Learning Curve and Initial Experience by the Implementation of a His-Bundle Pacing Program

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Einleitung / Introduction:

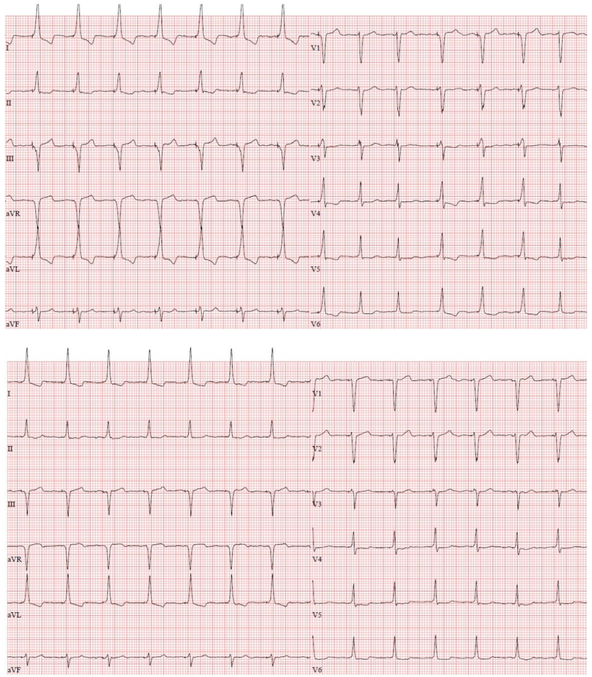
His-bundle pacing (HBP) has emerged in the last years as a promising alternative pacing technique. It aims to provide a more **physiological pattern of ventricular activation** via the native His-Purkinje system and thus to maintain contractile function, optimise atrioventricular synchrony and reduce the deleterious effects of a high percentage of right ventricular pacing. We report the initial experience of the first 10 HBP procedures in our centre.

Methoden / Methods:

The first 10 consecutive patients since the initiation of a His-Bundle pacing program in our institution in May 2020 were included in this analysis. All patients had **an indication for permanent pacing** and were **expected to require ventricular pacing >40%** of the time: 4 patients had a third degree atrioventricular block (AVB), 2 had a second degree AVB, 3 had atrial fibrillation with a slow ventricular response and symptomatic pauses and one patient exhibited symptomatic sick sinus syndrome with a long first degree AVB (PR interval 360ms). Mean age was 70,3 years and 70% were men. The lead used for HBP was a non-stylet-driven 4.1 Fr lead with an exposed helical screw (Medtronic Select Secure 3830, Medtronic, Minneapolis, MN). A range of acceptable sensing, impedance and threshold values were predefined, according to the current literature: Impedance 400-1500 Ohms, Sensing > 2mV, Threshold < 3,0V@1,0ms. **Selective HBP (sHBP)** was defined as the presence of an isoelectric His-paced to QRS interval similar to native HV interval and a QRS morphology identical to the intrinsic QRS morphology, while **non-selective capture (nsHBP)** was defined as engagement of His along with adjacent local myocardial tissue, with pseudo-delta wave in QRS, no isoelectric interval between spike and QRS, and QRS morphology similar, but not identical to the intrinsic QRS morphology. An electroanatomical 3D mapping system (Ensite NavX, Abbott) for precise identification of His-location was used in all cases.

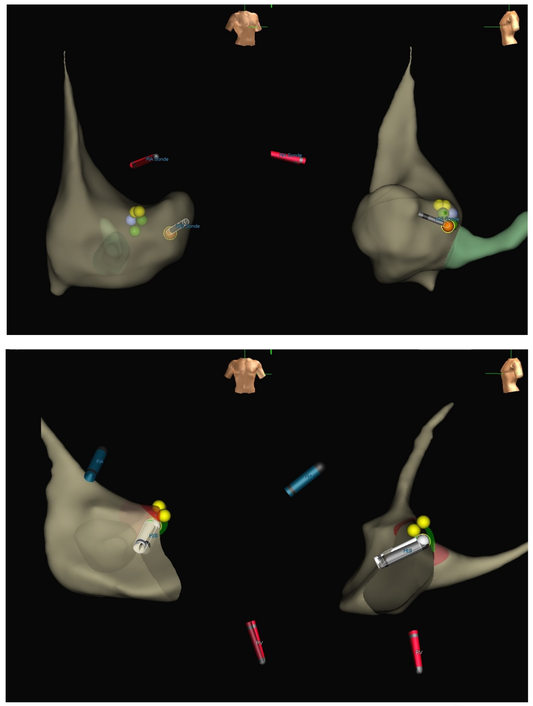
Resultate / Results:

HBP was successful with acceptable sensing, impedance and threshold values in 10/10 patients (**success rate 100%**). All cases were performed by using a specially designed, non-steerable sheath with dual-plane shaping (Medtronic C315 His, Medtronic, Minneapolis, MN) and no case required the use of a deflectable sheath (Medtronic C304, Medtronic, Minneapolis, MN). **Mean procedure time was 91 minutes (81-159 min.).** Mean sensing, impedance and threshold values were 3,8mV, 636 Ohms and 1,1V@1,0ms (0,5V@1,0ms - 3,0V@1,0ms) respectively. Mean procedure duration declined from 108 min. (82-159 min.) in the first 5 procedures to 89 min. (81-103 min.) in the next 5 procedures. Similarly, the mean threshold value declined from 1,6V@1,0ms in the first 5 procedures to 0,6V@1,0ms in the next 5 ones. **Selective HBP (sHBP) was achieved in 6 patients (60%),** while nsHBP was demonstrated in the rest 4 patients. No acute HBP-related complications were observed, no His-electrode dislocation has occurred. One patient underwent an early revision due to dislocation of the atrial electrode. In the 3-month follow-up of the first 5 patients, there was a loss of His-capture in one patient (who had also initially a high threshold of 3,0V@1,0ms at implantation); the other 4 patients exhibited a mean threshold value of 0,9V@1,0ms (0,5V@1,0ms - 1,75V@1,0ms) at three months.



Intermittent non-selective (above) and selective (below) His-bundle pacing.

Electroanatomical 3D mapping guidance in a HBP procedure without (above) and with (below) a back-up RV pacing-lead.



CONCLUSION: HBP is safe, effective and technically feasible as an alternative pacing method in patients with expected high percentage of ventricular pacing. The procedure duration is longer at the start of the learning curve, but declines relatively fast with accumulating experience. The use of an electroanatomical 3D mapping system for accurate anatomical localisation of His-Bundle appears to accelerate the learning curve and improve the success rate of HBP at least at the initial phase of a HBP program.