18th Gulf Heart Association Conference
November 12-14, 2026
Oman Exhibition & Convention Center
Muscat, Sultanate of Oman



POSTER PRESENTATION

Safety and Efficacy of Left Bundle Branch Area Pacing Versus Right Ventricular Pacing: A Systematic Review and Meta-analysis

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INTRODUCTION

Left bundle branch area pacing (LBBAP) has emerged as a physiological alternative to right ventricular pacing (RVP), potentially preserving ventricular synchrony and reducing pacing-related cardiac dysfunction. However, comparative evidence regarding its benefits in preventing heart failure hospitalization and its risk of procedure-related or device-related complications remains variable.

AIM

To compare the clinical outcomes of LBBAP versus RVP, focusing on heart failure hospitalization as the primary outcome and procedure-related or device-related complications as a safety outcome.

METHODS

A systematic search of major electronic databases was conducted to identify randomized and observational studies comparing LBBAP with RVP. Eligible studies reporting heart failure hospitalization or procedure-related or device-related complications were included. Pooled odds ratios (ORs) with 95% confidence intervals (CIs) were calculated using random-effects models. Statistical heterogeneity was assessed using the I^2 statistic and Cochran's chi-square test. Publication bias was evaluated through funnel plot symmetry.

RESULTS

Six studies involving 1,583 patients reported heart failure hospitalization. LBBAP was associated with a significantly lower risk of heart failure hospitalization than RVP (25/824 vs 79/759; OR 0.28, 95% CI 0.18–0.44; $p < 0.00001$). No significant heterogeneity was observed ($I^2 = 0\%$; $\chi^2 = 2.04$, $p = 0.84$), indicating consistency across the included studies. Five studies involving 1,589 patients evaluated procedure-related or device-related complications. LBBAP was associated with a significantly higher risk of complications than RVP (53/887 vs 18/702; OR 2.46, 95% CI 1.43–4.24; $p = 0.001$). Considerable heterogeneity was observed ($I^2 = 81\%$; $\chi^2 = 16.11$, $p = 0.001$), suggesting substantial variability in complication estimates across studies.

CONCLUSIONS

LBBAP was associated with a significantly lower risk of heart failure hospitalization compared with RVP, supporting its potential clinical benefit in patients requiring permanent pacing. However, the higher observed risk of procedure-related or device-related complications highlights the importance of careful patient selection, procedural expertise, and appropriate follow-up. Further large-scale, high-quality randomized trials are warranted to confirm these findings, clarify sources of heterogeneity in complication rates, and establish the long-term balance between clinical benefits and procedural risks.