



CORONARY ARTERY BYPASS SURGERY IN YOUNG ADULT A INSTITUTIONAL RETROSPECTIVE STUDY

Cardiovascular

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ABSTRACT

Objective: To study the overall causes, perioperative mortality, post operative complications, prognosis, outcome and follow up in a young adult present with coronary artery disease under going coronary artery bypass in our institute. **Methods:** A sum of 56 patient who are 40 years and less than 40 years who underwent coronary artery bypass surgery between January 2017 to December 2022 who's clinical case history, coronary angiography, pre operative and post operative echo cardiography, operative notes, post operative notes, outpatient follow up 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:** Out of 56 patient, 8 Female (14.3%) and 48 Male (85.7%), mean age 37.1 years (range 32 – 40 years), Diabetic 39 Patient (62.5%), Hypertensive 21 patient (37.5%) 7 / 8 women (87.5%) diabetic, 3/8 women both diabetic and hypertensive. Out of 48 male 47 (97.9%) chronic smoker, 45 (93.8%) chronic alcoholic, 44 (91.6%) both alcoholic and smoke, no women in this study neither alcoholic or smoker, 3 patient (5.35%) hyperlipidaemia, 2 patient (3.57%) hypothyroidism all 2/8 (25%) are female, 2 patient on haemodialysis for kidney disease, 1 patient with bilateral renal artery stenosis, 1 patient with right innominate, right subclavian, bilateral carotid stenosis. Left ventricular function was impaired with ejection fraction average 46% (range 30% - 55%). 1 patient with ventricular septal rupture, 2 patient with post coronary stent, The indication for surgery was triple vessel disease in 30 patient (53.57%), double vessel disease in 20 patient (35.7%), single vessel disease in 1 patient, single vessel disease with ventricular septal rupture in 1 patient, left main coronary artery stenosis in 4 patient (7%). Surgical procedure Off pump coronary artery bypass surgery in 51 patient (91%), On pump beating heart coronary artery bypass surgery in 2 patient (3.57%), On pump arrested heart coronary artery bypass surgery in 3 patient (5.35%). A total of 132 grafts were constructed (mean 2.4 grafts per patient), 35 (27%) 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 5 (8.9%) hospital death and 5 (8.9%) late death in follow up, total 10 (17.8%) death till now. **Conclusion:** Most common cause for young coronary artery disease from our clinical history is found to be early onset diabetic mellitus and from our personal history chronic smoking and chronic alcoholism, intra 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

Young adult, clinical history, coronary artery diseases, ejection fraction, 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 the number of young adult presenting with coronary artery disease had increased

Our study is retro Prospective study to study causes and comorbidity in young adult 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 40 years and less than 40 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 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

There were 56 patient, 8 female (14.3%) and 48 male (85.7%). mean age 37.1 years (range 32 – 40 years). And the patient present with comorbidity like early onset Diabetic mellitus where 39 patient (62.5%) and patient with Hypertensive 21 patient (37.5%) and in separating women from study out of 8 women in this study 7 (87.5%) where diabetic and 3 (37.5%) women where both diabetic and hypertensive.

From personal history out of 48 male there were 47 (97.9%) chronic smoker and 45 (93.8%) chronic alcoholic and 44 (91.6%) both alcoholic and smoker. No women in this study neither alcoholic or smoker

With routine blood investigations we found from 56 patient in this study 3 (5.35%) 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 2 patient (3.57%) hypothyroidism from total 56 patient and 2/8 (25%) female. Other addition disease or morbidity condition where 2 patient on haemodialysis for chronic kidney disease and 1 patient with bilateral renal artery stenosis, 1 patient with right innominate, right subclavian, bilateral carotid stenosis.

And the patient blood group analysis we found 21 (37.5%) patient O+ve blood group, 16 (28.57%) patient A+ve blood group, 14 (25%) patient B+ve blood group, 4 (7.14%) patient AB+ve blood group, 1 (1.78%) patient O-ve blood groups.

