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## CASE REPORT

# Aortic valve surgery for native valve endocarditis in extreme obesity

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## Abstract

Surgical aortic valve replacement represents a class one indication in the setting of aortic valve endocarditis and decompensated heart failure secondary to aortic regurgitation as per the European Society of Cardiology. However, extreme obesity, whereby the body mass index (BMI) >40 kg/m<sup>2</sup>, represents a challenging cohort of patients. Performing cardiac surgery in the bariatric population is fraught with challenges pertaining to intraoperative issues of surgical access and approach. We describe the case of a 45-year-old gentleman who had previously been diagnosed with infective endocarditis of the aortic valve and with a BMI of 68.2 (228 kg). Surgical aortic valve replacement in extreme obesity is associated with deep sternal wound infection, requirement and duration of mechanical ventilation, atrial fibrillation and renal failure. The 'obesity paradox' of overweight and class I obesity (BMI <35) has demonstrated favourable long-term results compared with underweight patients or even those with normal BMI undergoing cardiac surgery.

## INTRODUCTION

Surgical aortic valve replacement represents a class one indication in the setting of aortic valve endocarditis and decompensated heart failure secondary to aortic regurgitation as per the European Society of Cardiology [1]. However, in extreme obesity, whereby the body mass index (BMI) >40 kg/m<sup>2</sup>, represents a challenging cohort of patients [2]. The concept of the 'obesity paradox' has been written extensively when considering cardiac surgery in this cohort of patients and longer term outcomes have even proven to be more favourable in this cohort of patients [3, 4]. However, favourable outcomes were only demonstrable in overweight patients or those in the class 1 obesity category [3–5]. Extreme obesity was associated with significant adverse outcomes of increased frequency of deep sternal wound infection, requirement and duration of mechanical ventilation, atrial fibrillation and renal failure [5]. Performing cardiac surgery in the bariatric population is fraught with challenges pertaining to intraoperative issues of surgical access and approach and there are numerous retrospective single centre studies demonstrating the value of minimal access procedures in overweight or obese patients [6, 7]. When considering patients with extreme obesity, the institution and maintenance of cardiopulmonary bypass also require careful pre-planning

and discussion with anaesthetic and perfusion team members [8, 9]. The postoperative management challenges pertaining to analgesia requirements, and maintaining adequate ventilation represent equally important considerations to reduce the overall morbidity associated with the surgical procedure [9]. Furthermore, weight reduction has always been strongly encouraged particularly in patients who fall within the extreme obesity category before embarking on surgical aortic valve replacement [10]. We describe a patient with extreme obesity with a BMI of >60 who required urgent surgical aortic valve replacement for infective endocarditis. This case represents one of the largest patients to undergo this procedure with a successful outcome.

## CASE DISCUSSION

We describe the case of a 45-year-old gentleman who had previously been diagnosed with infective endocarditis of the aortic valve and managed medically 3 years before his index surgical admission. He had been left with severe aortic regurgitation following the procedure and been seen in the outpatient clinic where surgical intervention was not advised given his extreme obesity and ensuing prohibitive surgical risk. Subsequently, a few years following the initial assessment, he was admitted to another hospital with fever, feeling unwell with

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lethargy and increasing dyspnoea. His co-morbidities only included extreme obesity. He had been commenced on antibiotic therapy. He had developed new onset atrial fibrillation during inpatient admission. Due to his recent deterioration and suspected infective endocarditis and decompensated valvular heart failure, he was referred across to the tertiary hospital for inpatient cardiac surgery. He was in the extreme obese category with a weight of 228 kg and a calculated BMI of 68.2. Transthoracic echocardiography had demonstrated severe aortic regurgitation with dilated left ventricular dimensions and impaired function though the images were suboptimal due to body habitus. Because the patient still demonstrating evidence of sepsis, decompensated valvular heart failure, atrial fibrillation with rapid ventricular response and oxygen dependency and NYHA class IV dyspnoeic symptoms, the patient was consented for high-risk surgery. The body habitus of the patient precluded thorough investigations of his coronary arteries.

Preoperative considerations included the planning of the theatre operating table accommodated bariatric patients and additional attachments were necessary due to the size of the patient. Following discussion with the patient, a bioprosthesis was stated as the desired preference. Perfusion input was sought for institution and management of cardiopulmonary bypass including number of oxygenators, size of cannula, priming volume and flow rates. Intraoperative transoesophageal echocardiography confirmed severe aortic regurgitation and demonstrated severe tricuspid regurgitation with a dilated annulus of 4.2 cm. Operative findings were that of a tricuspid aortic valve with a perforated right coronary cusp and torn non coronary cusp with some old vegetations. Aortic valve replacement with a bioprosthesis (27 mm Perimount) and tricuspid valve repair (30 mm Triad annuloplasty ring) was performed. Patient came off cardiopulmonary bypass uneventfully and returned to the intensive care unit in a stable condition and was extubated on the evening of his operation. He progressed well and was returned to the ward the following day. His postoperative recovery was complicated by recurrence of atrial fibrillation and reexploration for cardiac tamponade. He was eventually discharged home on the 17th post-operative day.

## DISCUSSION

Surgical aortic valve replacement in extreme obesity (BMI > 40) is associated with adverse outcomes of deep sternal wound infection, requirement and duration of mechanical ventilation, atrial fibrillation and renal failure [5]. The 'obesity paradox' of overweight and class I obesity (BMI <35) has demonstrated favourable long-term results compared with underweight patients or even those with normal BMI undergoing cardiac surgery [3–5]. The size of this patient who weighed 228 kg and had a BMI of 68.2 represents a significant challenge to all

members of the theatre team and has not been described previously. In this case there was a clear operative indication for intervention; however, the extreme obesity and high-risk nature of the surgery required careful consideration and preplanning before surgery. Minimal access aortic valve replacement has been successfully performed with low morbidity in patients with obesity that requires aortic valve replacement [6, 7]. However, any type of aortic valve replacement in the setting of extreme obesity has not been successfully described using minimal access surgical aortic valve replacement approaches but has been described via unconventional transcatheter interventional routes in patients who cannot undergo traditional transfemoral, transapical or transaortic approaches [11]. We have demonstrated that surgical aortic valve replacement can be performed in the setting of extreme obesity in a patient with the heaviest weight and largest BMI recorded successfully and without significant morbidity. Limitations do exist pertaining to follow-up through transthoracic echocardiography and eventual requirement for reintervention on the aortic valve bioprosthesis.

## CONFLICT OF INTEREST STATEMENT

None declared.

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