To Determine Cardiac Function As A Predictor of Outcome in Patients with Septic Shock

Banna Divya[1], B Phanikrishna[2], K Raghu[3], GD Ravindranath[4]

Author's Affiliation:
[1]Post Graduate, [2]Professor, [3]Associate Professor, [4]Associate Professor, Department of Pediatrics, Narayana Medical College and Hospital, Chintareddypalem, Nellore, Andhra Pradesh 524003, India.

Corresponding Author:
Kondle Raghu, Associate Professor, Department of Pediatrics, Narayana Medical College and Hospital, Chintareddypalem, Nellore, Andhra Pradesh 524003, India.

E-mail: research.nmch@rediffmail.com

Abstract

Aim: Aim of the present study is to study the significance of echocardiography in patients with septic shock along with the significance of clinical prediction scores and their correlation with echocardiography findings in prognosis of a population of 50 septic shock patients presenting to ED in a tertiary care hospital. *Method:* The present study is conducted on 50 patients with septic shock presented to Department of Emergency Medicine, during July 2016 to November 2018. *Results:* The most common comorbid condition in the study was Type II Diabetes Mellitus. The most common diagnosis in the present study is Urosepsis with a contribution of 24% patients and mortality of 50%. In present study, 46% had normal LV function, 28% had Mild LV dysfunction, 22% had moderate LV dysfunction and 4% had severe LV dysfunction. The mean APACHE II in patients with No LVD is 14.957, mild LVD is 17.929, moderate LVD is 21.818 and severe LVD is 24. The mean qSOFA in patients with No LVD is 2.04, mild LVD is 2.43, moderate LVD is 2.36 and severe LVD is 2.50. The mean IVC diameter in patients with No LVD is 1.25 cm, Mild LVD is 1.68 cm, moderate LVD is 2.08 cm and severe LVD is 2.25 cm. Mortality in patients with APACHE II score >20 is 94.1%, i.e. 16 patients. Mortality in patients with qSOFA score 3 is 92.3%. APACHE II had positive correlation with qSOFA and negative correlation with LVEF and LOHS. Outcome of the present study showed 52% survivors and 48% non-survivors. Transthoracic echocardiography in ED has significant correlation with clinical prediction scores (APACHE II and qSOFA scores). *Conclusion:* the prognostic power of the qSOFA score at ICU admission regarding patients with septicemia. Present study results show that the qSOFA score ≥2 in admission could be helpful as a screening device for predicting clinical intensity and medical resource make use of within 72 hours right after admission, and for forecasting the 28-day mortality price.

Keywords: Septic Shock; Glasgow Coma Scale; Left Ventricular ejection fraction; Nitric oxide

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Introduction

Sepsis continues to be the principal reason for mortality and critical illness around the globe. It is a set of physiological, pathological, and biochemical abnormalities which could strike in response to infection because of any pathological agent. Despite the advances in the management and support of critically ill patients, sepsis remains the main reason behind mortality and serious disease throughout the world, amidst an estimated prevalence of 17 million deaths per year.[1]

The failure to promote effective therapeutics and the limited contentment in developing diagnostic or prognostication tests will likely be attributed to the heterogeneity inherent in the syndrome.[2]

Myocardial dysfunction is one of the manifestations of greater clinical relevance in sepsis and one of the organic dysfunctions that most occurs most in septic shock.[3] It consists of reversible systolic and/or diastolic dysfunction of the left ventricle (LV) and/or right ventricle (RV).[4,5] In recent years, myocardial dysfunction caused by sepsis turned into a focus of extensive case as an self-reliant prognosticator of mortality in this analytic context, specifically after the developing use of biomarkers of myocardial injury as indicators of poor prognosis.[6]

In this study the clinical findings of echocardiography by comparison with clinical scoring systems — Quick Sepsis related Organ Failure Assessment (qSOFA) score and Acute Physiological and Chronic Health Evaluation II (APACHE II) score were done to determine in ordering diagnostic and therapeutic interventions in the population of critically ill Septic Shock patients in the ED, Narayana Medical College, Nellore, Andhra Pradesh.

