Electrophysiological Features Differentiating
the Atypical Atrioventricular Node–Dependent
Long RP Supraventricular Tachycardias

Reginald T. Ho, MD, FHRS; Daniel R. Frisch, MD; Behzad B. Pavri, MD; Steven A. Levi, MD; Arnold J. Greenspon, MD

Background—Diagnosing atypical atrioventricular node-dependent long RP supraventricular tachycardias (SVTs) can be challenging.

Methods and Results—Nineteen patients with 20 SVTs (atypical atrioventricular nodal reentrant tachycardia without [n=11]/with [n=3] a bystander nodofascicular [NF] accessory pathway, orthodromic reciprocating tachycardia [ORT] using a decremental atrioventricular [permanent form of junctional reciprocating tachycardia; n=4] or NF [NF reentrant tachycardia; n=2]) accessory pathway underwent electrophysiological study. Postspacing interval (PPI)–tachycardia cycle length (TCL), corrected PPI, ∆VA (ventriculoatrial), ∆HA (His-atrial), ∆AH (atrio-His) values, and responses to His-refractory ventricular premature depolarizations were studied. Compared with atrioventricular nodal reentrant tachycardia, ORT patients were younger (42±13 years versus 54±19 years; \(P=0.036\)) and were women (5/6 [83%] versus 3/14 [21%]; \(P=0.036\)); TCLs were similar (435 ms versus 429 ms; 95% confidence interval, −47.5 to 35.5). PPI–TCL was shorter for ORT (118 ms versus 176 ms; 95% confidence interval, 26.3–89.7) but only 50% had PPI–TCL <115 ms, whereas 5 of 6 (83%) had PPI–TCL <125 ms (sensitivity, 83%; specificity, 100%). Corrected PPI <110 ms, ∆VA <85 ms, and ∆HA <0 ms had equivalent sensitivity (67%) and 100% specificity for ORT. Compared with permanent form of junctional reciprocating tachycardia, NF reentrant tachycardia/atrioventricular nodal reentrant tachycardia had longer ∆AH (29 ms versus 10 ms; 95% confidence interval, 3.03–35.0) or AH(SVT)<AH(NSR) (normal sinus rhythm) His-refractory ventricular premature depolarizations advanced (4/8 [50%]), delayed (4/8 [50%]), or terminated (5/8 [63%]) SVT in all accessory pathway patients.

Conclusions—This unusual SVT requires separate maneuvers to delineate its upper and lower circuit. Standard entrainment criteria are modestly sensitive but highly specific for ORT; and PPI–TCL of 125 ms seems better than 115 ms. The ∆AH criteria, or paradoxically AH(SVT)<AH(NSR), differentiates NF reentrant tachycardia/atrioventricular nodal reentrant tachycardia from permanent form of junctional reciprocating tachycardia. Bystander accessory pathways were only identified by His-refractory ventricular premature depolarizations. (Circ Arrhythm Electrophysiol. 2013;6:597-605.)

Key Words: accessory pathway ■ atrioventricular node ■ catheter ablation ■ entrainment ■ nodofascicular ■ nodoventricular ■ resetting ■ supraventricular tachycardia
Methods

Nineteen patients with 20 symptomatic atypical long RP SVTs underwent diagnostic electrophysiological study. After informed consent, femoral vein access was achieved percutaneously, and multipolar catheters were positioned in the high right atrium, His bundle region, right ventricle, and coronary sinus. Programmed stimulation and burst pacing were delivered from the ventricle and atrium to evaluate retrograde and antegrade conduction, respectively, and induce SVT. If SVT was noninducible in the baseline state, isoproterenol was infused and the stimulation protocol was repeated. After tachycardia induction, scanning ventricular premature depolarizations (VPDs) were delivered during the diastolic period of tachycardia, and SVT was entrained from the ventricle at a pacing cycle length of 10 to 50 ms shorter than tachycardia cycle length (TCL). Para-Hisian pacing and entrainment were performed selectively to confirm diagnoses.8,9 Radiofrequency ablation was performed in all patients by targeting either the SP or the AP after activation mapping or SP using the standard approach during sinus rhythm.10

Definition of Terms

Post-pacing interval (PPI): time between the pacing stimulus to the first return right ventricular electrogram after entrainment of tachycardia from the ventricle.11

Corrected PPI (cPPI): PPI−TCL−AH

VPDs after activation mapping or SP using the standard approach during ablation was performed in all patients by targeting either the SP or the ventricle (AH(SVT))−AH(NSR) if paradoxically, AH(SVT)<AH(NSR)

