# The inner diameter of the prosthetic aortic valve, an additional factor in achieving better hemodynamic parameters after surgical aortic valve replacement

**Tomo Svaguša[1]*, Dubravka Šušnjar[1], Stjepan Cvetković[2], Matija Drinković[2], Grgur Dulić[2]**

[1]Dubrava University Hospital, Zagreb, Croatia
[2]University Hospital Centre Osijek, Osijek, Croatia

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***ADDRESS FOR CORRESPONDENCE**: Tomo Svaguša, Klinička bolnica Dubrava, Av. Gojka Šuška 6, HR-10000 Zagreb, Croatia. / Phone: +385-98-537-133 / E-mail: svagusa.tomo@gmail.com

**ORCID:** Tomo Svaguša, https://orcid.org/0000-0002-2036-1239 • Dubravka Šušnjar, https://orcid.org/0000-0002-9644-9739 Matija Drinković, https://orcid.org/0009-0002-5442-3247 • Grgur Dulić, https://orcid.org/0000-0002-7300-0840

In patients with an implanted aortic valve, the importance of obtaining the maximum values of velocity and flow over the valve is extremely important to obtain adequate data on hemodynamics. However, the variability between the obtained values of ultrasound measurements in the same patients and among different ultrasound specialists has been known for a long time. Also, differences in hemodynamics between different manufacturers of heart valves are known, with a note that the larger the valve, the more favorable the hemodynamic effect on the valve is. By measuring the average internal diameter (ID) of the biological aortic valve in comparison with the body surface area (BSA) and the body mass index (BMI), an adequate instrument can be obtained for the comparison of different cardiac surgical centers. ID could also be a parameter that would allow us to compare different manufacturers of prosthetic aortic valves.[1,2] The aim is to show the results of one center over a year, the average ID of the aortic valve and its relationship with body surface area and body mass index.

**TABLE 1. Patient data.**

| | |
|---|---|
| N | 54 |
| MALE | 35 |
| AGE (year) | 68.07 ± 7.10 |
| HEIGHT (cm) | 167.68 ± 9.59 |
| MASS (kg) | 81.58 ± 15.41 |
| BSA ($m^2$) | 1.94 ± 0.21 |
| BMI ($kg/m^2$) | 29 ± 4.77 |
| INTERNAL DIAMETER (mm) | 21.4 ± 1.87 |
| INTERNAL DIAMETER/BSA ($mm/m^2$) | 11.13 ± 0.89 |
| INTERNAL DIAMETER/BMI ($mm/kg/m^2$) | 0.76 ± 0.12 |

BSA = body surface area, BMI = body mass index

The study included patients from University Hospital Centre Osijek, who were treated for severe isolated aortic valve stenosis from January to December 2022, and who have had a biological aortic valve implanted. Patients who had dilatation of the ascending part of the aorta, who had an implanted mechanical aortic valve, and who had significant aortic regurgitation in addition to aortic stenosis were excluded from data analysis. For adequate assessment and comparison with other centers, the average UP is expressed in relation to body surface area and body mass index. Patient's data and measured values are shown in **Table 1**. Data are shown as average ± standard deviation. The presence of a bicuspid aortic valve, the left ventricular ejection fraction, and the presence of postoperative aortic regurgitation were not examined in the presentation of the results. The above should be examined in more detail in future research.

Due to the different sizes of biological aortic valves used in clinical practice, we believe that the average internal diameter of the valve (the part through which blood passes) indexed by body surface area or body mass index would be adequate data for comparing different types of aortic valves. Also, it could become one of the parameters for comparison with different cardiac surgery centers.

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## LITERATURE

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