

Summaries of Articles

Clinical Investigations

Cardiovascular Responses to Exercise in Healthy Children

Z. Yiğit, F. Öztunç, V. Sansoy, D. Güzelsoy, A. Sarioğlu, G. S. Saylam, N. Gürses

Exercise tests are becoming an integral part of the diagnostic evaluation of children with cardiac disorders. The purpose of this study was to determine the reference parameters for exercise testing in normal Turkish children. Two-hundred and thirty-seven healthy children (102 girls and 135 boys), aged 5-14 years were studied using a modified Bruce protocol. The children were divided into groups according to their gender and age (5-6, 7-8, 9-10, 11-12, 13-14 years of age). In all age groups, exercise workload, peak exercise systolic blood pressure, diastolic blood pressure and heart rate, increase in systolic blood pressure and heart rate, double product were evaluated. All stated parameters except maximal heart rate increased with age in all groups. Atrial and ventricular premature beats were detected in eight children. Right bundle-branch block occurred in one subject. Ischemic ECG changes did not occur in any of the children.

The present study established reference parameters for treadmill exercise ECG test in Turkish children.

Key words: Exercise ECG, healthy children

Color-Doppler Echocardiography in the Assessment of Subclinical Cardiac Involvement in Chorea Minor due to Rheumatic Fever

A. Çelebi, T. Onat, G. Ahunbay, G. Batmaz

Twenty-five children with chorea minor with or without clinically evident carditis were evaluated by color-Doppler echocardiography (CDE) in addition to clinical examination. Cardiac involvement was clinically evident in 7 of 25 patients (%28), ie

isolated mitral regurgitation (MR) in 5, MR and pericarditis in one, combined mitral and aortic regurgitation (AR) in the other one. Clinical findings were in concordance with the findings by CDE in all patients with clinically evident valvular involvement. Echocardiography disclosed mild but significant valvular regurgitation in 14 (%78) of the remaining 18 patients, in whom clinically no valvular involvement was present. Silent valvular regurgitations encountered in pure chorea were as follows: 9 isolated MR, 2 MR+AR, and 3 isolated AR. The incidence of cardiac involvement, which was 28% (7/25) by clinical examination alone, significantly increased to 88% (22/25) after adding silent valvular regurgitations detected by CDE. It was concluded that echocardiographically mild but significant valvular regurgitations can be frequently found in chorea minor patients in whom these are clinically undetectable. Hence, CDE should be used to assess silent valvular regurgitation which may modify the duration of prophylaxis in patients with pure chorea.

Revascularization of the Circumflex Artery Using Pedicled Right Internal Mammary Artery Graft via the Transverse Sinus

B. Polat, M. Yılmaz, B. Akpınar, V. Aytekin, O. Bayındır, B. Sönmez

Retro-aortic crossing of the pedicled right internal mammary artery (RIMA) for revascularization of the circumflex artery (Cx) is an attractive technique to achieve complete arterial revascularization of the left ventricle.

Patients and Methods: Between April 1995 and December 1997, this technique was applied to 115 elective patients (98 males, 17 females; average age 56.3 years, range 34-75 years). Twenty-three patients were diabetics and ten patients had suffered from chronic obstructive pulmonary disease (COPD). Thirteen had a left ventricular ejection

fraction < 40%. The RIMA grafts were passed through the transverse sinus to revascularize the lateral back side of the myocardium. The RIMA graft was anastomosed to the Cx artery (the intermediary artery (IM) in 21, the obtuse marginal artery (OM) in 84, the posterolateral Cx (PLCx) in 10 patients). The left internal mammary artery (LIMA) graft was anastomosed to the LAD in 63, LAD and diagonal in 51 and LAD proximal-distal in one patient. In eight patients, the right gastroepiploic artery (RGEA) was anastomosed to the right coronary artery (RCA) or its branches. In 42 patients complete arterial revascularization had been achieved. Patients received on average, 2.52 arterial anastomoses and mean number of distal anastomoses was 3.2.

Results: There was no early or late mortality. Perioperative myocardial infarction was defined as new electrocardiographic Q waves combined with cardiac enzyme elevation creatine kinase MB fraction. Although it was documented in 4 patients (3.5%) none of them needed an intraaortic balloon pump (IABP) support. Three patients were reoperated for sternal dehiscence who had also COPD. Two patients underwent early reoperation for excessive bleeding. Thirty-five patients enrolled in prospective angiographic study agreed to undergo postoperative angiography (range 1 to 12 months after operation). Thirty-three of the 35 RIMA anastomoses and all of the LIMA anastomoses were patent. Treadmill tests were negative in 93 patients including the two patients who have occluded RIMA anastomoses.

Conclusion: We conclude that bringing RIMA via the transverse sinus for grafting the circumflex area provides great early patency and clinical results.

Key words: RIMA, transverse sinus, arterial revascularization.

