

ERECTILE FUNCTION AFTER CORONARY ARTERY BYPASS SURGERY

KORONER ARTER BYPASS CERRAHİSİ SONRASI EREKTİL FONKSİYON

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Abstract

Background: Erectile function is markedly affected by acute alterations in circulatory homeostasis. The objectives of this study were relevant in that, if there is a significant problem with erectile function in this expanding population of cardiac surgical patients, it has to be addressed because of importance of sexual health and its strong interaction with measures of quality of life. Methods: Candidates for CABG were interviewed using the International Index of Erectile Function (IIEF). The interview was performed before surgery and 6 months after surgery. Results: Thirty male patients were interviewed before the surgery. Eighteen patients (60,0%) had mild-moderate ED, whereas 8 (26,7%) had mild ED. The mean IIEF score increased from 43,0 to 44,7. IIEF decreased in 8, increased in 15 and did not change in 3 patients. Nine of 10 diabetic patients were interviewed after surgery, in whom IIEF decreased in 6 patients, increased in 2 and did not change in 1 patient. Among hypertensive patients, 10 were interviewed after surgery, in whom IIEF decreased in 4, increased in 5 and did not change in 1 patient. Conclusion: Our results reverted that diabetes was a risk factor for ED, whereas cardiac status remain noninfluential. Sexual function should be kept in mind and multidisciplinary approach should be considered to improve the quality of life. (*Anatol J Clin Investig 2008;2(4):146-149*).

Özet

Amaç: Erektıl fonksiyon dolaşım dengesindeki değişikliklerden belirgin şekilde etkilenir. Bu çalışmanın amacı, cinsel sağlık ile yaşam kalitesi arasındaki güçlü ilişki nedeniyle ve giderek genişleyen kalp cerrahisi hasta grubunda erektil fonksiyonlarda belirgin sorun olup olmadığını incelemektir. **Gereç ve Yöntem:** Koroner arter bypass cerrahisi adayları ile International Index of Erectile Function (IIEF) kullanılarak görüşme yapıldı. Hastalarla görüşmeler ameliyat öncesinde ve cerrahiden 6 ay sonra olmak üzere iki kez gerçekleştirildi. **Bulgular:** Cerrahi öncesi yirmialtı hasta ile görüşme gerçekleştirildi. Onsekiz hastada (60,0%) hafif-orta erektil fonksiyon bozukluğu, 8 (26,7%) hastada hafif erektil fonksiyon bozukluğu mevcuttu. Ortalama IIEF skoru 43,0'dan 44,7'ye yükseldi. Sekiz hastada IIEF azalma 15 hastada artma gösterdi, 3 hastada ise değişiklik görülmedi. Dokuz diabetik hastadan altı tanesinde IIEF azalma gösterirken, 2 tanesinde artış mevcuttu, bir hastada ise değişiklik gözlenmedi. On hipertansif hastanın 4'ünde azalma, 5'inde artma mevcuttu. Bir hipertansif hastada ise değişiklik görülmedi. **Sonuç:** Diabetes Mellitus erektil disfonksiyon için bir risk faktörü olarak ortaya çıkarken, kardiyak durum etkizis görünmektedir. Yaşam kalitesini artırmak için cinsel fonksiyonlar göz önünde bulundurulmalı ve multidisipliner yaklaşımlar uygulanmalıdır. (*Anatol J Clin Investig 2008;2(4):146-149*).

Coronary artery bypass grafting (CABG) is one of the most frequent surgical procedure actually performed in cardiac surgery which involves hemodynamic changes affecting the penile erectile function. Most of the male patients have decrease in sexual activity at the period of illness, and during convalescence, owing to the body's need to conserve its resources to deal with life-threatening emergencies rather than procreating, or seeking bodily pleasure. The body must be considered holistically, because diseases not affecting the genital region may be the cause of failure to achieve adequate erection. Erectile Dysfunction (ED) is defined by Buvat et al. [1] as the inability to achieve or maintain an erection sufficient for coitus. Organic and endocrine disorders may cause ED. Recently therapists have realised that 45% of cases seen have an organic component. Vascular (obstruction of the aortic bifurcation) and neurological diseases

(temporal lobe tumor, spinal cord disease and injuries, peripheral neuropathies) also effect erectile function [2].

Factors predisposing to occlusive vascular disease of the penile arteries are the same as those causing coronary artery disease [3]. The cardiovascular system plays a vital role providing the hydraulic mechanism for penile erection. Erectile function is markedly affected by acute alterations in circulatory stability. Coronary artery bypass graft (CABG) surgery which involves acute hemodynamic changes that should result in improvements in systemic vascular perfusion that subsequently decrease sympathetic drive and permit improvements in penile erectile function [4]. The objectives in this study were relevant in that, if there is a significant problem with erectile function in this expanding population of cardiac surgery patients, the problem need to

be addressed because of the importance of sexual health and its strong interaction with measures of quality of life, productivity, family stability and violence in society [5-8].

