

Safety and efficacy of His-bundle pacing/left bundle branch area pacing versus right ventricular pacing: a systematic review and meta-analysis

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Background: Recent studies have demonstrated that right ventricular pacing (RVP) has deleterious effects on non-synchronized ventricular contraction, while His-bundle pacing (HBP) or left bundle branch area pacing (LBBaP) contribute to improvements in patients' mid- and long-term outcomes. This meta-analysis aimed to compare the safety and efficacy of physiologic pacing (HBP/LBBaP) versus those of RVP.

Methods: A systematic search of PubMed, Cochrane Library, and Embase was conducted for studies that compared the effects of physiologic pacing and RVP. All eligible studies were published before January 1, 2021 and were conducted in humans. STATA software version 15.0 was used for all the data analyses.

Results: Twenty articles (n=2787 patients) were included in this meta-analysis. Compared to RVP, physiologic pacing were associated with a shorter QRS duration (weight mean difference [WMD] -41.84 , 95% confidence interval [CI] -50.74 , -32.94), better cardiac function ($57.95 \pm 9.72\%$ vs. $52.35 \pm 13.75\%$), and lower rates of mitral regurgitation (standardized mean difference [SMD] -0.33 , 95% CI -0.76 , 0.10), pacing-induced car-

diomyopathy (odds ratio [OR] 0.77 , 95% CI 0.52 , 1.15), death (OR 0.94 , 95% CI 0.78 , 1.12), heart failure hospitalization (OR 0.94 , 95% CI 0.79 , 1.12) and atrial fibrillation (OR 0.95 , 95% CI 0.76 , 1.18), although some results were not statistically significant. In addition, RVP led to the achievement of higher success rates than physiologic pacing (OR 0.05 , 95% CI 0.02 , 0.13), a shorter fluoroscopic time and mean procedure duration (WMD 6.21 , 95% CI 2.00 , 10.42 ; WMD 20.75 , 95% CI 13.78 , 27.72), a lower pacing threshold (WMD 0.48 , 95% CI 0.24 , 0.72), and fewer surgical complications (OR 1.02 , 95% CI 0.88 , 1.19). Compared with HBP, LBBaP appeared to have some advantages in R wave amplitudes, pacing threshold, fluoroscopic time, procedure time, and success rate, however, some results were not statistically significant.

Conclusion: Physiologic pacing (HBP/LBBaP) might be a better strategy than RVP and improve long-term clinical outcomes like cardiac function. Although LBBaP appears to have some advantages over HBP, the long-term benefits are still controversial. More large-scale randomized clinical trials are needed for further verification.