Focal atrial tachycardia (FAT) is an uncommon cause of supraventricular tachycardia in children, which occurs because of an abnormal, nonsinus, atrial focus with enhanced automaticity.1–3 FAT often occurs as an incessant arrhythmia. The natural history includes possible progression to tachycardia-induced cardiomyopathy, which is reversible with control of the arrhythmia.4–6

**Methods and Results**—This is a retrospective chart review of pediatric patients with FAT managed between January 2000 and November 2010 at 10 pediatric centers. There were 249 patients with a median age at diagnosis of 7.2 (95% confidence interval, 5.8–10.4) years. Cardiomyopathy was observed in 28%. Resolution of FAT occurred in 89%, including spontaneous resolution without catheter ablation in 34%. Antiarrhythmic medications were used for initial therapy in 154 patients with control of FAT in 72%. Among first-line medications, β-blockers were the most common (53%) and effective (42%). Catheter ablation was successful in 80% of patients. FAT recurrence was less common with electroanatomic mapping compared with conventional mapping techniques (16% versus 35%; P=0.02). Patients were followed for a median of 2.1 (95% confidence interval, 1.8–2.6) years.

**Conclusions**—FAT is managed successfully in most children. Many patients have control of FAT with medications; however, catheter ablation is used for most patients. Spontaneous resolution is common for young children, emphasizing the role for delayed ablation in this group. Ablation is successful for all ages. Lower recurrence occurs when electroanatomic mapping techniques are used. (Circ Arrhythm Electrophysiol. 2014;7:664-670.)

**Key Words:** anti-arrhythmia agents ■ catheter ablation ■ pediatrics

Focal atrial tachycardia (FAT) is an uncommon cause of supraventricular tachycardia in children, which occurs because of an abnormal, nonsinus, atrial focus with enhanced automaticity.1–3 FAT often occurs as an incessant arrhythmia. The natural history includes possible progression to tachycardia-induced cardiomyopathy, which is reversible with control of the arrhythmia.4–6

**Clinical Perspective on p 670**

Medical therapy has been the primary treatment for FAT, especially in young children who are more likely to have spontaneous resolution.7–9 A variety of antiarrhythmic medications have been effective, although FAT is often resistant to pharmacological therapy.7–12 Radiofrequency ablation (RFA) has been used successfully for definitive management.13–16 Recently, the use of 3-dimensional electroanatomic mapping during catheter ablation has enabled improved rates of acute and long-term control.13

The existing literature on FAT is limited to single-center experiences and small case series. There are no data to broadly evaluate the management and outcomes of FAT since the emergence and widespread use of modern antiarrhythmic medications and ablation techniques. This multicenter study describes the clinical course of a large, contemporary cohort of pediatric patients with FAT, including the prevalence of tachycardia-induced cardiomyopathy, effective medical management, and spontaneous resolution, as well as indications and outcomes for catheter ablation.

**Methods**

This is a retrospective review initiated by the coordinating site (Vancouver, Canada). Participating centers were solicited through the

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Pediatric and Congenital Electrophysiology Society. Local ethics approval was obtained at each center.

Patient Population
Pediatric patients presenting with FAT between January 2000 and December 2010 were identified at 10 institutions. The diagnosis of FAT was based on ECG, 24-hour Holter, or event monitor data consistent with electrophysiological criteria previously described11,17: (1) narrow complex tachycardia with visible P waves at a rate inappropriate for age and activity, (2) identical abnormal P-wave morphology in the first and all subsequent tachycardia beats, (3) progressive increase in atrial rate with tachycardia onset (warm-up), (4) variable rate depending on autonomic tone, and (5) first- or second-degree atrioventricular block in the presence of continued tachycardia (Figure 1). Features that help distinguish FAT from sinus tachycardia include: (1) routine ECG atrial rate >150% of the predicted mean, (2) inverted and notched P wave in V1, (3) P-wave axis in the horizontal plane <0°, and (4) P-wave duration >90 ms in V1.18,19 Patients with significant structural heart disease were excluded.

Data Collection
Charts were reviewed for demographic characteristics, clinical presentation, occurrence of cardiomyopathy, medical and ablation therapy, and patient outcomes according to a standardized data collection form.

