

Supplementary material

Table S1. Definitions

		Survey definitions
Cardiac anatomy		
Root dimension	Small 100-125% of normal >125% of normal	<p>Root dimension The annulus is normal or at least big enough to allow the insertion of a conventional AVR without causing patient-prosthesis mismatch (PPM). The aorta above the annulus up to the level of the sino-tubular junction is abnormal.</p> <p>Small root: TAVI may be contraindicated as a small root is associated with low coronary arteries. Ozaki may require technical modifications.</p> <p>Large root: Ozaki may be contraindicated. Ross may require technical modifications (interposition tube or externally supported root). AVR can be done as part of the root replacement if clinically indicated</p>
Annulus dimension	Small Large	<p>Annulus dimension Assume pulmonary valve (PV) is normal in size.</p> <p>Small annulus: Conventional AVR would result in severe patient-prosthesis mismatch (PPM) without annular enlargement. Ross would require a Konno or mini-Konno incision (fibrous annulus only).</p> <p>Large annulus: A Ross is technically possible only with AV annular reduction. Contraindication to Ozaki/TAVI if annulus is outside the treatable range (i.e. sizes and devices not available in bigger sizes).</p>
Small left ventricular outflow tract (LVOT) dimension		<p>Left ventricular outflow tract (LVOT) dimension Normal LVOT: LVOT is not a factor in valve choice.</p> <p>Small LVOT: There is tunnel-like obstruction which needs fixing by Konno-type surgery in addition to valve replacement</p>
Size discrepancy between aortic valve (AV) and pulmonary valve (PV)	AV < PV AV > PV	<p>Size discrepancy between aortic valve (AV) and pulmonary valve (PV) If size discrepancy is significant annular reduction or enlargement is needed for Ross, but Ross is technically feasible.</p>
Left anterior descending artery (LAD) crosses the		Left anterior descending artery (LAD) crosses the right ventricular outflow tract (RVOT)

	Survey definitions
right ventricular outflow tract (RVOT)	<i>The autograft cannot be safely lifted for Ross</i>
Pulmonary valve (PV) dysfunction Bicuspid but otherwise fully functional Preoperative mild regurgitation Preoperative mild stenosis Intraoperatively PV is thin looking with fenestrations, dysplastic or doming	Pulmonary valve (PV) dysfunction Bicuspid but otherwise fully functional Preoperative mild regurgitation Preoperative mild stenosis Intraoperatively PV is thin looking with fenestrations, dysplastic or doming
Bicuspid aortic valve (AV) without symptomatic connective tissue phenotype or high-risk genotype	Bicuspid aortic valve without symptomatic connective tissue phenotype or high-risk genotype <i>Both Ross and Ozaki possible</i>
Aneurysm of the ascending aorta	Aneurysm of the ascending aorta <i>The root is within reasonable limits, the abnormal dilatation of the aorta is in the ascending part, above the root. Ozaki and TAVI may have relative contraindications if the sino-tubular junction is borderline dilated.</i>
Presentation	
Aortic stenosis (dominant lesion)	Aortic stenosis (dominant lesion)
Aortic regurgitation (dominant lesion)	Aortic regurgitation (dominant lesion)
Emergency presentation	<i>The operation has to be performed within 24 hrs.</i>
Left ventricular function	Good (>55%) Moderate (35-55%) Poor (<35%)
High thromboembolic risk	Thromboembolic risk (history of embolism, clotting disorder, poor compliance with anti-thrombotic medication)

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High bleeding risk	Bleeding risk (any history of severe bleeding, bleeding disorder, end-organ lesion prone to bleeding, e.g brain aneurysm, severe inflammatory bowel disease)
Surgical risk	Low (EuroSCORE II 0-3%) Medium (EuroSCORE II 3-6%) High (EuroSCORE II >6%)
Active endocarditis	Active endocarditis
Aortopathy No connective tissue weakness Severe (e.g. Marfan, Ehler-Danlos, etc.)	Mild/moderate (bicuspid aortopathy without evidence of connective tissue weakness) Severe (syndromic / severe connective tissue disease, e.g. Marfan, Ehler-Danlos, Loeys-Dietz or malignant connective tissue mutations)
Previous sternotomy	Previous sternotomy
Previous thoracic radiotherapy	Previous thoracic radiotherapy (everything looks reasonable when opening the chest)
Cardiac comorbidities	
Mitral valve (MV) disease which requires surgery as a secondary indication MV amenable to repair MV needs replacement	Moderate or severe mitral valve (MV) disease which requires surgery as a secondary indication MV amenable to repair MV needs replacement
Tricuspid valve (TV) disease which requires surgery as a secondary indication TV amenable to repair TV needs replacement	Moderate or severe tricuspid valve (TV) disease which requires surgery as a secondary indication TV amenable to repair TV needs replacement

