



Letter to the Editor

To trust or distrust myocardial performance index (MPI) in severe acute malnutrition



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Myocardial performance index
Severe acute malnutrition
Global longitudinal strain

We have read the article in detail of cardiac changes in children hospitalized with severe acute malnutrition by Jain et al.¹ Firstly, we want to congratulate the authors for addressing the cardiac changes in severe acute malnutrition. Child undernutrition accounts for 45% of under five mortality.² Myocardial dysfunction might be one of the associated cause of mortality. However, there are few points which need more clarification:-

1. Myocardial Performance Index (MPI/Tei Index) is a useful tool to measure the cardiac function. It was purposed by Tei³ to measure the systolic and diastolic myocardial performance together. However, there are a few limitations of using MPI:-
 - A. Conventional Doppler-derived Myocardial Performance Index (PWD-MPI) has beat-to-beat-variation and to eliminate beat-to-beat variation bias, Tissue Doppler imaging (TDI-MPI) can be used. MPI is not a reliable parameter for assessment of isolated left ventricular diastolic dysfunction.⁴
 - B. The uniqueness of Tei index is its narrow range in individuals. However, author has taken 0.24–0.45 as a normal range (supplementary file). The normal range for adults is $0.39 + 0.05$ as per Tei² and for children, it is $0.36 + 0.07$ (PWD-MPI).⁵
 - C. Various studies published the conflicting correlation between MPI with malnutrition. Study by Brent et al⁶ showed that the Tei Index values were within the reference range and similar in cases (median, 0.37; IQR, 0.26–0.45) and controls (median, 0.36; IQR, 0.28–0.42) at admission. Similarly, El Razaky et al⁷ showed no substantial difference in MPI between moderately malnourished children and controls; however the study and patient population were different from current study.
 - D. Global Longitudinal Strain (GLS) is a more reproducible measure of left ventricular function. We should adopt strain imaging as a new gold standard for imaging ventricular function.⁸
2. In presence of sepsis/diarrhea/pneumonia, the results of cardiac biomarkers are spurious and have less specificity.^{9,10} If this study had been in severe malnourished children without these comorbidities, it would have more clinical relevance.

Declaration of competing interest

We have no conflict of interest.

References

1. Jain D, Rao SK, Kumar D, et al. Cardiac changes in children hospitalized with severe acute malnutrition: a prospective study at tertiary care center of northern India. *Indian Heart J*. 2019. <https://doi.org/10.1016/j.ihj.2020.01.005>.
2. Dhirar N, Dudeja S, Khandekar J, Bachani D. Childhood morbidity and mortality in India - analysis of national family health survey 4 (NFHS-4) findings. *Indian Pediatr*. 2018;55(4):335–338.
3. Tei C, Ling LH, Hodge DO, et al. New index of combined systolic and diastolic myocardial performance: a simple and reproducible measure of cardiac function—a study in normals and dilated cardiomyopathy. *J Cardiol*. 1995;26(6):357–366.
4. Fernandes JMG, de Oliveira Romão B, Rivera IR, et al. Clinical value of myocardial performance index in patients with isolated diastolic dysfunction. *Cardiovasc Ultrasound*. 2019;17(17).
5. Cui W, Roberson DA. Left ventricular Tei Index in children: comparison of tissue Doppler imaging, pulsed wave Doppler and M-Mode echocardiography normal values. *J Am Soc Echocardiogr*. 2006;19(12):1438–1445.
6. Brent B, Obonyo N, Akech S, et al. Assessment of myocardial function in Kenyan children with severe, acute malnutrition: the cardiac physiology in malnutrition (CAPMAL) study. *JAMA Netw Open*. 2019;2(3). e191054.
7. El Razaky O, Naeem A, Donia A, et al. Cardiac changes in moderately malnourished children and their correlations with anthropometric and electrolyte changes. *Echocardiography*. 2017;34:1674–1679.
8. Januzzi Jr JL, Chandrashekar Y. Strain echocardiography: the new gold standard for imaging ventricular function? *J Am Coll Cardiol*. 2017;70(8):955–957.
9. Smith A, John M, Trout R, Davis E, Moningi S. Elevated cardiac troponins in sepsis: what do they signify? *W Va Med J*. 2009;105(4):29–32.
10. Kakoullis L, Giannopoulou E, Papachristodoulou E, et al. The utility of brain natriuretic peptides in septic shock as markers for mortality and cardiac dysfunction: a systematic review. *Int J Clin Pract*. 2019;73(7). e13374.

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