

Procainamide vs Ibutilide in the Cardioversion of Recent-Onset Atrial Fibrillation and Flutter in the Emergency Department: A Retrospective Cohort Study

INTRODUCTION

Intravenous (IV) procainamide and ibutilide are two commonly used medications for the cardioversion of emergency department (ED) patients with recent onset (<48 hours) atrial fibrillation (AF) and atrial flutter (AFL; either = AF/AFL) across North America. It is unclear which medication is preferable. No trials have compared these agents for this indication and North American society guidelines offer contradictory recommendations: procainamide is the drug of choice in the Canadian guideline, where ibutilide is not recommended; the converse is true in U.S. guidelines. Issues of effectiveness, safety, and ease of use may contribute to drug selection. Ibutilide carries a black-box warning for the risk for torsade de pointes (polymorphic ventricular tachycardia [VT]) and requires at least 4h of monitoring, making it riskier and more cumbersome to administer than procainamide.

OBJECTIVES

The objectives are to evaluate the patient selection, effectiveness, and side-effect profiles of IV procainamide and ibutilide in the treatment of ED patients with recent-onset AF/FL.

METHODS

- Retrospective cohort study included all adults who received IV procainamide or ibutilide for recent-onset AF/FL from 01/2009 to 06/2015 in 21 community EDs within a large U.S. integrated health care delivery system.
- We gathered demographic and clinical variables from the electronic health record and structured manual chart review.
- Our effectiveness outcome was cardioversion at 90m, sustained to ED discharge.
- Safety outcomes were the 60m incidence of hypotension (defined as more than one systolic blood pressure <100 mmHg) and VT, at least three beats in duration.
- We describe patient characteristics and compare outcomes using Fisher's exact test (two-tailed) with significance noted when $p < 0.05$.

RESULTS

Among 730 unique ED adults, 376 received procainamide (51.5%) and 354 (48.5%) ibutilide. The two cohorts were comparable in demographics, symptom duration, and cardiac history, but ibutilide was preferred for patients with AFL (Table). The two agents had similar 90m rates of cardioversion for AF. For AFL, however, ibutilide was more effective. Hypotension occurred in 34 procainamide recipients (9.0%), only 17 of whom (4.5%) required any treatment (IV fluids or procainamide discontinuation or both) and resolved without sequelae in all 34 cases. Non-sustained monomorphic VT was uncommon. One ibutilide patient developed torsade, which resolved with treatment. More ibutilide-recipients received observation or hospitalization (Table).

Table. Characteristics and outcomes of emergency department patients receiving IV procainamide or ibutilide for the cardioversion of recent-onset atrial fibrillation (AF) or atrial flutter (AFL)

| | Procainamide N=376 | Ibutilide N=354 |
|---|-----------------------|--------------------|
| <u>Characteristics</u> | | |
| Age, years; median (interquartile range) | 63 (53-71) | 61 (52-71) |
| Sex, female | 166 (44.1) | 140 (39.6) |
| AFL* | 31 (8.2) | 61 (17.2) |
| Duration ≤12h | 322 (85.6) | 290 (81.9) |
| No history of AF/AFL | 168 (44.7) | 147 (41.5) |
| Reduced cardiac ejection fraction (<40%) | 1 (0.3) | 5 (1.4) |
| <u>Outcomes</u> | | |
| Cardioversion <90m | 168 (44.7) | 156 (44.1) |
| AF | 160/345 (46.4) | 116/293 (39.6) |
| AFL* | 8/31 (25.8) | 40/61 (65.6) |
| Hypotension* | 34 (9.0) | 0 |
| Monomorphic ventricular tachycardia (non-sustained) | 3 (0.8) | 1 (0.3) |
| Torsade de pointes | 0 | 1 (0.3) |
| Admitted to short-term observation or to hospital* | 45 (12.0) | 84 (23.7) |

Cell contents are reported as n (%), except where noted.

Bold font denotes statistically significant between-group difference.

* $P < 0.001$

CONCLUSIONS

ED patients selected for treatment with procainamide or ibutilide for the cardioversion of recent-onset AF/FL appear similar in demographics, cardiac history, and symptom duration. The two agents demonstrate comparable 90m effectiveness for AF, but ibutilide is more effective for AFL. Until randomized trials are conducted on patients with recent-onset AF/FL, our findings suggest that IV ibutilide may be preferable for AFL based on effectiveness, whereas procainamide may be preferable for AF based on ease of use and safety.

REFERENCES

January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the Heart Rhythm Society. *Circulation*. 2014;130:e199-267.

January CT, Wann LS, Calkins H, et al. 2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation. *Circulation*. 2019:Cir0000000000000665.

Kirchhof P, Benussi S, Kotecha D, et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur J Cardiothorac Surg*. 2016;50:e1-e88.

Macle L, Cairns J, Leblanc K, et al. 2016 Focused Update of the Canadian Cardiovascular Society Guidelines for the Management of Atrial Fibrillation. *Can J Cardiol*. 2016;32:1170-85.

Verma A, Cairns JA, Mitchell LB, et al. 2014 focused update of the canadian cardiovascular society guidelines for the management of atrial fibrillation. *Can J Cardiol*. 2014;30:1114-30.

Stiell IG, Macle L. Canadian Cardiovascular Society atrial fibrillation guidelines 2010: management of recent-onset atrial fibrillation and flutter in the emergency department. *Can J Cardiol*. 2011;27:38-46.

Stiell IG, Scheuermeyer FX, Vadeboncoeur A, et al. CAEP Acute Atrial Fibrillation/Flutter Best Practices Checklist. *CJEM*. 2018;20:334-42.

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