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Ross Procedure Revisited: Evaluating its Role in Contemporary Cardiac Surgery

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In this first issue of The Journal of the Best Available Evidence in Medicine (JBAEM), Smith and Petrou provide a narrative review regarding the revival of the Ross operation for replacement of the aortic valve.[1] They discuss the current indications of this procedure, its impact on the quality of life, and the long-term survival following surgical aortic valve replacement (SAVR). For its potential advantages, the authors strongly recommend the utilisation of the Ross procedure in specific subsets of young patients undergoing SAVR. The authors stated what Ross himself used to reiterate regarding the procedure and that it is ideal for younger patients, usually for those aged less than forty.[2] Pulmonary valve auto-transplantation was introduced almost simultaneously in clinical practice by Ross in 1962 and Barratt-Boyes in 1964.[2,3] Despite the publication date, the latter also performed the first cases in 1962.[3] The Ross operation is rather technically demanding.

The figures presented by Smith and Petrou illustrate the basic techniques of the operation.[1,4] Further technical details are beyond the scope of this editorial, but we value the use of Personalized External Aortic Root Support (PEARS), which was also introduced two decades ago to treat aneurysmal aorta in Marfan Syndrome.[5] We remind readers, however, that there are no prospective comparative studies on the use of PEARS in the Ross operation. The best available evidence for its use corresponds to type B-level evidence, based on the largest reported cohort: the initial series of 200 patients treated for root aneurysmal disease across 23 centres over 15 years, with an average follow-up of just under two years.[6] Although mortality rates were low, Van Hoof et al. had their own concerns regarding potential risk to the coronary arteries.[6]

Despite recent advances in valve technology for aortic valve replacement as well as transcatheter implantation, the 2021 ESC/EACTS Guidelines for the Management of Valvular Heart Disease, acknowledge the Ross procedure as an alternative aortic valve replacement in selected patients. However, it does not carry a formal class of recommendation.[7] Specifically, the guidelines state that "In selected patients, aortic valve repair or the Ross procedure may be an alternative to valve replacement, when performed by experienced surgeons."[7] This phrasing suggests a cautious endorsement, emphasizing the importance of surgical expertise and patient selection, but it stops short of assigning a specific recommendation class.[7] More recent publications, however, suggests that Ross operation, performed in high volume centres, is associated with lower mortality and morbidity in patients below sixty years of age.[8,9] The Ross procedure offers superior long-term survival, enhanced quality of life, and excellent durability compared to mechanical, bioprosthetic, and homograft aortic valve replacements, particularly in young adults. Evidence from randomized trials and long-term follow-up supports its use in expert centres.[8-10] Hence, the authors justifiably conclude that “all patients under the age of sixty should consider the Ross procedure as an alternative to conventional aortic valve replacement.”[1]

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It is important to highlight the issues that may preclude routine use of Ross operation for SAVR in the said age group. These include lack of accessible homograft bank, ethical, legal, and financial issues related to donor homograft harvesting and procurement. Without a doubt, the lack of access to homografts excludes all considerations to perform the Ross procedure in many centres. Hence, in today's practice, despite calls to expand the utilisation of this operation, only a few centres around the world offer the Ross procedure on a routine basis.[11-13]

We thank Smith and Petrou for presenting an excellent overview of a highly specialised topic, written by experts in the field, for both specialists and non-specialists in medicine, which aligns with one of the primary aims of JBAEM.

Disclosure Statement

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AI-generated image of a statue honoring Dr. Donald Ross, pioneer of the Ross Procedure, standing beside a heart valve model at Guy's Hospital.