	Survey definitions
History of endocarditis (aortic valve affected, pulmonary valve not affected, no active infection)	History of endocarditis (AV affected, PV not affected, no active infection)
History of rheumatic heart disease PV looks abnormal on echo PV looks normal on echo and intraoperatively	History of rheumatic heart disease PV looks abnormal on echo PV looks normal on echo and intraoperatively
Needs revascularisation Coronary artery bypass grafting (CABG) Percutaneous coronary intervention (PCI) Either CABG or PCI	Patient requires revascularisation for coronary artery disease Coronary artery bypass grafting (CABG) Percutaneous coronary intervention (PCI) Either CABG or PCI
Non-cardiac comorbidities	
Pulmonary hypertension (systolic PA pressure >60mm Hg)	Pulmonary hypertension (systolic PA pressure >60mm Hg)
Poorly controlled hypertension	Poorly controlled hypertension <i>Medically resistant forms or poor compliance with medication.</i>
Significant lung disease	Severe lung disease (AV surgery possible but a long operation ideally avoided)
Significant liver disease	Significant liver disease <i>Clinical and laboratory evidence of severe coagulopathy, liver dysfunction or consideration of future liver transplant</i>
Significant kidney disease	Significant renal disease <i>Clinical and laboratory evidence of significant kidney dysfunction, need for dialysis or consideration of future kidney transplant</i>
Diabetes Uncomplicated	Diabetes <i>Complicated if accompanied by microvascular</i>

		Survey definitions
Complicated (life expectancy <10 years)		<i>disease, arteriopathy, ulcers, amputation, reduced mobility, life expectancy less than 10 years.</i>
Stroke	Minor, resolved Major, sequelae present and reduce mobility	History of stroke/transient ischaemic attack Minor, resolved Major, sequelae present and reduce mobility
History of cancer (life expectancy less than 5 years)		History of cancer (life expectancy less than 5 years)
Body mass index	Low (<18 kg/m ²) High (>30 kg/m ²)	Body mass index
Anorexia or intestinal absorption disorder		Anorexia or intestinal absorption disorder <i>The patient is not cachectic or severely frail and a longer operation is possible. Intestinal problems suggest unpredictable absorption of warfarin and other nutrients which may affect INR stability.</i>
Frailty	Moderate Severe	Frailty (defined using accepted criteria) Moderate (a long operation possible) Severe (a long operation ideally avoided)
Comorbidities that influence adherence to medication		Comorbidities that influence adherence to medication <i>For example, cognitive impairment, psychosis, severe anxiety or depression.</i>
Concurrent medications and treatments		
Already on anticoagulation	With warfarin With novel oral anticoagulant (NOAC) or antiplatelet therapy	Already on anticoagulation With warfarin (e.g. mechanical mitral valve) With novel oral anticoagulant (NOAC) (e.g. atrial fibrillation with moderate risk) or antiplatelet therapy

		Survey definitions
Chemotherapy (current or within the last 6 months)		Chemotherapy (current or within the last 6 months) <i>Life expectancy is more than 5 years.</i>
Radiotherapy (current or within the last 6 months)		Radiotherapy (current or within the last 6 months) <i>Life expectancy is more than 5 years.</i>
High dose oral steroids as replacement therapy		Oral steroids <i>High dose, at a level that requires perioperative replacement and raises some concerns about wound healing.</i>
Lifestyle		
Physical activity	Sedentary with minimal activity Moderate to highly active Highly active (amateur or professional athlete)	Physical activity Inactive (sedentary lifestyle with minimal activity) Moderate to highly active (engages in and values regular activities, some of which can be strenuous) Athlete (pursues strenuous activities at amateur or professional level)
Heavy drinking (exceeds recommended safe limits guidelines)		Heavy drinking (exceeds recommended safe limits guidelines) and unwilling or unable to restrict alcohol intake
Reduced mobility (e.g. wheelchair bound, Parkinson's disease)		Reduced mobility (e.g. wheelchair bound, Parkinson's disease)
Working or living in a remote area with no easy access to healthcare		Working or living in a remote area with no easy access to healthcare
Patient considered unlikely to comply with anticoagulant medication		Patient considered unlikely to comply with anticoagulant medication (e.g. mental health problems, homelessness) or refuses it

	Survey definitions
Women of childbearing age	<p>Currently considering pregnancy</p> <p>Considering pregnancy in the future</p> <p>Does not wish to have children</p>
Personal preference	Women of childbearing age (16-year old to menopause)
Thinks mechanical valve sound will be disturbing	Currently considering pregnancy
Prefers not to have further surgical intervention	Considering pregnancy in the future
Prefers not to have warfarin anticoagulation	Does not wish to have children
Prefers a small surgical incision for cosmetic reasons	
Refuses transfusion on religious grounds	