The current study is to validate the relationship between clinical prediction score and cardiac function in prognosis of septic shock and to determine the significance of echocardiography findings in prognostication of critically ill septic shock patients.

Materials and Method

Study Design: This is a prospective study done to determine systemically the performance of existing the clinical prediction scores (APACHE II, qSOFA) and echocardiography findings (LVEF, LVD, DD, OT, IVC diameter, LVEDA) to risk stratify the emergency patients with septic shock.

Study Population: This is a prospective study done in patients who got admitted in Emergency Department of Narayana Medical College and Hospital, Nellore between July 2016 and November 2018. Transthoracic echocardiography is done to assess cardiac function and to obtain other cardiac parameters.

Procedure: Clinical examination was thoroughly done and all the vitals like Heart rate, Respiratory rate, Blood pressure, Temperature, Oxygen saturation, GCS were noted. The routine blood investigations such as Complete Blood picture and biochemical parameters required such as Serum creatinine, CBG, Lactate were sent. All the necessary culture samples were set up for microbial analysis. Radiological investigations like Chest Radiograph, Ultrasound were also performed in desired patients.

Transthoracic echocardiography was performed and patients were categorized based on the Left Ventricular Function. The details of the outcome (survivors and non survivors) of the study were also documented.

Inclusion Criteria

Patients with the following criteria were included in the study:

1. Age >18 years and <60 years
2. Signs and symptoms of Septic Shock based on American college of chest physician guidelines and New classification according to Society of Critical Care Medicine and European Society of Intensive Care Medicine in Sepsis 3 Update.
13. Patients willing to give consent and participation

Exclusion Criteria

Patients with following criteria were excluded from the study:

1. Pre-existing structural and functional cardiac diseases
2. Patients in postoperative period
3. Patients not willing to give consent and participation

Statistical Analysis: The data has been analyzed by SPSS Version 22.0. To test the association between the groups, chi-square test was used. To test the mean difference between two groups, Student's t-test was used. To test the correlation between the groups, Pearson's correlation test was used. To test the mean difference between three or more groups, ANOVA test was used. To represent a sensitivity/specificity pair corresponding to a particular decision, Receiver Operating Characteristic (ROC) curve was used and to measure how well a parameter can distinguish between two diagnostic groups, the area under the ROC curve (AUC) was used. All the p-values having less than 0.05 are considered as statistically significant.

Results

Out of 50 patients, the frequency of age is categorized to <30 years, 31–40 years, 41–50 years and >50 years

with 9 (18%) patients, 11 (22%) patients, 12 (24%) patients and 18 (36%) patients respectively (Table 1).

The number of patients on single vasopressor support is 19 (38%), the number of patients on dual vasopressor support is 23 (46%) and the number of patients on triple vasopressor support is 8 (16%).

The frequency of patients on ventilatory support is represented in Table 1. Out of 50 patients in this study, 32 patients accounting for 64% were kept on ventilator support and 18 patients accounting for 36% are without ventilator support.

The frequency of IVC diameter in these 50 patients at the time of presentation to ER is grouped into <1 cm, 1–2 cm and >2 cm with 6 (12%), 38 (72%) and 6 (12%) patients respectively. The number of patients with diastolic dysfunction (DD) is 25 (50%) of 50 patients.

Table 1: The Frequency of Different Parameters in the Total Population.

	Variable(s)	Frequency(n)	Percent (%)
Age Group	≤ 30 years	9	18.0
	31–40 years	11	22.0
	41–50 years	12	24.0
	> 50 years	18	36.0
Gender	Males	24	48.0
	Females	26	52.0
Diagnosis	Acute gastroenteritis	6	12.0
	Cellulitis	2	4.0
	Dengue shock syndrome	3	6.0
	Liver abscess	2	4.0
	Meningitis	6	12.0
	Multiple liver abscess	2	4.0
	Peritonitis	2	4.0
	Pneumonia	10	20.0
	Pneumonia with ARDS	5	10.0
	Urosepsis	12	24.0
CO-MORB	Nil	29	58.0
	HTN	3	6.0
	DM	10	20.0
	DM/HTN	4	8.0
	OLD CVA	4	8.0
GCS_GRP	3–8	2	4.0
	9–12	14	28.0
	> 12	34	68.0
ECG	NSR	38	76.0
	Sinus Tachy	10	20.0
	Sinus Tachy with RBBB	1	2.0
	ST DEP V4-V6	1	2.0
APACHE_GRP	< 10	6	12.0
	10–20	27	54.0
	> 20	17	34.0
qSOFA	1.0	1	2.0
	2.0	36	72.0
	3.0	13	26.0
IVC_GRP	<1	6	12.0
	1–2	38	76.0
	>2	6	12.0
VASOPRESSORS	Norepinephrine	19	38.0
	NorepiVasopressin	23	46.0
	Norepi/Vaso/Epinephrine	8	16.0

