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Clinical Highlights

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"Patient-Prosthesis Mismatch and the Predictive Use of Indexed Effective Orifice Area: Is it Relevant?"

Pibarot P, Dumesnil J - A Review Article

- An EOA indexed to body surface area is a statistically proven predictor of post-operative gradients and patient-prosthesis mismatch (PPM)[1] (See Figure 1)

  "Studies based on indexed EOA demonstrate a 20-70% prevalence of PPM in patients undergoing aortic valve replacement surgery."[1,2]

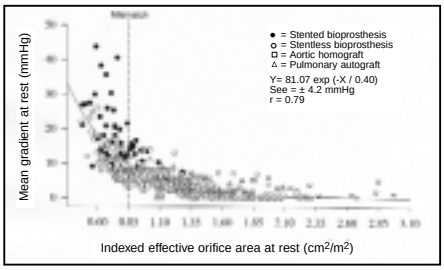

Figure 1. Indexed EOA demonstrates **a strong correlation** to post-op gradients. An EOA-I ≤0.85 cm^2/m^2 predicts high post-op gradients and PPM.*

- Numerous studies using indexed EOA (EOA-I) continue to demonstrate the harmful impact of patient-prosthesis mismatch, as shown in Table 1.

  Due to a weak correlation between indexed geometric orifice area (GOA-I) and pressure gradients, studies using GOA-I show minimal or no impact on PPM.[1,8,9,10] (See Figure 2)

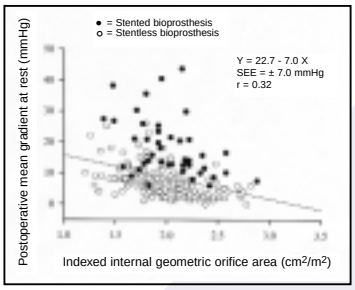

Figure 2. Indexed GOA shows **a weak correlation** to post-op gradients and does not predict PPM.*

Table 1 – Summary of Clinical Findings on PPM with Aortic Valve Replacement Surgery[1]

Parameter	Index	Clinical Impact of PPM
LV mass and function		
• LV mass regression	**EOA-I**	Decreased 4.5% with PPM compared to 23% without PPM[3], p=0.0001, n=1,103
• LV systolic function (cardiac index)	**EOA-I**	Decreased at 5 years from baseline Δ -.54 (l/min/n) with PPM compared to Δ -.017 without PPM[4], p=0.04, n=392
• Improvement of NYHA classification	**EOA-I**	Improved functional class by 1.5 with PPM compared to 1.9 without PPM[4], p=0.009, n=392
• Freedom from congestive heart failure	**EOA-I**	84% with PPM versus 89% without PPM[4], p=0.05, n=392
• Freedom from late cardiac events	**EOA-I**	Only 56% with severe PPM compared to 80% with moderate PPM and 94% without PPM[5], p=0.03, n=229
Early mortality	**EOA-I** **EOA-I**	7.9% with PPM compared to 4.6% without PPM[6], p=0.03, n=2,154 26% with severe PPM compared to 3% without PPM[2], p<0.0001, n=1,266
Freedom from late mortality	**EOA-I**	Only 75.5% with PPM compared to 84.2% without PPM[6], p=0.0004, n=2,154
High-risk patients		
• Mortality (LV ejection fraction <35%)	N/A	47% with small prosthesis compared to 15% with larger prosthesis[7], p=0.03, n=52
• Mortality (LV ejection fraction <40%)	**EOA-I**	67% with severe PPM compared to 16% with moderate PPM and 7% without PPM[2], p<0.001, n=1,266
Risk of congestive heart failure	**EOA-I**	60% increased risk of CHF with severe to moderate PPM[12], p=0.044, n=1,226

PPM can largely be avoided using a preventive strategy. Select a prosthesis with an EOA-I >0.85 cm^2/m^2. The SJM Regent® valve delivers the largest EOAs of any prosthetic heart valve suggesting that PPM should be unusual with this valve.[2,11]

For PPM reference tools including an EOA-I Pocket Guide and Operating Room Calculator, contact your St. Jude Medical representative or Customer Service at **1-800-544-1664**.

* Graphs used with permission from Philippe Pibarot, DVM, Ph.D., FACC

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