DEM Journal Club

Article Appraisal

Article: Randomized comparison of intravenous procainamide vs. intravenous amiodarone for the treatment of tolerated wide QRS tachycardia: the PROCAMIO study

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Background and Study Objective(s):

Although unstable ventricular tachycardia (VT) requires immediate electrical cardioversion, stable VT patients may be managed pharmalogically. The aim of this study was to compare safety and efficiency of procainamide (PR) and amiodarone (AM) in the acute management of stable VT.

Study Design:

The study was multicentre, prospective and randomized. Study population included patients presenting to 26 emergency departments across Spain with VT with (1) a regular rate of at least 120 beats per min with a wide complex QRS of at least 120 ms, and (2) without hypotension or signs or symptoms of heart failure. Randomization was carried out open-labelled in a 1:1 ratio. Treatment arms were comprised of either a single dose of IV PR 10mg/kg or IV AM 5mg/kg each over 20 min. The primary outcome was major cardiac adverse events (MACE) recorded in the study period (i.e. 40 min from start of IV infusion). MACE were defined as signs of shock, severe hypotension, heart failure and severe arrhythmia. Secondary outcomes included efficacy, defined as tachycardia termination (i.e. cardioversion to sinus or baseline rhythm), and total AE recorded in the 24-hour post-infusion observation period. It was hypothesized that the AM group would have a 15% higher rate of AE than the PR group with a sample size of 302 to produce this difference. Statistical analysis included two-tailed p-values comparing incidence rates with Pearson chi-square tests or Fisher's exact tests. Non-conditional logistic regression was used to calculate odd ratios and sensitivity analyses were performed to account for structural heart disease. P-value was not pre-defined.

Results:

The study enrolled 74 patients with 6 patients in each treatment arm removed from analysis due to protocol violation or development of exclusion critiera. Both groups had similar baseline characteristics. Rate of MACE was found to be less frequent in the PR group than the AM group (9% vs 41%, p = 0.006). Tachycardia termination rates were higher in the PR group than the AM group (67% vs. 38%, p = 0.026). Total AE were no different between the two groups (p = 0.24). In comparing patients with structural heart disease, the PR group had lower rates of MACE (11% vs. 43%, p 0.017) with a trend towards higher rates of tachycardia termination (65% vs. 39%, p = 0.069).

Validity of Results:

This randomized study was open labelled and not blinded; given that the primary outcome had subjective elements (e.g signs of heart failure) and that it is uncertain who recorded AE, there is potential for bias in ascertaining the primary outcome. Second, the calculation for sample size is unclear as the alpha and beta values were not specified, and, of the 302 patients apparently required, only 74 patients were enrolled. Thirdly, 12 patients initially randomized were removed from analysis for reasons that should have excluded them initially. Fourthly, the subgroup of patients with structural heart disease is underpowered. Finally, some AE were defined inconsistently; for example, hypotension was numerically defined in Methods, yet in Results it was dependent on subjective measures.

Generalizability of Results:

Firstly, the study AM dosage unusually high: ACLS guidelines in management of wide complex tachycardia uses 150 mg IV, yet patients in this study were given 5mg/kg, which for an average 70 kg male equates to 350 mg. Contrastingly, PR was dosed at 10 mg/kg over 20 min is similar to ACLS guidelines of 20-50 mg/min Second, AM has a half-life of 36 hours and PR 3-4 hours, and extending the observation period to determine VT recurrence rates might have helped. Lastly, this study was conducted in Spain, and extrapolation to Canadian demographics may be difficult.

The Bottom Line:

The PROCAMIO study found that PR has significantly lower rates of major cardiac AE with 40 minutes, and higher rates of cardioversion over a total period of 24 hours. Major study limitations however include small sample size, potential for bias and unusually high AM dosing.