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Prevalence of electrocardiographic abnormalities in patients with cardiac amyloidosis

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Background: Electrocardiographic (ECG) abnormalities are common in patients presenting with Light-Chain (AL) or Transthyretin (ATTR) related Cardiac Amyloidosis (CA). Type of amyloid may differently affect electrical properties of the heart being responsible for variable patterns of ECG anomalies at presentation.
Purpose: In this retrospective, observational study we sought to compare prevalence of ECG abnormalities between AL and ATTR patients with CA.
Methods: Clinical files from two Referral Centres were reviewed; ECG recordings were analysed by trained cardiologists and relevant findings were reported about rhythm (sinus vs atrial fibrillation [AF]), grade I or grade II atrio-ventricular (AV) delays, intra-ventricular (IV) conduction abnormalities, low-voltage QRS and pseudo-necrosis pattern. Presence of pace-maker (PM) and stimulated QRS were regarded to as clinical equivalents for AV block, after review of indications to implantation.
Results: Two hundred and fifty-one patients were identified (127 ATTR vs 124 AL; among ATTR, 27 patients had mutation in TTR gene: 10 Val142Ile, 11 Ile88Leu, 6 other). As expected, most ATTR patients were male (89% vs 56% in AL, p: $<$0.001), and AL patients were younger (mean age 64 [53–70] vs 79 [73–83]; p: $<$0.001).
Pathological ECG findings were common in both subgroups, involving more than three-quarters of the overall population (82% in ATTR, vs 72% in AL, p: 0.06). Atrial fibrillation was more common in ATTR, prevailing in 39% vs 5.6% (p: $<$0.001). ATTR had a higher burden of AV block (53% vs 13%, p: $<$0.001) and IV conduction delays (43% vs 21%, p: $<$0.001), and consistently presented a higher prevalence of PMs (24 patients vs 1). Low-voltage QRS was more prevalent in AL patients (52% vs 28%, p: $<$0.001), while no significant difference was found in prevalence of pseudo-necrosis patterns (ATTR: 29%, AL: 40%; p: ns).
Due to imbalance in age and gender and relative possible confounding effect on rhythm disturbances, adjusted odds ratios (OR) were calculated. It resulted that ATTR was independently associated with a higher prevalence of AF and AV conduction delays when compared to AL (adjusted OR: 4 [95% CI: 1.4–11.2], p: 0.008, and 6.2 [95% CI: 2.6–14.9], p: $<$0.001; respectively), while being inversely associated with low-voltage QRS (adjusted OR: 0.4 [95% CI: 0.2–0.9], p: 0.026).
Conclusions: ECG abnormalities are common in CA. Rhythm disturbances are more prevalent in ATTR, while AL more often results in low-voltage QRS. Such differences remain relevant after adjustment for age and gender imbalance, thus suggesting an aetiology-specific link.