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Review article

Quality of life in CABG patients: A review of literature

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Abstract

Coronary artery bypass grafting (CABG) is a type of surgery that improves blood flow to the heart. Surgeons use CABG to treat people who have severe coronary heart disease (CHD). CHD is a disease in which a waxy substance called plaque (plak) builds up inside the coronary arteries. CABG is the most common cardiac surgery. In this procedure arteries or veins from elsewhere in the patient's body is grafted to coronary artery to bypass blockages and improve blood supply to the heart. Research showed that Indians were particularly at risk of heart diseases, with Indian subcontinent 45% of global burden of CAD. Its widely believed that "Indian genes are three times more vulnerable to heart disease. The average age for heart attacks in the west for instance, is 65 years, where in India, it is 45. Quality of life (QOL) is a broad multidimensional concept that usually includes subjective evaluations of both positive and negative aspects of life. What makes it challenging to measure is that, although the term "quality of life" has meaning for nearly everyone and every academic discipline, individuals and groups can define it differently. This article focus up on the quality of life the post CABG patients have and what the existing literature is today.

Keywords: Coronary artery bypasses grafting, surgery, nursing, plaque, CAD

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1. Introduction

Cardiovascular disease is the most common cause of morbidity and mortality in developed countries, and controlling it is a major challenge for health care systems. The authors of the latest American Heart Association report predict a significant increase in the burden of cardiovascular disease in the USA by 2030, and a huge cost for its treatment [1, 2]. In developed

countries, population aging will become a major cause of the increased incidence of cardiovascular disease. Reduction of the premature mortality associated with cardiovascular disease is possible in Poland and throughout the world. The scale of the problem has been highlighted in a number of randomized studies, including The National Cardiovascular Disease Prevention and Treatment Program (POLKARD) 3 in Poland and the Japan Assessment of Pitavastatin

and Atorvastatin in Acute Coronary Syndrome (JAPAN-ACS) [4]. The achievement of positive results in the treatment of patients suffering from coronary heart disease (CHD) is possible thanks to the common introduction of invasive procedures on the heart, particularly in the coronary arteries. These procedures are performed more and more often in elderly patients [5, 6]. Coronary artery bypass grafting (CABG) is mainly performed in elderly patients to reduce mortality and improve their quality of life (QoL) [5]. A significant theme in assessment of QoL in patients after CABG is the long-term outcomes of treatment [7, 8]. The research referring to evaluation of QoL after CABG has been inconclusive. In the majority of patients, QoL has improved after CABG, but often in a differentiated manner, depending on the gender of patients studied [9].

Ancient Indian legacy

The word "Surgery" has multiple meanings it is the branch of medicine concerned with diseases and conditions which require or are amenable to operative or manual procedure. Surgery is the word done by a surgeon. Surgery (In Latin "Hand Work") is an ancient medical specialty that uses operative, manual and instrumental techniques on a patient to investigate and /or treat a pathological condition such as disease or injury or to help improve bodily function or appearance. Surgery is the treatment of bodily injuries or disorders by an incision or manipulation as, "opposed to drugs" (Oxford Dictionary).

The earliest known compendium on surgery where penned down by ancient Indians. Sushruta, father of Indian Surgery and Ophthalmology extensively described about various surgeries in his Sanskrit text "SushrutaSamhita" ranging from rhinoplasties, labioplasties and caesarians. From the ancient period going through historic period, Middle Ages to modern surgery; it has developed rapidly with scientific era. In the Scientific era three main developments permitted the transitions to modern surgical approaches – control bleeding, control of infection and control pain (anesthesia). Now the branches of surgery

became its full fledged form that is surgical specialty and sub specialties. Of which cardiac surgery has its own importance; as heart is one of the vital organ in human body [10].

Heart is a myogenous muscular organ found in all animals with a circulatory system that is responsible for pumping blood throughout the blood vessel by repeated rhythmic contractions. The average human heart beating at 72beats per minute will beat approximately 2.5 billion times during an average 66 year life span. It weighs approximately 250-350 gm. As it is a vital organ in human body the role of the heart is enormous [11].

As per WHO estimation globally almost 42% deaths from cardiovascular diseases are due to ischemic heart diseases. Cardiovascular diseases are the number one cause of death globally. An estimated 17.3 million people died because of cardiovascular diseases in the year of 2008. In India percentage of total deaths of all ages is 24% due to cardiovascular diseases (WHO estimation 2010). "More than 50000 heart surgeries are performed every year in India. In India, the fourth largest numbers of heart surgeries in the world are conducted." (Speech by Dr.APJ Abdul Kalam at the thirty second convocation of All India Institute of Medical Sciences).

