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Frequency of Ascending Aorta Replacement: A Description of 105 Patients with Bicuspid Aortic Valve undergoing Aortic Valve replacement

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Background: It has been well documented that patients with a congenital bicuspid aortic valve suffer from earlier valve dysfunction and abnormalities of the ascending aorta, frequently requiring aortic valve replacement and some requiring replacement of the ascending aorta. There have been a few reports with variable data on the frequency of aortic complications, including dilation, aneurysm and dissection, at the time of surgery. Whether or not to replace the ascending aorta at the time of AVR is certainly influenced by the presence of these aortic complications but there is no clear evidence to suggest at a definitive marker. With more evidence that increasing aortic size leads to increased rate of rupture and dissection, in addition to recent evidence that suggests that ascending aorta dilation continues after AVR, it is questionable whether or not this has affected the rate of ascending aorta replacement at the time of AVR.

Objectives: (1) To assess the frequency of aortic abnormalities in bicuspid aortic valve patients at the time of aortic valve replacement, (2) identify the predictors for ascending aortic complications and ascending aortic replacement in bicuspid aortic valve patients undergoing aortic valve replacement and (3) describe the clinical and echocardiographic characteristics of patients with bicuspid aortic valve requiring aortic valve replacement.

Methods: With permission from the IRB, we retrospectively searched all echocardiographic and transcription reports from 1995-2002 for patients with a bicuspid aortic valve. Of these patients, we identified 105 patients that had undergone an aortic valve replacement and had sufficient echocardiographic evidence of a BAV. Trans-esophageal and trans-thoracic echocardiograms were reviewed, data was gathered on the dimensions of the ascending aorta and valve function. Medical records were reviewed for information on the patients' past medical history, operative reports were reviewed to verify intra-operative assessment of aortic valve morphology.

Results: The majority of our patient population was male, 83.8%. The average age at the time of surgery was 53.2. Of the 105 patients in our study, 28 (27.2%) had the ascending aorta replaced in addition to the aortic valve replacement. Aortic dilation was considered to be 4.2 cm or greater for males and 3.6 cm or greater for females; 36.3% of the total population had aortic dilation, 33.7% of males and 50% of females. In terms of valve function, 48.5% of the population had aortic stenosis; of the males 45.3% had aortic stenosis and of the females 64.7% had aortic stenosis. Aortic insufficiency was present in 34 % of the population, 37.2% of the males and 17.6% of the females. 12.6 % of the population had both aortic stenosis and aortic insufficiency and 6% had normal functioning aortic valves.

Conclusion: Compared to previously reported ascending aorta replacement rates of 17%, the rate of replacement at our institution was higher at 27.2%. The rates of ascending aorta dilation and valve function abnormalities were very similar to previously reported frequencies. With evidence to suggest that rates of aortic rupture and dissection are greater than previously expected in patients with dilated ascending aortas, we would expect to see an even greater increase in the replacement of the ascending aorta with AVR. In addition, studies that suggest aortic dilation continues after AVR may also influence an increase in this frequency as well.