Pacemaker indication: yes no and the grey zone

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Conflicts

none
# Indications for Pacing

<table>
<thead>
<tr>
<th>Classes of recommendations</th>
<th>Definition</th>
<th>Suggested wording to use</th>
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</thead>
<tbody>
<tr>
<td>Class I</td>
<td>Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.</td>
<td>Is recommended/is indicated</td>
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<tr>
<td>Class II</td>
<td>Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.</td>
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<tr>
<td>Class IIa</td>
<td>Weight of evidence/opinion is in favour of usefulness/efficacy.</td>
<td>Should be considered</td>
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<td>Class IIb</td>
<td>Usefulness/efficacy is less well established by evidence/opinion.</td>
<td>May be considered</td>
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<tr>
<td>Class III</td>
<td>Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.</td>
<td>Is not recommended</td>
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Mechanisms of conduction damage after TAVR

- **Pre-existing calcification** of LV outflow
- **Mechanical injury & compression** of AV bundle and LBBB which are located more anteriorly, distally, and cranially to the aortic valve complex
Most common conduction abnormalities after TAVR

Block at the level or below the His bundle

LBBB

Absolute indications

- CHB and high degree block and 2:1
- Major indications: 14.2% 0-34% median 9.7%
- 80% of PM implantations
Risk factors for complete block

<table>
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<tr>
<th>Sex</th>
<th>male</th>
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Preexisting conduction defects
1st AV block, RBBB and LAH and intraprocedural AV block

Prosthesis related
Depth
Sizing
Type of valve

Footprint that mimics anatomy
Core valve 20.8 (9.3-30%) - approx 1/3
Edwards –Sapien 5.4 (0-10,18%)

Still unclear TAVR but it seems comparable to SAVR (Recovery 65-100%)

- registries: 92% remained paced

- Observation period 5-7 days

- AV block first 24 hours persisting >48 hours resolution unlikely 1-2 weeks – consider earlier implantation


True life
Case 1

Male 79 y
Day 2
• not included as a basic indication

• In the pacing guidelines it is an indication only if there are symptoms or positive EP – prolonged HV
Intrahisian block with Wenckebach phenomenon

Jean Luc Pasquier, MD, PhD, Robert Grolleau, MD

From Servicio de Cardiología A, Hospital Arnau de Vilanova, Centre Hospitalari Universitari, Montpellier, France.

An active 69-year-old man was investigated for recent onset of syncope. Baseline ECG demonstrated normal sinus rhythm without evidence of conduction disturbances or AV (A-V) block within normal range. Furthermore, echocardiography demonstrated normal left ventricular function, and the heart serography showed no evidence of ischaemia. During electrophysiological study (panel A), histology demonstrated H1 conduction with evidence of split His bundle. In contrast, the distal potential H2-V 20 ms, H-V 30 ms, suggesting intrahisian block. This 1:1 conduction pattern at a pacing cycle length of 500 ms. An incomplete heart block of 300 ms, manifesting a modified AV node stimulation in PR interval with Wenckebach phenomenon (panel B) and 2:1 AV block at a shorter cycle length. His bundle recording demonstrated intrahisian block. Wenckebach with a progressive increase in the conduction interval His potentials until block after the first two. A dual-chamber pacemaker was implanted, and the patient has recovered.

Intrahisian block is a classic relatively rare finding during electrophysiological study. In the initial study by Pichard et al., intrahisian block represented about 1/10 of 2:1 AV block. Sustained is the most frequent symptom. This rare occurrence, as well as its effect on haemodynamics, is summarized in normal Wenckebach block, whereas the His bundle has been reproduced in experimental studies and has been described for some time in humans. This effect reveals the dual conduction system. Intrahisian Wenckebach phenomenon has rarely been recognized and has been previously reported. The sequence of QRS intervals in our patient suggests that this phenomenon was associated with the His bundle.

