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Editorial

EDITORIAL

Mechanical prosthetic heart valves: here to stay!

Sofia Kassou[1] and Vassilios S. Vassiliou[2,*]

[1]Department of General Surgery, Royal Free NHS Trust, Barnet Hospital, London, UK, and [2]Norwich Medical School, University of East Anglia and Department of Cardiology, Norfolk and Norwich University Hospital, Norwich, UK

*Correspondence address. Norwich Medical School, Floor 2, Bob Champion Research and Education, Norwich NR4 7UQ, UK. Tel\Fax: 01603 592534; E-mail: v.vassiliou@uea.ac.uk

Since 1952 when Dr Hufnagel, an American cardiac surgeon at Georgetown University first used a caged ball valve in the descending thoracic aorta to treat aortic valve insufficiency [1], there have been significant advancements in mechanical valve prostheses to treat valvular disease with increasingly improving results. However, even some of the very old valves have served patients safely and effectively for many years. The long-lasting performance of such a valve is reported today in the Oxford Medical Case Reports by Jiménez Rodriguez *et al*. [2], presenting a female patient who had a Braunwald-Cutter valve implanted 43 years ago in 1974.

The patient received the Braunwald-Cutter valve in the mitral position at the age of 29 for mixed mitral valve disease associated with heart failure. Symptomatically, the patient improved significantly following the operation and had an uneventful pregnancy 2 years later. Despite other medical conditions since, which included atrial fibrillation and hairy tubular polyp for which she had total colectomy, the valve still functions very satisfactorily enabling the patient to have a good quality of life in NYHA II.

Apart from being a nice case demonstrating a successful long-term outcome, the medical historians will also find the history behind this valve interesting.

Dr Nina Braunwald studied medicine in New York and seized the opportunity to work as a postdoctoral fellow in the laboratory of Dr Hufnagel himself at Georgetown, where she completed her residency [3]. Completing her training, she was the first woman to be certified by the American Board of Cardiothoracic Surgery. Married to Eugene Braunwald, one of the most influential cardiologists of the 20th century, she then moved to the National Institute of Health in Bethesda, Maryland where Eugene was chief of cardiology and clinical director. There she followed her interest in artificial valves, initially implanting prostheses in dogs and then the first human implant in the mitral position in 1960 in a patient with mitral regurgitation [4]. Improving her original valve she then designed the Braunwald-Cutter in collaboration with the Cutter Laboratories, a cloth-covered mechanical valve aiming to reduce thrombosis, which saw use from the late 1960s.

Initially, due to lower thrombosis risk, the use of the valve expanded and was used both in the mitral but also aortic position. However, in 1979 implantation was halted due to reported events of fabric wear and poppet abrasion leading to poppet escape when placed in the aortic position [5, 6]. All patients with the valve in the aortic position were offered repeat surgery to have it replaced. For the patients with the valve in the mitral position however, It was deemed safe not to offer replacement as durability was better due to lower pressures and reduced valve velocity. Cases like the one presented in the Journal today emphasise this.

Nowadays, further evolution of medical research allows the use of both surgical mechanical and tissue prostheses as well as percutaneous transcatheter valve implantation use with good results. However, there is an ongoing research in the development of tissue engineered heart valves [7] especially for the paediatric population. Significant steps have been performed over the last two decades, based on the idea of fabricating living valves with the potential to mimic the ability of native valves to grow and regenerate, something which allows a very optimistic view to the future. Following a journey of over

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half a century, the artificial valves have evolved and improved and ongoing research will ensure they are here to stay.

CONFLICT OF INTEREST STATEMENT

None declared.

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