Material and Methods

Twenty six consecutive patients were enrolled in this study. Mean age was 60.9 ± 8.3 . We excluded patients with recent (<3months) venous or systemic thromboembolism, myocardial infarction, stroke or acute coronary syndrome, infection, inflammatory disease, surgery, malignancy and renal impairment, patients with valvular heart disease and those being treated with hormone replacement therapy.

Patients with coronary artery disease (CAD), undergoing CABG, were interviewed using the International Index of Erectile Function (IIEF), which was introduced by Rosen RC et al [9]. The interview was performed before surgery and approximately 6 months after surgery. Six months is regarded as adequate time in which to recover and reach a steady state of functioning. All patients were operated on by standart means of cardiopulmonary bypass. Data regarding to left ventricular ejection fraction, number of affected coronary vessels, presence of diabetes and hypertension were also collected.

Operative technique and anesthesia

All patients underwent standardized anaesthesia and surgical techniques. Intravenous penthotal sodium was administered 5 to 7 mg/kg for induction. Anesthesia was continued with sevoflouran or isoflouran. Vecuronium bromide 0.1 mg/kg was used as the myorelaxan drug. Cefazelin sodium and gentamycin sulphate were administered in the preoperative period in all patients. Extracorporeal circulation (ECC) was performed under moderate hypothermia. The internal mammary artery was harvested in all subjects plus one or more venous grafts. Heparin was administered as a loading dose of 300 IU/kg of body weight and supplemented to maintain an activated clotting time (ACT) of > 450 sec during CPB. The membrane oxygenator ((Dideco, Mirandola, Italy), a 3 mg/kg dose of heparin sodium, 2000 mL of Ringer's lactate priming, a roller pump, nasopharyngeal temperature was kept at 28°C. Cardiopulmonary bypass was instituted via the ascending aorta and single two stage venous cannulation (maintained at 2.2 to 2.4 liter/min⁻¹ per m⁻²). Heparin was neutralized with protamine hydrochlorur (Protamin 1000; Roche, Istanbul, Turkey) under monitoring with the ACT. Additional protamine sulfate was given, if the ACT was above 120 seconds. Surgical hemostasis was achieved using a standardized protocol.

Statistical Analysis

All data were reviewed prospectively. Data are expressed as mean \pm SD. Descriptive statistical analysis was done with the StatView statistical software package 5.0.1 (SAS Institute, Inc, Cary, NC).

Results

The mean age was 60.9 ± 8.3 . Ten patients (33.33%) were diabetic and 13 (43.33%) had hypertension. One vessel disease, 2 vessel disease, 3 vessel disease and multivessel disease was found in 2, 7, 11 and 6 patients, respectively. The mean ejection fraction (EF) was $56.9\% \pm 5.5\%$. Table-1 shows the characteristics of the patients. There was no relation between EF and affected coronary vessel number to erectile dysfunction. Eighteen patients (69.2%) had mild-moderate ED, whereas 8 (30.7%) had mild ED. The overall mean IIEF score increased from 43.0 ± 2.6 to 44.7 ± 4.3 . IIEF decreased in 8 (30.7%), increased in 15 (57.6%) and did not change in 3 (11.5%) patients. Nine of 10 diabetic patients were interviewed after surgery, in whom IIEF decreased in 6 (66.6%) patients, increased in 2 (22.2%) and did not change in 1 (11.1) patient. Among hypertensive patients, 10 were interviewed after surgery, in whom IIEF decreased in 4 (40.0%), increased in 5 (50.0%) and did not change in 1 (10.0%) patient. Only 1 (10.0%) patient's IIEF increased among patients with no hypertension and no diabetes. Controversely, 3 patients had hypertension and diabetes, in whom IIEF decreased in every patient. The changes of overall mean IIEF was 37.267 ± 15.070 to 38.767 ± 15.993 . IIEF changes in subgroups are summarized in Table-2 and Figure-1A-B. There was no relation between left ventricular ejection fraction and the number of affected coronary vessels to erectile function, statistically.

