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Topic 2: Valvular diseases, prostheses, endocarditis

Thursday, June 13, 2019 — 10h00—11h00

Poster n°1

Improvement of the PISA method in the setting of mitral regurgitation of complex geometry

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Introduction Doppler echocardiographic methods, such as proximal isovelocity surface area (PISA) are used to quantify mitral regurgitations (MR). However, their accuracy and reproducibility are still discussed, especially in case of MR of complex geometry. The aim of this study was to test in-vitro the accuracy of the PISA method depending on the shape and number of regurgitant flows.

Method Several regurgitant volumes (RV) were produced through various regurgitation severities and shapes in a left heart double activation simulator. Central and oblong MR were performed by suturing the extremity of a bioprosthesis leaflet to the annulus. Multiple jets regurgitation was performed by suturing centrally the two leaflets of an anatomically shaped mitral valve made of hydrogel. A transesophageal echocardiography probe was used to acquire the data. The RV was calculated with the classical PISA method (hemispheric assumption), or by considering the PISA as a hemicylinder or a double hemisphere. It was then compared to a reference value obtained from an electromagnetic flowmeter measurement (accuracy $\pm$ 2 ml/min).

Results For a central jet, the hemispheric assumption best estimated the RV (bias -3.5 ± 14.8 ml, $P = 0.10$). Oblong MR was underestimated with hemispheric assumption (-18.3 ± 14.9 ml, $P < 0.01$) whereas hemicylindrical assumption was more accurate (-0.2 ± 5.8 ml, $P = 0.85$). In case of 2 regurgitant jets, considering only the largest jet led to an important underestimation (-10.9 ± 5.6 ml, $P < 0.01$), whereas adding the two RV was more accurate (-1.2 ± 8.2 ml, $P = 0.50$).

Conclusion In case of a single central orifice, the hemispheric assumption correctly quantified the MR. In case of an oblong orifice, the hemicylindrical assumption provided a good quantification with simple measurements. In case of multiple jets of different sizes, it was more accurate to consider both jets for RV calculation.

Disclosure of interest The authors have not supplied their declaration of competing interest.

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Poster n°2

Natural history and outcome of adults with bicuspid aortic valve: A middle-aged French cohort of 541 patients

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Introduction No data are available on the natural history and outcomes of middle-aged European patients with bicuspid aortic valve (BAV), as the only 2 large studies were conducted on young adults in Canada and north America. We aim to determine the frequency of cardiovascular events and to assess the survival relative to that of the general population in a large consecutive series of adults diagnosed with BAV in our echocardiographic laboratory according to the presence or the absence of a valvular and/or vascular surgical indication at the time of diagnosis.

Method Between 2005 and 2017, 350 patients without surgical indication (medical group, mean age 53 years, 71% of men) and 191 patients with surgical indication (surgical group, mean age 59, 71% of men) at baseline have been included. Median follow-up was 80 [32—115] months.

Results In the medical group, 34 deaths (9.7%) were recorded (10 cardiovascular-related). The 5-years and 10-years survival rate were respectively $93 \pm 1\%$ and $88 \pm 2\%$ with a relative survival of BAV patients compared to the age-and-sex-matched population of 98.8%. Nine patients (2.6%) were diagnosed with infective endocarditis (IE) and no aortic dissection occurred. Aortic valve and/or ascending aorta surgery was performed in 102 patients (29%) during follow-up. In the surgical group, 12 deaths (6.3%) were recorded (5 cardiovascular-related). The 5-years and 10-years survival rate were respectively $97 \pm 1\%$ and $90 \pm 3\%$ with a relative survival of BAV patients compared to the age-and-sex-matched population of 99.2%. Five patients (2.6%) were diagnosed with IE and no aortic dissection occurred.

Conclusion In BAV, survival rates are not lower than for the general population. The rate of IE is low and no aortic dissection occurred in our study. Middle-aged adults with BAV have a

high likelihood of surgery on the aortic valve and/or ascending aorta.

Disclosure of interest The authors have not supplied their declaration of competing of interest.

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Poster n°3

Point-of-care Ultrasound guidance to reduce vascular access complications in transfemoral TAVR

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Introduction Major vascular (VAC) and life-threatening or major bleeding (LT/MB) complications represent the most frequent adverse outcomes of percutaneous transfemoral TAVR (TF-TAVR). Point-of-Care Ultrasound (POCUS) guidance allows the opportunity to obtain in real-time valuable anatomic informations to puncture in the ideal non-calcified central and horizontal segment of femoral artery. We sought to evaluate in our study the impact of implementation of POCUS-guidance on the vascular and bleeding complications.

