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Quality Of Life among Cardiac Patients after Angioplasty versus Bypass Grafting: a Cross Sectional Study from Rural Kanyakumari

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ABSTRACT

Background: With changing lifestyle, the prevalence of CAD has been increasing multifold and there is a growing dependence on surgical interventions in treating CAD. The WHOQOL- BREF scale will help in clinical cardiac practice by identifying the quality of life (QOL) in patients with either angioplasty or bypass graft surgery. This study aimed at comparing the QOL among cardiac patients who had undergone either PTCA or CABG within past 6 months. **Material and Methods:** This cross-sectional study was conducted among 114 adult CAD patients who had undergone either PTCA or CABG intervention in a tertiary care centre in Kanyakumari district over a 2 month period from April to June 2022. Those patients who underwent the procedure within past 4 weeks; were critically ill or had acute symptoms were excluded from the study. Data collection was done using a structured, predesigned questionnaire incorporating WHO BREF QOL questionnaire. **Results:** Mean age of the patients was 60.32 yrs. Patients who developed angina and dyspnoea were more among PTCA group than the CABG group. Only 26.3% claimed a good quality of life. PTCA patients had a statistically significant higher mean score than CABG patients in the domains of physical and psychological health. In contrast, CABG patients had a statistically significant higher environmental domain score than PTCA patients. **Conclusion:** Post angioplasty patients had a better physical and psychological quality of life, whereas CABG patients had better environmental quality of life. CABG patients clearly had a better outcome in terms of reduced post interventional symptoms.

Keywords: Quality of Life, angioplasty, bypass grafting, comparison.

Introduction

Coronary Artery Disease (CAD) is the single most common cause of death in the developing world. It is responsible for 1 in every 5 deaths happening around the country.[1] The morbidity and mortality associated with the disease makes timely accurate diagnosis and

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treatment of utmost importance. Poor lifestyle factors like unhealthy eating, lack of physical activity, smoking, tobacco chewing are considered to be the major risk factors for CAD despite many other contributory factors. With changing lifestyle, the prevalence of CAD has been increasing multifold and there is a growing dependence on surgical interventions in treating CAD.

One of the options to treat blocked or narrowed arteries is to bypass the blocked portion of coronaries with a healthy vessel from elsewhere in the body. Grafts used may be a piece of vein or artery from leg or chest. Blood bypasses the blockage by going through the new graft to reach the heart muscles, this is called as coronary artery bypass grafting (CABG).[1] Percutaneous Transluminal Coronary Angioplasty (PTCA), also known as angioplasty, is a minor invasive procedure to open blocked or stenosed coronary arteries allowing unobstructed blood flow to myocardium by the placement of a stent to relieve the obstruction.[1]

Quality of life is defined as individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. QOL is clearly the primary goal and benefit of any treatment plan. Quality of life (QOL) is a vital outcome after any surgical intervention.[2] In the context of cardiac patients undergoing surgical interventions, QOL will be a useful and objective measure of assessing recovery and normalization of life post intervention.

The WHOQOL- BREF instrument assessment will help in clinical practice by identifying the aspect of the patients' life which is impacted by the disease and where treatment needs to be focussed on to improve quality of life. Periodic assessments with this QOL scale will also reveal the changes in QOL over course of treatment.[3]

Spertus et al in 2005 said that 1-year quality of life scores were significantly better for patients treated with CABG surgery as opposed to PTCA.[4] A systematic review in 2016 suggested that although angioplasty, through its less invasive nature, might provide better QOL within the first few months, CABG is superior in providing improved QOL at both 6 and 12 months after procedure and in the long run.[5] Several studies have found that CABG is superior to angioplasty in terms of quality of life, whereas in some studies angioplasty has been found to have reduced restriction of physical activity. Despite the several studies comparing QOL after CABG versus angioplasty among patients with CAD, the results have remained ambiguous.[3-8] Therefore, in this study, the aim was to tried to estimate the quality of life using the WHOQOL-BREF scale among cardiac patients who had undergone either PTCA or CABG within past 6 months, compare the QOL between the two groups an identify factors affecting QOL.

Material & Methods

This cross-sectional study was conducted in a tertiary care centre in Kanyakumari district over a 2 month period from April to June 2022. From the Cardiology Follow-up clinic, 114 adult CAD patients who had undergone either PTCA or CABG intervention in this institute were selected by purposive sampling to be included in the study. Those patients who underwent the procedure within past 4 weeks; were critically ill or had acute symptoms were excluded from the study. Data collection was done using a structured, predesigned questionnaire incorporating WHO BREF QOL questionnaire. The WHO BREF questionnaire is designed with 26 questions under 4 domains namely physical health, psychological health, social relationships and environment. The answers to the 24 questions are then computed to obtain total scores for all four domains. The raw scores thus obtained were then transformed into a 0-100 scale to obtain the transformed score.[3] Domain scores are scaled in a positive direction, ie, a higher score denotes higher quality of life. After obtaining informed consent and ensuring privacy, the patients were interviewed to obtain clinical history and intervention

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details. Relevant clinical details were collected from their medical records as well. Data entry was performed using Microsoft Office Excel 2016 and statistical analysis was done using SPSS trial version 20. Descriptive statistics, Chi square test, Fisher's exact test, Students t test, Pearson's correlation and one way Analysis of Variance (ANOVA) were used for data analysis with a predetermined statistical significance level of 5%.

