PATIENT-PROSTHESIS MISMATCH

Indexed Effective Orifice Area

Evaluation of Bovine Pericardium Bioprostheses

PATIENT-PROSTHESIS MISMATCH (PPM):

"Mismatch can be considered to be present when the effective prosthetic valve area, after insertion into the patient, is less than that of a normal human valve".[1]

HOW CAN I IDENTIFY AND DEFINE THE PPM?

A smaller effective orifice area (EOA) than expected in relation to the patient's body surface area (BSA) will result in higher transvalvar gradients. Therefore, the parameter used to characterize PPM is the indexed EOA (EOAi) - that is, the EOA of the prosthesis divided by the patient's BSA:[2]

$$EOAi = \frac{EOA}{BSA}$$

PPM is present when the EOA of the inserted prosthetic valve is too small relative to BSA.[3-8]

HOW CAN I AVOID THE PPM?

AORTIC VALVE

PPM can be prospectively avoided by selecting an aortic prosthesis with:

• An EOAi > 0.85 cm^2/m^2 (indicated in **green**) on the Table 1.

•Values between 0.65 and 0.85 cm^2/m^2 (indicated in **orange**) represents borderline PPM.

•An EOAi ≤ 0.65 cm^2/m^2 (shown in **red**) indicates PPM and should be avoided.[7-10]

Table 1. In vitro indexed effective orifice area (EOAi) values of aortic bovine pericardium bioprostheses.

Valve size (mm)		17	19	21	23	25	27	29
EOA (cm^2)		1.09	1.45	2.01	2.34	2.88	3.25	3.26
BSA (m^2)	1.0	1.09	1.45	2.01	2.34	2.88	3.25	3.26
	1.1	0.99	1.32	1.83	2.13	2.62	2.95	2.96
	1.2	0.91	1.21	1.68	1.95	2.40	2.71	2.72
	1.3	0.84	1.12	1.55	1.80	2.22	2.50	2.51
	1.4	0.78	1.04	1.44	1.67	2.06	2.32	2.33
	1.5	0.73	0.97	1.34	1.56	1.92	2.17	2.17
	1.6	0.68	0.91	1.26	1.46	1.80	2.03	2.04
	1.7	0.64	0.85	1.18	1.38	1.69	1.91	1.92
	1.8	0.61	0.81	1.12	1.30	1.60	1.81	1.81
	1.9	0.57	0.76	1.06	1.23	1.52	1.71	1.72
	2.0	0.55	0.73	1.01	1.17	1.44	1.63	1.63
	2.1	0.52	0.69	0.96	1.11	1.37	1.55	1.55
	2.2	0.50	0.66	0.91	1.06	1.31	1.48	1.48
	2.3	0.47	0.63	0.87	1.02	1.25	1.41	1.42
	2.4	0.45	0.60	0.84	0.98	1.20	1.35	1.36
	2.5	0.44	0.58	0.80	0.94	1.15	1.30	1.30

EOA = effective orifice area; BSA = body surface area.
Methodology: ISO 5840-2 (F.4: Pulsatile-flow testing).
EOAI > 0.85 cm^2/m^2 (No PPM)
0.65 cm^2/m^2 < EOAI ≤ 0.85 cm^2/m^2 (Borderline PPM)
EOAI ≤ 0.65 cm^2/m^2 (PPM)

MITRAL VALVE

PPM can be prospectively avoided by selecting a mitral prosthesis with:

•An EOAi > 1.2 cm^2/m^2 (indicated in **green**) on the Table 2.

•An EOAi ≤ 1.2 cm^2/m^2 indicates PPM (shown in **red**) and should be avoided.[4,11]

Valve size (mm)		25	27	29	31	33	35
EOA (cm^2)		2.79	2.93	3.56	3.84	4.13	4.48
BSA (m^2)	1.0	2.79	2.93	3.56	3.84	4.13	4.48
	1.1	2.54	2.66	3.24	3.49	3.75	4.07
	1.2	2.33	2.44	2.97	3.20	3.44	3.73
	1.3	2.15	2.25	2.74	2.95	3.18	3.45
	1.4	1.99	2.09	2.54	2.74	2.95	3.20
	1.5	1.86	1.95	2.37	2.56	2.75	2.99
	1.6	1.74	1.83	2.23	2.40	2.58	2.80
	1.7	1.64	1.72	2.09	2.26	2.43	2.64
	1.8	1.55	1.63	1.98	2.13	2.29	2.49
	1.9	1.47	1.54	1.87	2.02	2.17	2.36
	2.0	1.40	1.47	1.78	1.92	2.07	2.24
	2.1	1.33	1.40	1.70	1.83	1.97	2.13
	2.2	1.27	1.33	1.62	1.75	1.88	2.04
	2.3	1.21	1.27	1.55	1.67	1.80	1.95
	2.4	1.16	1.22	1.48	1.60	1.72	1.87
	2.5	1.12	1.17	1.42	1.54	1.65	1.79

Table 2. In vitro indexed effective orifice area (EOAi) values of mitral bovine pericardium bioprostheses.

