Methods. 20 young patients affected by FD (mean age: 14.2±3.5 years; 18 males and 2 females) were enrolled. Arterial stiffness was measured by the standardized non-invasive $QKd_{100\text{-}60}$ method. A 24-hour ambulatory blood pressure monitoring and a transthoracic echocardiography were also performed.
Results. The young FD patients showed disadvantageous differences in 24-hour ambulatory blood pressure monitoring (systolic blood pressure: $p<0.001$; diastolic blood pressure: $p<0.02$; mean arterial pressure: $p<0.01$) and in $QKd_{100\text{-}60}$ value ($p<0.001$) compared with controls.
Conclusions. Paediatric FD patients resulted in a significantly decreased arterial distensibility if compared with controls that might explain the differences in their blood pressure levels. It underlines an early vascular involvement in children with FD. Notwithstanding the very early age of the patients, prevention of complications involving also the cardiovascular system should be taken into account for a long-term specific therapy.

Aritmie

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CARDIOVERSIONE ELETTRICA E FIBRILLAZIONE ATRIALE PERSISTENTE: COMPLICANZE TROMBOEMBOLICHE ED EMORRAGICHE IN ACUTO E A LUNGO TERMINE

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Background. La cardioversione elettrica (CVE) è un efficace strumento di ripristino del ritmo sinusale (RS) nei pazienti (pz) affetti da fibrillazione atriale (FA) persistente, ma essa stessa si accompagna ad un rischio tromboembolico che varia dall'0.3-0.8% a seconda delle caratteristiche della popolazione studiata, nonostante un la terapia anticoagulante orale (TAO). Tali risultati provengono però da studi retrospettivi e datati, in cui veniva sostanzialmente valutata la sicurezza in acuto della procedura in pz con differenti profili di rischio tromboembolico, spesso non adeguatamente anticoagulanti. Scopo del nostro lavoro è stato valutare in modo prospettico, a breve e lungo termine, la sicurezza della CVE in pz con FA persistente sottoposti a CVE previa TAO efficace per almeno 4 settimane e mantenimento della stessa terapia nelle 12 settimane successive.
Materiali e metodi. 511 pz con FA persistente (66% M, età media di 69±10 anni; 67% ipertesi e 78% CHA_2DS_2-VASC ≥2) sono stati consecutivamente arruolati nel nostro Centro da gennaio 2005 a dicembre 2009. Tutti i pz sono stati sottoposti a CVE esterna in regime di Day Hospital, mediante defibrillatore bifasico, con assistenza anestesiologica e previa terapia anticoagulante orale efficace (mantenendo INR tra 2 e 3) per almeno 4 settimane. In dimissione tale terapia veniva confermata per almeno 12 settimane. Durante il follow-up tutti i pz sono stati sottoposti a visita cardiologica, ECG ed Holter inizialmente a 3, 6 e 12 mesi, poi successivamente ogni anno. Sono state definite "acute" le complicanze di natura tromboembolica ed emorragica verificatesi entro 30 giorni dalla CVE. Sono stati considerati "maggiori", gli episodi emorragici che hanno richiesto interventi chirurgici per la loro risoluzione o trasfusione di emazie con riduzione dell'emoglobina ≥2 g/dl.
Risultati. Delle 484 CVE efficaci e con follow-up disponibile, 59 pz (12.2%) hanno sviluppato una complicanza. Nei primi 30 giorni dopo la CVE si sono verificati 2 (0.4%) eventi ischemici cerebrali (rispettivamente 1 stroke e 1 TIA, entrambi in RS e in corso di TAO efficace) e 1 decesso secondario ad arresto cardiaco. Nessun pz ha sviluppato emorragie in fase acuta. Durante il follow-up (durata media di 44±10 mesi), 12 pazienti sono deceduti (4 neoplasie, 3 infarti miocardici, 1 embolia polmonare massiva, 1 dissezione aortica, 1 morte improvvisa e 2 cause sconosciute); 13 pz (2.7%) avevano sviluppato un evento tromboembolico cerebrale o sistemico (5 stroke, 3 TIA e 5 eventi embolici periferici); 21 pz (4.4%) presentavano una complicanza emorragica: 3 maggiori (2 cerebrali e 1 gastrointestinale, tutti i pz in TAO, 2 in RS e 1 in FA) e 18 minori. Il tempo medio dall'arruolamento all'evento avverso è stato di 8±4 mesi (range 4-12 mesi). Infine 10 pz avevano sviluppato nel corso degli anni complicanze di altra natura: 3 (0.2%) episodi di scompenso cardiaco secondario a recidiva di FA, 3 (0.2%) riacutizzazioni di scompensi cardiaci cronici e 4 (0.8%) infarti acuti del miocardio.
Conclusioni. La CVE effettuata in pz adeguatamente anticoagulanti è una procedura sicura in acuto (0.6% di complicanze nei primi 30 giorni, in assenza di complicanze emorragiche); a lungo termine invece tale percentuale aumenta all'11%, ma essa è legata prevalentemente alle complicanze emorragiche secondarie alla terapia anticoagulante orale.

