



Quality of life after coronary artery bypass graft & percutaneous transluminal coronary angioplasty: A follow up study from India

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Coronary artery bypass graft (CABG) and percutaneous transluminal coronary angioplasty (PTCA) are treatments of choice for coronary artery disease. Quality of life (QoL) is an important factor in determining optimum treatment. This study was aimed to compare changes in QoL, six months post procedure, between CABG and PTCA, and to understand the confounding effect of various contributing factors. Thirty stable angina patients each in CABG and PTCA groups, were followed up for six months. QoL was assessed with WHO-QoL-BREF. Depression was rated on the Hamilton Depression Rating Scale. Changes in QoL and depression within and between CABG and PTCA groups were compared. Multinomial logistic regression was used to measure the predictive strength of treatment type (CABG and PTCA) on QoL, controlling for significant confounders. Although scores of QoL and depression significantly changed over time in both the groups, time×group interaction did not reach to a significance. Significant confounding effects of diabetes ($P<0.01$), hypertension ($P<0.05$) and diet restriction ($P<0.05$) were found. Controlling for confounding effects of these factors, group distribution to PTCA, compared to CABG, significantly predicted greater improvements in QoL ($P<0.01$).

Key words CABG - coronary artery disease - depression - diabetes - lifestyle - PTCA - QoL - stable angina

Cardiovascular diseases (CVDs) are a leading cause of death in all parts of India¹. Treatment options for coronary artery disease (CAD) include coronary artery bypass graft (CABG) and percutaneous coronary intervention or percutaneous transluminal coronary angioplasty (PTCA). As per an estimate, more than

60,000 of each of the two procedures are being performed annually². In a systematic review on comparison of quality of life (QoL) between CABG and PTCA by Fatima *et al*³ found that >50 per cent of studies that compared QoL scores at six months after procedure reported CABG to be superior. Little data are available on comparison of QoL

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between CABG and PTCA from India. Only two studies from India assessed QoL pre- and post procedures, albeit separately for CABG and PTCA^{4,5}. The present study was aimed to compare QoL after CABG and PTCA in an Indian setting after six months and to assess for the role of various confounders.

This hospital-based prospective study included 30 patients each with stable angina in CABG and PTCA groups, with a follow up period of six months. The sampling was purposive. The study protocol was approved by the Institutional Ethics Committee of Central Institute of Psychiatry, Ranchi, India, and data were collected from the Cardiac Sciences department of Abdur Razzaque Ansari Memorial Weavers' Hospital (Apollo Hospitals Group), Ranchi. Data were collected for a period of 15 months between July 2006 and October 2007. Patients of either sex aged between 40-75 yr admitted in the hospital or undergoing either of the procedures (CABG or PTCA) and willing to participate in the study were further detailed about testing procedure. Patients with a history of stroke, transient ischaemic attack, myocardial infarction, head injury and comorbid renal diseases were excluded. The two groups were matched for age and gender. Detailed history was taken from the guardians to exclude major psychiatric illnesses.

After taking informed written consent, sociodemographic and clinical details were collected. QoL was assessed with WHO-QoL-BREF⁶; a 26-item scale distributed across four domains - physical health, psychological, social relationship, and environment. The severity of depression was rated on the 21-item Hamilton Depression Rating Scale (HDRS)⁷. Both the groups were assessed one to four days before CABG or PTCA. Postoperatively, patients were reassessed six months after the intervention.

Statistical analysis was done using the Statistical Package for the Social Sciences version 16.0 for Windows (SPSS Inc. Chicago, IL, USA). The Chi-square test and Student's *t* test were used to compare demographic and clinical variables. Pre-post comparison of WHO-QoL and HDRS scores, in each group, was analyzed using non-parametric Wilcoxon signed-rank test. To examine the between-group differences, repeated measures analysis of variance (RM-ANOVA) was applied. Finally, a multinomial logistic regression was used to measure the role of treatment distribution (CABG and PTCA) on changes in QoL, as well as to measure the confounding effects

of improvement in depression, duration of CAD, other metabolic disorders, tobacco and alcohol use and lifestyle measures. For inclusion in regression analysis, improvements in QoL and depression were categorized in terms of absolute change in scores (post-pre for QoL and pre-post for HDRS). While scores on QoL were categorized under those with 0 or less, 1-9, >10, 4 or less, 5-9, >10 were used as classification reference ranges for HDRS scores.

In the CABG group, initially, 39 patients were enrolled, of whom two males and one female died before follow up, and six patients did not turn up for follow up. In the PTCA group, initially, 44 patients were enrolled, of whom 14 (10 males and 4 females) patients did not turn up for follow up. In each group, 30 patients were included in the final analysis. Each patient group comprised 28 male and two female patients. There were no differences in the two groups in terms of age and education. The frequency of patients with diabetes was significantly greater in the CABG group ($P<0.01$) compared to PTCA. Group difference only reached a significance ($P=0.052$) on the frequency of hypertensives. The groups were comparable on substance use, both tobacco and alcohol. Furthermore, the two groups did not differ on lifestyle variables such as diet restriction and physical exercise at six months.

