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Evaluation the possible practical utility of shock index and modified shock index on long-term mortality among patients with acute decompensated heart failure; Persian Registry Of cardioVascular diseasE/ Heart Failure (PROVE/HF) study

Mehrbod Vakhshoori[1], Niloofar Bondariyan[2], Sayed Ali Emami[3], Maryam Heidarpour[4], Davood Shafie[5]

[1] Heart Failure Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran. Email address: mehrbod10@yahoo.com

[2] Department of Clinical Pharmacy, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran. Email address: niloofar.bondariyan@gmail.com

[3] Heart Failure Research Center, Isfahan Cardiovascular Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran, Email address: ali.emami91@yahoo.com

[4] Assistant Professor of Endocrinology, Isfahan Endocrine and Metabolism Research Center, Isfahan University of Medical Sciences, Isfahan, Iran. Email address: Heidarpourmaryam110@gmail.com

[5] Assistant Professor, Heart Failure Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran. Email address: d.shafie87@gmail.com

ABSTRACT

Background: There are several indices for prognosis assessment in cardiovascular diseases (CVDs). Shock index (SI) and modified shock index (MSI) are amongst them, mostly used in those with myocardial infarction, but the probable usefulness of these indices are quite unclear in heart failure. We sought to assess the possibility of SI and MSI as long-term prognostic indices in patients with acute decompensated heart failure (ADHF).

Methods: We performed this retrospective cohort study in context of Persian Registry Of cardioVascular diseasE/ Heart Failure (PROVE/HF) study. From March 2016 to March 2020, a total of 3896 ADHF patients were recruited. We assessed SI and MSI at admission time and used receiver operating characteristic (ROC) curve to determine optimum SI and MSI cut-off points. Kaplan-Meier curves were also used to illustrate mortality during follow-up period. Finally, we evaluated the CVD death association with SI and MSI cut-off points and quartiles using different hazard regression models.

Results: Our samples had a mean age of 70.22±12.65 years (males:62.1%). Optimal SI and MSI cut-off points were found to be 0.66(sensitivity:62%, specificity:51%) and 0.87(sensitivity:61%, specificity:51%), respectively. During the mean follow-up of 10.26±7.5 months, 1110 (28.5%) deaths occurred.

We found that patients who had SI ≥0.66 or within the third and fourth SI quartiles had remarkably higher death chance in comparison to the reference groups (hazard ratio(HR):1.58, 95%CI:1.39-1.80,P<0.001, HR:1.38,95%CI:1.14-1.66,P=0.001 and HR:2.00,95%CI:1.68-2.38,P<0.001, respectively). Similar outcomes were also observed for MSI MSI≥0.87: HR:1.52,95%CI:1.34-1.72,P<0.001, 3rd quartile (0.89≤MSI<1.00):HR:1.23,95%CI:1.009-1.50,P=0.041, 4th quartile (MSI≥1.00):HR:1.80,95%CI:1.53-2.13,P<0.001). Also, mortality rate was higher among patients with higher SI and MSI cut-off and quartiles, as proved by Kaplan-Meier curves.

Conclusion: This study indicated patients with higher SI and MSI might be at higher long-term mortality risk. Moreover, these two inexpensive bedside indices might be a practical tool to assess prognosis in ADHF, especially in nations with limited resources.

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Presenter Name: Mehrbod Vakhshoori.
Mode of Presentation: Oral.
Contact number: +98-913-296-5712

BIOGRAPHY

Mehrbod Vakhshoori completed his MD at Isfahan university of medical sciences, Iran with GPA of 3.92/4 (top 3rd rank among approximate 200 medical students). He is a research assistant at heart failure research center affiliated to Isfahan cardiovascular research institute, Iran. He has published more than 35 articles in different medical journals. Also, he is the reviewer of several scientific journals and has been invited to review more than 15 manuscripts. His publications got more than 130 citations with h-index of 6. He was also the editorial board of a domestic journal affiliated to medical students' research committee of Isfahan university of medical sciences, named "Golbang". He also translated two medical books in Persian. He is also the official member of Cochrane collaboration since 2020. He is also the official member of Iranian general practitioner association. He has a registered patent related to formulation of anti-microbial cream. He was also the member of talent development office affiliated to Isfahan university of medical sciences and selected as a novel idea presenter at research idea contest. He has several certificates in different research fields including medical writing, research methodology, Medline, Endnote, SPSS, etc.