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Guidelines and recommendations for valve assessment by TOE

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Already the recommendations for evaluation of the severity of native valvular regurgitation (1) published in the year 2003 listed the available methods for examination and quantification in detail and discussed them according to their significance. One major innovation was the classification of valvular regurgitation into three levels of severity (mild, moderate, severe), analogous to what was already daily practice for the grading of valvular stenosis.

The more recent recommendations for the echocardiographic evaluation of valvular lesions are found in the European literature. For all of these publications working groups have collected the evidence from published studies as well as expert opinions and boiled them down to statements and recommendations for which a consensus could be obtained amongst the echocardiographic societies. These publications describe in detail the single methods applicable in the echocardiographic examination, give instructions on their correct use and discuss their validity and significance. More and more the use of classification systems are recommended for valvular dysfunctions, as the appropriate classification helps to understand the underlying pathologic mechanisms of the disease and also guides towards a better assessment in the planning of a positive surgical correction. It is therefore advisable to study this literature intensively and in detail.

Baumgartner et al. (2) published in 2009 recommendations for the echocardiographic assessment of valve stenosis. All available measurements are described and discussed

according to their validity with the help of levels of recommendation. One important message is that planimetry can be used as standard to measure valve area in mitral stenosis, but that the continuity equation needs to be used for aortic valve and tricuspid valve stenosis to assess valve area (see table 1).

In 2010, the European Association of Echocardiography published recommendations for the assessment of valvular regurgitation (3+4). One major innovation is that the size of the regurgitation jet, either measured by its extent or the area of the jet or its diameter in relation to the outflow tract, is no longer recommended to be used for quantification. It is influenced by too many factors including instrument settings and loading conditions and therefore very unreliable. Recommended measurements are the diameter of the vena contracta and the PISA method. In addition, the Doppler volumetry – the calculation of regurgitation volume and area using stroke volume comparison – is recommended for experienced examiners (see table 2). This paper also comments on the validity of 3D echocardiographic assessments.

In their recommendations for evaluation of prosthetic valves with echocardiography, Zoghbi et al. (5) describe in detail the characteristics of different valve prosthesis available and the specific examination techniques necessary. They have included a table giving an detailed overview on the quantification of stenosis and regurgitation in prosthetic valve. As it makes no sense to reproduce this in short version, it is recommended to individ-

Table 1: The most important parameters in the quantification of valvular stenosis.

Aortic stenosis	mild AS	moderate AS	severe AS
Aortic jet velocity	2,6 - 2,9 m/sec	3,0 - 4,0 m/sec	> 4 m/sec
Mean gradient	< 30 mm Hg	30 - 50 mm Hg	> 50 mm Hg
Aortic valve area	> 1,5 cm ²	1,0 - 1,5 cm ²	< 1,0 cm ²
Velocity ratio	> 0,50	0,25 - 0,50	< 0,25
Mitral stenosis	mild MS	moderate MS	severe MS
Valve area	> 1,5 cm ²	1,0 - 1,5 cm ²	< 1,0 cm ²
Mean gradient	< 5 mm Hg	5 - 10 mm Hg	> 10 mm Hg
Tricuspid stenosis	mild TS	moderate TS	severe TS
Mean gradient	Not defined	Not defined	≥ 5 mm Hg
Impact VTI	Not defined	Not defined	> 60 cm
Pressure half time	Not defined	Not defined	≥ 190 ms
Orifice area	Not defined	Not defined	≤ 1 cm ²
Pulmonary stenosis	mild PS	moderate PS	Severe PS
Pulmonary jet veloc.	< 3 m/sec	3,0 - 4,0 m/sec	> 64 mm Hg > 4 m/sec
Peak gradient	< 36 mm Hg	36 - 64 mm Hg	> 64 mm Hg

Table 2: The most important parameters in the quantification of valvular regurgitation.

Aortic regurgitation	mild AR	moderate AR	severe AR
Vena contracta	< 3 mm	3 - 6 mm	> 6 mm
Pressure half time	> 500 ms	200 – 500 ms	< 500 ms
PISA regurgitant orifice	< 10 mm ²	10 – 29 mm ²	≥ 30 mm ²
Regurgitant volume	< 30 ml	30 – 59 ml	≥ 60 ml
Mitral regurgitation	mild MR	moderate MR	severe MR
Vena contracta	< 3 mm	3 – 6 mm	≥ 7 mm
PISA regurgitant orifice	< 20 mm ²	20 - 39 mm ²	≥ 40 mm ²
Regurgitant volume	< 30 ml	30 – 59 ml	≥ 60 ml
Tricuspid regurgitation	mild TR	moderate TR	severe TR
Vena contracta	Not defined	< 7 mm	≥ 7 mm
PISA regurgitant orifice	Not defined	Not defined	≥ 40 mm ²
Regurgitant volume	Not defined	Not defined	≥ 45 ml
Pulmonary regurgitation	No quantitative measurements were defined		

ually study this literature. For many prostheses gradients and orifice areas are listed.

References

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