

Coronary Artery Bypass surgery and sexual function

Mehmet Bilgehan Yuksel¹, Ilhan Gecit², Ayhan Karakose³, Necip Pirincci², Mustafa Gunes²,
Cemalettin Aydin⁴, Mehmet Kaba²

Abstract

Objectives: To evaluate the influences of coronary artery by-pass surgery (CABS) on sexual function(SF) and the comorbidities on the impact of CABS on SF.

Methods: The data of 112 patients who underwent CABS and interviewed by full form of IIEF questionnaire before and 6 months after CABS were retrospectively evaluated. We specifically analyzed and compared the preoperative and postoperative (PAP) IIEF questionnaire(IQ) results to determine the influences of CABS on SF. Furthermore, we separately analyzed the same PAP data in diabetic, hypertensive and both diabetic and hypertensive subgroups and compared the data in each group to find possible influences of the comorbidities on the impact of CABS on SF.

Results: The mean age was 61,7±9,1. The number of patients without erectile dysfunction(ED) increased from 3(%2.6) to 7(%6.2), with severe and moderate ED decreased from 85(%75.9) to 33(%29.4), with mild ED increased from 24(%21.4) to 72(%64.2) after CABS, which revealed the severity of ED declined in overall and ED completely improved in some patients after CABS. The total IIEF, erectile function (EF), intercourse satisfaction, orgasmic function and sexual desire scores significantly increased after CABS(P=0,000). Although OS(Overall Satisfaction) had an increase, no statistically significant alteration was found(P= 0,04). The SF most improved in both diabetic and hypertensive group, it was least affected in diabetic group.

Conclusions: CABS had positive impacts on EF and almost all domains of SF. While the lonely presence of diabetes did not significantly affect the impact of CABS on SF, the SF most improved in both diabetic and hypertensive cases after CABS.

Key words: Comorbidities; coronary artery by-pass surgery; sexual function

Introduction

The most common cause of death in the world is cardiovascular disease (CVD) (1,2). Sexual dysfunction (SD) is common in patients with CVD. The reported prevalence of erectile dysfunction (ED) shows an increase from %46 in men with coronary artery disease (CAD) to 84% in men with congestive heart failure (2-4). Age, medical treatments, and cardiovascular risk factors such as hypertension, diabetes mellitus, and dyslipidaemia have been shown to be contributing to impaired sexual function (SF) (5-7). Cardiac surgeries are among the most stressful operations for the patients, and coronary artery bypass surgery (CABS) is one of the most frequent surgical procedure actually used for the treatment of CAD (8,9). Although most of the elderly people remain sexually active and there is an established relation between CAD and male SD, studies analyzing the SF following CABS are limited.

When some studies stated that preoperative erectile function (EF) appeared to be the best predictor of postoperative EF in patients who will undergo CABS, one study suggested that the conventional on-pump CABS surgery could significantly impact SF (9-11). However, resumption of SF is one of the important factors of psychosocial recovery after CABS (12).

The aim of this study was evaluating the SF before and after CABS in patients with CAD, and determining the incidence and types of sexual problems and the possible alterations in SF after CABS in relation with some comorbidities by using full form of International Index of Erectile Function (IIEF) questionnaire, in an effort to obtain data for counselling and rehabilitation of future patients

Material and method

The data of 112 patients who underwent CABS were retrospectively evaluated. The data of patients who underwent elective CABS, were preoperatively and postoperatively interviewed by using the full form of IIEF questionnaire, had no previous cardiac surgery except for cardiac catheterization and had stable partners with regular intercourse were included in the study. The data of patients with the features that could alter SF such as renal failure, thyroid disease, chronic liver disease, previous pelvic and genitourinary surgeries, and who had previous diagnosis and medical or surgical treatment of ED were excluded from the study.

The patients were interviewed by full form of IIEF questionnaire previous to CABS. This questionnaire consists of 15 questions to evaluate the subgroups of sexual function including total IIEF score, erectile function (EF), orgasmic function (OF), sexual desire (SD), intercourse satisfaction (IS) and overall satisfaction (OS). Scoring the IIEF domain of erectile function provides the classification of each patient as having no (26–30), mild (17–25), moderate (11–16) or severe (0–10) ED. As a result of this evaluation, we have determined the preoperative status of EF and other subgroups of SF in IIEF questionnaire. At 6th month's control, the questionnaire was completed by all patients again and the same data demonstrating postoperative status were also collected. By using preoperative and postoperative data, we specifically analyzed and compared the preoperative and postoperative IIEF questionnaire results with the aim of finding the incidence and severity of ED, determining the possible alterations in all subgroups of SF in IIEF questionnaire related to CABS, and showing the possible influences of CABS on SF.