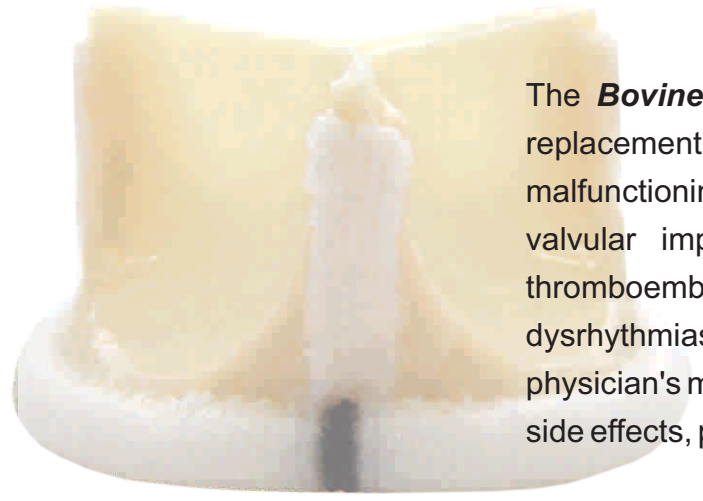
EOA = effective orifice area; BSA = body surface area.
Methodology: ISO 5840-2 (F.4: Pulsatile-flow testing)
EOAI > 1.2 cm^2/m^2 (No PPM)
EOAI ≤ 1.2 cm^2/m^2 (PPM)

References:

1. Rahimtoola SH. The problem of valve prosthesis-patient mismatch. Circulation 1978;58:20-4.
2. Pibarot P, Dumesnil JG. Prosthesis-patient mismatch: definition.clinical impact and prevention. Heart 2006;92:1022-9.
3. Pibarot P, Dumesnil J, Lemieux M, et al. Impact of prosthesis-patient mismatch on hemodynamic and symptomatic status. Morbidity and mortality after aortic valve replacement with a bioprosthetic heart valve. J Heart Valve Dis 1998;7:211-8.
4. Blais C, Dumesnil J, Balliot R, et al. Impact of valve prosthesis-patient mismatch on short-term mortality after aortic valve replacement. Circulation 2003;108:983-8.
5. Pibarot P, Dumesnil J. Hemodynamic and clinical impact of prosthesis-patient mismatch in the aortic valve position and its prevention. JACC 2000;36:1131-41.
6. Rao V, Jamieson W, Ivanov J, et al. Prosthesis-patient mismatch affects survival after aortic valve replacement. Circulation 2000;102:5-9.
7. Rahimtoola S. Valve prosthesis-patient mismatch: an update. J Heart Valve Dis 1998;7:207-10.
8. Pibarot P, Dumesnil J, Cartier P, et al. Patient-prosthesis mismatch can be predicted at the time of operation. Ann Thorac Surg 2001;71:S265-8.
9. Kadir I, Izzat M, Birdi I, et al. Hemodynamics of St. Jude Medical prosthesis in the small aortic root: in vivo studies using dobutamine doppler echocardiography. J Heart Valve Dis 1997;6(2):123-9.
10. Bach D, Goldbach M, Sakwa M. et al. Hemodynamics and early performance of the St. Jude Medical Regent™ aortic valve prosthesis. J Heart Valve Dis 2001;10:436-42.
11. Li M, Dumesnil JG, Mathieu P, Pibarot P. Impact of valve prosthesis-patient mismatch on pulmonary arterial pressure after mitral valve replacement. J Am CollCardiol 2005;45:1034-40.

VISIT OUR WEB SITE AT

www.braile.com.br



The ***Bovine Pericardium Bioprostheses*** are indicated for use as replacement valves in patients with a diseased, damaged, or malfunctioning native or prosthetic valve. Possible side effects for all valvular implants include, but are not limited to: regurgitation, thromboembolic phenomena, resistance to flow, infection, hemolysis, dysrhythmias, and prosthetic dehiscense or failure. Please see the physician's manual for a full description of indications, contraindications, side effects, precautions, warnings and instructions for use.

BRAILE BIOMÉDICA INDÚSTRIA, COMÉRCIO E REPRESENTAÇÕES LTDA
Av. Pres. Juscelino K. de Oliveira, 1505
CEP 15091-450 - São José do Rio Preto-SP - Brasil
Phone 55-17-2136-7000