The Table shows within- and between-group effects for pre-post changes in scores of QoL and HDRS. Comparison of pre-post scores on WHO-QoL showed a significant change (over a period of six months post-intervention) on scores of total, physical and psychological domains in the CABG group and total and physical domains in the PTCA group. Between-group interaction effects did not reach to a significance on any of the QoL domains.

While studies on CABG outnumber those on PTCA, both procedures have been found to significantly improve QoL⁸⁻¹². Our study results showed that while both physical and psychological domains of QoL were improved in the CABG group, PTCA primarily improved physical QoL. The two studies conducted in India^{4,5} that measured QoL pre- and post procedures (CABG and PTCA) found an improvement only in physical health domain of QoL and did not show an improvement in the domain of psychological functioning. The Table also showed a non-significant time×group interaction on HDRS scores, while showing significant increases over time in both the groups.

Table. Results of within- and between-group effects for pre- and post-changes in scores of quality of life (QoL) and depression

QoL	Mean±SD		Within-group effect		Between-group effect (<i>i.e.</i> , time×group interaction)		
	Pre	Post	Wilcoxon Z	P	Wilks' lambda (df=1, 58)	P	Effect size (η_p^2)
WHO-QoL total							
CABG	2.7±0.97	3.1±0.84	3.44	0.001	0.5	0.46	0.009
PTCA	2.5±0.63	3.0±0.78	3.14	0.002			
Domains of WHO-QoL							
Physical							
CABG	13.2±2.3	15.9±3.2	3.86	<0.001	1	0.321	0.017
PTCA	13.4±2.7	16.9±3.9	4.10	<0.001			
Psychological							
CABG	15±1.8	16.8±3.7	2.78	0.005	1	0.28	0.020
PTCA	14.9±1.9	15.7±3.2	1.36	0.17			
Social relationship							
CABG	7.8±1.8	8.4±2.43	1.28	0.20	0.28	0.60	0.005
PTCA	8.4±1.9	8.8±2.31	0.76	0.45			
Environment							
CABG	19±2.3	20.0±2.8	0.99	0.32	2.2	0.14	0.037
PTCA	18.4±2.6	18.3±2.8	0.63	0.53			
HDRS							
CABG	17.33±6.51	10.90±5.56	4.24	<0.001	0.97	0.21	0.027
PTCA	16.47±5.24	11.80±5.24	3.82	<0.001			

CABG, coronary artery bypass graft; PTCA, percutaneous coronary angioplasty; HDRS, Hamilton Depression Rating Scale; SD, standard deviation

Ravven *et al*¹³ in their meta-analysis on patients who underwent CABG found that even though depression was improved in some patients, most patients did not experience remission of depression. On the other hand, PTCA has been shown to contribute independently to a higher risk of developing depressive symptoms¹⁴. Mutually contrasting findings were observed in pre-post studies done on Indian patients. While patients who underwent PTCA showed a significant improvement in depression post three days of procedure⁵, those taken up for CABG did not show an improvement in depression at the seventh day follow up⁴. Our study results showed that, by six months post-intervention, patients in both the groups reported significant improvements in depression. Baseline depression in participants of our study was of moderate severity, which explained significant improvements in depression scores post procedures.

Regression analysis showed that group distribution to either CABG or PTCA, independently, did not significantly contribute to predicting improvement in QoL ($\chi^2=0.890$; $P=0.641$). Confounding effects

of diabetes ($\chi^2=9.22$; $P<0.01$), hypertension ($\chi^2=3.93$; $P<0.05$) and diet restriction ($\chi^2=5.35$; $P<0.05$) were found significant. The final model, removing the confounding effects of these factors, showed that group distribution to CABG predicted lesser QoL improvements ($\chi^2=16.62$; $P<0.01$; Cox and Snell pseudo $R^2=0.242$) compared to PTCA.

Cohen *et al*¹² reported a significant superiority of PTCA over CABG in physical health domain at one month postoperatively. Fatima *et al*³ in their systematic review marginally favoured CABG rather than PTCA. The less improvements in those who underwent PTCA was attributed to higher rates of restenosis and recurrence of angina^{15,16}.

Our study had several limitations. Inadequate sample size was the major limitation of the study in generalizing the study findings. Other limitations included male predominated sample, exclusion of persons with CAD below 40 yr of age and lack of assessment on several other confounders such as severity and recurrence of angina, incidence

of restenosis^{15,16}, extent of vessel involvement¹⁷, quantitative assessment of blood pressure¹⁸, presence of chronic obstructive pulmonary disease and serum creatinine levels⁹, serum troponin T, creatine kinase muscle brain levels and baseline dyslipidaemia¹⁹, which were found to significantly influence improvements in QoL. The CABG group having more patients with diabetes mellitus, which might have affected restenosis rates and general target vessel revascularization and therefore QoL, than the PTCA group, rendered the samples skewed, despite the use of statistical correction for this factor. In addition, the lack of comparative assessment in a healthy control group and follow up assessment restricted to only six months also added to the limitations of the study.

In conclusion, patients taken up for either CABG or PTCA showed significant improvements in psychological and physical QoL at six months post-intervention. Controlling for hypertension, diabetes mellitus and post-intervention diet restriction CABG predicted lower improvements in overall QoL compared to PTCA.

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