The descriptive data were also evaluated in the sample. This data included age, body mass index, the comorbidities of diabetes mellitus (DM), hypertension (HT) and both (DM+HT), the severity of vascular disease, alcohol, smoking habit and medical treatments. The patients were grouped into 3 subgroups according to the concomitant comorbidities, such as diabetic (group 1), hypertensive (group 2) and both diabetic and hypertensive (group 3) subgroups. We separately analyzed the same preoperative and postoperative IIEF data in 3 subgroups and compared the data in each group with the aim of finding possible influences of the comorbidities on the impact of CABS on SF results of IIEF questionnaire.

Statistical analysis

All data were reviewed retrospectively. Data are expressed as Mean±SD. The categorical variables were presented as percentage (%). Analytical tests including independent

Student's *T*-tests, Mann Whitney U test and Wilcoxon test were used for comparing the

preoperative and postoperative data and evaluating the correlations between the data, as appropriate. A *P* value <0, 05 was considered significant. SPSS version 16.0 was used for the analyses.

Results

The mean age was 61.7±9.1 years. The sample included 41(36.6%) diabetic, 50 (44.64%) hypertensive and 28 (25%) diabetic and hypertensive patients. 76 (67.8%) patients were with hyperlipidemia. One vessel disease, 2 vessel disease, 3 vessel disease and multivessel disease was determined in 10(8.92%), 33(29.46%), 52(46.42%) and 17(15.17%) patients, respectively. The mean ejection fraction was 58%±17.4. The demographic features of patients were clearly demonstrated in table 1.

Table 1. The demonstration of demographic features of patients

n	(112)
Mean age	61.7±9.1
DM	41 (36.6%)
Hypertension	50 (44.64%)
DM + Hypertension	28 (25%)
Hyperlipidemia	76 (67.85%)
Smoking	85 (75.89%)
Family history	59 (52.67%)
One vessel disease	10 (8.92%)
Two vessel disease	33 (29.46%)
Three vessel disease	52 (46.42%)
Multivessel disease	17 (15.17%)
Mean ejection fraction	58% (SD 17.4)
Beta blocker medication	83 (74.10%)
CCB medication	7 (6.25%)
ACE inhibitor medication	46 (41.07%)
AT2 blocker medication	8 (7.04%)
Statin medication	89 (79.46%)
Diuretic medication	13 (11.60%)
Mean body mass index	28 (SD 3.77)

DM: Diabetes mellitus
CCB: Calcium channel blocker

The analysis of preoperative and postoperative IIEF results showed that severe ED was preoperatively present in 1(0.89%) patient, and it was increased to 8 (7.14%) at 6th month postoperatively. While 84 (75) patients had moderate ED preoperatively, it decreased to 25 (22.32%) at 6th month control after the surgery. However, 24(21.42%) patients were with mild ED preoperatively, this result increased to 72(64.28%) postoperatively. The number of patients without ED increased from 3 (2.6%) to 7 (6.2%). The preoperative and postoperative results of ED were clearly seen in table 2.

The evaluation of IIEF data regarding all subgroups of sexual function in IIEF questionnaire in overall revealed that total IIEF scores significantly increased after the operation (*P*=0.000). In addition, both of the IIEF scores of EF, IS, OF and SD also significantly increased (*P*=0.000 in all).

Table 2: The demonstration of pre and postoperative status of erectile dysfunction in the sample. (1., 2., 3., 4., 5. and 15. questions in IIEF -15 questionnaire evaluates the erectile function.)

Severity of ED	Preoperative Erectile Function	Postoperative Erectile Function
Severe ED (IIEF score 6-10)	1 (0.89%)	88 (7.14%)
Moderate ED (IIEF score 11-16)	84 (75%)	25 (22.32%)
Mild ED (IIEF score 17-25)	24 (21.42%)	72 (64.28%)
No ED (IIEF score 26-30)	3 (2.6%)	7 (6.2%)

No significant alteration was occurred in the IIEF score of OS postoperatively (P=0.04). The analysis and comparison of IIEF results in the subgroups of sexual function in IIEF questionnaire in overall was demonstrated in table 3.

Table 3. The comparison of pre and postoperative IIEF scores in overall.

