Higher state and trait anxiety seems not to be related to the occurrence of syncope.

P6630
Changes of cerebral oxygen saturation measured by near infra-red spectroscopy in patients with vasovagal syncope during head-up tilt test, considering their age, gender and concomitant diseases

J. Jedrzejczyk-Spaho, A.Z. Pietrucha, I. Bzukala, E. Konduracka, J. Nessler.
John Paul II Hospital, Coronary Heart Disease and Heart Failure Department, Krakow, Poland

Introduction: The aim of this study was to assess, using NIRS technique, which clinical features may predispose patients to the greater cerebral desaturation during head-up tilt test, which may potentially increase the risk of brain injury due to a global hypoperfusion during syncope episode.
Materials and methods: 1270 consecutive patients with suspected vasovagal syncope referred for further diagnosis. All patients underwent standard HUTT (Westminster protocol). In the case of negative result of passive HUTT, 0.4 mg nitroglycerine was administered sublingually.
Non-invasive monitoring of regional oxygen saturation (rSO2) of frontal lobes of the brain by the reflectance spectroscopy in the near-infra-red light (NIRS) was performed. Based on the values of the brain saturation the maximal desaturation of brain lobes during HUTT (rSO2max_L; rSO2max_R) was calculated, individually for each hemispere. Area under the curve (AUC-total_L; AUC-total_R) limited by rSO2 trend and the baseline level was also calculated. Patients were divided into studied groups according to the presence or absence of concomitant disorders (cardiologic, neurologic and others), age (under 40 years old; 40 years old or more) and gender.
Results: Head-up tilt test with monitoring of cerebral oxygen saturation using NIRS was performed on 1270 patients, 786 women (61,1%), aged from 16 to 82 (median 40.0 years, IQR 24–59), 638 patients were under 40 years old (50,2%). Only vasovagal syncope was identified in 655 pts. (51.6%), whereas VVS with concomitant disorders, was diagnosed in 615 pts. (48,4%).
We observed significantly higher maximal desaturation in women regarding both hemisperes (rSO2max_L; rSO2max_R). Maximal desaturation for the left lobe (rSO2max_L) was also significantly higher in older (>40 years old) patients. Patients with no concomitant diseases had significantly lower maximal desaturation, as well as the values of total area under the curve of desaturation for the left cerebral lobe (rSO2max_L and AUC-total_L).
Patients with cardiological diseases had significantly higher rSO2max_L and AUC-total_L, while patients with neurological diseases had significantly higher total AUC for both cerebral lobes (AUC-total_L; AUC-total_R). The group with both cardiological and neurological diseases were characterised with significantly higher AUC-total_L.
Conclusions: The clinical characteristics such as age, gender and concomitant diseases influence significantly changes in the cerebral desaturation associated with syncope.
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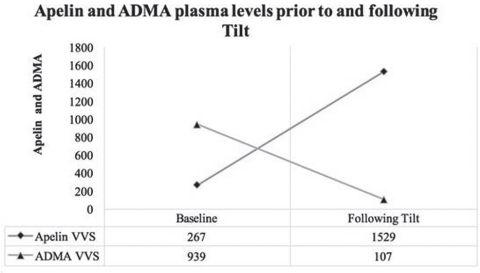
P6631
Serum apelin and asymmetric dimethylarginine (ADMA) levels in patients with vasovagal syncope

A. Atici[1], H.A.B. Barman[2], M.R.S. Sonsoz[3], G.A. Aciksari[4], O.D. Diker[5], A.D. Demirkiran[3], F.O. Ozturk[6], S.T. Tugrul[7], I.S. Sahin[7], A.K.B. Bilge[3].
[1]Istanbul Bilim University, Cardiology, Istanbul, [2]Okmeydani Training and Research Hospital, Cardiology, Istanbul, [3]Istanbul University, Cardiology, Istanbul, [4]Medeniyet University, Istanbul, [5]Okmeydani Training and Research Hospital, Biochemistry, Istanbul, [6]Mus State Hospital, Cardiology, Mus, [7]Bagcilar University Hospital, Cardiology, Istanbul, Turkey

