99(94.3%) chronic smoker(40yrs) and 88(83.8%) chronic alcoholic(40yrs), 90% of them stopped both smoking and alcohol around 65 years of age due to economic crisis in there family and worsening health condition of them, No women in this study neither alcoholic or smoker.

With routine blood investigations we found from 134 patient in this study 22(16.4%) patient where hyperlipidaemia with elevated total cholesterol level, high low density lipoprotein level and elevated triglycerides.

In our routine thyroid profile in female patient we found 4 patient (3%) hypothyroidism from total 134 patient and all are female 4/29 (13.8%) female.

Other addition disease or morbidity condition where 1 patient on haemodialysis for chronic kidney disease and 4 patient with chronic obstruction pulmonary disease, 1 patient with post pulmonary tuberculosis sequelae, 1 patient with complete atrio ventricular conduction block, 6 patient with bilateral common carotid artery stenosis, 2 patient with left common carotid stenosis, 1 patient with seizure disorder, And

the patient blood group analysis we found 55(41%) patient O+ve blood group, 42(31.3%) patient B+ve blood group, 26(19.4%) patient A+ve blood group, 7(5.2%) patient AB+ve blood group, 3(2.2%) patient O-ve blood groups, 1 (0.7%) patient AB-ve blood group.

Preoperative echocardiography shows about 70(52.2%) patient had grade I left ventricular diastolic dysfunction and 5(3.7%) patient had grade II left ventricular diastolic dysfunction and 3(2.2%) patient had grade III left ventricular diastolic dysfunction, 6 (4.5%) patient had grade I left ventricular systolic dysfunction and 4(3%) patient had grade II left ventricular systolic dysfunction and 4 (3%) had severe left ventricular systolic dysfunction, with ejection fraction average 53% (range 45% - 65%).

Number of patient presented with acute coronary artery diseases induced complication, 1 patient presented with acute myocardial infarction with apical ventricular septal rupture of 4mm with severe ventricular dysfunction.

And the number of patient presented with post coronary artery stent are 12 (9%) patient out of this 3 patient with left anterior descending artery stented around 20 years before, 3 patient with left anterior descending artery stented around 10 years before, 3 patient with right coronary artery stented around 10 years before, 1 patient with left circumflex artery stented around 10 years before, 1 patient with left circumflex artery stented 3 years before, 1 patient with both left anterior descending artery and right coronary artery stented 5 years before, now admitted with stent block and acute coronary artery diseases for coronary artery bypass surgery.

In addition to coronary artery diseases, 1 patient had left atrial myxoma, 4 patient had severely calcified aortic valve stenosis, 1 patient had severe mitral valve regurgitation, 1 patient had mild aortic valve regurgitation and mild mitral valve regurgitation, 12 patient had mild mitral valve regurgitation.

The indication for coronary artery bypass surgery was triple vessel disease in 65 patient(48.5%), double vessel disease in 40 patient(29.8%), single vessel disease left anterior descending artery in 5 (3.7%) patient, left circumflex artery in 1 patient and single vessel disease with apical ventricular septal rupture 4mm in 1 patient, associated with left main coronary artery stenosis in 44 patient(32.8%), 1 patient with single vessel left anterior descending artery disease with left atrial myxoma.

The indication for coronary artery bypass surgery with aortic valve replacement in 4(3%) patient from this 1 patient had single vessel left anterior descending artery disease with severe calcified aortic stenosis, 2 patient had double vessel left anterior descending artery and left circumflex artery disease with severe calcified aortic valve calcification, 1 patient had triple vessel disease with severe aortic valve calcification.

The indication coronary artery bypass surgery with mitral valve replacement in 1 patient with single vessel left anterior descending artery disease with rheumatic disease mitral regurgitation.

A total of 320 grafts were constructed (mean 2.4 grafts per patient), 35 (26%) of them being arterial, only artery graft harvested was left internal mammary artery, out of 35 the arterial graft and the distal anastomosis was 31 left internal mammary artery to left anterior descending artery and 4 left internal mammary artery to diagonal grafted. From total 134 patient 35 patient (26%) had single arterial graft with other vein graft, Other 285 graft from total 320 grafts were great saphenous vein and there distal anastomosis site were to left anterior descending artery 108, to obtuse marginal 63, to

diagonal 31, to right coronary artery 45, to posterior descending artery 30, to Ramus 8.

And the Surgical procedure was Off pump coronary artery bypass surgery in 108 patient(81%), On pump beating heart coronary artery bypass surgery in 5 patient (3.7%), off pump converted to On pump beating heart coronary artery bypass surgery in 2 patient with severe left ventricular dysfunction, On pump arrested heart coronary artery bypass surgery in 6 patient(4.5%) with severe left ventricular dysfunction with average pump time 170 minutes (range 160–180 minutes), On pump arrested heart coronary artery bypass surgery with apical ventricular septal rupture repaired with gortex patch in 1 patient (pump time 220 min), On pump arrested heart coronary artery bypass surgery with aortic valve replacement in 4 patient (3%) average pump time 160 minutes (range 150–170 minutes), On pump arrested heart coronary artery bypass surgery with mitral valve replacement in 1 patient (pump time 148 minutes), On pump arrested heart coronary artery bypass surgery with left atrial myxoma excision in 1 patient (pump time 138 minutes).

Minimally invasive off pump coronary artery bypass surgery in 2 patient(1.5%) from this first patient had single vessel disease left anterior descending artery diseased so left internal mammary artery to mid left anterior descending artery anastomosis done, second patient had double vessel disease left anterior descending artery diseased and left circumflex artery diseased so left internal mammary artery to mid left anterior descending artery and great saphenous vein to obtuse marginal and proximal to ascending aorta anastomosis done.

