

Electrocardiographic trends in medically and surgically treated patients with chronic thromboembolic pulmonary hypertension

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Background: There are only few data about electrocardiographic (ECG) changes in patients with chronic thromboembolic pulmonary hypertension (CTEPH), a potentially reversible cause of right ventricular (RV) overload. The aim of our study was to compare ECG patterns and trends between patients who underwent pulmonary endarterectomy (PTE) and patients who remained on medical treatment (MT) alone.

Methods: We analysed n=112 CTEPH patients (75 male, mean age 54 ± 15 year, functional class II/III/IV:n=29/61/22, with mean pulmonary artery pressure $50,6 \pm 9,7$ mmHg at baseline), of which 66 underwent PTE and 46 remained on MT. Twenty patients of MT group received sildenafil, bosentan, treprostinil or iloprost. ECG, echocardiography, six minute walk distance (6MWT) and clinical parameters at baseline and at least 6 months after either PTE or the decision to proceed with MT alone were assessed (median 1 year in both groups).

Results: All the patients had ECG abnormalities at baseline. The most common were: negative T waves V₁-V₄, right axis deviation, signs of RV hypertrophy (RVH), negative T waves in II,III,aVF, S₁Q₃T₃ and nRBBB. After successful PTE the frequency of electrocardiographic signs of RV overload and hypertrophy significantly decreased, except for nRBBB. Trend towards higher prevalence of all ECG abnormalities was obvious, though nonsignificant, in MT group (table). Among routinely assessed echocardiographic variables RV end-diastolic dimension was most strongly related to signs of RV hypertrophy (p=0.03). There was no correlation between tricuspid regurgitation systolic gradient and signs of RV overload/hypertrophy in ECG.

	PTE baseline	Follow up	p	MT baseline	Follow Up	p
negative T wave V ₁ -V ₄	37 (62%)	9 (15%)	*	13 (37%)	16 (46%)	ns
right axis deviation	30 (50%)	6 (10%)	*	14 (40%)	18 (51%)	ns
RVH	28 (47%)	6 (10%)	*	8 (23%)	13 (37%)	ns
negative T wave in II,III,aVF	26 (43%)	10 (22%)	*	8 (23%)	12 (34%)	ns
S ₁ Q ₃ T ₃	24 (40%)	3 (5%)	*	6 (17%)	9 (26%)	ns
nRBBB	20 (33%)	15 (25%)	ns	10 (29%)	13 (37%)	ns

* p<0.001; ns: non significant

Conclusions: The frequency of negative T waves V₁-V₄, right axis deviation, signs of right ventricle hypertrophy, negative T wave in II, III, aVF, S₁Q₃T₃ but not of nRBBB, significantly decrease after successful PTE. Right ventricular diastolic dimension, and not systolic pressure seems to be the main parameter which determines ECG pattern of patients with CTEPH.