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TIME DELAY OF RR INTERVAL AND RT INTERVAL AT THE ACME OF STRESS TEST IN NORMAL SUBJECTS

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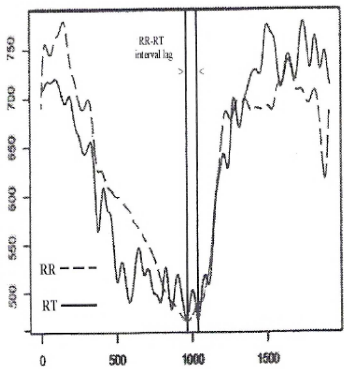
Background. In clinical applications the QT interval is "corrected" basing on the preceding RR interval, but there is evidence that the QT interval may depend on several previous RR intervals. At moment the measure of this delay has been performed only during stationary conditions, for instance from 24h Holter recordings, using a mathematical model of the RR-QT interaction in ischemic patients. The value of this delay was estimated to be 150 beats, corresponding to 2.36 minutes.
Aim. To evaluate the time delay in a non stationary condition, as the one provided by the exercise stress test in normal subjects.
Methods. 20 normal subjects underwent to the exercise stress test according to the Bruce protocol. Standard 12-lead ECG was recorded using PC-ECG 1200 (Norav Medical Ltd.), which provides in output digital signal with resolution of 2.441μV and 500 Hz sampling frequency. Pre-processing was performed on the raw data. For the RR extraction, the precordial lead V5 was chosen and RT interval was preferred to QT interval because less influenced by artefacts. The R peak detection was performed using a derivative-threshold algorithm. The RR and RT series during the test show qualitatively a V shape profile affected by noise, where the minimum of RR corresponds to the acme. The delay was measured as the time difference between the RR and the RT minima. The estimate of the minimum was performed using a wavelet multi resolution analysis, that allows to extract the trend filtering out the noise.
Results. The beat numbers at which minima of RR and RT occur are reported in Table I for all 20 patients. In 17/20 cases, in 1/20 and in 2/20 cases, beat number of RR minimum was respectively <, = and > than beat numbers of RT minimum. In the first group of patients (17/20) the mean of the difference beat of RT minimum and of RR minimum is 71.7 beats and can be quantified in 25 seconds (Figure). These values are remarkably smaller than the ones found in literature, during 24h Holter ecg recordings i.e. 2.36 minutes and 150 beats.
Conclusions. Our study provides the assumption that the RT (or QT interval) depend on several previous RR intervals. For the first time we demonstrate the presence of RR-RT interval lag in non stationary condition (i.e. during stress test), in normal subjects. The sympathetic effect on ventricular repolarization seems to continue beyond the end of the effort. This phenomenon could represent physiological adaptation to diastolic overload as a consequence of sudden reduction in heart rate.

Table I. Beat numbers of RR minimum and RT minimum.

RR	964	1337	783	537	1184	1912	2066	1975	1220	1350
RT	1002	1450	798	588	1262	1982	2211	2134	1218	1376
RR	2105	1513	782	1200	1139	1134	994	1819	982	1373
RT	2157	1656	1016	1261	1174	1112	1062	1922	1047	1373



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ENDOTHELIAL FUNCTION AND VASOVAGAL SYNCOPE: A CASE-CONTROL STUDY

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Background. Changes in the endothelial function may be involved in the pathogenesis of vasovagal syncope (VVS). The aim of this study was to evaluate the association between endothelium-dependent flow-mediated dilation (FMD) and tilt-induced VVS.
Methods. We assessed otherwise healthy outpatients with unexplained syncope underwent to nitroglycerine-potentiated head-up tilt test (HUT). Seventeen patients with mixed (30±10 years, 5 males), 21 with cardioinhibitory (31±13 years, 10 males), 17 with vasodepressive (32±16 years, 6 males), and 15 with negative (33±13 years, 7 males) HUT responses were consecutively selected. Age-matched controls included 28 healthy and unrelated subjects (30±4 years, 13 males) without history of syncope. Brachial artery FMD was performed in the morning, with subjects supine, in a quiet air-conditioned room (22-24°C) by high resolution ultrasound. Automatic computerized analysis was used to measure brachial artery diameter on end-diastolic frames acquired every second during the study.
Results. FMD was significantly greater in patients who were HUT positive (HUT+) than in those with a negative (HUT-) outcome and in control group