	Variable(s)	Frequency(n)	Percent (%)
Outcome	Survivors	26	52.0
	Non-Survivors	24	48.0
LVD	No	23	46.0
	Mild	14	28.0
	Moderate	11	22.0
	Severe	2	4.0
DD	No	25	50.0
	Yes	25	50.0
VENTILATOR	No	18	36.0
	Yes	32	64.0

Diagnosis: Out of 50 cases, 24% showed Urosepsis, 20% showed Pneumonia, 10% showed Pneumonia with ARDS, 4% showed Cellulitis, 12% showed Acute Gastroenteritis, 12% showed Meningitis, 6% showed Dengue shock syndrome, 4 % showed Liver abscess, 4% showed Multiple Liver abscess, and 4% showed Peritonitis.

Frequency of APACHE scores: The frequency of APACHE II group is presented in (Table 1). There are 6 cases in APACHE II (Group <10), 27 cases in APACHE II (Group 10–20) and 17 cases in APACHE II (Group >20).

Frequency of qSOFA scores: Out of 50 patients. The number of patients with qSOFA score 1 is 1, patients with qSOFA score 2 is 36 and patients with qSOFA 3 is 13 in number.

Frequency of LVD: Out of the 50 patients, the percentage of patients with No LVD is 46%, the percentage of patients with mild LVD is 28%, the percentage of patients with moderate LVD is 22% and the percentage of severe LVD is 4%.

Frequency of Outcomes: Out of 50 patients, the percentage of survivors is 52% and the percentage of non-survivors is 48%.

The mean age was 44.17 ± 14.54 years in patients with No LVD, 42.36 ± 12.13 years in patients with mild LVD, 45.82 ± 12.25 years in patients with moderate LVD and 35.0 ± 0.0 years in patients with severe LVD. The difference in the age among the groups was insignificant. The mean GCS was 13.43 ± 2.94 in patients with No LVD, 12.93 ± 3.25 in patients with mild LVD, 13.45 ± 2.38 in patients with moderate LVD and 13 ± 1.41 in patients with severe LVD. The difference in the GCS among the groups was insignificant. The mean HR was 118.61 ± 14.53 in patients with No LVD 107.57 ± 21.6 in patients with mild LVD, 123.82 ± 10.82 in patients with moderate LVD and 125 ± 7.07 in patients with severe LVD. The difference in HR among the groups was insignificant. The mean MAP was 55.78 ± 10.51 in patients with no LVD, 53.88 ± 14.62 in patients with mild LVD, 55.58 ± 11.4 in patients with moderate LVD and 53.5 ± 9.19 in patients with severe LVD. The difference in MAP among the groups was insignificant. The mean RR was 33.65 ± 10.16 in patients with No LVD, 32.64 ± 7.96 in patients with mild LVD, 35.09 ± 9.31 in patients with moderate LVD and 37.0 ± 12.73 in patients with severe LVD (Table 2).