Quality of life and CABG

Quality of life is important to everyone. Although the World Health Organization (WHO) defined health very broadly as long as a half century ago, it is very essential part of wellbeing. Quality of life (QOL) is a broad multidimensional concept that usually includes subjective evaluations of both positive and negative aspects of life. What makes it challenging to measure is that, although the term "quality of life" has meaning for nearly everyone and every academic discipline, individuals and groups can define it differently. Although health is one of the important domains of overall quality of life, there are other domains as well—for instance, jobs, housing, schools, the neighborhood. Aspects of culture, values, and spirituality are also key domains of

overall quality of life that add to the complexity of its measurement [12].

Surgical revascularization of the coronary arteries leads to changes in quality of life (QoL) for patients with coronary heart disease. Coronary artery bypass grafting (CABG) is a type of surgery that improves blood flow to the heart. Surgeons use CABG to treat people who have severe coronary heart disease (CHD). CHD is a disease in which a waxy substance called plaque (plak) builds up inside the coronary arteries. These arteries supply oxygen-rich blood to your heart. Over time, plaque can harden or rupture (break open). Hardened plaque narrows the coronary arteries and reduces the flow of oxygen-rich blood to the heart. This can cause chest pain or discomfort called angina (an-JI-nuh or AN-juh-nuh). If the plaque ruptures, a blood clot can form on its surface. A large blood clot can mostly or completely block blood flow through a coronary artery. This is the most common cause of a heart attack. Over time, ruptured plaque also hardens and narrows the coronary arteries. CABG is one treatment for CHD. During CABG, a healthy artery or vein from the body is connected, or grafted, to the blocked coronary artery. The grafted artery or vein bypasses (that is, goes around) the blocked portion of the coronary artery. This creates a new path for oxygen-rich blood to flow to the heart muscle. Surgeons can bypass multiple coronary arteries during one surgery [13].

Coronary Artery Bypass Surgery also Coronary Artery Bypass Graft (CABG pronounced as "cabbage") surgery and colloquially "heart bypass" or "bypass surgery" is a surgical procedure performed to relieve angina and to reduce risk of death from Coronary Artery Disease (CAD). Angina is chest pain due to ischemia (Lack of blood supply and further leads to lack oxygen supply) of the heart muscle, generally due to obstruction or spasm of the coronary arteries (The heart's blood vessels). Coronary Artery Disease, the main cause of angina is due to atherosclerosis (It's a condition in which an artery wall thickens as a result of the accumulation of fatty materials, such as cholesterol.) of cardiac arteries.

Hypercholesterolemia is a condition there is abnormal increase of cholesterol content in blood—that is that is, higher concentrations of Low Density Lipoprotein (LDL) and lower concentrations of functional High Density Lipoprotein (HDL)—are strongly associated with cardiovascular disease because these promote atherosclerosis [14].

CABG is the most common cardiac surgery. In this procedure arteries or veins from elsewhere in the patient's body is grafted to coronary artery to bypass blockages and improve blood supply to the heart. According to number of arteries bypassed the term may be single bypass, double bypass, triple bypass, quadruple bypass and quintuple bypass. CABG is indicated when other alternative like medical management (antianginal medications plus statins, antihypertensive, smoking cessation, tight blood sugar control in diabetics) and Percutaneous Interventions (PCIs—otherwise known as Angioplasty—is a technique of mechanically widening a narrowed or obstructed blood vessel by passing a balloon tipped catheter) fails. Both PCIs and CABG are effective than medical management at relieving symptoms (For example angina, fatigue, difficulty in breathing). CABG is superior to PCIs for some patients with multivessel CAD. For a conventional CABG a Cardiopulmonary Bypass (CPB) is essential. CPB is a technique that temporarily takes over the function of lung and heart during surgery maintaining the circulation of blood and oxygen content of body. The CPB pump itself is often referred to as a heart lung machine or "the pump". It took 3-6 hours to complete CABG surgery depending on the number of blockages [15].

First CABG

The first CABG surgery was performed in the USA on May 2, 1960, at The Albert Einstein College of Medicine-Boroxn municipal Hospital centre by a team led by Dr. Robert Goetz. The first CABG surgery in India was performed by Dr. Cherian in 1975. World's first conscious off pump CABG surgery was done in India [16].

Research showed that Indians were particularly at risk of heart diseases, with

Indian subcontinent 45% of global burden of CAD. It's widely believed that "Indian genes are three times more vulnerable to heart disease. The average age for heart attacks in the west for instance, is 65 years, where in India, it is 45.