Introduction: Vasovagal syncope (VVS) is most often caused by syncope. Apelin is a newly defined adipokine for the adipose tissue family. Asymmetric dimethylarginine (ADMA) is the major inhibitor of NO synthase in the protein structure produced by methylation of L-arginine by intracellular methyltransferase enzymes. In this study, we aimed to investigate the changes in Apelin and ADMA levels of patients who were diagnosed with VVS immediately before and after the tilt test.
Material/Methods: 50 patients were included in the study whose over 18 years of age who were followed up with our outpatient cardiology clinic recurrent vasovagal syncope diagnosis. The control group consisted of 26 healthy volunteers with age and gender matched.Blood samples were taken before and immediately after the test to evaluate Apelin and ADMA levels.
Results: The mean age of the patients with VVS was 24.70±3.86 while the mean age of healthy volunteers was 25.92±3.33. 33 were women (66%) of the 50 patients diagnosed with vasovagal syncope (VVS), and also 14 were women (53%) of the 26 healthy volunteers. There was no statistically significant difference in both Apelin and ADMA values, when the measured values were compared prior to and following the tilt test in the control group (Apelin215 (93–374) vs 215 (137–443); p 0.069, ADMA 955 (503–1343) vs 971 (539–1634); p0.148). After Tilt test, in patients with VVS, Apelin values were higher than baseline and ADMA values were lower (Apelin 267 (130–445) vs 1529 (1152–2768); p<0.001, ADMA 939 (545–1343) vs 107 (66–198); p<0.001).

Table 1

	VVS (n=50)	Control (n=26)	p
Age (year)	24±3.86	25.92±3.33	0.175
Gender (women %)	33 (66%)	14 (53%)	0.301
LVEF	65.50±5.19	67.53±4.30	0.090
SBP (mmHg)	112.06±11.63	115.00±6.63	0.238
HR (min)	73.44±3.59	74.76±3.16	0.116
TTST	35 (22–38)		
VD Type	26 (52%)		
Mixed Type	24 (48%)		
TSS	4.26±0.98		
SS (within 6 months)	2.34±0.74		



	Baseline	Following Tilt	p
Apelin VVS	267 (130-445)	1529 (1152-2768)	**<0.001**
Apelin CG	215(93-374)	215(137-443)	0.069
ADMA VVS	939(545-1343)	107(66-198)	**<0.001**
ADMA CG	955(503-1343)	971(539-1634)	0.148

Apelin and ADMA levels

Conclusion: It was detected that Apelin levels were increased while ADMA levels decreased after the test in the patient with VVS. The change in apelin and ADMA levels in patients with VVS may have a role in the appearance of syncope.

P6632
Vectorcardiographic QRS loop geometry in patients with neurally mediated syncope

D. Blendea[1], J.N. Ruskin[1], C.A. McPherson[2]. *[1]Harvard Medical School, Massachusetts General Hospital, Boston, United States of America; [2]Yale University School of Medicine, Medicine, Bridgeport, United States of America*

Introduction: We have shown in previous studies that patients with neurally mediated syncope (NMS) who have an isolated QRS complex of very low voltage (Figure A) in one of the frontal leads on the 12-lead electrocardiogram (ECG) are more likely to have recurrent syncope. We hypothesized that these changes might be related to a specific electrical activation pattern that could predispose to NMS.
Purpose: The aim of the study was to assess using vectorcardiography the ventricular activation in patients with NMS.
Methods: We included 109 patients (age 51±7 years, 73 women) with NMS with a positive response to tilt table testing (NMS group) and 102 subjects (age 47±8 years, 67 women) who never had syncope and had no significant structural or functional abnormalities on echocardiogram (control group). Data from 12 lead ECG including the lowest QRS voltage in the frontal leads (QRSmin), as well as VCG derived from the 12 lead ECG was analyzed.
Results: Very low voltage (QRSmin ≤0.3mV) in the frontal leads was significantly more prevalent in the NMS group than in the control group (72% vs 21%, respectively; p<0.001). In frontal plane QRSmin correlated significantly to the vectorcardiographic QRS loop area (r 0.57, p=0.023) and the width-to-length ratio of the QRS loop (r 0.75, p=0.037). The vectorcardiographic QRS loop in the frontal plane was smaller and more elongated in the VVS group than in the control group (Figure B) having significantly lower QRS loop area and width-to-length ratio (0.31±0.59mV2 vs. 0.63±0.72 mV2; p<0.001, and 0.15±0.09 vs. 0.25±0.19; p<0.001). ROC analysis showed that QRS loop area in the frontal plane of 0.20

