Odabir pacijenata za implantaciju TAVI – optimalno mjerenje anulusa aortne valvule

Selection patients for TAVI – optimal measurement of aortic valve annulus

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Uvod. U odabiru bolesnika za transkatetersku implantaciju aortne valvule (TAVI), jedno od najvažnijih mjerenja je veličina anulusa aortne valvule koja dalje određuje tip i veličinu proteze, ključne odrednice za uspješnost zahvata.[1] Cilj studije je usporediti točnost različitih ehokardiografskih metoda u usporedbi sa CT-om u mjerenju anulusa aortne valvule.

Metode i rezultati. Analizirana su 24 uzastopna bolesnika kojima je učinjena uspješna implantacija CoreValve u Kliničkom bolničkom centru Zagreb. Odabir veličine proteze temeljio se na CT mjerenjima anulusa aortne valvule (prosječni promjer i perimetar). Prije zahvata, bolesnicima je učinjena transtorakalna ehokardiografija (TTE) te 2D transezofagusni ultrazvuk srca (TEE) (osim jednoj bolesnici kod koje je postojala kontraindikacija za pretragu). 3D TEE je učinjen u 13 bolesnika. Podaci su analizirani retrospektivno, ispitivaču nije bila poznata veličina implantirane valvule. Promjer anulusa je mjeren iz parasternalnog 2D TTE prikaza, iz 2D TEE (120°), te iz 3D višekutnih prikaza. Također je 3D TEE-om mjeren perimetar anulusa. U 4 bolesnika odabir zalistka prilikom implantacije nije bio u skladu sa CT mjerenjima. U usporedbi sa CT-om, samo 9/24 (37,5 %) bolesnika su točno izmjereni pomoću 2D TTE, kod ostalih 15 (62,5 %) su mjerenja podcijenila veličinu proteze. Za 2D TEE, 11/23 (47,8 %) mjerenja su bila u skladu sa CT-om, 10 (43,5 %) podcijenjenih, a 2 (8,7 %) precijenjena. 3D TEE je u usporedbi sa CT-om bio točan u procjeni 10/13 (76,9 %) bolesnika, kod 1 (7,7%) su 3D mjerenja podcijenila, a u 2 (15,4%) precijenila veličinu implantirane valvule. Većini bolesnika implantirane su CoreValve veličine 26 (n=13) i 29 (n=7) – usporedna mjerenja prikazana su u **tablici 1**. 2D TTE i TEE generalno podcjenjuju veličinu anulusa u usporedbi sa CT-om za 1-3 mm. 3D TEE mjerenja se razlikuju od CT-a za <0,5 mm.

Zaključak. CT i 3D TEE su se pokazali točnima u preciznom mjerenju geometrije anulusa aortne valvule. Pomoću ovih mjerenja, za razliku od 2D TTE i TEE, osobito kada se nadopunjuju, moguće je točno odrediti veličinu valvule, nadilazeći zamke u procjeni kada je annulus ovalan, nepravilnog oblika ili izrazito kalcificiran.

Background. In selection patients for transcatheter aortic valve implantation (TAVI), one of the most important measurements is aortic annulus dimension for optimal valve type selection and sizing, being crucial for the procedure success.[1] The aim of the study is to validate different echocardiography tools versus CT for aortic annulus measurement.

Methods and Results. 24 consecutive patients who underwent successful CoreValve implantation in University Hospital Center Zagreb were enrolled. Selection of valve dimension was based on CT measurements of aortic annulus (mean diameter and perimeter). All patients underwent transthoracic echocardiography (TTE) prior procedure. 2D transesophageal (TOE) echo was performed in all but one patient (due to contraindications), and 3D TOE in 13 pts. Data was analyzed retrospectively, investigator being blinded for the implanted valve size. Annulus diameter was measured from 2D TTE parasternal view, 2D TOE (120°) and 3D multiplane views. 3D TOE perimeter derived annulus diameter was also obtained. 4 CT examinations were incongruent with the implanted valve size. Compared to CT measurements, only 9/24 (37.5%) pts were correctly measured by 2D TTE and 15 pts (62.5%) were undersized. For 2D TOE compared to CT, 11/23 (47.8%) measurements were correct, 10 (43.5%) undersized and 2 (8.7%) oversized. 3D TOE compared to CT was correct in 10/13 (76.9%) pts, 1 (7.7%) being undersized, and 2 (15.4%) oversized. The majority of patients were implanted CoreValve size 26 (13 pts) and 29 (7 pts) – multimodality measurements are shown in **Table 1**. 2D TTE and TOE underestimate annulus size compared to CT for 1-3mm. 3D TOE measurements differ from CT for <0.5mm.

Conclusion. CT, as well as 3D TOE have been shown to provide more accurate aortic annulus geometric measurements. Unlike 2D TTE and TOE they, especially combined, can estimate correct valve size and overstep pitfalls, even when aortic annulus is oval shaped, irregular or severely calcified.

TABLE 1. Comparation of the multimodality measurements of aortic annulus dimensions for two most used CoreValve sizes (26 and 29)

	CT	3D TOE	2D TOE	2D TTE
CoreValve 26				
Mean annulus diameter	22.1	21.5	20.91	20.4
Perimetry derived diameter	22.2	22.6		
CoreValve 29				
Mean annulus diameter	**24.1**	**23.7**	**21.6**	**21.4**
Perimetry derived diameter	24.6	26.6		

LITERATURE

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