His-refractory VPDs reset or terminated tachycardia in all 8

Entrainment From Ventricle

A-A-V patterns were common and occurred more frequently with atypical AVNRT than ORT (79% versus 17%; P=0.036). They were pseudo A-A-V patterns in 9 of 12 (atypical AVNRT [n=8], PJRT [n=1]) and true A-A-V responses in the remaining 3 (atypical AVNRT with [n=2] and without [n=1] NF AP). Although the PPI−TCL was shorter for ORT (118 ms versus 176 ms; 95% CI, 26.3–89.7), half had a PPI−TCL≥115 ms (sensitivity [SN], 50%; specificity, 100%; positive predictive value, 100%). In contrast, PPI−TCL<125 ms occurred in 5 of 6 ORT and 0 of 14 AVNRT (SN, 83%; specificity, 100%; positive predictive value, 100%; Figure 5). The cPPI was also shorter for ORT (115 ms versus 170 ms; 95% CI, 21.7–88.3), but 2 of 6 ORT had a value ≥110 ms, both associated with antidromic capture of the His bundle (SN, 67%; specificity, 100%). The ∆V A was smaller for ORT (101 ms versus 160 ms; 95% CI, 25.9–42.2) but 2 of 6 ORT had a value ≥85 ms (SN, 67%; specificity, 100%). His bundle electrograms were identifiable during entrainment in 17 of 20 (85%) SVTs and were captured orthodromically in ORT (n=4) and antidromically in 13 (AVNRT [n=11], ORT [n=2]). The ∆HA was smaller for ORT (~1 ms versus 72 ms; 95% CI, 35.6–110) but 2 of 6 ORT had a value >0 ms (SN, 67%; specificity, 100%).

His-Refractory VPDs

His-refractory VPDs reset or terminated tachycardia in all 8 patients with an AP and was the only maneuver to identify a concealed, bystander NF AP during atypical AVNRT. They advanced the atrium in 4 APs (AV AP [n=3], NF AP [n=1]), delayed it in 4 (NF AP [n=3], AV AP [n=1]), and terminated SVT with VA block in 5 (NF AP [n=3], AV AP [n=2]). All 4 APs exhibiting paradoxical delay was associated with PPI−TCL>125 ms.

Other Criteria

Compared with PJRT, the ∆HA was longer for NFRT/atypical AVNRT (29 ms versus 10 ms; 95% CI, 3.03–35.0); and 3 SVTs (atypical AVNRT/NF AP [n=2], NFRT [n=1]) had...
an AH interval paradoxically shorter than that during sinus rhythm. Para-Hisian pacing was unhelpful in 14 of 19 (74%) patients because either fast pathway (FP) conduction always preempted slower SP/AP conduction during pacing (n=12) or consistent 1:1 conduction over the SP/AP could not be achieved, despite pacing at the slowest rate allowable by sinus rhythm (n=2). Para-Hisian entrainment was successfully performed in only 2 patients and confirmed the established diagnosis.

Nodal Pathways
The proximal insertion of all 4 nodal APs was the SP of the AV node. In 1 patient, it was the left atrionodal extension of the SP requiring ablation along the posteroseptal mitral annulus. The distal insertion of the nodal APs was fascicular (para-Hisian pacing [n=1]; para-Hisian entrainment [n=1]; Figure 4), ventricular (manifest QRS fusion during entrainment [n=1]; Figure 2), and indeterminate (n=1).

Ablation
The successful ablation site for all patients with atypical AVNRT with and without a bystander NF AP was the SP of the AV node along the posteroseptum of the right atrium and includes the patient with both atypical AVNRT/NF AP and NFRT. The other patient with NFRT had an AP inserting into the left atrionodal extension of the SP and required ablation along the posteroseptal mitral annulus. All patients with PJRT had successful AP ablation along the posteroseptum of the tricuspid annulus near the ostium of the coronary sinus identified by activation mapping during tachycardia.