Method POCUS-guidance for vascular access was implemented as the default approach in our institution in 06/2013 for all TF-TAVR and was applied by all operators after a short training course. Thus, we defined three period and groups of consecutive patients according to the method of puncture (fluoroscopic or POCUS-guidance) and the generation of THV (2nd or 3rd gen.). TF-TAVR with POCUS-guidance and 2nd generation THV and from 06/2013 to 11/2014 (POCUS-guided-2nd gen. group; $n = 119$) were 1:1 successfully matched with 95 patients of the Fluo-guided-2nd gen. with propensity-score (10 variables) (The last TF-TAVR with guidance with 2nd gen. THV; $n = 119$). TF-TAVR implanted with 3rd gen. THV from 11/2014 to 12/2018 (POCUS-guided-3rd gen. group; $n = 308$) were analyzed separately.

Results After propensity-matching, all the vascular and bleeding complications were reduced in the POCUS-guided-2nd gen. group compared to Fluo-guided-2nd gen. group with respectively: VAC (6,3% vs. 16,8%; OR = 0,31; 95% CI = 0,12—0,85; $P = 0,023$); LT/MB (22,1% vs. 6,3%; OR = 0.24, CI = 0.09-0.63; $P = 0,004$); and VAC related to vascular access (12,6 vs. 4,2%; OR = 0,31; CI = 0.10—1.01; $P = 0,052$).

Conclusion This is the first and the largest study to demonstrate that POCUS-guided cannulation of the femoral artery is associated with a reduction of vascular and bleeding complication and support POCUS-guidance as the gold-standard for TF-TAVR.

Disclosure of interest The authors declare that they have no competing interest.

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Poster n°4

Assessment of osteoblastic activity with 18F-sodium fluoride PET in aortic bioprosthesis structural valve dysfunction: First results of a monocentric observational pilot study

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Introduction Structural valve degeneration (SVD) of bioprostheses is a common and serious complication in patients undergoing aortic valve replacement. SVD pathophysiology remains unclear.18F-sodium fluoride (NaF) and 18F-fluorodeoxyglucose (FDG) positron emission tomography (PET) have respectively shown that an active metabolic phenomenon of calcification rather than an inflammatory process contribute to native aortic valve stenosis. We studied the respective value of NaF and FDG PET to explore the potential mechanisms involved in SVD.

Method SVD patients underwent NaF PET to explore potential active calcification process, FDG PET to explore potential inflammatory process and thoracic CT. Tracer uptake was quantitatively measured by the bioprosthesis tissue-to-background ratio of standardized uptake values (TBR). Echocardiographic parameters, bioprosthesis calcium scoring on CT, and qualitative pattern of NaF and FDG activity on bioprostheses were analyzed.

Results Twenty-one patients were included. Calcium score was higher in patients with significant NaF visual uptake versus patients without (1065 ± 505 vs. 462 ± 320, $P = 0.015$). The median NaF TBR (3.49, [2.33—5.04]) was significantly higher than FDG (1.34, [1.20—1.47]). Patients with NaF TBR greater than the median value had a higher calcium score (1059 ± 550 vs. 566 ± 363, $P = 0.05$), and showed a tendency to have more severe hemodynamic stenosis. Picture shows an example of patient with SVD (A); CT (B) established localizations of calcium deposits; NaF PET/CT (C) show intense uptake adjacent to calcifications; FDG PET/CT (D) show no uptake (Fig. 1).

Conclusion These results suggest a link between SVD severity and active calcification activity and opens new perspectives on the assessment of SVD pathophysiology through NaF PET quantification of ongoing mineral burden.

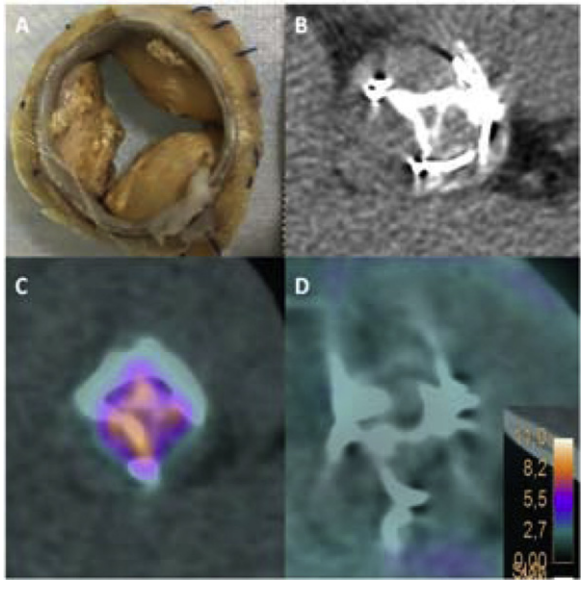

Fig. 1

Disclosure of interest The authors declare that they have no competing interest.

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