IIEF subgroups	Mean	Mean Diff.	P value
Preop total IIEF	37,47±5,07		
Postop total IIEF	47,16±11,51	9,69	0,000
Preop EF	15,34±2,24		
PostopEF	18,08±5,39	2,74	0,000
Preop IS	9,15±1,21		
Postop IS	10,45±2,54	1,3	0,000
Preop OF	3,78±1,13		
Postop OF	6,86±2,17	3,08	0,000
Preop SD	4,26±0,77		
Postop SD	5,49±1,99	1,23	0,000
Preop OS	4,95±1,68		
Postop OS	5,53±2,21	0,58	0,040

N=112
 EF: erectile function,
 IS: intercourse satisfaction,
 OF: orgasmic function,
 SD: sexual desire
 OS: overall satisfaction

The analysis of IIEF data in 3 subgroups of the sample regarding the comorbidities declared different results. In group 1, it was seen that there were no statistically significant differences between preoperative and postoperative scores of total IIEF (P=0.226), EF (P=0.328), IS(P=0.161), and SD (P=0.668). While OF score significantly increased from 3.70±1.10 to 6.17±2.34 (P=0.000), OS significantly decreased from 5.34±1.66 to 4.09±1.82 after the operation (P=0.003). In group 2, the scores of total IIEF, EF, IS, OF and SD significantly increased (P=0.000 in all). Although an increase from 4.80±1.69 to 5.82±1.90 was also seen in terms of OS score, it was not found statistically significant (P=0.06). In group 3, total IIEF and EF scores significantly increased from 35.82±6.56 to 56.42±5.97 and from 14.67±2.95 to 22.07±3.37, respectively (P=0.000 in all).

Furthermore, a significant improvement was also seen in other subgroups of sexual function in IIEF questionnaire including IS, OF, SD and OS (P=0.000 in all). The analysis and comparison of preoperative and postoperative IIEF data in 3 subgroups of the sample regarding the comorbidities were shown in table 4

Table 4: Pre and postoperative IIEF scores in 3 subgroups, regarding to the comorbidities.

	Mean	Mean Diff.	p value
Group 1 n=41			
Preop IIEF	38,04±3,75		
Postop IIEF	40,19±11,47	2,25	0,226
Preop EF	15,65±1,65		
PostopEF	14,85±5,11	-0,8	0,328
Preop IS	9,14±0,96		
Postop IS	9,85±2,88	0,71	0,161
Preop OF	3,70±1,10		
Postop OF	6,17±2,34	2,47	0,000
Preop SD	4,39±0,86		
Postop SD	4,29±1,45	-0,1	0,668
Preop OS	5,34±1,66		
Postop OS	4,09±1,82	-1,25	0,003
Group 2 n=50			
Preop IIEF	37,72±4,73		
Postop IIEF	49,14±8,93	11,42	0,000
Preop EF	15,34±2,07		
PostopEF	19,26±4,28	3,92	0,000
Preop IS	9,32±0,76		
Postop IS	10,68±2,27	1,36	0,000
Preop OF	4,04±1,12		
Postop OF	7,08±1,98	3,04	0,000
Preop SD	4,16±0,65		
Postop SD	5,68±1,99	1,52	0,000
Preop OS	4,80±1,69		
Postop OS	5,82±1,90	1,02	0,060
Group 3 n=28			
Preop IIEF	35,82±6,56		
Postop IIEF	56,42±5,97	20,6	0,000
Preop EF	14,67±2,95		
PostopEF	22,07±3,37	7,4	0,000
Preop IS	8,85±1,89		
Postop IS	11,10±1,42	2,25	0,000
Preop OF	3,35±0,98		
Postop OF	7,42±2,13	4,07	0,000
Preop SD	4,25±0,75		
Postop SD	6,67±1,76	2,42	0,000
Preop OS	4,60±1,49		
Postop OS	7,25±1,95	2,65	0,000

EF: erectile function,
 IS: intercourse satisfaction,
 OF: orgasmic function,
 SD: sexual desire
 OS: overall satisfaction

Discussion

CABS is known to cause inflammatory response that is primarily associated with low blood pressure, temperature changes, leukocytosis and tissue edema and can lead to end-organ dysfunction, which may affect the SF (2,13,14). The current technical and technological improvements have rendered CABS more safe, reducing to acceptable levels the surgical risk even in older cases (2,15). Although most of the elderly people are sexually active and there is an established relation between CAD and male SD, studies analyzing the SF following CABS are limited. The most common sexual problems in patients with CAD are faced with include reduced libido, avoidance of sexual activity, and ED (16). When some studies stated that preoperative EF appeared to be the best predictor of postoperative EF in patients who will undergo CABS, one study suggested that the conventional on-pump CABS surgery could significantly impact SF (10,11).