Discussion
Compared with atypical AVNRT, patients with ORT (NFRT/PJRT) were younger and predominantly women, although the demographics may be skewed by the small study population. These long RP tachycardias respond differently than their short RP counterparts to pacing maneuvers; and the rare tachycardia associated with a NF AP can be misdiagnosed as PJRT if the upper circuit is not analyzed. Therefore, separate pacing maneuvers in the atrium and ventricle are required to delineate the upper and lower circuit, particularly when a 1:1 AV relationship exists (Figure 6; Table 2).
Entrainment From Ventricle

Although A-A-V responses are generally considered diagnostic of AT, A-A-V patterns were common in our series, particularly for atypical AVNRT with its longer paced VA interval. Pseudo A-A-V patterns occur when decremental conduction over the SP or AP produced long VA intervals that exceed the pacing cycle length so that the first atrial electrogram after entrainment is actually driven by the penultimate pacing stimulus. True A-A-V responses were the result of dual retrograde responses (double fire) with simultaneous conduction over the FP and NF AP or SP occurring only with atypical AVNRT with and without a concealed, bystander NF AP, respectively. This is different from the A-A-V response of AT, which results from retrograde conduction over the AV node followed by the first return beat of AT after pacing. A mechanism to explain dual retrograde (A-A-V) responses during atypical AVNRT is the presence of a large excitable gap with collision between antidromic and orthodromic wavefronts in the SP (retrograde limb) of the circuit. The last \( n \) paced antidromic wavefront conducts completely over the FP to the atrium (first A) and then collides with the previous \( n-1 \) orthodromic wavefront in the SP. The last \( n \) paced orthodromic wavefront has no antidromic wavefront with which to collide, conducts over the SP to activate the atrium (second A) and then reinitiates the tachycardia. With onset of ventricular pacing, retrograde block occurs in the SP effectively terminating tachycardia and conduction exclusively over the FP. When pacing stops, retrograde conduction occurs over both the FP and SP, the latter reinitiating tachycardia.

Conventional SVT criteria during entrainment from the ventricle establish the lower portion of the tachycardia circuit as macroreentrant involving the His-Purkinje system/ventricle (PJRT/NFRT) or not (AVNRT). A PPI–TCL<115 was specific for ORT but conduction delay over the AP caused PPI–TCL>115 ms in half ORT yielding misdiagnosis of AVNRT as has been observed in other series. A higher cutoff value of 125 ms increased the SN for ORT by 33%, while maintaining 100% SP. The cPPI correctly adjusted the
long PPI during ORT when both retrograde AP and antegrade AV node decrement occurred—the latter from antidromic capture of the His bundle and retrograde concealment into the AV node. However, when substantial delay occurred over the AP, the cPPI could not correct the long PPI and even paradoxically prolonged it because the first return AH became shorter than during SVT. Slow, decremental AP conduction also affected the SN of the $\Delta VA$ and $\Delta HA$ criteria for ORT but maintained their high SP. Therefore, any standard criteria positive for ORT (PPI–TCL<115 ms, cPPI<110 ms, $\Delta VA<85$ ms, and $\Delta HA<0$ ms) was diagnostic of ORT, despite discordance among each other which occurred 50% of the time.

**His-Refractory VPDs**

His-refractory VPDs that reset (advance or delay) or terminate tachycardia indicate the presence of an AP but not necessarily its participation in tachycardia. They can reset or terminate atypical AVNRT in the presence of a concealed, bystander NF AP inserting into the retrograde SP. In such a case, the VPD conducts over the NF AP ahead of the AVNRT wavefront and penetrates its excitable gap in the SP after the lower turnaround point of the circuit. Its antidromic wavefront collides with tachycardia, whereas its orthodromic wavefront encounters either relative or absolute distal SP refractoriness delaying or terminating tachycardia, respectively. His-refractory VPDs identified an AP in all patients with ORT and was the only pacing maneuver to diagnose a concealed, bystander NF AP in 3 patients with atypical AVNRT by delaying the atrium and terminating tachycardia with VA block. Although entrainment of atypical AVNRT/NF AP from the ventricle with orthodromic capture of the His bundle is theoretically possible, it was not observed. His-refractory VPDs also determined the degree of decremental conduction over each AP. Severe AP decrement paradoxically delayed the atrium because the degree of VPD prematurity was offset by a greater than or equal degree of AP conduction delay (fully compensatory). Mild AP decrement advanced the atrium because the degree of VPD prematurity was offset by a lesser degree of AP conduction delay (partially compensatory). Paradoxically delay might identify patients who have long PPIs after entrainment independent of tachycardia mechanism.