Intra aortic balloon counterpulsation was used in 13 patient (9.7%) with severe ventricular dysfunction, out of this 9 patient(6.7%) in perioperative period and 4 patient in post operative period average time 48hrs (range 24hrs to 72hrs) and till death.

Post operative average ventilation time 18hrs (range 18hrs to 24hrs), There were 21(15.7%) hospital death and 15(11%) late death in follow up and in total 36(26.8%) death till now, out of 21 hospital death 7 cases died on post operative day 0 and 3 cases died on post operative day 2, 5 cases died on post operative day 3, 3 cases died on post operative day 5, 3 cases died on post operative day 8 and the causes of death would be difficult to wean from ventilation and intra aortic balloon counterpulsation with acute respiratory distress syndrome and ventricular dysfunction going for cardio respiratory arrest.

Post operative ejection fraction average 50% (range 45% to 55%), most of patient discharged on average post operative day 10 (range 8-12 post operative day), there where 5 late discharge out of this 3 cases are due to post operative sternal surgical site wound discharge, 2 cases due to post operative sternal wound gaping and secondary suturing done, out of 15 late death 8 patient died in covid 2020 with respiratory failure, 7 patient died of recurrent respiratory failure and cardiac failure after 2 to 3 years of surgery, out of total 134 patient 98(73%) patient are alive till now in follow up

## DISCUSSION

An increasing number of elderly people are now undergoing coronary artery bypass surgery. Elderly patient compare to younger age group present for surgery with a greater burn of risk factor and reduced functional level. At present with advance in prevention and treatment of coronary artery diseases has reduced death and disability in millions and have advanced the age at which patient present for coronary artery bypass surgery.

The management of this disease in elderly patient is

challenging as they present with high comorbidity. Short term outcome are hence poorer in them but symptom relief occur in most survivors and is accompanied by excellent rates of long term survival and a good quality of life. This ageing surgical population not unexpectedly has a relatively greater prevalence of cerebrovascular disease, left ventricular dysfunction, diabetes mellitus, chronic obstruction pulmonary diseases, renal impairment and peripheral arterial disease therefore such elderly people with multiple comorbidities tend to have a high rate of complication after coronary artery bypass surgery.

The gold standard surgical procedure for ischaemic coronary artery disease is coronary artery bypass surgery and the indication do not defer between adult and elderly population. And the number of ischaemic coronary artery diseases presenting after post coronary stenting also increased and they are coming out with high mortality after surgical procedure. From our institutional study we see 15% in hospital mortality and 11% late mortality in elderly patient presenting with ischaemic coronary artery disease undergoing coronary artery bypass surgery with severely calcified aortic stenosis and mitral regurgitation under going valve replacement. we see them with bilateral common carotid artery stenosis, chronic renal failure on haemodialysis, severe left ventricular dysfunction with low ejection fraction, post myocardial infarction with ventricular septal rupture, uncontrolled diabetic mellitus, chronic smoking, chronic alcoholism all this comorbidity had high mortality in our study.

Elderly people presenting with only coronary artery diseases with no other comorbidity for coronary artery bypass surgery had very good prognosis in follow up study and with no post operative complications compare to elderly patient present with additional comorbidity undergoing surgical procedure. And many elderly patient after coronary artery bypass surgery had very good survival rate and life expectancy in our short 6 years follow up study. Short term outcome are poorer in them but symptom relief occurs and had good quality of life. out of 15 (11%) cases of late mortality only 7 cases had cardiac causes severe left ventricular dysfunction, 8 cases died in 2020 covid so late mortality in our short 6 years follow up study is low.

Prevention is better than cure. Comparing report from other study . In our study with high proportion of male patient (78.4%) the risk factor for ischaemic coronary artery disease is uncontrolled diabetic mellitus (62.7%), and in male cigarette smoking(94.3%),chronic alcoholism (83.8%). Chronic obstruction pulmonary disease in 4 patient and post tuberculosis sequelae in 1 patient, 4 cases of hypothyroidism all 4 are women, and to less extend obesity and dyslipidemic. All are treated with life style modification , yoga, walking, Cooking and advice to stop smoking and alcohol and medical treatment with antiplatelet, antilipidemic, insulin, antidiabetic, antihypertensive therapy to improve long graft patency . In our short 6 years follow up study we don't see different in arterial or venous graft it all depends on number of graft arterial or venous has help to improve late outcome in follow up cases.

#### Limitations Of Our Study

We recognize some limitation in this study, which may affects it's conclusion. Although our study was from a single institution with a highly experienced cardiac surgeon, post graduate with adequate knowledge it may be taken up for other related study. Also the number of patient in this study was relatively small for short period it did not allow an adequate analysis of clinical and technical strategies over a time. As we had only short follow up periods we were able to collect information about post operative morbidities from all the patient as possible, we also acknowledge the natural limitations of this being a retrospective study.

#### CONCLUSION

Elderly people presenting with coronary artery diseases in our institute found to be uncontrolled Diabetic mellitus and hypertensive. which is the most common associated comorbidity causes for elderly coronary artery disease from our clinical history. And from our personal history chronic smoking and chronic alcoholism had additional causes associated with coronary artery diseases. From our study perioperative mortality and morbidity is high in elderly people with cerebrovascular disease, left ventricular dysfunction, diabetes mellitus, chronic obstruction pulmonary diseases, renal impairment and peripheral arterial disease and acute myocardial infarction induced complication like ventricular septal rupture, additional valvular disease undergoing coronary artery bypass surgery. But post operative follow up in this patients shows some freedom from cardiovascular lethal or morbid event ,with minimal need for revascularization in our short follow up periods . Therefore individual risk benefit must be taken into consideration by surgeon ,taking into account several different factors and not just age alone.

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