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Original Article

Oral flecainide is effective in management of refractory tachycardia in infants

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ABSTRACT

Background: Propranolol and digoxin have been used as first line drugs for treatment of supraventricular tachycardia (SVT) in infants. Flecainide and other drugs have been effective as a second line treatment for controlling refractory SVT.
Material and methods: This is a prospective study without randomization and control. The inclusion criteria were: infants (≤12 months) with tachyarrhythmia who failed to respond to first line drugs. Patients having post-surgical arrhythmias were excluded from the study.
Results: A total of 8 infants were treated with flecainide for refractory tachyarrhythmia's. Diagnosis on electrocardiogram (ECG) was atrioventricular reentry tachycardia (AVRT) in 5, atrial ectopic tachycardia (AET) in 2, a combination of AVRT and atrioventricular nodal reentry tachycardia (AVNRT) in 1. All patients had failed trial of antiarrhythmic drugs prior to presentation: digoxin and propranolol in 7, amiodarone in 3, cardioversion in 1. Flecainide (80–130 mg/m^2 orally) resulted in termination of the tachycardia in all 8 patients. Acute pharmacological termination of arrhythmia occurred with oral flecainide loading in 1 and temporarily with intravenous esmolol loading in 1 patient. Adjuvant therapy in form of propranolol was used in 5 and digoxin in 2. There were no side effects noted. Four episodes of recurrence were noted in 3 patients over 2 years, all of which responded to dose increase. Mean follow up time is 24.75 months.
Conclusion: This small case series indicates that flecainide is an effective antiarrhythmic agent, free of side effects and when used orally is capable of terminating and controlling relatively resistant supraventricular tachycardia in children.

1. Introduction

Approximately, 60% of children with supraventricular tachycardia (SVT) develop their initial episode by 1 year of age.[1] Most often it is managed with a single drug. Spontaneous resolution occurs in 50–80% of infants by 1 year of age.[2] In 10% of patients, first line drugs in the form of digoxin and/or beta-blocker may not be effective. These patients need second line drugs like flecainide, amiodarone, sotalol or propafenone. These drugs can be used either as monotherapy or in combination for control of tachycardia.[3–7] A few patients in this group may not be controlled with drugs and may rarely require radiofrequency ablation.

Flecainide has been effective in controlling refractory SVT when used as a monotherapy or with other antiarrhythmics in children.[3,5–7] Flecainide has been effectively used

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intravenously for acute termination of arrhythmia, followed by oral maintenance for prevention of recurrence. Its use has been variable depending on a variety of factors. In a North American survey, less than 5% of patients received flecainide.[7] In India, intravenous flecainide is not available while the oral form is available only at limited locations. We present our experience with oral flecainide in acute and medium term control of arrhythmia in infants with SVT not controlled with first line drugs. Since intravenous flecainide is not available in India, we used oral flecainide. Sotalol and amiodarone would then have been used as the last line therapy, a strategy used by others too.[3]

2. Methods

Data was prospectively collected, however, there was no randomization and there were no controls. The inclusion criteria were: infants (≤12 months) with a diagnosis of tachyarrhythmia with a failure to control SVT with first line drugs i.e. propranolol and digoxin in standard dosages and no history of cardiac surgery. The parameters recorded are shown in Tables 1 and 2. The QTc was calculated from surface electrocardiograms using Bazett's formula.

Echocardiogram was performed on all patients before initiation of therapy to assess anatomy as well as ventricular size and function. Twenty-four hour ambulatory ECG monitoring (Holter) was done prior to discharge and subsequently at 1 month follow up and then 3 monthly to assess efficacy of treatment in the first year of follow up following which at 6 monthly intervals. This was done since follow up only on basis of history may not be reliable in infants. The objective of treatment was to get complete suppression of arrhythmia. Effective control of arrhythmia was defined as complete suppression of tachyarrhythmia on Holter monitoring.

3. Results

3.1. Patient profile

A total of 8 patients met the inclusion criteria during the study period (January 2006 to December 2010). The mean age of patients was 5.1 months with the range of 2 months–12 months (Table 1). Seven infants had normal ventricular function by echocardiography and one had an ejection fraction of 40% of left ventricular function (patient no. 3), not low enough to contraindicate flecainide therapy. The decreased function was due to tachyarrhythmia associated cardiomyopathy which improved completely once the rate was controlled. At the time of presentation to our institution, all patients had a failed trial with more than one drug (4 had 2 antiarrhythmics tried, 4 had 3 antiarrhythmics tried and in addition 1 had attempted cardioversion). All patients were in tachycardia when they presented to us. Three patients were on our follow up from neonatal period and had failure of first line medications when they were included in our study.

3.2. Dosages and monitoring

All patients were hemodynamically stable at presentation; oral maintenance dose was started in all except one (patient no. 4) where oral loading of flecainide was performed. Oral loading was done in the one patient with 120 mg/m^2/day of flecainide divided in three doses over 12 h which resulted in termination of arrhythmia. No side effects were noted with oral loading. The median dose of flecainide at initiation of therapy was 80 mg/m^2/day (range 70–100 mg/m^2/day) and was given in two to three divided doses. Corrected QTc interval was noted prior to discharge and subsequently at follow up visits. The median dose required for the efficacy was 100 mg/m^2/day (range: 80–130 mg/m^2/day). QTc was not allowed to increase beyond 0.46 ms and drug dose increase was stopped if QTc reached or exceeded 0.46 ms.

Efficacy was defined as complete suppression of arrhythmia. Therapy was initiated in the hospital, and all infants were monitored as inpatients for 3–5 days prior to discharge. In view of the known interference of milk with flecainide absorption, we disallowed feeds half an hour before and after administration of flecainide.[8] Dose was adjusted for the body surface area as the baby grew. The dose was recalculated at monthly follow up visits and was rounded off to convenient dispensing dose (with the dilution of 10 mg/ml).

3.3. Response to therapy

All the patients reverted to normal sinus rhythm (8/8). Sinus rhythm was restored in less than 3 days in 2/8 patients and

Table 1 – Study patient profiles.

Patient	Age (months)	Cardiac anatomy	ECG diagnosis	Previous drugs used/ cardioversion
1	2	Normal	AVRT & AVNRT	D,P,A
2	3	Ebstein's	AVRT	D,E,A
3	2	Normal	AET	D,P
4	12	Normal	AVRT	D,P,A
5	2	Normal	AVRT	D,P,CV
6	12	Normal	AVRT	D,P
7	6	Normal	AVRT	D,P, A
8	2	Normal	AET	D,P

Abbreviations: AVRT = atrioventricular reentry tachycardia, AVNRT = atrioventricular nodal reentry tachycardia, AET = Atrial ectopic tachycardia, VT = Ventricular tachycardia.
D = digoxin; P = propranolol; E = esmolol; A = amiodarone; CV = cardioversion.