Editorial:
Ventricular Tachycardia —
Practical and Provocative Electrophysiology

JOHN D. FISHER, M.D.

IN THIS ISSUE of Circulation Horowitz et al.1 and
Mason and Winkle2 describe the use of catheter in-
duction of ventricular tachycardia (VT) in select-
ing antiarrhythmic regimens. The purposeful provocation of
a potentially lethal arrhythmia, even under “safe,”
controlled catheterization laboratory conditions is a for-
ign idea to many physicians, and some perspec-
tive is required.

The high mortality associated with recurrent VT3, 4
has prompted efforts to secure objective proof of the
efficacy of antiarrhythmic regimens before discharge
from the hospital. The methods used to assess efficacy
may be active (provocative) or passive.

The passive-objective approach estimates the effect-
iveness of antiarrhythmic therapy by measurement of
drug blood levels5 or trendscription, i.e., continuous
ECG monitoring with automatic counting of pre-
mature ventricular complexes (PVCs).6, 7 If VT recur
at frequent intervals or is clearly related to the
number or grade of PVCs, then the combination of
rotation of drugs with monitoring of blood levels and
trendscription is excellent. However, some patients
have VT only at infrequent intervals,8 often without
increasing numbers or grades of PVCs.5, 8, 9 Day-to-
day variations in the number of PVCs without ther-
apeutic interventions may be so marked10, 11 that to be
reasonably certain that a drug is actually effective may
require a 90% or greater reduction in PVCs. These
considerations detract from the sense of security
which might otherwise be afforded by demonstration
of adequate blood drug levels or abolition of PVCs.

The provocative-objective approach to VT, ex-
emplified by the two articles in this issue, is based on
four concepts8, 12, 13 which are well-supported by ex-
perimental evidence.

Concept 1: In the absence of previous tachycardia
or syncope, VT is rarely produced by electrophysiologic stresses including one to three PVCs or
rapid pacing.8, 13, 14

Concept 2: In patients with recurrent VT, it is
usually possible to duplicate the rate and configura-
tion of spontaneous VT under controlled catheteri-
Zation laboratory conditions, using the stresses listed
under concept 1, 8, 12, 13, 15

Concept 3: Once induced, VT can usually be ter-
minated by pacer techniques permitting serial testing
without frequent DC cardioversion, thus increasing
patient acceptance. 1, 2, 8, 11, 17

Concept 4: The efficacy of antiarrhythmic therapy
can be judged by the degree to which the normal
response (concept 1) to stresses is restored. 1, 2, 8, 11, 17

These concepts have been successfully applied for
control of supraventricular tachycardias in the form of
serial electrophysiologic-pharmacologic testing.13, 19

The techniques have pitfalls, as attested by the
authors of the current articles. In addition, the phy-
cian must deal with non-electrophysiologic provoca-
tions such as noise, exercise, and psychologic stresses
to assure maximum efficacy of therapy.13 Reduction of
the number and duration of hospital admissions after
serial testing brings savings in hospital costs and work
days lost. It is also psychologically important for the
patient.

The role of provocative testing in the control of VT
is undefined. There is no agreement on the details of
patient selection, testing protocol, choice of drugs for
testing, and the role of special implantable pacemakers.
In the treatment of potentially lethal arrhyth-
mias, it is essential to assess the effectiveness of any
proposed therapy before discharge from the hospital.
For patients in whom the frequency of episodes is
directly related to the number of PVCs, control may
be established by prolonged ECG trendscription
monitoring with rotation of medications guided by
changes in numbers of PVCs and drug blood levels.
Serial electrophysiologic testing as different drugs are
administered appears to be appropriate and effective
in the management of patients whose VT is infrequent
or unrelated to the number of spontaneous extrasys-
toles. Even when no protective regimen is identified,
the predictive implications of such failure alert the
physician that exceptionally close observation of such
patients is mandatory.
### Table 1. Serial Electrophysiologic Testing for Ventricular Tachycardia: Collected Series

<table>
<thead>
<tr>
<th></th>
<th>Horowitz et al.1</th>
<th>Mason and Winkle2</th>
<th>Fisher et al.3, 11*</th>
<th>Wu et al.17</th>
<th>Hartzler and Maloney18</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serial testing</td>
<td>20</td>
<td>21</td>
<td>42</td>
<td>1</td>
<td>6</td>
<td>90</td>
</tr>
<tr>
<td>VT induction</td>
<td>20/20† (100%)</td>
<td>24/29 (83%)</td>
<td>39/42 (93%)</td>
<td>1/1</td>
<td>6/6 (100%)</td>
<td></td>
</tr>
<tr>
<td>± Prior regimens (mean)</td>
<td>1-25 hosp admissions</td>
<td>(4.8)</td>
<td>1-16 (5.6) (Several)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Days serial testing (mean)</td>
<td>1-10 (4.5)</td>
<td>1-6</td>
<td>1-19 (3.9)</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated protection/VT recurrent while on prescribed regimen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete</td>
<td>9/0</td>
<td>13/0</td>
<td>21/3</td>
<td>1/0</td>
<td>5/0</td>
<td>49/3</td>
</tr>
<tr>
<td>Good</td>
<td>4/0</td>
<td></td>
<td></td>
<td></td>
<td>(+1 surgery)</td>
<td>4/0</td>
</tr>
<tr>
<td>Partial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20/5</td>
</tr>
<tr>
<td>None-very little</td>
<td>7/7</td>
<td>7/-</td>
<td>2/2</td>
<td></td>
<td></td>
<td>16/-</td>
</tr>
<tr>
<td>Follow-up, months (mean)</td>
<td>3-27</td>
<td>Treated pts</td>
<td>1-33 (8.1)</td>
<td>0-41 (13)</td>
<td>13</td>
<td>1-18</td>
</tr>
<tr>
<td>Deaths</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During testing</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>During follow-up (total)</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
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<tr>
<td>VT related deaths:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>— Pts treated on basis of testing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0/0/0</td>
</tr>
<tr>
<td>— Full/partial/no protection</td>
<td>0/0/0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>— Pts on other treatment</td>
<td>3</td>
<td></td>
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</table>

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**References**


Ventricular tachycardia--practical and provocative electrophysiology.
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