Results

A total of 114 patients with ages ranging from 42 to 80 years were included in the study. The mean age of the patients was 60.32 yrs (+/- Standard deviation SD of 8.82 yrs). Almost three fourths of the study population was male at 75.4% (86) while females formed 24.6% (28). The basic demographic characteristics of the study population were as described below in Table 1.

Table 1: Demographic characteristics of study participants (n=114)

Characteristics	Frequency	Percent
Marital status		
Married	78	68.4
Widowed	29	25.4
Separated	7	6.1
Educational status		
Illiterate	3	2.6
Primary school	18	15.8
Middle school	31	27.2
Higher secondary school	56	49.1
Graduate & above	6	5.3
Previous occupational status		
Unemployed	16	14
Unskilled work	71	62.3
Skilled work	21	18.4
Professional	6	5.3
Current working status		
Unemployed	46	40.4
Unskilled work	54	47.4
Skilled work	14	12.3

Clinical Profile:

Almost half of the patients, 49.1% (56), had hypertension and diabetes mellitus, while 27.2% (31) had associated hypertension, diabetes and hypercholesterolemia, and 18.4% (21) had diabetes alone. A small minority of patients (5.3%) suffered from associated Chronic Kidney Disease (CKD). Regarding the pattern of coronary vessel involvement, 42.1% (48) had triple coronary vessel disease, 39.5% (45) had double vessel disease and 18.4% (21) had single coronary vessel involvement. PTCA was done in 52.6% patients (60) and CABG was done in 47.4% cases (54). Most of the patients, 79.9% (91) had the cardiac intervention done at least 1 to 3 months prior to the time of study. Only 10.5% (12) of patients had the procedure done 3-6 months prior while 9.6% (11) had the procedure done more than 6 months prior to this study. The post interventional events or complications among the patients were as summarized in Table 2 below.

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Table 2: Post interventional complications in PTCA versus CABG patients

Post interventional complications	Total cases N=114 (%)	PTCA N=60 (%)	CABG N=54 (%)	P value
Angina	14 (12.3)	13 (21.7)	1 (1.9)	0.002*
Dyspnoea	11 (9.6)	9 (15)	2 (3.7)	0.003#
Restriction of physical activity	72 (63.2)	26 (43.3)	46 (85.2)	0.000*
Body pain	71 (62.3)	29 (48.3)	42 (77.8)	0.001*
Hospitalization	13 (11.4)	9 (15)	4 (7.4)	0.203

**statistically significant p<0.05; Chi square test; # Fishers exact test*

The proportion of patients who developed angina and dyspnoea were higher among PTCA group than the CABG group (21.7% versus 1.9% and 15% versus 3.7% respectively). This difference in proportions was statistically significant on bivariate analysis with Chi-square test ($\chi 2$ 9.3, Odds ratio 5.4) and Fishers exact test (p 0.003) respectively. In contrast, the proportion of patients who had body pain and restricted physical activity were higher in the CABG group than the PTCA group (85.2% versus 43.3% and 77.8% versus 48.3% respectively). This difference in proportions was also statistically significant as per Chi square test ($\chi 2$ 10.5 and 21.4 respectively).

Quality of Life:

When asked to rate their own quality of life, almost half of them, 44.7% (51) had a neutral opinion that it was neither good nor bad. Around 18.4% (21) felt their quality of life was poor, while 26.3% (30) claimed it was good. A small proportion of 10.6% (12) felt it was very poor. No one claimed to have a very good quality of life. When asked if they were satisfied with their health status, 13.2% (15) claimed to be satisfied, 28.1% (32) were dissatisfied while the majority of the patients, 58.8% (67), remained neutral.

The domain scores of the patients were computed by adding up the question scores and transforming it into a 0-100 scale. The mean scores of all four domains of quality of life among PTCA and CABG patients are described below in Table 3.

Table 3: Quality of life domain scores of patients in PTCA group versus CABG group

Domains	Mean score ± SD			P value
	Total	PTCA group	CABG group	
Physical health	46.6 (9.7)	50.7 (10.1)	41.9 (6.8)	0.000*
Psychological	50.2 (6.3)	51.6 (7.4)	48.7 (4.1)	0.011*
Social relationships	52.3 (10.8)	51.9 (13.3)	52.8 (7.1)	0.672
Environment	53.1 (6.3)	51.2 (7.5)	55.2 (3.8)	0.001*

**statistically significant; Independent t test*

PTCA patients had a statistically significant higher mean score among than CABG patients in the domains of physical and psychological health. In contrast, CABG patients had a statistically significant higher environmental domain score than PTCA patients. The social relationship domain scores were almost similar between both the intervention groups. There was a statistically significant difference in all the mean domain scores across the three groups of coronary vessel involvement (one way ANOVA- p value < 0.001).

