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### Mortality from Aortic Stenosis Across the Spectrum of Severity: Analysis of Big Data from the National Echo Database of Australia



G. Strange<sup>1,\*</sup>, S. Stewart<sup>2</sup>, D. Celermajer<sup>3</sup>, T. Marwick<sup>4</sup>, G. Scalia<sup>5</sup>, D. Prior<sup>6</sup>, M. Ilton<sup>7</sup>, D. Playford<sup>1</sup>

<sup>1</sup> University Of Notre Dame, Fremantle, Perth, Australia

<sup>2</sup> Queen Elizabeth HOspital, Adelaide, Australia

<sup>3</sup> University of Sydney, Sydney, Australia

<sup>4</sup> Baker IDI, Melbourne, Australia

<sup>5</sup> The Prince Charles Hospital, Brisbane, Australia

<sup>6</sup> University of Melbourne, Melbourne, Australia

<sup>7</sup> Royal Darwin Hospital, Darwin, Australia

**Background:** Echocardiogram (echo) is pivotal in evaluating aortic stenosis. We evaluated mortality with aortic stenosis in a large cohort, matched with mortality.

**Methods:** Using the National Echo Database of Australia (>530,000 echos) linked with National Death Index, survival was determined from the last recorded echo to census in October 2017. Data were available from 352,844 individuals (186,820 men, mean age  $60.8 \pm 18.0$  years; 166,024 women, mean age  $60.9 \pm 19.2$  years) with a mean follow-up of 5.4 years.

**Results:** Peak aortic valve velocity (AVvel) was recorded in 278,955 patients, demonstrating a J-shaped mortality pattern with highest age- and sex-adjusted risk profile in those individuals ( $n = 52,010$ ) in the upper quintile ( $>1.8$  ms and mean aortic gradient of 13 mmHg; hazard ratio 1.29 [95% confidence interval 1.25–1.32];  $p < 0.001$ ) relative to the lowest quintile. One- and 5-year mortality was 5.0% and 14.9% in the lowest vs 9.2% and 28.1% in the highest ( $p < 0.0001$ ) quintile, respectively. The upper quintile was then further examined for survival against increasing gradients ( $n = 44,340$ ). Adjusting for age, sex and ejection fraction, the long-term mortality risk (up to 15 years) plateaued at a mean gradient  $\geq 30.9 \pm 1.3$  mmHg (AVvel  $>3.71 \pm 0.26$  ms), with an adjusted hazard ratio of 0.94 (95% confidence interval 0.82–1.08;  $p = 0.4$ ) compared with the highest quintile of that group (mean gradient  $59.9 \pm 9.4$  mmHg, AVvel =  $4.96 \pm 0.47$  ms). One- and 5-year mortality were similar for those with mean gradient 20–30 mmHg (10.9% and 32.6%, respectively), 30–40 mmHg (11.8% and 33.0%, respectively), and  $>40$  mmHg (13.7% and 34.5%, respectively).

**Conclusion:** Aortic stenosis is associated with significant mortality across the spectrum of severity, including mild disease. There is no discernible difference in survival between 'moderate' and 'severe' aortic stenosis.

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### Mortality from Left Atrial Enlargement Based on Method of Measurement: Analysis of Big Data from the National Echo Database of Australia



C. Murphy<sup>1,\*</sup>, D. Playford<sup>2</sup>, S. Stewart<sup>3</sup>, D. Celermajer<sup>4</sup>, T. Marwick<sup>5</sup>, G. Strange<sup>6</sup>

<sup>1</sup> Mount Hospital, Perth, Australia

<sup>2</sup> University of Notre Dame, Fremantle, Australia

<sup>3</sup> University of Adelaide, Adelaide, Australia

<sup>4</sup> University of Sydney, Sydney, Australia

<sup>5</sup> Baker IDI Heart and Diabetes Institute, Melbourne, Australia

<sup>6</sup> University of Notre Dame, Sydney, Australia

**Background:** There are multiple echocardiographic (echo) methods of measuring left atrial size; however, these have not been directly compared in a large patient cohort, matched with mortality data.

**Methods:** The National Echo Database of Australia is a vendor-agnostic cloud-based database, containing echo measurement data (1997–2017) from laboratories ( $n = 10$ ) across Australia. Data linkage to the National Death Index provided survival status on each individual from the last recorded echo to the census in October 2017.

**Results:** Left atrial volume indexed to body surface area (LAVI) and two-dimensional parasternal left atrial dimension was recorded in 161,489 and 85,298 patients, respectively. Four-chamber and two-chamber left atrial area measurements were available in 26,315 and 6,528 patients, respectively. Corresponding four-chamber (and two-chamber atrial length was available in 19,609 and 5,857 patients, respectively. Each measurement demonstrated a J-shaped mortality pattern, with LAVI showing the strongest association with survival risk. Excluding the lowest LAVI quintile ( $<22$  mL/m<sup>2</sup>, to correct for J-shaped mortality profile), analysis of each decile identified an increase in mortality risk beginning with the LAVI decile of 29–31 mL/m<sup>2</sup> ( $p < 0.0001$  for each decile).

**Conclusion:** Increased left atrium size is strongly associated with mortality above a size threshold. Left atrial volume index appears to be the most robust predictor of mortality, increasing in a predictable fashion when LAVI  $>29$  mL/m<sup>2</sup>.

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