![Figure 3. Atypical atrioventricular nodal reentrant tachycardia with a concealed, bystander nodofascicular accessory pathway (AP). Top, A His-refractory ventricular premature depolarization paradoxically delays tachycardia by 41 ms (fully compensatory). The $AH_{\text{sync}}$ is very short (38 ms; $AH_{\text{his}}=54$ ms). Bottom, Entrainment from the ventricle with antidromic capture of the His bundle showing a true A–A–V response (retrograde FP and slow pathway/nodofascicular AP) and long postspacing interval–tachycardia cycle length=135 ms, $\Delta VA=135$ ms, and $\Delta HA=39$ ms. AH indicates atrio-His; CS, coronary sinus; FP, fast pathway; HA, His-atrial; HRA, high right atrium; RV, right ventricle; and VA ventriculoatrial.](http://circep.ahajournals.org/content/601/Fig3)
Other Criteria

The ΔAH criteria differentiates tachycardia circuits whose upper portion is partially extranodal (PJRT) or completely intranodal (NFRT/atypical AVNRT).\(^{16}\) During PJRT, the AH interval is a true interval reflecting sequential activation of the atrium and His bundle over the AV node and similar to the AH interval when pacing at the TCL. In contrast, during NFRT and atypical AVNRT, the AH interval is a pseudointerval reflecting simultaneous activation of the atrium and His bundle over the AV node and similar to the AH interval when pacing at the TCL. The ΔAH was longer for the nodal tachycardias (NFRT/atypical AVNRT) compared with PJRT, and the AH interval was paradoxically shorter for atypical AV nodal response (n=2) and NFRT (n=1) than during sinus rhythm. A major limitation of ΔAH criteria, however, is the SN of the AV node to rapid fluctuations in autonomic tone so that comparison of AH intervals between tachycardia and pacing should be done close in time allowing for minimal change in the autonomic state of the patient. For atypical AV node–dependent long RP tachycardias, para-Hisian pacing was generally not useful because (1) retrograde FP conduction consistently preempted SP/AP conduction, (2) SP/AP often exhibited retrograde Wenckebach conduction, despite ventricular pacing at the slowest cycle length allowable by the sinus rate, and (3) an AV nodal response is not diagnostic of pure AV nodal conduction but can also be observed with a NF AP.\(^{4}\)

Nodal Pathways

The proximal insertion of all 4 nodal APs was determined to be the SP of the AV node by the ability of His-refractory VPDs to perturb the retrograde limb of the circuit during atypical AVNRT and NFRT. A SP insertion can also be identified by the ability of His-refractory VPDs to reset or terminate typical AVNRT in the antegrade limb.\(^{19}\) Various maneuvers can determine the distal insertion site of concealed nodal APs. An AP response to para-Hisian pacing/entainment identifies a nodoventricular AP because retrograde conduction is dependent on myocardial capture. An AV nodal response

Figure 4. Atypical atrioventricular nodal reentrant tachycardia with a concealed, bystander nodofascicular accessory pathway (AP). Top. A His-refractory ventricular premature depolarization terminates tachycardia with VA block. Paradoxically, $AH_{SVT} < AH_{NSR}$ which excludes permanent form of junctional reciprocating tachycardia. Center. Entrainment from the ventricle yields a true A-A-V response and a long postspacing interval–tachycardia cycle length=232 ms. Note that the atrium is not advanced until the third complex, despite retrograde capture of the His bundle indicating that the His bundle is not part of the circuit further excluding orthodromic reciprocating tachycardia. Bottom. Para-Hisian entrainment. Loss of His bundle capture (last paced complex) causes a 55 ms increase in the VA at the anteroseptum (indicating FP conduction) which then exposes conduction over a slowly conducting nodofascicular (NF) AP caused by the penultimate pacing stimulus (arrows). Note the change in the proximal CS electrogram and equivalent increase in the VA at the anteroseptum that is only possible with a NF (not NV or AV) AP. AH indicates atrio-His; CS, coronary sinus; FP, fast pathway; HRA, high right atrium; RV, right ventricle; and VA ventriculoatrial.
indicates a NF AP because retrograde conduction is dependent on His-RB capture. Limited data suggest that manifest fusion during right ventricular entrainment of ORT using a nodal AP is specific to a nodoventricular fiber. Because the circuit for NFRT is contained within the specialized conduction system, ventricular fusion cannot occur with paced complexes that penetrate the excitable gap and entrain tachycardia (analogous to A VNRT). Although this is true when collision between antidromic and orthodromic wavefronts occurs in the AV node or His bundle, it is not when the collision point is in the right bundle distal to the bifurcation of the His bundle and proximal to the take-off of the NF AP. In this case, the His bundle–left bundle–ventricular axis is orthodromically activated and can fuse with paced complexes from the right ventricle.