Blood Levels of Erythropoietin in Congestive Heart Failure and Relationship to Clinical, Hemodynamic and Hormonal Profiles

M. K. Erol, E. Bozkurt, F. Akçay, H. Şenocak, Ş. Karakelleoğlu, S. Ateşal, N. Alp

This study was performed in patients with congestive heart failure (CHF) to investigate the relationship between serum erythropoietin (EPO) levels and other neurohormonal changes, clinical and hemodynamic parameters, severity of the disease and also the effect of treatment on EPO levels. It was carried out in 20 healthy subjects and 76 patients with congestive heart failure admitted to Cardiology Department of Medical Faculty of Atatürk University between July 1995 and February 1996. Patients with CHF were classified according to New York Heart Association (NYHA) classification as group I (n=15), group II (n=21), group III (n=20) and group IV (n=20).

Serum EPO, aldosterone and plasma atrial natriuretic factor (ANF) levels, plasma renin activity (PRA) were measured in all groups. Serum erythropoietin levels were found to be higher in patients with CHF than in controls and increased progressively from group I to IV. Serum EPO levels were significantly higher in both group III and IV patients than in the control group. ($p<0.001$; $p<0.001$). There was a positive relationship to serum EPO and PRA ($p<0.02$), ANF ($p<0.005$), aldosterone ($p<0.05$) levels.

While serum EPO levels declined ($p<0.001$), left ventricular ejection fractions increased ($p<0.001$) after a 21-day combination therapy with diuretics, digitalis and angiotensin-converting enzyme inhibitors.

We conclude that plasma EPO levels rise with the progression of CHF and decrease with effective therapy of the disease. Our results suggest the participation of EPO in the neurohormonal response in CHF and that this parameter may be used as an indicator of tissue hypoxia in evaluation of the efficiency of therapy.

Key words: Erythropoietin, congestive heart failure

Adjustment of Heart Rate and Double-product to ST-segment Level, -index, and -integral in Exercise Testing

M. Gençbay, M. Değertekin, Y. Bakaran, İ. Dindar, F. Turan

The aim of this study was to determine the performance of the methods devised by adjustment of heart rate (HR) and double-product (DP) changes to ST-segment level, ST-segment index, and ST-segment integral changes during exercise testing and to find if any method had a test performance, comparable to or superior than the standard method (using only ST-segment depression criteria). For this purpose, the best three methods in regard to the test performance were determined and compared to that of the standard method.

One-hundred and seven patients (33 female, 74 male, age 54 ± 9.2) who underwent coronary angiography were enrolled in the study. Exercise tests were performed with ST/HR slope protocol within 10 days after coronary angiography. Adjustments of ST-segment level, -index, and -integral to HR and DP were made both with linear regression basis and simple adjustment method that is the ratio of ST-segment levels, -index, or -integral change to the HR or DP change during exercise testing. Coronary angiograms and exercise tests were assessed in a double-blind manner, and intra-observer variability for the assessment of coronary angiography was determined. Coronary angiograms were assessed by perfusion scoring with the Gensini scoring method.

When all methods of the study were compared with their corresponding areas under receiver-operating curves; methods with linear-regression-based adjustments of ST-segment level to HR (ST-lev/HR slope), ST segment integral to HR (ST-int/HR slope); and the method with simple adjustment of the ST-segment level to HR (ST-lev/HR index) had significantly superior test performance than the other methods. Sensitivities and specificities of these three methods were: 86%, 66%, 65%; 83%, 63%, respectively (all $p < 0.05$). No significant differences

existed in performance among these three methods (ST lev/HR slope vs ST int/HR slope, $p = 0.097$; ST lev/HR slope vs ST lev/HR index, $p = 0.074$). When correlations of index or slope values of each patient were tested with their corresponding perfusion scores derived from the Gensini method, significant correlations prevailed between them (r for ST-lev/HR slope vs Gensini perfusion scores was 0.65, $p < 0.001$). We concluded that ST-lev/HR slope, ST-int/HR slope, and ST-lev/HR index methods had significantly superior test performances than the other methods which included the standard ST-segment depression criteria method. These three methods can be reliably used clinically instead of the classical method utilizing ST-segment depression criteria.

Reviews

Mechanism of Torsade de Pointes Arrhythmias

B. Görennek

Torsade de pointes (TdP) arrhythmias are defined as polymorphic tachycardias which can terminate by themselves or degenerate to ventricular fibrillation. The prolongation of the repolarization time is a very important factor to initiate arrhythmias. Phasic variations in electrical polarity and amplitude of the QRS complexes are observed. TdP may occur as a congenital disorder. Recently there has been a marked progress in the understanding of their genetic basis. On the other hand, drug-induced TdP occurs due to proarrhythmic effects of some antiarrhythmic drugs. Bradycardia, frequency changes, prolongation of the QT time, dispersion of repolarization, early afterdepolarizations and delayed afterdepolarizations are precipitating factors of TdP. In addition, electrolyte abnormalities, changes in T and U waves and presence of ventricular hypertrophy may contribute to the initiation of TdP.

