Summaries of Articles

Clinical Value of Serial Transesophageal Echocardiography in Thrombolytic Treatment of Mechanical Prosthetic Valve Thrombosis

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Thrombolytic therapy (TT) for thrombosed prosthetic heart valves have been used as an alternative to surgical thrombectomy and valve replacement. However, diagnostic criteria, indications and delivery methods for TT have not been standardized. There do not exist definitive established guidelines for TT of obstructive type (O) prosthetic valve thrombosis (PVT), and may more debatable is whether TT is a reasonable therapy for nonobstructive type (NO) PVT. The aim of this study was to investigate the potential value of serial transesophageal echocardiography (TEE) guidance for more effective and safer administration of TT in prosthetic valve thrombosis (PVT), and to investigate clinical importance of the morphological characteristics of PVT (obstruction, mobility) determined by TEE and fibrinolytic infusion protocol (fast vs slow) for TT success and complications. The study group consisted of 28 pts (F 18, M 10, mean age 36±12) who underwent 50 TT sessions for the treatment of 32 PVT (mitral 24, aortic 6, mitral and aortic 1, tricuspid 1) episodes. Patients with obstructive (O) thrombus, and those with nonobstructive (NO) thrombus who either had a history of embolization or had a large thrombus mass (≥10 mm base diameter and/or≥5 mm mobile segment length) were accepted as candidates for TT. Streptokinase (SK) was the initial agent in all primary PVT episodes. In early experience (n=13) a total of 1.5 million units of SK was administered in 3 hours. In subsequent patients (n=14) a slow infusion of 60.000-100,000 U/hr for a total of 15-24 hours was given. Urokinase (n=2) or rt-PA (n=7) was chosen for recurrent thrombus or in the case of failure of two subsequent SK sessions. The overall TT success rate was 88% (29/33) in all episodes, and were 88% (22/25) and 85.7 % (6/7) in mitral and aortic PVT episodes, respectively (p>0.1). Complete TT success was achieved in pts with tricuspid PVT. The overall success rate was found to be unassociated with the valve types, thrombus morphology (obstruction, mobility), NYHA classes, and infusion protocol of SK. Complications of thrombolytic treatment was seen in 6 (18.7%) thrombotic episodes. Major complications included death in 1 (3.1 %), coronary embolization in 1 (3.1%) and cerebral embolization in 1 (3.1%) episode. Minor bleeding was noted in 3 (9.3%) of the episodes. Of interest all major complications occurred in the group that received the rapid infusion of SK as initial treatment.

Conclusions: (1) TEE has greatly improved the recognition of detailed morphologic characteristics of PVT, (2) TT success seems to be not different for the mitral and aortic valve trombosis, (3) prolonged fibrinolytic infusion protocol may decrease the incidence of embolic events, (4) functional status (NYHA Class III and IV) of pts during TT does not limit successful outcome, and (5) not only fixed obstructive PVT, but also NO PVT still constitute an indication for TT because of tendency for embolic events.

Key words: prosthetic valve thrombosis, thrombolytic therapy, transesophageal echocardiography.

A New Approach to Assessment of Aortic Regurgitation; Planimetric Measurement of Diastolic Aortic Valve Malcoaptation Area by Transesophageal Echocardiography

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Doppler echocardiographic calculation of regurgitant orifice area (ROA) is a different approach in the assessment of the severity of aortic regurgitation (AR), but these Doppler methods are based on indirect calculation of ROA, However, there is no available echocardiographic study in which diastolic coaptation defect of the regurgitant aortic valve measured by planimetry. The aim of this study is to evaluate AR severity by planimetric measurement of diastolic coaptation defect in patients who underwent transesophageal echocardiography (TEE). Diastolic coaptation defect was defined as diastolic aortic valve malcoaptation area (DAVMA). Study population comprised 90 patients (M 38, F 52, mean age 42±26) with AR which were graded as mild (n=45), moderate (n=31) and severe (n=14) by hemodynamic assessment (HA). Mean values of DAVMA for each groups of

AR grade were determined by TEE and cut-of limits which differentiate each corresponding AR grade from other grades were investigated. Mean DAVMA of mild, moderate and severe AR groups were 0.15±0.05, 0.29±0.08 and 0.68±0.21 cm^2, respectively (mild vs moderate P<0.001; moderate vs severe AR, p<0.001). DAVMA was graded as mild (≤0.2 cm^2), moderate (>0.2-0.4 cm^2) and severe (>0.4 cm^2) coaptation defect. For mild AR, sensitivity, specificity, positive and negative predictive value (PD+, PD-) and diagnostic accuracy (DA) of DAVMA (<0.2 cm^2) were 85, 97, 97, 87, and 91 %, respectively. Also, sensitivity, specificity, PD (+), PD (-), DA of DAVMA (>0.2-0.4 cm^2) were 84, 92, 81, 93, and 90 % for mild AR; and of DAVMA (>0.4) were 98, 93, 93, 98 and 97 % for severe AR. DAVMA is found to be well correlated (r=0.75) with AR grades as determined by HA.
We conclude that transesophageal planimetric measurement of DAVMA is reliable and feasible method based on functional anatomic assessment of the valve to evaluate severity of aortic regurgitation.