Limitations
The number of patients in our collection is relatively small, and our data should be evaluated in more patients. Furthermore, 1 patient contributed 2 SVTs, which violates the requirement for independent observations. However, it is to our knowledge the only series comparing both bystander NF tachycardias and NFRT providing useful information about these rarely described tachycardias. Accurate diagnosis requires evaluating all available clues from the electrophysiologic study (eg, effect of BBB) as differentiating NFRT from atypical A VNRT/NF AP using entrainment alone can be difficult and potentially misleading in certain situations. If the refractory period of a bystander NF AP is sufficiently short to support 1:1 conduction during entrainment and conduction over the NF AP is faster than over the His-Purkinje system, the pathway for entrainment of atypical A VNRT/NF AP and NFRT is the same and the PPI can be short. Conversely, severe decremental conduction over a NF AP might generate long PPIs during entrainment of

Table 1. Electrophysiological Criteria Differentiating the 4 Atypical AV Node–Dependent Long RP SVTs

<table>
<thead>
<tr>
<th>Atypical AVNRT (w/wo NF AP; n=14)</th>
<th>PJRT/NFRT (n=6)</th>
<th>P Value/95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td>54±19</td>
<td>42±13</td>
</tr>
<tr>
<td>Women</td>
<td>3/14 (21%)</td>
<td>5/6 (83%)</td>
</tr>
<tr>
<td>TCL</td>
<td>429 ms</td>
<td>435 ms</td>
</tr>
<tr>
<td>A-A-V pattern</td>
<td>11/14 (79%)</td>
<td>1/6 (17%)</td>
</tr>
<tr>
<td>PPI–TCL</td>
<td>176 ms</td>
<td>118 ms</td>
</tr>
<tr>
<td>PPI&lt;115</td>
<td>0/14 (0%)</td>
<td>5/6 (83%)</td>
</tr>
<tr>
<td>cPPI</td>
<td>170±34 ms</td>
<td>115±69 ms</td>
</tr>
<tr>
<td>cPPI&lt;110</td>
<td>0/13 (0%)*</td>
<td>4/6 (67%)</td>
</tr>
<tr>
<td>∆VA</td>
<td>160±34 ms</td>
<td>101±76 ms</td>
</tr>
<tr>
<td>∆VA&lt;85</td>
<td>0/14 (0%)</td>
<td>4/6 (67%)</td>
</tr>
<tr>
<td>∆HA</td>
<td>72±40 ms</td>
<td>-1±58 ms</td>
</tr>
<tr>
<td>∆HA&lt;0</td>
<td>0/11 (0%)</td>
<td>4/6 (67%)</td>
</tr>
<tr>
<td>NFRT/Atypical AVNRT</td>
<td>PPI–TCL</td>
<td>P Value/95% CI</td>
</tr>
<tr>
<td>∆AH</td>
<td>29±19 ms</td>
<td>10±17 ms</td>
</tr>
</tbody>
</table>

AV indicates atrioventricular; AP, accessory pathway; CI, confidence interval; cPPI, corrected postpacing interval; NF, nodofascicular; NFRT, NF reentrant tachycardia; PJRT, permanent form of junctional reciprocating tachycardia; PPI, postpacing interval; SVT, supraventricular tachycardia; and TCL, tachycardia cycle length.

* cPPI could not be calculated in 1 patient because a His bundle deflection was not observed after entrainment.

### Figure 5
Postspacing interval–tachycardia cycle length (PPI–TCL) values for atypical atrioventricular nodal reentrant tachycardia (AVNRT; with/without a concealed, bystander nodofascicular [NF] accessory pathway) and orthodromic reciprocating tachycardia (permanent form of junctional reciprocating tachycardia [PJRT]/NF reentrant tachycardia).

### Figure 6
Diagram illustrating the reentrant circuits for the 4 atypical atrioventricular (AV) node–dependent SVTs. The upper and lower portions of each circuit differ and require separate pacing maneuvers for diagnosis. A concealed nodofascicular accessory pathway bypasses the His bundle and allows access to the AV nodal reentrant tachycardia (AVNRT) circuit from the ventricle. HPS indicates His-Purkinje system; NFRT, NF, reentrant tachycardia; and PJRT, permanent form of junctional reciprocating tachycardia.
Table 2. Differential Diagnosis of a Long RP Tachycardia Reset (Advanced or Delayed) or Terminated (With VA Block) by His-Refractory VPDs

<table>
<thead>
<tr>
<th>Atypical AVNRT+Bystander NF</th>
<th>NFRT</th>
<th>PJRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPI–TCL &gt;125 ms</td>
<td>&lt;125 ms</td>
<td>&lt;125 ms</td>
</tr>
<tr>
<td>∆AH &gt;40 ms or ∆AH (终值) &lt; &lt;20 ms</td>
<td>&gt;40 ms or ∆AH (终值) &lt;</td>
<td>&lt;20 ms</td>
</tr>
</tbody>
</table>

AVNRT indicates atrioventricular nodal reentrant tachycardia; NF, nodofascicular; NFRT, NF reentrant tachycardia; PJRT, permanent form of junctional reciprocating tachycardia; PPI, pacing interval; SVT, supraventricular tachycardia; TCL, tachycardia cycle length; and VPDs, ventricular premature depolarizations.