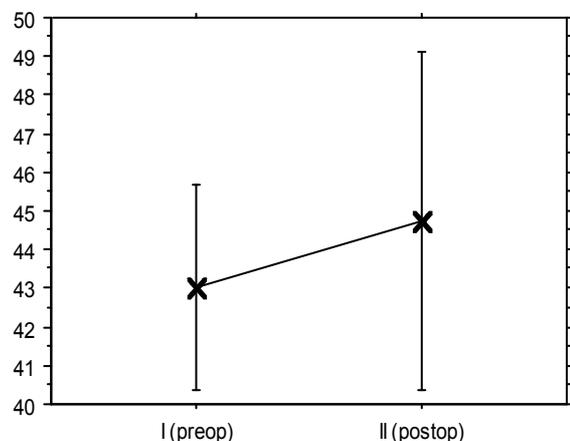


Figure-1A. Overall changes of IIEF score

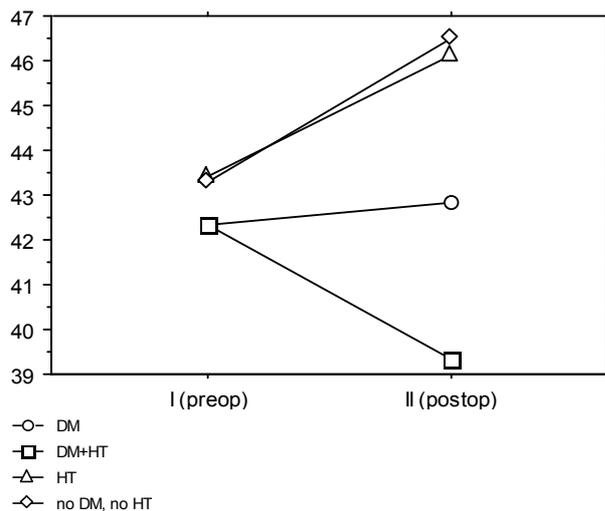


Figure-1B. Change of IIEF score in diabetic (DM), hypertensive (HT), diabetic and hypertensive (DM+HT) and non-diabetic non-hypertensive (no DM, no HT) patients.

Discussion

Open heart surgery with cardiopulmonary bypass (CPB) and cardioplegic arrest of the heart is known to cause inflammatory response, that can lead to end-organ dysfunction which may affect the postoperative course of the patients and may limit surgical success [1-3]. CPB induces complex changes in blood proteins and cells that culminate in the activation of diverse inflammatory and coagulation pathways [4]. The inflammatory response after conventional CABG is primarily associated with low blood pressure, temperature changes, leucocytosis and tissue oedema [5,6]. The technical and technological improvements occurred in the last decade have rendered this operation more and more safe, reducing to acceptable levels the surgical risk even in very old and sick cases [15].

Erectile dysfunction is a common disease having influence on quality of life. There were only a few studies in literature, which evaluated erectile function retrospectively before and after CABG [4], with similar findings regarding to changes in erectile function after CABG. Vascular disorders, e.g. atherosclerosis, is one of the organic causes of ED [2], so it is not surprising that CAD patients have ED. The preoperative mean IIEF score are all similar in non-diabetic non-hypertensive, diabetic, hypertensive and both hypertensive and diabetic patients. The IIEF score decreased

more in patients, who are both diabetic and hypertensive. Diabetes is a well known risk factor for atherosclerosis, which is a cause for ED. Furthermore, hypertension is also related with endothelial dysfunction and atherosclerosis. So, the additive effect of both, diabetes and hypertension, seem to be responsible for ED, postoperatively. On the other hand, non-diabetic hypertensive patients' IIEF score increased and non-hypertensive diabetic patients' IIEF score did not change after CABG, statistically. These results showed, that diabetes was a risk factor for ED in CAD patients, where hypertension was an additive risk factor for ED in the presence of diabetes. But it should be pointed out that non-diabetic non-hypertensive patients' IIEF score increased after CABG.

Left ventricular ejection fraction and the number of affected vessels remain non-influential on changes in IIEF score. It can be recommended, that the systemic effect of cardiac status is less effective on erectile function than a systemic disease like hypertension in the presence of diabetes or diabetes alone.

In conclusion, this study suggests that coronary artery bypass surgery can have a significant impact in erectile function. But the presence of diabetes and hypertension are risk factors for ED. Especially those patients with diabetes and hypertension should be treated after CABG for ED. To improve quality of life, the sexual function, also in women, should be remembered. Therefore working together with other disciplines (gynaecology, psychiatry, sexual medicine, urology) is of great importance [10].

These results need to be confirmed in greater series. Also hemodynamic changes in penile vasculature before and after CABG should be evaluated.

Table-1. Characteristics of patients

Number	26
Age (years, mean±sd)	60.9 ± 8.3
One vessel disease (n)	2
Two vessel disease (n)	7
Three vessel disease (n)	11
Multivessel disease (n)	6
Ejection fraction (% , mean±sd)	56.9 ± 5.5%
Diabetes mellitus (n)	9
Hypertension (n)	10

Table-2. Preoperative and postoperative IIEF scores

	n		Mean	Mean Diff.	p-value
Overall	26	Preop IIEF	37.2 ± 15.0	1.7	0.0519
		Postop IIEF	38.7 ± 15.9		
Diabetes Mellitus	9	Preop IIEF	38.1 ± 13.4	-0.6	0.5599
		Postop IIEF	37.5 ± 13.6		
Hypertension	10	Preop IIEF	43.1 ± 2.4	1.0	0.4878
		Postop IIEF	44.1 ± 4.4		
Hypertensive and diabetic patients	4	Preop IIEF	31.7 ± 21.2	-2.2	0.0780
		Postop IIEF	29.5 ± 19.7		
Only diabetic patients	6	Preop IIEF	42.3 ± 1.6	0.5	0.7412
		Postop IIEF	42.8 ± 4.1		
Only hypertensive patients	9	Preop IIEF	33.7 ± 19.2	2.1	0.1303
		Postop IIEF	35.8 ± 20.5		

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