Definitions
FAT was considered incessant if demonstrated for >50% of monitored time by 24-hour Holter or telemetry. Cardiomyopathy was defined by an ejection fraction <40% or a shortening fraction <28%. Rhythm control was defined as normal sinus rhythm and noninducibility of the FAT after ablation. Resolution was defined as normal sinus rhythm on 24-hour Holter with no recurrence of symptoms after discontinuing antiarrhythmic therapy for 1 month. Spontaneous resolution was defined as resolution not requiring ablation therapy.

Statistical Analysis
Frequency tables were generated for all categorical data. Comparisons between groups of patients were made using a χ² test. Continuous data were analyzed using a univariate procedure. Data are presented as the median value with 95% distribution-free confidence limits constructed around the median value. A nonparametric 1-way ANOVA (Wilcoxon rank-sum test) was used to test for group differences. All statistical analyses were completed using SAS Statistical Software version 9.3 (SAS Institute, Cary, NC).

Results
Patient Presentation
The study population included 249 patients from 10 centers (Table 1). Median age at diagnosis was 7.2 (95% confidence interval [CI], 5.8–10.4) years with a median follow-up of 2.1 (95% CI, 1.8–2.6) years. There was a bimodal distribution of patients by age at diagnosis, with the highest number occurring from birth to 1 year (Figure 2).

FAT was detected as an incidental finding in the absence of other presenting symptoms or signs in 105 patients (42%). For children with symptoms, the most common presentations were palpitations (82 of 144; 57%), heart failure (24 of 144; 17%), and syncope (17 of 144; 12%). Fetal tachycardia was observed in 16 patients. Hospitalization was observed at the time of presentation for 101 patients (41%).

The diagnosis of FAT was based on ECG criteria in the vast majority of patients (99%). In 3 patients the diagnosis was based on Holter monitoring (n=2) or an event monitor (n=1). The median atrial and ventricular rates varied (atrial: 183 beats per minute; 95% CI, 170–197; ventricular: 176 beats per minute; 95% CI, 165–185) with atrioventricular block observed in 98 of 241 patients with tracings available for review (41%). P-wave axis was 0 to 90° in 56%. At presentation, FAT was incessant in 60 of 184 (33%). At diagnosis, echocardiography data were available for 210 patients (84%). The median shortening fraction was 34% (95% CI, 32–35%; n=202) and ejection fraction was 61% (95% CI, 59–63%; n=138).

Initial Management
Antiarrhythmic medications were used as initial therapy for 154 patients (62%; Figure 3). Catheter ablation was used for...

Figure 1. Twelve-lead ECG of focal atrial tachycardia (FAT). A 12-lead ECG (done at 50 mm/s paper speed) of an infant with FAT during adenosine administration. The atrial rate is 200 beats per minute and P-wave morphology is consistent with a left atrial origin.
Table 1. Patient Demographics and Clinical Findings

<table>
<thead>
<tr>
<th>Patients</th>
<th>249</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male sex</td>
<td>154</td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>7.2 y (95% CI, 5.8–10.4 y)</td>
</tr>
<tr>
<td>Duration of follow-up</td>
<td>2.1 y (95% CI, 1.8–2.6 y)</td>
</tr>
<tr>
<td>ECG (246 patients)</td>
<td></td>
</tr>
<tr>
<td>Atrial rate</td>
<td>183 beats per minute (95% CI, 170–197)</td>
</tr>
<tr>
<td>Ventricular rate</td>
<td>176 beats per minute (95% CI, 165–185)</td>
</tr>
<tr>
<td>First-degree AV block</td>
<td>40</td>
</tr>
<tr>
<td>Second-degree AV block</td>
<td>46</td>
</tr>
<tr>
<td>First- and second-degree AV block</td>
<td>12</td>
</tr>
<tr>
<td>24-h Holter (152 patients)</td>
<td></td>
</tr>
<tr>
<td>Maximum heart rate</td>
<td>197 beats per minute (95% CI, 190–203)</td>
</tr>
<tr>
<td>Average heart rate</td>
<td>113 beats per minute (95% CI, 102–125)</td>
</tr>
<tr>
<td>Monitoring (184 patients)</td>
<td></td>
</tr>
<tr>
<td>Incessant FAT</td>
<td>60</td>
</tr>
<tr>
<td>Echocardiography (210 patients)</td>
<td></td>
</tr>
<tr>
<td>SF</td>
<td>34% (32–35%)</td>
</tr>
<tr>
<td>EF</td>
<td>61% (59–63%)</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>101</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>69</td>
</tr>
<tr>
<td>Mortality</td>
<td>1</td>
</tr>
</tbody>
</table>

AV indicates atrioventricular; EF, ejection fraction; FAT, focal atrial tachycardia; and SF, shortening fraction.

initial therapy in 69 (28%), and 26 patients (10%) had monitoring with neither antiarrhythmic medications nor catheter ablation. Patients who initially received antiarrhythmic medications were younger than patients who received catheter ablation (2.5 years [95% CI, 0.6–5.9] versus 13.5 years [95% CI, 12.7–14.4]; P<0.0001).