Key words: aortic valve malcoaptation area, regurgitant orifice area, aortic regurgitation, transesophageal echocardiography

TEE-guided Cardioversion is Feasible and Safe in Patients with Nonvalvular Atrial Fibrillation

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Elective cardioversion (CV) of atrial fibrillation is associated with an increased risak for systemic thromboembolic events. The purpose of this study was to determine the feasibility and safety of transesophageal echocardiography (TEE) guided CV with short-term anticoagulation in patients with non-valvular atrial fibrillation (NVAF).

Two-hundred-fifty-two consecutive patients (117 men, 135 women, mean age 62.6 ± 10) with NVAF were included in the study. The inclusion criterion was a clinical duration of atrial fibrillation more than 2 days and less than 1 year duration. Seventy-three patients underwent conventional transthorasic echocardiography (TTE) followed by 3 weeks of anticoagulation. Subsegmently 58 of them were converted to sinus rhythm (27 pharmacological, 18 electrical and 13 spontaneous). One- hundred and seventy-nine patients underwent conventional TTE followed by TEE. Six patients with evidence of atrial thrombi were excluded and received prolonged warfarin treatment. Patients in whon TEE revealed no atrial or ventricular thrombi underwent pharmacological or electrical CV under IV heparin therapy followed by warfarin for 1 month. One-hundred and sixty-seven patients had successful CV to sinus rhythm (electrical in 71, pharmacological in 71, spontaneous in 25). All patients were followed up for one month after discharge. There were no documented thromboembolic complications during hospitalization or in the follow-up period. It is concluded that in patients with NVAF, TEE guided CV without previous long term anticoagulation is a feasible and a safe approach.

Key words: Cardioversion, atrial fibrillation, echocardiography, thromboembolic events

Prognostic Implications of Left Atrial Spontaneous Echo-contrast in Nonvalvular Atrial Fibrillation

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Left atrial spontaneous echo-contrast (LASEC) has been shown to be associated with a history of thromboembolism. We studied the influence of LASEC seen by tronseophageal echocardiography (TEE) in patients with nonvalvular atrial fibrillation (NVAF) on subsequent thromboembolic events and on survival. The study group consisted of 172 patients with NVAF, mean age 63 ± 11, 8 men and 84 women. Clinical and echocardiographic data were collected at baseline and patients were progressively followed up, and all new thromboembolic events and deaths were documented.

LASEC was present at baseline in 75 (% 43) patients. Two patients were excluded because of left atrial thrombus seen by TEE. The remaining 73 patients with LASEC and 97 patients without LASEC were followed up for a mean of 15.5 ± 5.3 months (6 to 24 months). Groups were comparable by age, sex, risk factors and treatment protocols. LASEC (+) group had more patients with enlarged (>4.0 cm) LA and low (<% 55) left ventricular ejection fraction. During the follow up, new thromboembolic events (8 cerebral, 1 mesenteric artery, 1 peripheral vessel) were detected in 8 (% 11) patients with LASEC and 2 (% 2) patients without

LASEC ($p<0.03$). There were no deaths during the follow-up.

NVAF patients with LASEC, have a significantly higher risk of developing new thromboembolic events and may represent a subgroup which must be followed up more intensively.

Key words: Nonvalvular atrial fibrillation, spontaneous echo-contrast.

Use of Cyanoacrylate Glue in the Management of Troublesome Cardiovascular Events

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We used commercially available cyanoacrylate adhesive in 10 patients for he management of 6 different troublesome situations.
In the first case of type II aortic dissection, distal suture line was reinforced and distal false lumen was obliterated by direct topical application of cyanoacrylate glue. In two cases, right ventricular free wall rupture was repaired by gluing a pericardial patch. In another four cases, postoperative sternal union was reinforced by the application of cyanoacrylate to the sternal edges. Femoral artery wall invaded with epidermoid carcinoma was reconstructed by the aid of cyanoacrylate. Bleeding from the left ventriculotomy suture line after cardiac hydatid cyst enucleation was controlled by gluing teflon felts over the suture line. In the last case, abundant bleeding from the aortotomy suture line after aortic valve replacement on a fragile aorta was controlled by gluing a teflon felt around the aortotomy. All patients recovered uneventfully and were discharged from the hospital in good condition.

Commercially available cyanoacrylate is a new adjunct to cardiac surgery in the management of troublesome situations with documented safety and life-saving results with a negligible cost.

Key words: Cyanoacrylate, aortic dissection, sternal detachment, ventricular rupture, arterial reconstruction.

