Published online 2022 February 5.



Letter

## Echocardiographic Diagnostic Characteristics for the Coronary Artery Pattern in Patients with TGA

Ehsan Aghaei-Moghadam<sup>1, 2, 3</sup>, Mohammad Reza Mirzaaghayan<sup>1</sup>, Pardisa Purdadadsh Miri<sup>1</sup>, Sara Allahkarami<sup>1</sup> and Elmira Hajiesmaeil Memar <sup>1</sup>,<sup>2,\*</sup>

<sup>1</sup>Division of Pediatric Cardiology, Pediatrics Center of Excellence, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran <sup>2</sup>Department of Pediatrics, Tehran University of Medical Sciences, Tehran, Iran <sup>3</sup>Growth and Development Research Center, Tehran University of Medical Sciences, Tehran, Iran

, Corresponding author: Department of Pediatrics, Pediatrics Center of Excellence, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran. Email: dr.elmira.memar@gmail.com

Received 2021 April 03; Revised 2021 December 12; Accepted 2021 December 26.

Keywords: 2D Echocardiography, Pediatrics, TGA

## Dear Editor,

Coronary circulation anatomy in patients with transposition of the great arteries (TGA) is a major challenge for surgeons before the arterial switch operation (ASO) since the coronary arteries need to be transferred if any abnormal pattern exists. Therefore, having information about the coronary pattern before the ASO plays an important role in preoperation planning. Echocardiography is an acceptable, easy-to-perform, and noninvasive tool for the determination of coronary circulation; however, its diagnostic characteristics have not been numerous up to present.

A total of 218 known patients with the TGA were evaluated in this regard. A single experienced cardiologist performed all echocardiographic investigations before the ASO. The true coronary pattern was evaluated using eyeball assessment by a single experienced surgeon during the surgery without being informed about the previous echocardiographic findings. The prevalence rates of the normal coronary pattern by echocardiography and surgeon's eyeball assessment were 88% (n = 192) and 91.7% (n = 200), respectively. The diagnosis of the unusual pattern was considered a positive event. The findings showed a true-positive rate of 1.8% (n = 4), a true-negative rate of 83.9% (n = 183), a false-positive rate of 10.1% (n = 22), and a false-negative rate of 4.2% (n = 9). The echocardiography diagnostic characteristics indicated sensitivity of 30.8% (95% CI: 9.1 - 61.4%), specificity of 89.3% (95% CI: 84.2 - 93.1%), positive likelihood ratio of 2.9 (95% CI: 1.2 - 7.1), negative likelihood ratio of 0.78 (95% CI: 0.05 - 1.1), positive predictive value of 15.4% (95% CI: 6.8 - 31.3%), negative predictive value of 95.3% (95% CI: 93.4 - 96.7%), and accuracy of 85.8% (95%

CI: 80.4 - 90.1%). The authors of the present study have previously assessed the echocardiographic characteristics for the determination of the coronary pattern in 125 patients (1) and reported the sensitivity and specificity of 42.9% and 88.1%, respectively.

Bertail-Galoin et al. in 2020 studied 108 neonates with the TGA. They reported that echocardiographic findings were in line with the surgeon's assessment in 82.4%. Moreover, false-positive and false-negative rates were 2.8% and 14.8%, respectively (2), which are inconsistent with the false-positive and false-negative rates of 10.1% and 4.2% in the current study. Christmann et al. in 2019 evaluated 131 neonates and observed that echocardiography was correct in 69%, with sensitivity and specificity of 20% and 92%, respectively (3), which is almost close to the present study findings. Fundora et al. in 2016 assessed 142 neonates and reported diagnostic accuracy of 86%, which is completely in line with the present study results (4).

## Footnotes

**Authors' Contribution:** E.A. developed the original idea and the protocol. P.P. and S.A. both contributed to the interpretation of the data. E.H. was involved in analysis, writing the manuscript, and statistical analysis. E.A. and M.M. were involved in critical revision.

**Conflict of Interests:** The authors declare that there is no conflict of interest.

Funding/Support: None.

Copyright © 2022, Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (http://creativecommons.org/licenses/by-nc/4.0/) which permits copy and redistribute the material just in noncommercial usages, provided the original work is properly cited.

## References

- Mirzaaghayan MR, Ghamari A, Amini S, Rabbani A, Mohebbi A, Aghaei Moghadam E. A 3-Year Single Surgeon Experience of the Arterial Switch Operation. *Iran J Pediatr.* 2020;30(5). doi: 10.5812/ijp.98540.
- 2. Bertail-Galoin C, Leconte C, Bakloul M, Perouse-de-Montclos T, Moulin-Zinsch A, Martin-Bonnet C, et al. Value of preoperative echocardiography for the diagnosis of coronary artery patterns in neonates with transposition of the great arteries. *Arch Cardiovasc Dis*. 2021;**114**(2):115– 21. doi: 10.1016/j.acvd.2020.06.005. [PubMed: 33069638].
- 3. Christmann M, Amini K, Wipf A, Weber R, Quandt D, Hübler M, et al. Preoperative echocardiographic determination of the coronary anatomy in patients with transposition of the great arteries helping or confusing the surgeon? *Prog Pediatr Cardiol.* 2019;**54.** doi: 10.1016/j.ppedcard.2019.02.002.
- 4. Fundora MP, Aregullin EO, Wernovsky G, Welch EM, Muniz JC, Sasaki N, et al. Echocardiographic and Surgical Correlation of Coronary Artery Patterns in Transposition of the Great Arteries. *Congenit Heart Dis.* 2016;**11**(6):570-7. doi: 10.1111/chd.12338. [PubMed: 26931510].