Reviews of CABG and health related quality of life

A study on assessment of health-related quality of life after coronary revascularization. The use of patient-oriented outcomes, in particular health related quality of life (HRQOL), to evaluate coronary revascularization is continuously increasing. Current data underline that patients undergoing conventional CABG show a tremendous improvement of HRQOL status as early as 3 months postoperatively. The benefits of minimal invasive CABG via mini-thoracotomy are compromised by increased incidence of pain during the immediate postoperative period. Totally endoscopic approaches seem to be more effective with regard to pain reduction and resume of everyday activities. Compared to catheter-based interventions there is evidence that conventional CABG offers significant advantages over PCI. The influence of drug-eluting stents and newer surgical techniques on HRQOL remains to be determined. Inclusion of HRQOL data in CABG and PCI databases can play a central role in order to identify patient groups who benefit the most from each revascularization strategy [17].

A study was conducted on health-related quality of life and functional capacity following coronary artery bypass graft surgery. Comprehensive data on 508 CABG patients were prospectively collected, including preoperative risk factors and postoperative morbidity in a surgical center and in all eighteen secondary referral hospitals up to discharge. The RAND-36 Health Survey (RAND-36) was used as indicator of quality of life. The primary outcome was change in the physical component summary; mental component summary and General Health summary scores from the RAND-36. All assessments were made preoperatively and repeated 12 months later. Analysis was based on three

age groups: 64 years or less (282 patients), 65-74 years (175 patients), and 75 or more years (51 patients). Thirty-day and 1-year survival rates were 98.2 and 96.7%, respectively. A great majority (86.4%) of the patients recovered without major complication. In all, the present data showed significant improvement in all eight domains of QOL as well as in functional capacity and NYHA class during the 1st year after CABG. However, the mean change in RAND-36 Mental Component Summary scores among patients aged 75 years or more did not reach a statistically significant level ($P=0.097$) and they had significantly minor improvement as compared to younger patients ($P<0.05$). Moreover, patients General Health score improvement was poorer and statistically insignificant ($P=0.817$) [18].

A study was conducted on health-related quality of life after coronary artery bypass grafting by using Euro score. Three hundred and two patients were evaluated for the Euro SCORE risk and health-related quality of life (HRQoL) during three years after CABG as assessed by the 15D instrument. Both additive and logistic Euro SCORE correlated significantly with the 15D score at 6, 18 and 36 months. A clinically important increase $> \text{or } = 0.03$ in the 15D score was achieved by 50.6% of patients at 6 months, 40.0% at 18 months and 35.9% at 36 months. The rates were similar among patients with increasing Euro SCORE at 6 and 18 months, but tended to decrease at 36 months in the highest Euro SCORE group (Euro SCORE 0-2: 46.8%; 3-5: 34.8%; and 6-14: 33.3%, respectively, $P=0.13$). Both additive (area under the receiver operating characteristic curve, AUC: 0.582, $P=0.024$) and logistic Euro SCORE (AUC: 0.575, $P=0.039$) were predictors of a significant increase of the 15D score. The best cut-off value of the additive Euro SCORE for prediction of a clinically important improvement of the 15D score during 3-year follow-up was 3, as 46.7% of patients with Euro SCORE 0-3 and 30.1% of patients with a score >3 ($P=0.006$) improved clinically. The present study showed that the Euro SCORE also predicts long-term HRQoL after CABG [19].

A study was conducted on Health-related quality of life, anxiety and depression before and after coronary artery bypasses grafting. Aim of the study was to assess health-related quality of life as well as anxiety and depression in patients undergoing coronary artery bypass graft (CABG). A total of 54 patients answered questionnaires assessing quality of life (SF-36, MacNew), anxiety and depression (STAI, HADS-D) before surgery as well as 4 weeks and 3 months afterwards. Significant improvements in health-related quality of life (MacNew) were identified 3 months after surgery. Whereas preoperative anxiety significantly correlated with health-related quality of life (MacNew) three months after surgery, correlations between preoperative depression and postoperative quality of life were only found for singular scales. Regarding clinical practice providing information about the probable course of quality of life and explaining surgery as a kind of input for the benefit of long-term enhancement seems necessary. Furthermore the assessment of preoperative well-being should be integrated in routine care in order to identify and support patients with higher levels of anxiety and/or depression [20].

A study was conducted to evaluate Health-related quality-of-life outcomes among coronary artery bypass graft surgery patients. In this paper, researchers review the current literature on HRQL and CABG surgery, including changes in HRQL following CABG, preoperative predictors of HRQL after CABG surgery, HRQL as a predictor of post-CABG mortality and comparisons of CABG with other revascularization and treatment strategies [21].

