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RESEARCH LETTER

Expansion of Transcatheter Aortic Valve Implantation and Mortality due to Aortic Stenosis Between 2010 and 2019

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Aortic stenosis (AS) accounts for the greatest number of deaths from valvular heart disease in high-income countries.[1] The introduction of transcatheter aortic valve implantation (TAVI) provided a treatment option for inoperable patients, improved access to treatment across the spectrum of risk, raised awareness for AS, and fueled strategies for timely intervention. We investigated the effect of expansion of TAVI on mortality due to AS at a population level in high-income countries.

Mortality estimates were retrieved from the Global Burden of Disease Study 2019 for individuals ≥65 years of age.[2,3] Age-adjusted mortality rates are standardized to the 2000 US standard population. Penetration of TAVI was quantified based on data from BIBA MedTech Insights for 21 high-income countries (Figure [A]). Subgroup analyses were performed by age groups and sex. Trends were tested based on the join point regression technique, using the Joinpoint Trend Analysis Software 4.9.1.0, considering a 2-sided $P<0.05$ as statistically significant.[4,5] Annual percentage changes (APC) are reported with 95% CIs. Correlation was assessed using bivariate Pearson correlation. The data underlying this article is available on reasonable request.

The annual number of TAVI per 100 000 individuals ≥65 years of age significantly increased from 24.0 per 100 000 individuals in 2014 to 78.6 per 100 000 individuals in 2019 (APC, 26.1 [95% CI, 18.1–34.5]; Figure [B]). Age-adjusted all-cause mortality among individuals ≥65 years of age decreased from 4060.1 in 2010 to 3800.4 per 100 000 individuals in 2017 (APC, −0.9 [95% CI, −1.1 to −0.8]) and remained stable thereafter. Age-adjusted mortality due to AS among individuals ≥65 years of age increased from 41.6 in 2010 to 43.4 per 100 000 individuals in 2015 (APC, 0.7 [95% CI, 0.2–1.3]), before declining to 41.5 per 100 000 individuals in 2019 (APC, −1.3 [95% CI, −2.0 to −0.5]; Figure [C]). A decline in mortality between 2015 and 2019 was consistent across subgroups of age (starting from age 70 years) and sex. Age-adjusted mortality among women decreased from 41.4 in 2015 to 39.6 per 100 000 individuals in 2019 (APC, −1.1 [95% CI, −1.6 to −0.5]), and decreased among men from 45.5 in 2015 to 43.6 per 100 000 individuals in 2019 (APC, −1.2 [95% CI, −1.8 to −0.6]). For individual countries, there was a significant inverse correlation of age-adjusted mortality in 2019 and the average annual percentage change in TAVI rates between 2010 and 2019 ($P=0.028$; Figure [D]).

In an analysis of 21 high-income countries, the number of TAVI procedures more than tripled between 2014 and 2019. Increasing penetration of TAVI was paralleled by a decline in age-adjusted mortality due to AS in individuals aged ≥65 years, and countries with a greater adoption of TAVI had a lower age-adjusted mortality due to AS in elderly individuals. These observations suggest