Medical Therapy

There were 168 patients who received antiarrhythmic medications, including 154 as initial therapy and 14 after initial management with catheter ablation. In total, 44 different medication combinations were used; when β-blockers were considered as one group and class Ic antiarrhythmic agents were considered as one group, there were 22 different combinations (Table 2). The median number of medication regimens per patient was 1 (95% CI, 1–2); however, 75 patients received ≥2 regimens. The median duration of therapy was 343 days (95% CI, 274–427; n=154) with 43 patients continuing medical therapy with no FAT at the time of last follow-up.

Fifty-three of 154 patients (34%) achieved either complete suppression or rate control of FAT with first-line therapy alone. The median duration of first-line therapy was 89 (95% CI, 35–192) days. The overall duration of therapy was longer in patients who achieved control of FAT compared with patients who did not (359 versus 68 days; P=0.0004).

β-Blockers were the most common medications used as first-line treatment alone (n=74) or in combination with other medications (n=11). β-Blockers as monotherapy were effective for first-line treatment in 31 of 74 patients (42%). Other medications including amiodarone, digoxin, flecainide, and sotalol were used less commonly for first-line treatment. As monotherapy, these medications were effective in 10% to 56% of patients.

Overall, 111 of 154 patients (72%) achieved control of FAT with medical therapy, including complete suppression of FAT in 93 patients and rate control in 18 patients. Nine patients had serious adverse events while on antiarrhythmic medications. There were proarrhythmic effects in 1 patient each on the following medication(s): digoxin, esmolol, flecainide, and flecainide and nadolol. Other adverse effects included a 4-year-old girl who experienced mental status changes with esmolol, a 6-year-old boy who experienced 2 syncopal episodes while on flecainide, and a 15-year-old boy who experienced hypotension with atenolol. There was also a 15-month-old boy who experienced postoperative apnea secondary to hypoglycemia while on nadolol. In 1 case, a 13-year-old girl collapsed while receiving intravenous amiodarone, required extra corporeal life support, and died after support was withdrawn because of significant neurological complications. All of these patients required hospitalization and discontinuation of the precipitating medical therapy.

Spontaneous Resolution

Patients with spontaneous resolution were younger at presentation compared with patients who received catheter ablation (0.2 versus 12.2 years; P<0.0001). Fifty-three of 72 patients (74%) presenting at age <3 years had spontaneous resolution (Figure 2), including 50 patients aged <1 year at FAT diagnosis. Patients presenting at age <3 years were more likely to have spontaneous resolution compared with those presenting at age ≥3 years (74% versus 13%; P<0.0001). During follow-up, there were no cases of spontaneous resolution among 10 patients presenting from age 2 to 5 years. Spontaneous resolution was observed in 18 of 129 patients (14%) aged >5 years.
Fifty-one patients achieved resolution of FAT after a period of medical therapy. The median duration of therapy in these patients from initiation to discontinuation of all antiarrhythmic medications was 346 (95% CI, 307–428) days. The duration was similar for patients presenting at age <3 years compared with those presenting at age ≥3 years (337 versus 476 days; P=0.06).

### Catheter Ablation

There were 134 patients (54%) who underwent a total of 167 catheter ablation procedures, including 69 patients who had ablation as initial therapy. The median age at first ablation was 12.8 (95% CI, 12.0–13.7) years. The median duration from diagnosis to first ablation was 62 (95% CI, 45–99) days. Effective catheter ablation was the most common indication, accounting for 55% of patients. Medical treatment failure or abnormal heart function occurred in the remaining. Seventy-three patients received ablation after medical therapy, including 31 patients with prior control of FAT using medication alone.

