

Abstract

Introduction

Severe aortic stenosis (AS) was traditionally managed with surgical aortic valve replacement (SAVR). Transcatheter aortic valve implantation (TAVI) emerged as a less invasive alternative, initially mainly for high-risk patients. Its use expanded to intermediate- and low-risk patients based on promising outcomes. This meta-analysis evaluates TAVI's efficacy and safety in young, low-risk patients, where SAVR is the established standard.

Methods

Following PRISMA guidelines, we systematically searched randomized controlled trials (RCTs) comparing TAVI with SAVR in young (mean age <75 years) and low-risk patients (STS score <4%) with severe AS. Primary endpoint was a composite of death and disabling stroke. Secondary endpoints included all-cause mortality, stroke, atrial fibrillation (AF), permanent pacemaker implantation (PPI), acute kidney injury (AKI), New York Heart Association (NYHA) class, and quality of life (KCCQ score) improvements.

Results

Four RCTs with 4252 patients (2125 TAVI and 2127 SAVR) were included. TAVI had a significantly lower incidence of death or disabling stroke (2.64% vs. 5.22%, OR 0.55, $p=0.011$) and lower rates of readmission (7.1% vs. 9.3%, OR 0.71, $p=0.04$), AF (8.7% vs. 33.5%, OR 0.14, $p<0.0001$), and AKI (0.9% vs. 2.2%, OR 0.41, $p<0.0001$). However, TAVI patients had higher PPI rates (13.6% vs. 6.4%, OR 2.29, $p<0.0001$). Faster quality of life and symptomatic improvements were sustained in the TAVI group.

Conclusion

TAVI is a viable option for young, low-risk patients with severe AS, showing non-inferiority to SAVR in short-term outcomes. TAVI's benefits include reduced composite episodes of mortality or disabling stroke, readmission, AF, and AKI rates, though higher PPI episodes require careful patient selection.