First-degree Atrioventricular Block in Combination with Age ≥ 80 years is Predictive of Subsequent Pacing Requirement in Patients with Syncope

A Retrospective Single Centre Study of Implantable Loop Recorder Data

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Indications for Loop Recorder Implantation

➢ SYMPTOMS
  • Palpitations
  • Syncope/Pre-Syncope

➢ REQUIREMENT
  • Absence of conventional pacing indication on resting 12 lead ECG +/- ambulatory monitoring
### Pacing indications in suspected Brady-arrhythmia

<table>
<thead>
<tr>
<th>ECG characteristic</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncope, Bundle Branch Block + positive EP study</td>
<td>IB</td>
</tr>
<tr>
<td>Alternating bundle branch block (with or without symptoms)</td>
<td>IC</td>
</tr>
<tr>
<td>Bundle Branch Block, syncope, non diagnostic investigations</td>
<td>IIb - C</td>
</tr>
<tr>
<td>First degree atrioventricular block</td>
<td>No current recommendations</td>
</tr>
</tbody>
</table>
Evidence for risk factors identified by loop recorders

• Mitro et al (2017)
  – Retrospective single centre cohort study of 112 patients

• Univariate analysis
  – Age > 65 $p = 0.01$
  – 1st degree AV block $p = 0.005$
  – Absence of prodromal symptoms $p = 0.02$
  – Trauma secondary to syncope $p = 0.011$
  – Sinus bradycardia $p = 0.002$
Hypothesis

• Combination of increased age & ECG predictors → direct pacemaker implantation

• Investigation of hypothesis
  – Retrospective observational study of population in West Hertfordshire who received ILR (2015-2018)
Methods

• Local database used to identify patients

• Data collection: MedCon, discharge summaries, medical notes & ECGs

• Recorded indication, initial resting ECG findings, ILR findings and outcomes
Results

• 174 ILR implants at WGH for syncope

• 127 patients were aged 79 and younger (73%).
  – 6% (n=8) required subsequent pacing.

• 47 patients aged 80 or over (27%).
  – 34% (n=16) required subsequent pacing
    – (p = 0.000002)*

*Fisher exact test
Results

• Age ≥ 80 in isolation does not predict subsequent pacemaker implantation

• 4% (n=5) < 80 with normal resting ECG required pacing

• 14% (n=3) ≥ 80 with normal resting ECG required pacing
  – p = 0.13
Results

12 lead ECG abnormalities at the time of loop recorder implantation
Results

- First degree AV block is a significant risk factor for subsequent pacing requirement (p<0.0001*).
  - 6% (n=8) with normal ECG’s required subsequent pacing.
  - 66% (n=10) with first degree AV block required subsequent pacing.

*Fisher Exact Test
Results

Pacing requirement Aged <80 years cf aged ≥80 years
Results

• 90% (n=9) aged ≥ 80 in combination with first degree AV block (PR >200ms) required subsequent pacemaker implantation (p<0.0001)*
  – Mean time from ILR to pacemaker implantation 298 days +/- 129

• First degree AV block did not predict subsequent pacing in those aged <80 (p=0.24)*

* Fisher Exact Test
Results

Age ≥ 80 in combination with first degree AV block did not predict pacing *indication* at time of implant.

- 5 patients received ILR diagnosis of high grade AV block
- 4 patients received ILR diagnosis of symptomatic sinus node dysfunction
Results

- PR duration in isolation does not predict subsequent pacing requirement ($p = 0.66$)*

<table>
<thead>
<tr>
<th>All Patients with First Degree AVB</th>
<th>PR interval (mean +/- SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required pacing (all ages)</td>
<td>245ms +/- 11</td>
</tr>
<tr>
<td>Did not require pacing (all ages)</td>
<td>254ms +/- 18</td>
</tr>
</tbody>
</table>

* Unpaired t-test
Results

There is no correlation between age and PR duration ($R = -0.25^*$)
Conclusions

• The PR interval duration in isolation does not predict subsequent pacing requirement

• Age ≥ 80 years isolation does not predict subsequent pacing requirement

• The combination of age ≥ 80 and 1st degree AVB on initial resting 12 lead ECG is strong predictor of subsequent pacing requirement
Limitations

• Retrospective study

• Small sample size
Recommendations

• Multi-Centre observational study

➢ Future directions: Develop scoring system for pacing in suspected bradycardia

  ▪ Including risk factors:
    - Age
    - Trauma due to syncope
    - Lack of prodromal symptoms
    - ECG characteristics
Questions?

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References