Ablation therapy was effective in 109 of 134 patients (81%; Table 3). Accounting for all 167 procedures, success and recurrence rates were 132 of 167 (79%) and 29 of 132 (22%). An electrophysiology study without catheter ablation was performed in 14 patients. Among these, 10 patients had FAT that was either suppressed or quiescent at the time of the procedure. Two patients with limited symptoms had ectopic foci in locations that were deemed to carry a significant risk of ablation (1 near the sinus node and the other near the atrioventricular node), so catheter ablation was not attempted. One patient had nonsustained FAT, and mapping was not sufficient for ablation to proceed. One patient experienced an air embolism during the electrophysiology study, and the procedure was stopped.

Detailed procedural data were available for 148 procedures in 121 patients (90%). For these procedures, the ectopic focus was right-sided in 61%, including 25% in the right atrial appendage or crista terminalis. The remaining procedures showed foci in the left atrium (13%), left atrial appendage (11%), pulmonary veins (9%), mitral valve annulus (1%), or other locations (5%). For left-sided foci, a transseptal approach was used in all procedures in patients as young as 2.8 years. Patient size was not a factor in determining a transseptal approach. For anesthetic management, 5 centers reported using general anesthetic only and 1 center reported using conscious sedation only. Four centers determined the anesthetic plan on a case-by-case basis, including starting with no/light sedation and progressing to general anesthesia as needed. The median procedure time was 193 (95% CI, 170–217) minutes, and the median fluoroscopy time was 23 (95% CI, 20–30) minutes with a median of 7 (95% CI, 6–9)
lesions ablated for a median total RFA time of 287 (95% CI, 221–360) seconds. Patients were followed for a median of 21.7 (95% CI, 17.0–29.0) months after ablation.

Three-dimensional electroanatomic mapping was used in 98 of 134 patients (73%) who underwent ablation, accounting for 110 of 167 of all procedures (66%). Similar rates of acute success were achieved for patients who underwent ablation for 110 of 167 of all procedures (66%). Similar rates of acute success were achieved for patients who underwent ablation for 110 of 167 of all procedures (66%).

Complications of RFA were observed in 8 patients. A 15-year-old boy experienced cardiac arrest 6 hours after ablation, which was attributed to bradycardia-related torsades de pointes. Another 15-year-old boy experienced air embolism during his electrophysiology study, and the procedure was stopped. A third 15-year-old boy experienced a stroke during his second ablation procedure. A 2-month-old boy developed sinus node dysfunction after ablation, and a 7-year-old boy experienced pulmonary vein stenosis after RFA of an ectopic focus at that location. Three patients experienced other arrhythmias in the context of RFA procedures, including 2 with atrial fibrillation and 1 with atrial flutter, all requiring electric cardioversion.

Cardiomyopathy

Echocardiographic evidence of tachycardia-induced cardiomyopathy was observed in 69 patients (28%). The median shortening fraction and ejection fraction in these patients were 21% (95% CI, 17–23%; n=63) and 40% (95% CI, 32–44%; n=41), respectively. Normal heart function was achieved in 58 of 67 patients (87%) >3.3 months (95% CI, 1.1–4.5 months; n=47). Two patients did not have a repeat echocardiogram. Clinical improvement was secondary to rhythm control in 46 of 53 patients (87%).

Medications to improve heart function and cardiomyopathy-related symptoms including intravenous inotropic agents, diuretics, and angiotensin-converting enzyme inhibitors were used in 36 of 69 patients (52%). Three patients (1-day-old girl, 3-month-old boy, 13-year-old girl) required extra corporeal life support in the context of severe cardiac dysfunction with FAT refractory to treatment. One of these patients (1-day-old girl) ultimately underwent cardiac transplantation.

Fifty-five of 69 patients (80%) with cardiomyopathy had resolution of FAT at last follow-up. Eleven additional patients continued on antiarrhythmic therapy with suppression of FAT. Resolution was similar in patients with and without evidence of cardiomyopathy (95% versus 87%; P=0.13).

Patient Status

At last follow-up, 185 of 209 patients (89%) had resolution of FAT. An additional 40 patients continued to receive antiarrhythmic medications with no evidence of arrhythmia. In 71 of 209 patients (34%), resolution was observed without catheter ablation.

There were 9 patients with persistent FAT despite ongoing medical treatment. One patient received concomitant therapy for cardiomyopathy. Two patients continue to be treated for cardiomyopathy alone, and 14 continue with FAT but with no medical treatment. As mentioned above, 1 of the patients on extra corporeal life support (a 13-year-old girl) died after support was withdrawn because of significant neurological complications.