NFRT that resemble atypical AVNRT. Entrainment results, therefore, should be corroborated with the other important findings of the study. Entrainment is not possible for patients with only nonsustained tachycardia or whose tachycardia repeatedly terminates with pacing. In such situations, evaluating the response of tachycardia at the beginning of ventricular overdrive pacing can help differentiate ORT from AVNRT but does not distinguish NFRT from PJRT or AVNRT/NF AP from ORT.²¹,²² Atrial extrastimulation and overdrive pacing were not systematically performed during or after tachycardia to exclude junctional tachycardia or assess VA linking.²³,²⁴ However, because focal junctional tachycardia associated with retrograde conduction over the SP is extremely rare and none of our tachycardias exhibited nonreentrant behavior (eg, warm-up/cool-down phenomena, initiation after a spontaneous junctional complex), we are confident of our diagnoses. In addition, the value of VA linking in long RP tachycardias is unclear because VA intervals can vary significantly during atypical ORT and AVNRT because of decremental conduction over the AP and SP, respectively. Rather, AT was excluded by classical electrophysiologic criteria.

Conclusions

Diagnosing the atypical AV node–dependent long RP SVT requires separate pacing maneuvers to delineate the upper and lower limbs of the circuit. Long PPIs are common and a PPI–TCL<125 ms seems better than 115 ms for differentiating ORT (PJRT/NFRT) from atypical AVNRT. Other entrainment criteria (cPPI<110 ms, ∆VA<85 ms, and ∆AH<0 ms) are only modestly sensitive but 100% specific for ORT. Differentiating nodal tachycardias (NFRT/atypical AVNRT) from PJRT can be established by ∆AH criteria or the paradoxical finding of AH (终值) < <AH (终值). His-refractory VPDs was the only maneuver to identify a bystander, concealed NF AP during atypical AVNRT.

Disclosures

None.

References


**CLINICAL PERSPECTIVE**

Atypical atrioventricular (AV) node–dependent long RP supraventricular tachycardias (SVTs) are uncommon and can be challenging to diagnose. Standard SVT criteria using pacing maneuvers in both the atrium (ΔAH criterion) and the ventricle (postspacing interval–tachycardia cycle length, corrected postspacing interval, ΔVA, and ΔHA criteria) were used to define the upper and lower circuit of the 4 AV node–dependent long RP SVTs: atypical atrioventricular nodal reentrant tachycardia (AVNRT) with and without a concealed, bystander nodofascicular (NF) accessory pathway (AP) and orthodromic reciprocating tachycardia using a concealed, slowly conducting, decremental atrioventricular (permanent form of junctional reciprocating tachycardia) or NF AP (NF reentrant tachycardia). We found that a postspacing interval–tachycardia cycle length<125 ms was better than 115 ms for differentiating orthodromic reciprocating tachycardia (permanent form of junctional reciprocating tachycardia/NF reentrant tachycardia) from AVNRT; and other entrainment criteria (corrected postspacing interval<110 ms, ΔVA<85 ms, and ΔHA<0 ms) had 67% sensitivity and 100% specificity for orthodromic reciprocating tachycardia. The ΔAH criterion or paradoxically, AH_{SVT}<AH_{NSR} differentiated nodal tachycardias (NF reentrant tachycardia/typical AVNRT) from permanent form of junctional reciprocating tachycardia. His-refractory VPDs advanced, delayed, or terminated SVT in all AP patients and was the only maneuver to identify a concealed, bystander NF AP during atypical AVNRT. In summary, diagnosis of these unusual SVTs requires separate pacing maneuvers to delineate the upper and lower limbs of the circuit. Because of decremental retrograde AP conduction, standard entrainment criteria from the ventricle are only modestly sensitive but highly specific for orthodromic reciprocating tachycardia. His-refractory VPDs are important to identify bystander APs during atypical AVNRT.
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