Key words: Arrhythmias, torsade de pointes, ventricular tachycardia

Role of Postmenopausal Estrogen Therapy in the Prevention of Coronary Heart Disease

G. Akgün

Postmenopausal women lose protection from coronary heart disease (CHD) and this is probably related to the loss of estrogen. Estrogen raises levels of HDL-cholesterol and lowers levels of LDL-cholesterol, Lp (a), fibrinogen and plasminogen activator-inhibitor-1. It also prevents the oxidation of LDL-cholesterol and improves carbohydrate metabolism and insulin sensitivity. Estrogen also has direct actions on the arterial wall. It dilates coronary arteries, abolishes the vasoconstrictor response to acetylcholine, decreases the proliferation and migration of smooth muscle cell, inhibits foam cell formation and decreases collagen and elastin production. But do these anti-atherogenic effects of estrogen translate into clinical benefits? The evidence for a benefit of estrogen on CHD in women, comes from observational case-control, cohort, cross-sectional epidemiological studies. Randomised, placebo-controlled trials studying the role of estrogen in primary or secondary prevention of CHD are lacking. Also in women with a uterus, unopposed estrogen is associated with an increased risk of endometrial cancer, therefore in most women, progesterone must be added to estrogen. The effect of this combination on the prevention of CHD is not well documented. It is known that long-term use of estrogen increases the risk for breast cancer.

Two ongoing trials to answer the question of HRT are: Women's Health Initiative (WHI) study, a randomized placebo-controlled primary prevention trial of combined estrogen and progesterone replacement therapy in healthy women and Heart and Estrogen/Progesterone Replacement Study (HERS), a secondary prevention trial in women with documented coronary artery disease. The results of these clinical trials must be awaited. At present, whether to use HRT or not must be made on an individual basis, weighing the risks and benefits.

Key words: atherosclerosis, coronary heart disease, menopause, hormone replacement therapy.

Apoptosis and the Cardiovascular System

H. Bahadır, M. S. Mehr, O. Sağkan

In recent years, the concept of apoptosis has become the goal of scientific investigations in various medical disciplines, including cardiology. Apoptosis is the self-killing mechanism of the cell and the main purpose of apoptosis is summarised as cleaning of the old, nonfunctioning and infected cells. The major difference between apoptosis and normal cell death is the cleaving of the DNA producing 180-200 bp segments. Apoptosis is controlled by hormones, growth factors, cations and genes which are the most important. This article describes the discovery, definition, comparison with necrosis, genetic control and possible mechanisms of apoptosis. The most recent trials in cardiology regarding this subject are also discussed.

Key words: Apoptosis, cardiovascular system, genetics

Case Reports

A Rare Cause of Heart Failure: Hypocalcemic Cardiomyopathy

M. Kahraman, M. Moğulkoç, H. Dinçer, C. Özer

Hypocalcemia is a relatively uncommon but reversible cause of congestive heart failure. A 29-year-old woman, admitted to the hospital due to congestive heart failure, was operated for thyroid gland carcinoma fifteen years ago. She was taking oral calcium and thyroid replacement therapy after the operation. Her ejection fraction was 28% and she had no evidence of underlying cardiac disease. Symptoms subsided with medical treatment, but no echocardiographic improvement was observed in left ventricular size and functions. She was admitted to the hospital again in hypocalcemic tetany state six months ago. The dosage of calcium was increased and Vit D added to her medications. Two months later, she was completely asymptomatic and her ejection fraction was 58% in echocardiographic examination. This time heart failure medications was

stopped and she continued to take only calcium and Vit D. Three months later she was again asymptomatic, her physical and echocardiographic examination were completely normal. Chronic hypocalcemia can cause severe left ventricular dysfunction. This clinical situation, namely hypocalcemic cardiomyopathy, though in some cases long-lasting, can be reverted by calcium replacement.

A New Method to Prevent Ischemia of the Distal Extremity During Intraaortic Balloon Pump

*H. Karabulut, R. Tosun, A. Korukçu,
H. Gerçekoğlu, M. Demirtaş, O. Sokullu, M. Şişman*

Intraaortic balloon pumping (IABP) is still the most common assist circulatory support system. One of the serious potential complications of this system is limb ischemia. A 64-year-old patient who underwent coronary bypass surgery developed ischemia on the IABP-applied limb, and the device, was tried to be transferred to the other extremity. Because this trial failed and the patient still needed circulatory support, the IABP was again applied on the same limb. Distal perfusion was accomplished by using two 16 G catheters in each femoral artery which were connected with an extension tube used for the arterial pressure monitorization, and a blood flow of

90 ml/min was achieved. Signs of ischemia disappeared with the help of this system. Since the patient needed no further circulatory support, intraaortic pumping and distal perfusion was terminated after fifteen hours.

After insertion of IABP, if the transfer of the balloon to the other limb is not feasible, this is an easy and effective method.

Key words: Coronary artery surgery, intraaortic balloon pumping, limb ischemia

Endoscopic Saphenous Vein Harvesting in Coronary Bypass Surgery

B. H. Şirin, C. Tetik, L. Yılık

Leg wound complications after standard open techniques of saphenous vein graft excision are not infrequent and remains a persistent clinical problem in coronary surgery. Endoscopic harvesting of saphenous vein has been developed as a technique in minimally invasive surgery. We have started using this technique for the first time in Turkey in our clinic recently. This report concerns the application of endoscopic technique and early results in two cases.

Key words: Endoscopy, saphenous vein graft, coronary bypass.