Effects of Ionic Versus Non-ionic Contrast Agents on Dispersion of Ventricular Repolarization

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Ionic versus non-ionic contrast agents are used for cardiovascular diagnostic and interventional procedures, and in general, are well tolerated. However a small percentage of patients develop transient hypotension, bradyarrhythmias, ventricular tachyarrhythmias, or allergic reactions after injection of contrast agents. Ventricular tachyarrhythmias can be dangerous. QT dispersion in surface ECG reflects inhomogeneity of ventricular repolarization and therefore, as a marker for arrhythmia risk. This study was designed to evaluate the proarrhythmic effects of ionic (Ioxaglate) versus non-ionic contrast (Iopamidol) agents in patient with coronary artery disease (CAD).

33 male patients (age: 55.2±9.8 years) with CAD were performed coronary angiography. In all patients left ventriculogram preceded the selective injections in the right and left coronary arteries. Ionic contrast agent (Ioxaglate) was given to 16 patients, non-ionic contrast agent (Iopamidol) was given to 17 patients. Before and after left ventriculogram, all patients ECG's were recorded with simultaneous 6-channel-ECG from standard chest leads. High speed (100mm/s) and high gain (20mm/mV) ECG recordings were taken and analysed later. All parameters were corrected for heart rate using Bazett formula. Statistical analysis was performed using paired Student-t test; all results are expressed as mean±SD.

QTc dispersion ($p=0.003$), JTc dispersion ($p=0.008$), TTc dispersion (Tpeak-Tend) ($p=0.014$), QT dispersion/RR ratio ($p=0.0002$), JT dispersion/RR ratio ($p=0.0015$), JTa dispersion/RR ratio($p=0.033$), and TT dispersion/RR ratio ($p=0.005$) were increased in ionic contrast agent (Ioxaglate) group. In non-ionic contrast agent (Iopamidol) group; TT dispersion/RR ratio ($p=0.043$) was increased only.

Complex premature beats and nonsustained ventricular tachycardia occured in 3 patients and 1 patient used Ioxaglate, in 2 patients and 1 patient used Iopamidol, respectively. Sustained VT or VF did not occur.

These data suggest that the non-ionic contrast agent (Iopamidol) results in significantly fewer effects on electrophysiologic parameters, less increase on ventricular excitability than the ionic contrast agent (Ioxaglate).

Key words: Coronary angiography, contrast agent, ionic, non-ionic, QT dispersion.

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Case Reports

Transcatheter Radiofrequency Perforation in Pulmonary Valve Atresia with Intact Ventricular Septum in a Newborn

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In a 4-day-old newborn with valvular pulmonary atresia with intact ventricular septum an open right ventricular outflow tract was created by means of interventional cardiological methods. Following an inadvertant perforation without sequelae or clinical symptoms, radiofrequency perforation and supsequent balloon dilation were performed. Because of severe right ventricular hypoplasia and residual pulmonary stenosis he needed subsequent systemic-pulmonary arterial shunt and reballooning of the pulmonary valve, respectively. The baby was discharged uneventfully after one month.

Key words: Pulmonary atresia, interventional cardiology, radiofrequency

Primary Cardiac Rhabdomyosarcoma in Childhood: Case Report

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Primary, malignant cardiac tumors are extremely rare in childhood. These tumors are fibrosarcomas, rhabdomyosarcomas, malignant teratomas and neurogenic sarcomas. The case of an 11-year-old boy with the clinical findings of cardiac tamponade is reported in whom a cardiac tumor was diagnosed by echocardiogram and cardiac magnetic resonance imaging. The tumor proved to be rhabdomyosarcoma on histopathologic examination.

Key words: Primary cardiac tumor, rhabdomyosarcoma

Echocardiographic Detection of Thrombus in Pulmonary Arteries in Three Patients with Pulmonary Hypertension Secondary to Atrial Septal Defect

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There are limited numbers of case reports concerning pulmonary arterial (PA) thrombus (THR) detected by transesophageal echocardiography (TEE), and these reports include cases with PATHR due to pulmonary embolism and primary pulmonary hypertension. In this paper, we report three (2 F,1 M, ages 61,28 and 49) cases who had pulmonary hypertension secondary to atrial septal defect (ASD) and THR associated with spontaneous echo contrast (SEC) in abnormally dilated pulmonary arteries. Large ostium secundum type ASD was detected in two cases, and leakage of the sutured atrial septal patch in a third patient. Pulmonary artery systolic pressure of cases were calculated as 120, 120 and 70 mm Hg, respectively. Thrombus was detected in right PA of first two cases, and in both right and left branches of PA of the third case. Concomitant SEC was also observed in all cases. To our knowledge, this is first report of thrombus in dilated pulmonary artery secondary to PHT associated with atrial septal defect.

Key words: Thrombus, spontaneous echo contrast, pulmonary hypertension.

Aneurysms of the Right Ventricular Outflow Tract After Tetralogy of Fallot Repair: Reconstruction with Pulmonary Allograft in 2 Cases

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The right ventricular outflow tract aneurysm is an uncommon late complication of repair of tetralogy of Fallot. Its development is primarily related to persistently high right ventricular pressure after repair. Two cases with residual ventricular septal defect and right ventricular outflow tract aneurysm after repair were herein reported.

Key words: Tetralogy of Fallot, right ventricular outflow tract aneurysm, reoperation