Editorial

Mitral valve systemic vascular resistance index in cardiac surgery should be one more enigma

Paulo Roberto B. Evora^

Department of Surgery and Anatomy Ribeirão Preto Medical School, University of São Paulo, São Paulo, Brazil

Correspondence to: Paulo Roberto B. Evora. Rua Rui Barbosa, 367, a14015-120, Ribeirão Preto, São Paulo, Brazil. Email: prbevora@gmail.com.

Comment on: Umeki A, Yamamoto T. Analysis of systemic vascular resistance after cardiac surgery: a retrospective cohort study. J Thorac Dis 2022;14:4341-51.

Keywords: Mitral valve; cardiac surgery; systemic vascular resistance; mitral valve disease

Submitted Jan 09, 2023. Accepted for publication Mar 06, 2023. Published online Mar 30, 2023.

doi: 10.21037/jtd-2023-02

View this article at: https://dx.doi.org/10.21037/jtd-2023-02

Factors influencing the systemic vascular resistance index (SVRI), which is related to arterial hypotension, are not well understood, especially after the use of cardiopulmonary bypass (CPB). In any case, SVRI after mitral valve (MV) surgery continues to be lower than that after other procedures. The decrease in SVRI after thoracic aortic aneurysm (TA) surgery shows a general post-CPB trend, blood pressure is higher after aortic valve (AV), and TA requires more catecholamine to maintain blood pressure. Therefore, there are unique SVRI characteristics according to the type of cardiac surgery that often stabilizes within a few hours.

In a careful investigation, Umeki & Yamamoto (1) confirmed the SVRI differences between cardiac surgery types. The surgeries performed were grouped into four types: the decrease in SVRI after AV and TA shows a general post-CPB trend. Several studies (2,3) suggested that MV surgery is a risk factor for SVRI reduction, thus supporting our hypothesis.

The present editorial motivation would be the modern vasoplegia concepts of inflammation, ischemia, and reperfusion mediated by endothelium-dependent signaling pathways. Then, we decide to highlight the enigmas supported by the mitral valve. Perhaps one of the greatest and oldest cardiology enigmas is why some young patients present acute pulmonary edema as the first sign of mitral stenosis without previous symptoms of effort (dyspnea, orthopnea). On the other hand, many patients with similar hemodynamic changes and severity of mitral stenosis are chronically symptomatic. Maybe Umeki & Yammamoto (1) presented one more mitral enigma.

In the 70s, we carried out studies of the peripheral flow by plethysmography measurements of the foot in eleven patients with mitral stenosis. The values obtained were low in most cases without correlations between values of the peripheral flow and the mitral valve area measured during surgery or the parameter derived from hemodynamic assessment. We speculated on two factors: (I) self-regulation (4) and (II) the sympathetic autonomous nervous system. The data obtained by Nielsen (5) and Abramson (6) confirmed the suspicion of inadequate compensatory mechanisms in this condition, which are not as effective as in normal individuals. The Umeki & Yammamoto (1) study focused on differences in the trends of systemic vascular resistance after cardiac surgery and emphasized the differences observed for each surgical type. Regarding the features of the SVRI curve for each surgery, the curve for MV surgery was distinct.

To conclude, some speculations are pertinent to give a certain intellectuality to the text ("*Decipher me, or I'll devour you*"). The Sphinx is present in both ancient Egyptian and Greek mythology. In Egyptian myth, the Sphinx was more of a symbol than an individual entity. It was a guardian figure, the protector of the pyramids, and the scourge of the

^ ORCID: 0000-0001-9631-946X.

enemies of Re, the sun god. It also represents the pharaohs and the pharaoh's divine power. Considering the riddles, MV can be an analogy of the Sphinx. However, MV does not have an Oedipus to decipher her secret(s), perhaps the reason to keep 'smiling' to the surgeons. Surgical treatment of mitral valve disease is among the most universally performed. Its morbimortality is low, but his smile is always alerting—"*Beware, I have my enigmas*"—an explicit message in Umeki & Yammamoto's research.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *Journal of Thoracic Disease*. The article did not undergo external peer review.

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at https://jtd.amegroups.com/article/view/10.21037/jtd-2023-02/coif). The author has no conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Cite this article as: Evora PRB. Mitral valve systemic vascular resistance index in cardiac surgery should be one more enigma. J Thorac Dis 2023;15(4):1539-1540. doi: 10.21037/jtd-2023-02

References

1. Umeki A, Yamamoto T. Analysis of systemic vascular resistance after cardiac surgery: a retrospective cohort study. J Thorac Dis 2022;14:4341-51.
2. Putnam EA, Manners JM. Vascular resistance during cardiopulmonary bypass. Its effect on cardiac performance in the immediate post-bypass period. Anaesthesia 1983;38:635-43.
3. Tsiouris A, Wilson L, Haddadin AS, et al. Risk assessment and outcomes of vasoplegia after cardiac surgery. Gen Thorac Cardiovasc Surg 2017;65:557-65.
4. Evora PR, Godoy RA, Cherri J, et al. Peripheral blood flow measured by plethysmography with venous occlusion in patients with mitral stenosis. Arq Bras Cardiol 1982;38:459-63.
5. Nielsen HE. Clinical investigation into the cardiac output of patients with compensated heart disease during rest and during muscular work. Acta Med Scand 1937;91;223-66.
6. Abramson DI. Vascular responses on the extremities of man in health and disease. The University of Chicago Committee on Publications in Biology and Medicine. 1st Edition. Chicago, IL, USA: University of Chicago Press, 1944.