References

EP
HV baseline 58
after TAVI 70
Case 2

Male 82 y
chronic Afib
Temporary block during the procedure recovery before exit-
new LBBB -QRS 162msec- Afib
New persistent LBBB- Develops in 29-65%
New RBBB less frequent- if RBBB preexisting additional damage usually causes CHB
New LBBB resolves in 30–50%
new LBBB in 40 % of SAPIEN valve pts resolves in 1 month.
LBBB worsens outcomes and heart failure hospitalization
Association to ↑ mortality conflicting data

Neither new LBBB or RBBB are absolute indications for PM

REMOVAL OF TEMPORARY WIRE
4 HOURS LATER - DAY 3

CLUE SLOW CONDUCTION AFIB COMPARED TO BASELINE

PM implanted on emergency basis
Case 3

80 y woman
Baseline
SR LBBB
Exit from lab with LBBB QRS 200 msec+ PR prolongation 200
• inconsistency in literature
• preexisting abnormalities and worsening of preexisting conduction defects
• Changes LBBB + ΔPR >20 ms increase risk of CHB

Implant PM

HV 90
+split
His
Case 4

82 y male

LV EF 35-40%
CHB during procedure
Before EXIT from lab
Day 1 same afternoon
# CRT indications

## Indications for cardiac resynchronization therapy in patients in sinus rhythm

<table>
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<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
<th>Ref.</th>
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<tr>
<td>1) LBBB with QRS duration $&gt;150$ ms. CRT is recommended in chronic HF patients and LVEF $\leq 35%$ who remain in NYHA functional class II, III and ambulatory IV despite adequate medical treatment. $^d$</td>
<td>I</td>
<td>A</td>
<td>48–64</td>
</tr>
<tr>
<td>2) LBBB with QRS duration 120–150 ms. CRT is recommended in chronic HF patients and LVEF $\leq 35%$ who remain in NYHA functional class II, III and ambulatory IV despite adequate medical treatment. $^d$</td>
<td>I</td>
<td>B</td>
<td>48–64</td>
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• up to 30% of these patients report recovery of the conduction in the first 30 days post procedure, the decision on placement of a device can be made at that time.

**Suggested solutions**

• Prolong FU monitoring period with a secure type temporary lead screwed in for 30 days at VVI 50

• Early Implant of a CRT- P device
Don’t forget other indications
Sinus node disease- SND

88y woman
Syncope prior to TAVI
• There are grey zones
• Pacemakers are implanted earlier than proposed
• Landmark studies PPM implanted during the index hospitalization (97.1%) in the majority of the patients, with median time to PPM being 3 days post-TAVR

Why is it different

- **Risk of death** — dislocation of temporary wires
- **Complications** — thrombosis infection
- **Pt immobilized** — prolonged ICU old pts
Are there any tools that could help???
grey cases

• EP
• ILR
• Timing - Prolong monitoring
Baseline EP may predict PM implantation and identify pts that need a PM after TAVI in a grey zone


• Recovery before the end of the procedure
• No Pre-existing conduction abnormalities
• No abnormalities after
• EP +/- ILR?

• Present ACC/HRS guidelines encourage that these decisions be left to the discretion of the physician
• European grey – nothing significant

ILR
Future studies

• Prognosis assessment of persistent left bundle branch block after TAVI by an electrophysiological and remote monitoring risk-adapted algorithm: rationale and design of the multicentre LBBB–TAVI Study

• EP guided implantations - programming at a mode that can evaluate recovery of rhythm - expected in 2018

• Ambulatory Electrocardiographic Monitoring for the Detection of High-Degree Atrio-Ventricular Block in Patients With New-onset PeRsistent LEft Bundle Branch Block After Transcatheter Aortic Valve Implantation. The "MARE" Study

• ILR guided
What do the experts recommend???
Class I indication

• If a patient at any point during or after TAVR develops Mobitz Type 2 AV block or complete AV block

• EP should be consulted for pacemaker implantation prior to discharge
Expert Analysis
Risk Stratification for Pacemaker Placement After TAVR 2016
Rohan Kalathiya, MD; Atman P. Shah, MD; Gaurav A. Upadhyay, MD, FACC
Thank you for your attention