Discussion

This multicenter study describes the clinical course and outcomes for 249 children with FAT. To our knowledge, this is the largest study of FAT in children and reflects the scope of current therapeutic options.

For this patient cohort, FAT management is characterized by an increased number of therapeutic options compared with previous data, including the number and combinations of antiarrhythmic medications, as well as the availability and use

### Table 3. Catheter Ablation for Focal Atrial Tachycardia

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Ablation 1</th>
<th>Ablation 2</th>
<th>Ablation 3</th>
<th>Ablation 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute success</td>
<td>109 (82%)</td>
<td>17 (65%)</td>
<td>6 (75%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Partial success</td>
<td>5 (4%)</td>
<td>2 (8%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Failure</td>
<td>18 (14%)</td>
<td>7 (27%)</td>
<td>2 (25%)</td>
<td>1 (100%)</td>
</tr>
<tr>
<td>Recurrence after acute success</td>
<td>24 (22%)</td>
<td>3 (18%)</td>
<td>2 (33%)</td>
<td>...</td>
</tr>
</tbody>
</table>

Indication (patients may have had multiple indications for catheter ablation)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Ablation 1</th>
<th>Ablation 2</th>
<th>Ablation 3</th>
<th>Ablation 4</th>
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<tbody>
<tr>
<td>Elective</td>
<td>74</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Treatment failure</td>
<td>49</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Abnormal heart function</td>
<td>30</td>
<td>...</td>
<td>...</td>
<td>...</td>
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<tr>
<td>Other</td>
<td>10</td>
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Location

<table>
<thead>
<tr>
<th>Location</th>
<th>RA</th>
<th>LA</th>
<th>Multifocal</th>
<th>Noninducible/no data</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA</td>
<td>84 (59%)</td>
<td>18 (60%)</td>
<td>4 (50%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>LA</td>
<td>47 (33%)</td>
<td>9 (30%)</td>
<td>2 (25%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Multifocal</td>
<td>4 (3%)</td>
<td>1 (3%)</td>
<td>2 (25%)</td>
<td>1 (100%)</td>
</tr>
<tr>
<td>Noninducible/no data</td>
<td>7 (5%)</td>
<td>2 (7%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Mapping

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Electroanatomic mapping</th>
<th>Traditional mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA</td>
<td>98 (69%)</td>
<td>13 (43%)</td>
</tr>
<tr>
<td>LA</td>
<td>44 (31%)</td>
<td>17 (57%)</td>
</tr>
</tbody>
</table>

*Two patients with EPS only, no ablation during the first catheter procedure went on to have catheter ablation during a subsequent procedure, accounting for 134 patients who underwent catheter ablation overall.

EPS indicates electrophysiology study; LA, left atrium; and RA, right atrium.

For this patient cohort, FAT management is characterized by an increased number of therapeutic options compared with previous data, including the number and combinations of antiarrhythmic medications, as well as the availability and use.
of catheter ablation therapies. Patients in this study received 44 different medication combinations. In total, 54% of all patients received at least 1 RFA procedure, including 4 procedures in children aged <1 year. Overall, the rate of FAT resolution was 89%.

As a result of these expanded options, the calculus for clinical decisions has changed. Patients presenting at any age may receive primary medical or ablation therapy followed by, if necessary, subsequent trials of either therapeutic modality. In some cases, children with FAT refractory to initial treatments undergo a complex clinical course involving multiple medications and catheter procedures. With emerging experience to show that catheter therapies are safe and effective, even in young patients, family choice is often the key determinant for using medical versus ablation therapy.

Clinicians have a primary role to counsel families regarding the use of various clinical approaches; however, there are limited data to guide this. The current literature suggests that a higher rate of spontaneous resolution is observed in children aged <3 years, and therefore, primary medical therapy is indicated for this group. Additionally, previous studies suggest lower success and higher complication rates associated with RFA in young or small children. Based on these data, many institutions do not routinely provide RFA for children aged <3 years or with weight <25 kg.