Left ventricular function was impaired with ejection fraction average 46% (range 30% - 55%), and more number of patient presented with acute coronary artery diseases induced complication, 1 patient presented with acute myocardial infarction with apical ventricular septal rupture with severe ventricular dysfunction and 2 patient presented with post coronary stent in left anterior descending artery a year before admission for coronary artery bypass surgery

The indication for coronary artery bypass surgery was triple vessel disease in 30 patient(53.57%) , double vessel disease in 20 patient(35.7%), single vessel disease in 1 patient and single vessel disease with ventricular septal rupture in 1 patient, left main coronary artery stenosis in 4 patient(7%), coronary artery bypass surgery with right innominate bilateral carotid and right subclavian artery stenosis for endarterectomy in a patient

A total of 132 grafts were constructed (mean 2.4 grafts per patient), 35 (27%) of them being arterial, only artery graft harvested was left internal mammary artery , out of 35 the arterial graft and the distal anastomosis was 34 left internal mammary artery to left anterior descending artery and 1 left internal mammary artery to diagonal grafted. From total 56 patient 35patient (62.5%) had arterial graft with other graft. Other 97 graft from total 132 grafts were great saphenous vein and there distal anastomosis site were to obtuse marginal 25, to diagonal 8, to posterior descending artery 25, to distal right coronary artery 16, to left anterior descending artery 16, to Ramus 3, to posterior left branch 1.

And the Surgical procedure was Off pump coronary artery bypass surgery in 51 patient(91%), On pump beating heart coronary artery bypass surgery in 2 patient (3.57%), On pump arrested heart coronary artery bypass surgery in 1 patient with severe left ventricular dysfunction (pump time 178 min), 1 patient On pump arrested heart coronary artery bypass surgery with right innominate, bilateral carotid with right subclavian endarterectomy (pump time 277 min), 1 patient On pump arrested heart coronary artery bypass surgery with ventricular septal rupture repaired with gortex patch(pump time 253 min).

Post operative average ventilation time 18hrs (range 18hrs to 24hrs), There were 5(8.9%) hospital death and 5(8.9%) late death in follow up and in total 10 (17.8%) death till now, out of 5 hospital death 4 cases died on post operative day 0 and 1 case died on post operative day 3.

Post operative ejection fraction average 45% (range 40% to 55%) , out of 5 late death 2 patient died in covid 2020 1 patient died in road traffic accident, 2 patient died of congestive cardiac failure after 2 years of surgery, out of total 56 patient 46(82%) patient are alive till now in follow up

DISCUSSION

Coronary artery disease most common among elderly population and most data available are subject to the elderly population. The number of coronary artery disease in younger population (<and= 40 years) is low as compare to elderly population and it account for only 6 to 10% of all case of myocardial infarction. And number of young patient present with coronary artery disease is increased from past year this may be due to change in life style, habitual in fast moving world.

The management of this disease in young patient is challenging as they present with high comorbidity. When we identify them early with there risk factors and correct them it may led them to have longer life expectancy and greater functional requirement for leading a normal life

The gold standard surgical procedure for ischaemic coronary artery disease is coronary artery bypass surgery and the indication do not defer between young and older 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 9% in hospital mortality and 9% late mortality in young patient presenting with ischaemic coronary artery disease undergoing coronary artery bypass surgery. we see them with bilateral carotid and subclavian stenosis, renal artery stenosis, 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

Young population presenting early 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 young patient present with additional comorbidity undergoing surgical procedure. And many young patient after coronary artery bypass surgery had very good survival rate and life expectancy in our short 6 years follow up study and late mortality

after coronary artery bypass surgery in young patient in our study is mostly non cardiac causes. out of 5 (9%) cases of late mortality only 2 cases had cardiac causes severe left ventricular dysfunction ,2 cases died in 2020 covid and 1 case died in road traffic accident 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 (85.7%) the risk factor for ischaemic coronary artery disease is early onset diabetic mellitus (62.5%), and in male cigarette smoking(97.9%),chronic alcoholism (93.5%). 7 out of 8 women in this study are diabetic and 3 out of 8 women are both diabetic and hypertensive no women in this study are smoker or alcoholic, 2 cases of hypothyroidism all 2 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 antiplatlet, 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 concussion. 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

Young patient presenting with coronary artery diseases in our institute found to be early onset Diabetic mellitus which is the most common associated causes for young 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 young coronary artery diseases patient present with severe left ventricular dysfunction and acute myocardial infarction induced complication like ventricular septal rupture and additional comorbidity undergoing coronary artery bypass surgery. But post operative follow up in this patients shows freedom from cardiovascular lethal or morbid event ,with minimal need for revascularization in our short follow up periods