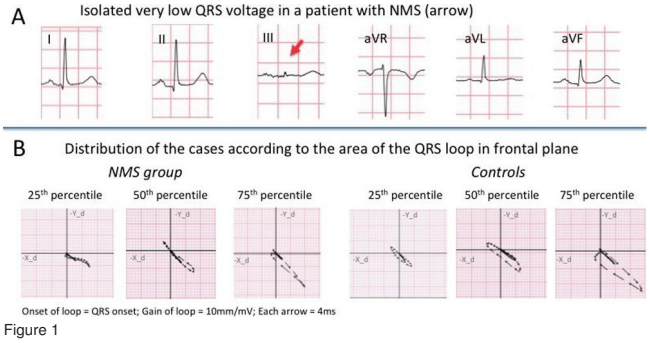


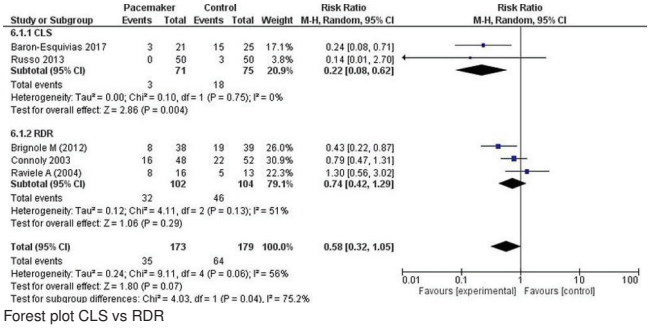
Figure 1

mV2 discriminated between NMS and controls with a sensitivity of 82% and specificity of 77% (AUC=0.81).
Conclusions: The presence of isolated very low QRS voltage in frontal plane ECG leads, as well as of small and elongated frontal QRS loops on the vectorcardiogram may help identify predisposition to NMS.

P6633
Pacing as a treatment for recurrent cardioinhibitory vasovagal syncope: systematic review with meta-analysis

G. Cunha, R. Gomes, B. Rocha, B. Silva, R. Morais, I. Araujo, C. Fonseca.
Hospital São Francisco Xavier, Heart Failure Unit, Internal Medicine Department, Lisboa, Portugal

Introduction: Vasovagal reflex is the most common cause of syncopal episodes, mostly considered a benign condition. However, some patients have recurring episodes and/or major trauma associated with syncope, thus compromising quality-of-life. Pacemaker with rate drop response (RDR) and Closed-Loop Stimulation (CLS) algorithms have been investigated in recurrent vasovagal syncope (R-VVS). The latter has shown promise in cardioinhibitory R-VVS (defined as heart rate $<$40 bpm $>$10 seconds and/or asystole $>$3 seconds).
Purpose: To define the role of cardiac pacing in cardioinhibitory R-VVS.
Methods: MEDLINE, Cochrane Library and registered clinical trials were searched for single or double-blinded placebo-controlled randomized controlled trials (RCT) on cardiac pacing treatment for R-VVS and systematically reviewed for inclusion and further analysis.
Results: Five clinical trials met the eligibility criteria, with a total of 254 patients included. Four trials were double-blinded and four had a follow-up of at least one year. Two of them investigated the CLS and three the RDR algorithms. The analysis of all trials (N=5) as well as that of the double-blinded with a follow-up greater than a year (N=3) did not find a significant reduction in recurring syncopal events (RR: 0,53; 95% IC: 0,21–1,34; RR: 0,58; 95% IC: 0,32–1,05, respectively). When analyzing the trials by algorithm, the RDR pacemaker has shown no significant advantage (RR: 0,74; 95% IC: 0,42–1,29). However, the CLS algorithm was associated with a 22% reduction in the syncopal events (RR: 0,22; 95% IC: 0,08–0,62).