A study was conducted to assess the Health-related quality of life after coronary artery bypass grafting. Objective outcome measures (i.e., survival, mortality, morbidity, complication rate, symptom recurrence, and need for re-interventions) have long been used as benchmarks for successful cardiac surgery, including coronary artery bypass grafting (CABG). If an increasing proportion of adult patients referred for CABG are elderly, octogenarians or even nonagenarians, the acquired HRQoL benefit from bypass surgery

should be considered to be at least as important an outcome measure as potentially marginal improvement in life expectancy or longevity alone. To achieve the maximal HRQoL benefit and to optimize patient selection, a comprehensive analysis and understanding of contributors that affect pre- and postoperative self-perceived HRQoL is essential. These include patient-related characteristics (e.g., demographics and underlying co morbidities), surgical technique-related factors, and healthcare-related attributes. In this paper the investigators review the randomized controlled trials published during the last ten years to analyze the effect of CABG on HRQoL. Specifically, investigators focus on the differences between the on-pump and off-pump (OPCAB) bypass techniques; investigate the factors that contribute to post-CABG HRQoL, and study post-CABG HRQoL in elderly patients [22].

A study on Relief of symptoms and improvement of health-related quality of life five years after coronary artery bypass graft in women and men. The study was undertaken to determine the relief of symptoms and improvement in other aspects of health-related quality of life (QoL) during 5 years after CABG in women and men. Patients who underwent CABG in western Sweden were approached prior to and 5 years after surgery. Health-related QoL was estimated with Physical Activity Score (PAS), Nottingham Health Profile, and Psychological General Well-Being Index. Women (n = 381) had a 5-year mortality of 17% compared with 13% for men (n = 1,619; NS). After 5 years, 1,719 patients (survivors) were available for the survey; of these, 876 (51%) answered the inquiry both prior to and after 5 years. The results shows that in general, women suffered more than men both prior to and after CABG; however, in some aspects the improvement was more pronounced in men. Because of the limited response rate, the results may not be applicable to a non selected population who had undergone CABG [23].

A study was conducted to compare health-related quality-of-life outcomes of men and women after coronary artery bypass surgery through 1 year: findings from the POST

CABG Bio behavioral Study. A longitudinal study of symptoms and health-related quality of life was conducted among patients from four clinical centers enrolling both men ($n = 405$) and women ($n = 269$) in the Post CABG Bio behavioral Study in the United States and Canada. After 6 weeks from CABG (average 81 days), both men and women had less anxiety and symptoms related to depression than before surgery ($P < .001$). After 6 months (average 294 days), both men and women improved in physical and social functioning ($P < .001$). Although changes in scale scores were similar for men and women at each time point, women scored lower than men on these domains ($P < .001$, adjusted for baseline medical and socio demographic differences) and had more symptoms related to depression through 1 year after CABG ($P = .003$). The results shows that both male and female patients improve in physical, social, and emotional functioning after CABG, and recovery over time is similar in men and women. However, women's health-related quality-of-life scale scores remained less favorable than men's through 1 year after surgery [24].

A study was conducted to assess the Effect of coronary artery bypass graft surgery on older women's health-related quality of life. The purpose of this study was to determine if health-related quality of life (HRQL) improves after coronary artery bypass graft (CABG) surgery in older women. Study participants included 34 women 61 years or older who had elective or urgent CABG surgery for the first time. OUTCOME MEASURES: The 2 measures of HRQL were the Medical Outcomes Study Short Form-36 and the Feeling Thermometer (FT). The Short Form-36 is composed of 8 subscales that are summarized into the Physical and the Mental Composite Scores. The FT is a utility measure that rates patients' preferences for different health states. HRQL of older women was improved after CABG surgery: 7.79 points in the physical composite scores ($P = .001$), 7.26 in the mental composite scores ($P = .008$), and 29.77 points in the FT scores ($P < .001$). Age was a predictor of HRQL, with older women demonstrating poorer physical and better mental HRQL 3 months after the

operation. HRQL of older women is improved significantly as early as 3 months after CABG surgery [25].

A study was conducted to evaluate Health-related quality of life in the elderly after coronary artery bypass grafting. The health related quality of life was measured with the EASY Care questionnaire and similar one of own construction supplemented with some items of the WHOQol-BREF scale. Two years after CABG, 100 patients were available for the study (six persons died and three persons refused). Response rate was 92%. Significant reduction of symptoms of the coronary artery disease was shown. The chest pain was declared in 18% in I group vs. 70% in II group; palpitation in 23% in I group vs. 38% in II group and effort angina in 38% in I group vs. 65% in II group. The positive evaluation of the health status was declared significantly more often in the patients of I group in comparison to patients in II group. CABG caused positive change concerning health-related quality of life in the elderly two years after surgery [26].

Conclusion

Elderly patients with CHD have decreased QoL, which improves following CABG in women and normalizes in men. Surgical revascularization of the coronary arteries in patients with CHD decreases depression and improves the ability to perform basic activities of daily living. The quality of life of CABG patients depends on multiple aspects. The CABG now commonly practiced in many hospitals all around the globe, tends to miss the quality of life parameter in to due consideration by the health care workers. Nurses have very much to do to help the patients to attain maximum better quality of life. As said its is add life to years and years to life.

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