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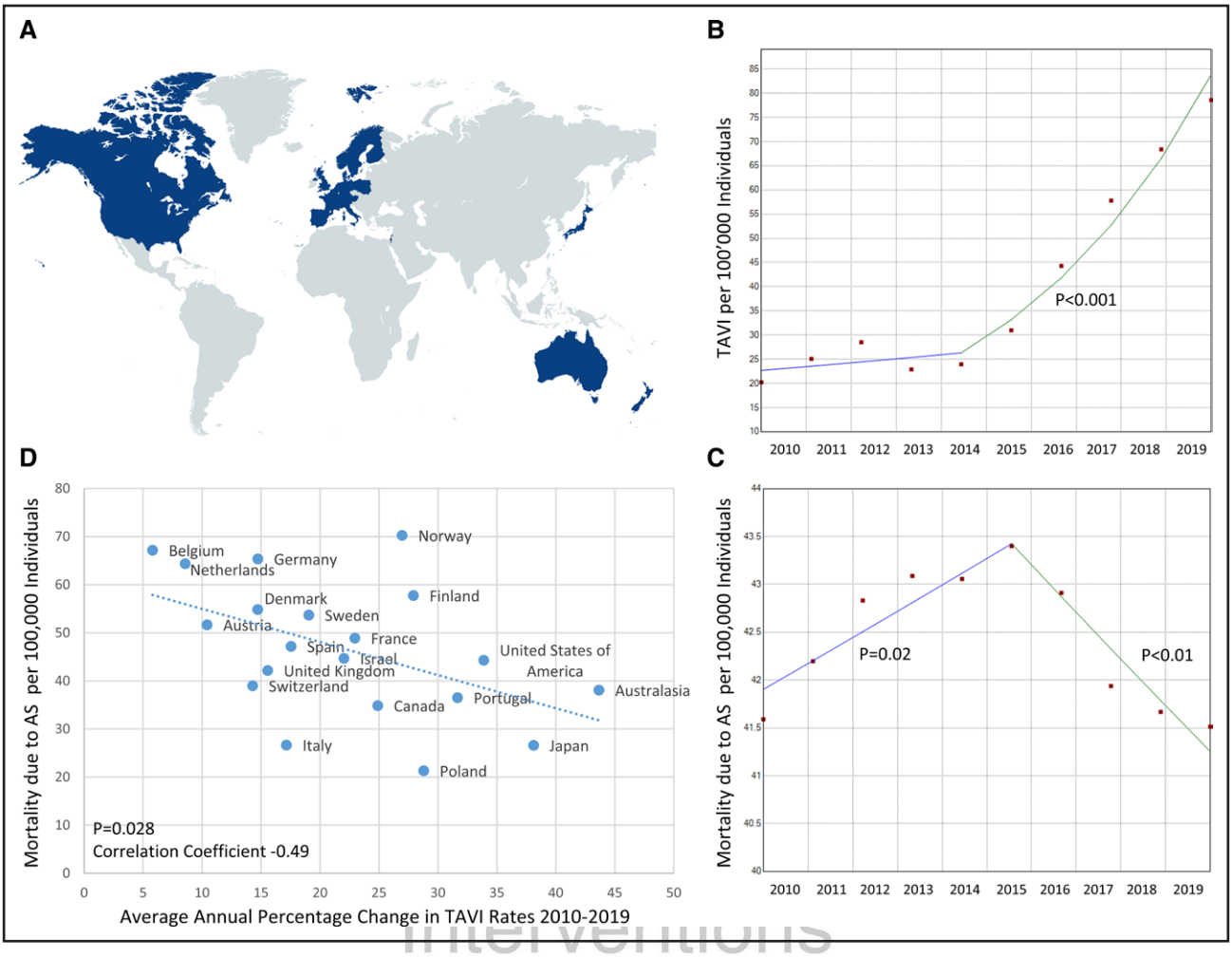

Figure. Expansion of transcatheter aortic valve implantation (TAVI) and mortality due to aortic stenosis (AS) between 2010 and 2019.

A, Twenty-one high-income countries from 4 continents 2010–2019: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States. Source of mortality estimates: Institute for Health Metrics and Evaluation. Used with permission. All rights reserved. TAVI rates for 2010–2012 were available for 14 countries only. Source: BIBA MedTech Insights. **B**, Numbers of TAVI per 100 000 individuals ≥65 y between 2010 and 2019. Lines reflect trends, and squares reflect observed rates. **C**, Age-adjusted mortality due to AS in individuals ≥65 y of age. Lines reflect trends, and squares reflect observed rates. **D**, Age-adjusted mortality due to aortic stenosis in 2019 and average annual percentage change in TAVI rates between 2010 and 2019 for individual countries.

that the diffusion of TAVI favorably affected mortality in elderly patients with AS. Reduction of geographic and demographic variability in TAVI utilization may further decrease mortality due to AS.

ARTICLE INFORMATION

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