Our study shows that 74% of children with FAT diagnosed in the first year of life achieve spontaneous resolution, suggesting that these children, in particular, may benefit from an initial trial of medical therapy. The rate of spontaneous resolution reported in this group is a conservative estimate. For some children, primary or early ablation therapy interrupts the possibility of spontaneous resolution and, therefore, alters the natural history. Among older children, the rate of spontaneous resolution is more difficult to assess reliably because of the increased use of catheter ablation in this group. These findings are similar to previous reports that show spontaneous resolution in a majority of patients, with higher rates among young children.

In terms of medical therapy for FAT, there are no clear trends to suggest which medications are most useful. Overall, 22 different medication combinations were effective for FAT suppression. Current medication choices depend on physician preference and empirical trials. In some cases, FAT may be difficult to treat and require multiple medication combinations; however, >70% of patients who receive medical therapy eventually achieve control. Some patients have ongoing FAT when medication is withdrawn and require subsequent medical or catheter therapy. The option for a sustained period of FAT control with medical therapy has an important role in preventing or reversing the functional changes associated with tachycardia-induced cardiomyopathy.

Our study suggested that ß-blockers and class Ic antiarrhythmic medications were most commonly useful for FAT management compared with other medications such as amiodarone that were less useful. However, our analysis includes relatively few cases for comparison and, as a retrospective study, has no standard dosing or criteria for medication failure or changing medication regimens. A prospective, controlled trial to determine which medications are most effective and in which patient groups may be needed.

Although spontaneous resolution in older children is uncommon, this study confirms that RFA is useful for this group. Many older patients in our study received successful primary ablation therapy. Overall, RFA was effective as definitive therapy in 80% of all FAT patients. Catheter ablation has previously been shown to be a safe and effective therapeutic option for pediatric supraventricular tachycardia, including FAT. Our success and recurrence rates are comparable to those reported in the literature.

There is limited experience with catheter ablation of FAT in younger children. Although initial studies of RFA in young or small children suggested there may be lower success and higher complication rates, more recently, Blaufox et al. found similar success and complication rates for catheter ablation of FAT in children aged <1.5 years compared with older children. In our study, the youngest patient to receive ablation therapy was aged 2 months. Catheter ablation was successful for FAT resolution after unsuccessful medical therapy in the setting of tachycardia-induced cardiomyopathy.

Our study also supports evidence that electroanatomic mapping instead of conventional mapping for catheter ablation improves outcomes in pediatric FAT. Toyohara et al. reported a series of 35 pediatric FAT patients who had 100% acute success and 11% recurrence with RFA using the CARTO Navigation System (Biosense Webster, Inc, Diamond Bar, CA). Data from Cummings et al. showed improved ablation success and recurrence rates with electroanatomic mapping compared with conventional mapping for pediatric FAT. Predictably, electroanatomic mapping techniques are associated with reduced fluoroscopy time and have been suggested to improve catheter ablation of pediatric arrhythmias, particularly for complex substrates including patients with structural heart disease.

Study Limitations
This is a retrospective study and subject to limitations, including variable duration of follow-up and available data for each patient, as well as a bias toward selecting challenging cases and cases managed with ablation at tertiary care centers. As the largest series of FAT to date, this study represents a broad spectrum of patients and practice patterns. Specific information regarding medication dose and procedural details for each ablation procedure was not assessed.

Conclusions
FAT is managed successfully in most children despite no standardized approach. Children with FAT often present with incessant tachycardia and tachycardia-induced cardiomyopathy. Spontaneous resolution is common, especially in young children, and these children are likely to benefit from an initial trial of medical therapy to reduce arrhythmia burden. Catheter ablation is frequently successful with fewer recurrences when using electroanatomic mapping techniques.

Sources of Funding
This work was funded by a grant from the Rare Disease Foundation, Vancouver, Canada.

Disclosures
None.
References


CLINICAL PERSPECTIVE

Focal atrial tachycardia in children often presents in infancy and may resolve or persist and even progress to tachycardia-induced cardiomyopathy. Data on therapy and outcomes are limited. In this large, contemporary, retrospective observational series, medical management was the mainstay of treatment in younger patients, and combination therapy was prescribed in nearly half of the patients. No single regimen appeared most effective. Catheter ablation was used as initial therapy in 28% of patients. Resolution of tachycardia-induced ventricular dysfunction was achieved in nearly all patients (87%). The overall outcome was good for this patient population with few adverse events. Although outcomes are favorable, studies are needed to clarify optimal treatment approaches for young patients with this arrhythmia.
Current Management of Focal Atrial Tachycardia in Children: A Multicenter Experience

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