Utility of Diastolic Shock Index at Admission as a Predictor of Severity in Patients with Diverticulitis

Nicholas Druar MD, MPD, Santosh Swaminathan, MBBS, J. Alexander Palesty, MD, FACS
Stanley J Dudrick Department of Surgery, St. Mary's Hospital, Waterbury CT

Introduction

Diastolic shock index (DSI) represents the ratio between heart rate and diastolic blood pressure. Previous research has suggested it can be used to predict severity of disease in infectious conditions where the peripheral vasculature becomes dilated as a physiologic response to shock.[1,2] A progressive increase in DSI greater than 2.5 has been shown to be associated with increased risk of death in patients with septic shock. Here we attempted to understand the use of DSI to predict the severity of disease in patients admitted with diverticulitis to a community hospital.

Purpose

The use of diastolic shock index has not been studied in diverticulitis, a serious cause of septic shock in the surgical patient. We aim to understand its predictive ability in differentiating ICU admission vs surgery as well as its ability to determine death.

Methods

- Retrospective chart review study of single community hospital from July 2017-July 2020
- Patients admitted with diverticulitis based on ICD-10 codes
  - Stratification of Uncomplicated/Complicated
  - Excluded
    - Diverticulosis
    - Patients admitted for follow-up (eg Hartmann's reversals)
- First set of documented vitals used for calculation of DSI

Combined Groups

Mortality	Mean DSI (95% CI)	p-value
Survived (n=317)	1.17 (1.14-1.2)	
Died (n=6)	1.24 (0.77-1.7)	0.53

ICU Admission	Mean DSI (95% CI)	p-value
No ICU (n=286)	1.15 (1.12-1.18)	
ICU (n=37)	1.29 (1.17-1.42)	0.003

Surgery	Mean DSI (95% CI)	p-value
No Surgery (n=243)	1.19 (1.16-1.23)	
Surgery (n=80)	1.1 (1.04-1.16)	0.013

Stratified Groups

Non Complicated (n=224)				
Variable	Group	Mean DSI	95% CI	p-value
Need for Surgery	Yes n=60	1.07	1.0-1.14	
	No n=164	1.17	1.13-1.2	**0.02**
ICU Admission	Yes n=13	1.16	1.1-1.17	
	No n=211	1.14	0.95-1.36	0.79
Mortality	Yes n=3	1.19	-0.19-2.6	
	No n=221	1.14	1.1-1.17	0.71

Complicated (n=99)				
Variable	Group	Mean DSI	95% CI	p-value
Need for Surgery	Yes n=20	1.19	1.07-1.32	
	No n=79	1.24	1.17-1.3	0.53
ICU Admission	Yes n=24	1.37	1.2-1.52	
	No n=75	1.19	1.13-1.25	**0.0089**
Mortality	Yes n=3	1.28	0.23-2.33	
	No n=96	1.23	1.17-1.29	0.77

Results

- Total of 323 Patients
  - 224 (69.4%) classified as non-complicated
  - 99 (30.7%) classified as complicated

Variable	Value
Female	195 (60.4%)
Mean Age (95% CI)	61.8 (60.1-63.5)
Mean LOS in days (95% CI)	4.7 (4.2-5.1)
Mean DSI (95% CI)	1.17 (1.14-1.2)

Discussion/Conclusion

- Our results suggest ICU admission might be more suggestive of septic shock present in these patients
- Those that don't need surgery might have a higher DSI due to an underlying shock treated first without surgery (ie. percutaneous drainage) and then later admitted for definitive treatment
- Our results are limited by single hospital setting and single DSI value
- Diastolic shock index appears to have possible utility in guiding management of diverticulitis

References

1. Kim DS, Park JE, Hwang SY, Jeong D, Lee GT, Kim T, Lee SU, Yoon H, Cha WC, Sim MS, Jo IJ, Shin TG. Prediction of vasopressor requirement among hypotensive patients with suspected infection: usefulness of diastolic shock index and lactate. Clin Exp Emerg Med. 2022 Sep;9(3):176-186.
2. Daş M, Bardakci O, Siddikoglu D, Akdur G, Yilmaz MC, Akdur O, Beyazit Y. Prognostic performance of peripheral perfusion index and shock index combined with ESI to predict hospital outcome. Am J Emerg Med. 2020 Oct;38(10):2055-2059.