There was a statistically significant difference between the physical domain scores among the different educational and occupational groups, as per ne way ANOVA test (p 0.000 and 0.002 respectively). There was a weak negative correlation between age and environmental domain scores (r -0.256; p 0.006). This shows that as age increased, the environmental quality of life score decreased. No correlation with age was observed for the other domain scores (p>0.05). Males had a higher mean score than females (54.61 versus 45.29) in the domain of social

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quality of life. This difference in means was highly statistically significant as per Independent t test (t 4.28, p 0.000). Females had a higher score than males in physical health domain, but this was not statistically significant (48.4 versus 45.9). There were no gender differences in the scores for psychological and environmental domains.

Discussion

This study showed that only 26.3% of the cardiac patients had a good self-rated quality of life whereas up to half of them claimed a neutral self-rated quality of life. Similarly only 13.4% patients were satisfied with their health post-surgical interventions. This study also showed that environmental quality of life was better in CABG patients when compared to PTCA patients post procedure. However, the physical and psychological domains of quality of life were significantly better in PTCA patients than in CABG patients. This shows a definite restriction of activity and physical limitation affecting the cardiac patients post procedure. Males had a higher mean score than females in the domain of social quality of life in this study.

Favarato et al in 2007 reported that the CABG patients had greater improvement in QOL after 1 year of follow-up. All the therapeutic strategies presented with greater scores. However, the CABG group was the one that had significantly greater improvement in physical and social functioning, vitality and general health when compared to angioplasty. Also, men had the best QOL at the beginning of the treatment when compared to women; with a progressive improvement after 6 and 12 months.[9] This was similar to our study findings.

Borkon et al. showed that QOL score is significantly greater in the CABG group than in the PCI group at 6 and 12 months postoperatively, primarily due to restenosis in the PCI group.[10] Brorsson et al reported bypass patients had better pain relief (19.4 vs. 19.6,$p<0.05$), quality of life (17.6 vs. 4.6 $p<0.05$), general health perception (17.3 vs. 12.1,$p<0.05$) at 21 months whereas our study showed that PTCA patients has better physical, psychological quality of life post procedure.[11]

In contrast to our study, Jurkiewicz et al. showed physical quality of life was lower in PTCA patients vs. CABG patients (38.30+/- 11.10 vs. 42.64+/-9.76).This study also showed that PTCA patients had increased incidence of unstable angina compared to CABG patients.[12] Increased incidence of angina and dyspnoea were also associated with the PTCA group in our study whereas the bypass group had more body pain an restriction of activity. SJ Pocock et al circulation 1996-showed slightly increased chances of angina especially after 6 months post – intervention which resulted in slightly greater impairment of quality of life in PTCA when compared to CABG.[13]

Also, Employment status especially in men more than or equal to 60 years showed that PTCA patients returned to work sooner (40% at 2 months than 10% of CABG) but latter caught up after 5 months. After 2 years 22% and 26% of CABG and PTCA Patients respectively were not working for cardiac reasons .Patients with post procedural angina at 2 years were much more likely to be unemployed than those without angina.[13] In our study too, the unemployment rate increased from 14% to 40.4% post intervention.

Similar study by Michael Borkon et al. showed physical function decreased for CABG at 1 month($P=0.001$), it improved and was better than PTCA group by 12 months($P=0.008$),they also showed relief of angina was better for CABG than PTCA overtime.[14]

Our study showed 15% of the PTCA patients required post procedural hospitalization whereas only 7.4% of CABG patients required post interventional hospitalization. PW Serruys et al reported that the rate of event free survival at 1 year was 73.8% for those who received stenting when compared to 87.8% among those who underwent bypass surgery.[15]

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However, the limitations of this study are the small sample size and assessment of QOL from -6 months post procedure. A longitudinal assessment of QOL periodically for upto 2 years after procedure may give a better idea about how the QOL changes over time in bypass patients versus angioplasty patients. Since this was a hospital based study, the findings cannot be generalized to the community.

Conclusion

Post angioplasty patients had a better physical and psychological quality of life, whereas CABG patients had better environmental quality of life. CABG patients clearly had a better outcome in terms of reduced post interventional symptoms. PTCA patients were much more at a benefit in terms of less post interventional bodily pains and restriction of activity which resulted in early return of normal life. However, the self rated quality of life was still low among cardiac patients. This could be because of the shorter interval between procedure and QOL assessment. Periodic assessments using WHOQOL- BREF scale at specific intervals upto 2 years post procedure may give a better idea about impact of these interventions on quality of life of cardiac patients.

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