Forest plot CLS vs RDR

Conclusions: The results of this meta-analysis suggest that the pacemaker DDD-CLS may have a role in cardioinhibitory R-VVS. The published data thus far is limited and pacemaker implantation should be reserved to carefully selected patients with refractory cardioinhibitory R-VVS and compromised quality-of-life.

P6634
Novel method of analysing heart rate variability at rest predicts a positive tilt table testing in patients with syncope of unknown origin

E. Myrovali[1], A.P. Antoniadis[2], M. Sotiriadou[2], C. Lazaridis[2], C. Bakogiannis[2], A. Karamanolis[2], P. Kyriakou[2], V. Skeberis[2], N. Fragakis[2], L. Hadjileontiadis[3], V. Vassilikos[2]. *[1]Aristotle University of Thessaloniki, Department of Electrical and Computer Engineering, Thessaloniki, Greece; [2]Hippocration General Hospital of Thessaloniki, Third Department of Cardiology, Thessaloniki, Greece; [3]Khalifa University of Science and Technology, Department of Electrical and Computer Engineering, Abu Dhabi, United Arab Emirates*

Background/Introduction: Syncope is a common clinical entity, which is often challenging to explain. Head-up tilt test (HUTT) is a useful surrogate investigation in the diagnostic workup of syncope and can unveil a neurally-mediated syncope (NMS) in a considerable proportion of patients. The autonomic nervous system modulates both the heart rate variability (HRV) and the NMS events, the link however between HRV and HUTT outcome has not yet been elucidated.
Purpose: To investigate the association of HRV at rest with the HUTT outcome in patients with syncope of unknown origin (SUO).
Methods: We assessed 26 patients (15 females, age 46.5±21.8 years) with SUO who underwent a HUTT. We calculated three indices of HRV during a 5-minute ECG recording at the resting stage of HUTT before bed tilt. We employed a wavelet higher order spectral analysis (WHOS) in the low frequency band LF: 0.075–0.15 Hz which is an index of sympathetic and parasympathetic activity, using the wavelet bispectrum method to assess for nonlinear interactions in the HRV signal. To capture the time variations of bifrequency pairs, we applied the wavelet bispectrum in equal-length parts of the HRV signal. The bifrequency peaks F1 and F2 provide the evidence of frequency interactions and the wavelet biamplitude quantifies their strength. In all signal parts, maxA is the maximum of wavelet biamplitude, maxFc1 the maximum of wavelet bifrequency Fc1 and maxFc2 the maximum of wavelet bifrequency Fc2. HUTT response was classified as positive or negative.
Results: Positive HUTT was seen in 11 patients and negative in 15. Positive tests lasted for 30.0±9.2 minutes and negative tests were completed in 40 minutes. Patients with positive HUTT exhibited higher maxA (5.49±3.59 vs. 2.95±1.88, p=0.04) and lower maxFc2 (0.12±0.02 vs. 0.14±0.01, p=0.004). No difference across groups was seen in maxFc1 (Table).

HRV indices at rest and HUTT outcome

Features	Positive HUTT	Negative HUTT	p
maxA	5.49±3.59	2.95±1.88	0.04
maxFc1	0.14±0.02	0.15±0.004	0.62
maxFc2	0.12±0.02	0.14±0.01	0.004

Conclusion(s): We provide a novel approach in the diagnosis of NMS by analysing HR dynamics in the frequency domain using a nonlinear and non-stationary method based on WHOS analysis. In patients with SUO, data from the rest stage before bed tilt, reveal subtle changes in HRV that are associated with a positive HUTT outcome suggestive of NMS. Further studies will confirm if this methodology can supplement HUTT thereby contributing to a cost- and time-effective diagnosis of NMS.