REFERENCES

1. ChoudhuryL, MarshJD. Myocardial infarction in young patients, Am J Med, 1999, vol. 107 (pg. 254-261) Google Scholar Cross ref Pub Med World Cat
2. MorillasP, BertomeuV, PabonP, AncilloP, BermejoJ, FernandezC. Aros Characteristics and outcome of acute myocardial infarction in young patients. The PRIAMHO II study, Cardiology, 2006, vol. 107(pg. 217-225) Google Scholar Cross ref Pub Med World Cat
3. KellyME, De LariaGA, NajafiH. Coronary artery bypass surgery in patients less than 40 years of age, Chest, 1988, vol. 94 (pg. 1138-1141) Google Scholar Cross ref Pub Med World Cat
4. NgWK, VedderM, WhitlockRM, MilsomFP, NisbetHD, SmithWM, KerrAR, FrenchJK. Coronary revascularisation in young adults, Eur J Cardiothorac Surg, 1997, vol. 11 (pg. 732-738) Google Scholar Cross ref Pub Med World Cat
5. Rohrer-GublerI, Niederhauser U, Turina MI. Late outcome of coronary artery bypass grafting in young versus older patients, Ann Thorac Surg, 1998, vol. 65 (pg. 377-382) Google Scholar Cross ref Pub Med World Cat
6. French JK, ScottDS, WhitlockRM, NisbetHD, VedderM, KerrAR, SmithWM. Late outcome after coronary artery bypass graft surgery in patients <40 years old, Circulation, 1995, vol. 929 Suppl (pg. I114-19) Google Scholar Cross ref Pub Med World Cat
7. RoquesF, NashefSA, MichelP, GauducheauE, deVincenziSC, BaudetE, CortinaJ, David M, Faichney A, Gabrielle F, Gams E, Harjula A, Jones MT, Pintor PP, SalamonR, ThulinL. Risk factors and outcome in European cardiac surgery: analysis of the EuroSCORE multinational database of 19030 patients, Eur J CardiothoracSurg, 1999, vol. 5 (pg. 816-822) Google Scholar Cross ref Pub Med World Cat
8. PerekB, JemielityM, UrbanowiczT, MisterskiM, DyszkiewiczW. Clinical profile of patients aged 40 and younger undergoing coronary artery bypass grafting, Pol Merkuri Lekarski, 2005, vol. 18 (pg. 516-520) Google Scholar Cross ref Pub Med World Cat
9. FormicaF, FerroO, GrecoP, MartinoA, GastaldiD, PaoliniG. Long-term follow-up of total arterial revascularization using exclusively pedicle bilateral internal thoracic artery and right gastroepiploic artery, Eur J CardiothoracSurg, 2004, vol. 26 (pg. 1141-1148) Google Scholar Cross ref Pub Med World Cat
10. KolhP, WindeckerS, AlfonsoF, ColletJ, CremerJ, FalkV et al. 2014 ESC/EACTS Guidelines on myocardial revascularization. Eur J CardiothoracSurg2014;46:517-92. Google Scholar Cross ref Pub Med World Cat
11. NguyenT, VirgilioC, KakudajJ, OmariB, MillikenJ,RobertsonJet al. Characteristics of patients less than 45 years of age compared with older patients undergoing coronary artery bypass grafting. ClinCardiol1998;21:913-6. Google Scholar Cross ref Pub Med World Cat

12. HuléA, BernabeuE, Gómez-VicentR, VenturaJ. Coronary bypass surgery in young adults. Long-term survey. *Interact CardioVascThoracSurg* 2008;7:126–9. Google Scholar Cross ref Pub Med World Cat
13. AntunesPE, Ferrão de OliveiraJ, PrietoD, CoutinhoGF, CorreiaP, BrancoCF et al. Coronary artery bypass surgery without cardioplegia: hospital results in 8515 patients. *Eur J CardiothoracSurg* 2015;5:1–8. Google Scholar Cross ref Pub Med World Cat
14. GraemeHL, DunningJ, SeifertB, SodeckG, CarrMJ, BurgerHU, BeyersdorffF. Statistical and data reporting guidelines for the European Journal of Cardio-Thoracic Surgery and the Interactive CardioVascular and Thoracic Surgery. *Eur J Cardiothorac Surg* 2015;48:180–93. Google Scholar Cross ref Pub Med World Cat
15. FitzgibbonG, HamiltonM, LeachA, KafkaH, MarkleH, KeonW. Coronary artery disease and coronary bypass grafting in young men: experience with 138 subjects 39 years of age and younger. *JACC* 1987;9:977–88. Google Scholar Cross ref Pub Med World Cat