Abstract

Atrial fibrillation is a common cardiac arrhythmia, and has been a significant financial burden. Class III antiarrhythmics such as dofetilide, ibutilide, and amiodarone are indicated for rhythm control. Magnesium may possess intrinsic antiarrhythmic properties, and may potentially increase the efficacy of class III antiarrhythmics when used concomitantly. Objective: The purpose of this article is to review the literature on the efficacy of magnesium in addition to Class III antiarrhythmics, specifically amidarone, ibutilide, and dofetilide for the cardioversion of atrial fibrillation. Methods: Databases Pubmed and CINAHL are utilized along with the search terms amiodarone, dofetilide, ibutilide, magnesium, atrial fibrillation, conversion, rhythm control, and cardioversion. Results: One study on dofetilide and 5 studies on ibutilide were identified. No studies were found on amiodarone. Patients with atrial fibrillation who received dofetilide and magnesium had higher rates of successful cardioversion as compared to those who only received dofetilide. Conversion rates were similar between the 2 treatment groups for patients with atrial flutter. As for ibutilide, 4 studies have shown that the addition of magnesium significantly increases conversion rates for patients with atrial fibrillation or typical atrial flutter. Conversion rates were similar for patients with atypical atrial flutter. One study showed that addition of magnesium did not improve efficacy of ibutilide. Higher doses of magnesium (4 g) were associated with improved outcomes. Adverse effects of magnesium were mild and included flushing, tingling, and dizziness. Patients who received magnesium had shorter corrected QT intervals and smaller increase in corrected QT interval from baseline. Compare to previous studies, studies included in this review had higher conversion rates for dofetilide and ibutilide as well as dofetilide and magnesium or ibutilide and magnesium combination therapies. However, only 2 ibutilide studies and 1 dofetilide study reported baseline characteristics such as left atrial size, history of heart failure, and duration of atrial fibrillation, which are significant predictors of successful cardioversion. Therefore, differences in baseline demographics may have influenced the results. Conclusion: Magnesium may be used as adjunct for dofetilide and ibutilide due to potential improved efficacy and minimal toxicity. Dose ranging studies should be conducted in the future to establish the optimal dose and duration of therapy as well as the optimal serum magnesium concentration in order for the clinician to manage and monitor patients appropriately.

Keywords
Atrial Fibrillation, Atrial Flutter, Anti-Arrhythmia Agents, Magnesium Sulfate.