P6635
Clinical and electrocardiographic predictors of arrhythmic syncope in patients with severe aortic stenosis

J. Francisco Pascual[1], E. Rodenas Alesina[2], Y. Belahnech Pujol[2], N. Rivas Gandara[1], I. Roca Luque[1], J. Perez Rodon[1], A. Santos Ortega[1], S. Llerena[1], A. Moya Mitjans[1], V. Serra Garcia[2], Y. Cossio Gil[3], G. Oristrell Santamaria[2], D. Garcia-Dorado[2]. *[1]University Hospital Vall d'Hebron, Unitat d'Arritimes, Servei de Cardiologia - Universitat autònoma de Barcelona, CIVER-CV, Barcelona, Spain; [2]University Hospital Vall d'Hebron, Servei de Cardiologia - Universitat autònoma de Barcelona, CIVER-CV, Barcelona, ESSpain; [3]University Hospital Vall d'Hebron, Barcelona, Spain*

Background: Despite aortic stenosis (AoS) has been described itself as a cause of syncope, multiple other aetiologies can be present. Identification of an underlying arrhythmic cause of the syncope has evident clinical and prognostic implications. Few studies in the literature have evaluated the main causes of syncope in this population and the predictors of an arrhythmic cause.
Aim: To evaluate the clinical and electrocardiographic factors that could predict an arrhythmic aetiology of syncope in patients with severe AoS
Methods: We conducted an observational cohort study. All consecutive patients with the discharge hospital diagnosis of syncope and AoS from January 2010 to December 2017 were included. All patients were referred for evaluation of unexplained syncope, and were examined by multidisciplinary team according the current ESC syncope and valvular heart diseases guidelines. Main cause of syncope was defined according ESC syncope guidelines.
Results: Out of 293 patients with diagnosis of syncope and AoS, 41 (13.9%) presented severe AoS at the moment of the syncope. Fourteen (34.1%) patients had an arrhythmic syncope (8 (30.7%) advance AV block, 4 (15.4%) sinus node dysfunction, 2 (7.7%) fast atrial arrhythmias) and 30 patients had non-arrhythmic syncope (16 (39%) unexplained syncope, 7 (17.1%) Reflex/orthostatic syncope, 4 (9.6%) other causes). There were no significance differences in sex (46.7% vs 45.5% female, p=0.94), age (77.5±12.5 vs 76.9±8.9 y. o, p=0.16), treatment with antihypertensive drugs (73.3% vs 81.8% p=0.57) and basal comorbidities in patients with and without arrhythmic syncope. The presence of a wide QRS complex in the ECG on admission (16.7% vs 63.6%, RR 3.76 p$<$0.01) and lower heart rate on admission (80.1±22.2 vs 60.24±21.1 bpm p=0.02) were associated with a higher risk of arrhythmic syncope, while the presence of an identifiable clinical trigger (56.7% vs 9.1%, RR 0.15, p$<$0.01) was a predictor for a non-arrhythmic syncope. Patients with non-arrhythmic syncope had a trend in having a higher peak gradient in the echocardiogram (88.5±24.2 vs 71.3±27.2 mmHg p=0.07)
Conclusions: Arrhythmic syncope is a common cause of syncope in patients with severe aortic stenosis. The presence of a wide QRS complex in the admission ECG and lower heart rate on admission are associated with a higher risk of arrhythmic syncope, while the presence of an identifiable clinical trigger is a predictor for a non-arrhythmic syncope.
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P6636
Association of angiotensin-converting enzyme I/D gene variant rs1799752 and autonomic dysfunction with cardiovascular profile in syncope patients

T. Gligorijevic[1], I. Kolic[2], M. Zivkovic[2], B. Milovanovic[1], S. Hinic[1], A. Stankovic[2], M. Zdravkovic[1]. *[1]University Hospital Medical Center Bezanijska Kosa, Belgrade, Serbia; [2]Insitute for Nuclear Science "Vinca", Belgrade, Serbia*

Introduction: The symptoms of autonomic dysfunction were strongly associated