In the present study, we aimed to evaluate the preoperative and postoperative status of SF in patients with CAD, to determine the incidence and types of sexual problems and the possible alterations in SF after CABS in relation with some comorbidities by using the full form of IIEF questionnaire. ED is defined as the inability to achieve an erection in order to maintain satisfactory intercourse. The prevalence of ED in general population is 19–52% (2,17). Atherosclerosis is the most common cause of ED, and the patients with CAD are commonly together with ED that occurs as a result of some potential mechanisms (2,18). ED has significant influences on quality of life. There were only a few studies in literature, which evaluated EF retrospectively before and after CABS, regarding to changes in EF after CABS (19,20). In our study we evaluated EF before and after the surgery. It was found that the number of patients without ED increased 3(%2.6) to 7(%6.2). However, while total account of severe and moderate ED decreased from 85(%75.9) to 33(%29.4), the number of patients with mild ED increased from 24(%21.4) to 72(%64.2). It was clearly seen that the severity of ED declined in overall and also ED completely improved in some patients (n=4) after the surgery. Therefore, we supposed that CABS had positive impacts on EF. In the literature, one study revealed that CABS may have a significant impact on EF (10,21). Nevertheless, some reports declared that CABS does not provide a net gain in SF (10,11). It should be kept in mind that ED may be early marker of CAD, and must prompt every physician to evaluate the patient for CAD (18). Although some previous reports in the literature commonly used the short form of IIEF questionnaire (IIEF-5) and analyzed only EF and/or had commonly no sufficient follow-up period, we used the full form of IIEF questionnaire and also evaluated all sexual components of the sample before and 6 months after CABS. Thus, we could analyses the alterations in other components of sexual function

in IIEF questionnaire related to the CABS. The previous literature showed that CABS influenced SF and resumption of sexual activity is an important factor for recovery. In a study, it was found that after the diagnosis of a cardiac disorder or a cardiac intervention, %25 lost their SF completely, %25 of patients had normal SF, and %50 had a decreased SF (22). The previous literature determined that a considerable improvement in comparison to the patients' status before CABS and one study declared that the most common sign of patients' recovery after cardiac surgery is resumption of their social and sexual activity (2,23).

In our study, the evaluation of IIEF data regarding all subgroups of SF in IIEF questionnaire revealed that total IIEF score and IIEF scores of EF, IS, OF and SD significantly increased after the operation (P= 0,000 in all). Although an increase were also seen in terms of OS, no statistically significant alteration was found (P= 0,04). The improvement of the majority of subgroups of SF in IIEF questionnaire showed that CABS had positive impacts on SF of patients with CAD. Vascular disorders are one of the organic causes of SF so it is not surprising that the patients with CAD have SD. The association between ED and cardiovascular risk factors has been previously reported by several authors (2,24-27). Both ED and CAD share the same risk factors including aging, diabetes mellitus, hypertension, hyperlipidemia and smoking (19,27-29). Although there are some reports addressing the predictive factors of SF following CABS; they did not evaluate the impacts of each vascular RFs on sexual function after CABS (10,11). In our study, the sample were divided in 3 subgroups according to the comorbidities, including diabetic (group 1), hypertensive (group 2) and both diabetic and hypertensive (group 3) subgroups. The preoperative and postoperative IIEF data were separately determined in 3 subgroups. The comparison of preoperative and postoperative IIEF results in each group with the aim of finding possible influences of the comorbidities on the impact of CABS on sexual function was performed. This analysis revealed different results in each group. In group 1, it was seen that there were no statistically significant differences between preoperative and postoperative scores of total IIEF, EF, IS, and SD. Nevertheless, OS score significantly decreased, while OF score significantly increased in diabetic patients after CABS. In the guidance of these results, it was concluded that CABS had no significant effects on sexual function in diabetic patients with CAD. Nevertheless, while total IIEF, EF, IS, OF and SD scores significantly increased in group 2. These results showed that a significant improvement was occurred in almost all scores of the parameters in hypertensive patients after CABS. Furthermore, all scores of the subgroups of sexual function in IIEF questionnaire significantly improved in group 3 after CABS. In overall, these results revealed that while the sexual function most improved

in both diabetic and hypertensive patients, it was least affected in only diabetic patients after CABS.

Conclusion

The determination of the decline in the severity of ED in overall and the complete improvement of ED in some patients after CABS revealed that CABS had positive impacts on EF in patients with CAD. Furthermore, the demonstration of a significant improvement in the majority of subgroups of SF in IIEF questionnaire was concluded that CABS had also an encompassing positive impact on almost all domains of sexual function in patients with CAD. On the other hand, the analysis of possible influences of the comorbidities on the impact of CABS on sexual function showed that while the lonely presence of diabetes mellitus did not significantly affected the impact of CABS on sexual function, the sexual function most improved in both diabetic and hypertensive cases after CABS. We supposed that these results need to be confirmed by prospective and randomized trials in greater series.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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