The mean APACHE II was 14.96 ± 6.47 in patients with No LVD,17.93 ± 6.76 in patients with

Table 2: Patient's ANOVA One way for Demographic and Clinical Profile

	LVD (Mean ± SD)					F value	*p*-value
	No (23)	Mild (14)	Moderate (11)	Severe (2)	Total (50)		
AGE	44.17 ± 14.54	42.36 ± 12.13	45.82 ± 12.25	35.0 ± 0.0	43.66 ± 13.01	0.44	0.73
GCS	13.43 ± 2.94	12.93 ± 3.25	13.45 ± 2.38	13 ± 1.41	13.28 ± 2.81	0.11	0.95
HR	118.61 ± 14.53	107.57 ± 21.6	123.82 ± 10.82	125 ± 7.07	116.92 ± 16.83	2.50	0.07
MAP	55.78 ± 10.51	53.88 ± 14.62	55.58 ± 11.4	53.5±9.19	55.11±11.63	0.09	0.97
RR	33.65 ± 10.16	32.64 ± 7.96	35.09 ± 9.31	37.0 ± 12.73	33.82 ± 9.24	0.22	0.89
CBG	132.0 ± 42.11	133.86 ± 59.28	167.55 ± 78.61	68.0 ± 25.46	137.78 ± 58.48	2.13	0.11
APACHE II	14.96 ± 6.47	17.93 ± 6.76	21.82 ± 7.05	24.0 ± 9.9	17.66 ± 7.22	3.19	0.03*
qSOFA	2.04 ± 0.37	2.43 ± 0.51	2.36 ± 0.50	2.50 ± 0.71	2.24 ± 0.48	2.75	0.054

	LVD (Mean ± SD)					F value	p-value
	No (23)	Mild (14)	Moderate (11)	Severe (2)	Total (50)		
LVEF	55.17 ± 3.64	43.93 ± 2.95	35.45 ± 2.21	23.0 ± 4.24	46.4 ± 9.84	138.99	< 0.0001**
IVC	1.25 ± 0.37	1.68 ± 0.29	2.08 ± 0.5	2.25 ± 0.49	1.59 ± 0.52	14.36	< 0.0001**
LVOT	2.33 ± 0.34	2 ± 0.21	1.71 ± 0.36	1.0 ± 0.14	2.05 ± 0.45	18.76	< 0.0001**
LVEDA	14.17 ± 2.84	13.93 ± 2.59	15.45 ± 3.7	16.5 ± 3.54	14.48 ± 2.99	0.93	0.44
LOHS	5.04 ± 1.64	5.0 ± 3.44	4.91 ± 3.83	1.0 ± 0.0	4.84 ± 2.82	1.32	0.28

* P < 0.05 - Significant, ** p < 0.0001 - Very High Significant

mild LVD, 21.82 ± 7.05 in patients with moderate LVD and 24.0 ± 9.9 in patients with severe LVD. The difference of APACHE II among the groups was significant. The mean qSOFA was 2.04 ± 0.37 in patients with No LVD, 2.43 ± 0.51 in patients with mild LVD, 2.36 ± 0.50 in patients with moderate LVD and 2.50 ± 0.71 in patients with severe LVD. Though there was increase in score among the groups, the difference was statistically insignificant. The mean IVC was 1.25 ± 0.37 in patients with No LVD, 1.68 ± 0.29 in patients with mild LVD, 2.08 ± 0.5 in patients with moderate LVD and 2.25 ± 0.49 in patients with severe LVD. The difference in IVC diameter among the groups was highly significant. The mean LVOT was 2.33 ± 0.34 in patients with No LVD, 2 ± 0.21 in patients with mild LVD, 1.71 ± 0.36 in patients with moderate LVD and 1.0 ± 0.14 in patients with severe LVD. The difference in LVOT diameter among the groups was insignificant. The mean LVEDA was 14.17 ± 2.84 in patients with No LVD, 13.93 ± 2.59 in patients with mild LVD, 15.45 ± 3.7 in patients with moderate LVD and 16.5 ± 3.54 in patients with severe LVD.

The difference in LVEDA among the groups was not significant. The mean LOHS was 5.04 ± 1.64 days in patients with No LVD, 5.0 ± 3.44 in patients with mild LVD, 4.91 ± 3.83 in patients with moderate LVD and 1.0 ± 0.0 in patients with severe LVD. Though the LOHS gradually reduced among the groups, the difference of LOHS among the groups was statistically insignificant.

APACHE scores vs LVD function: The mean APACHE II in patients with No LVD is 14.957, the mean APACHE II in patients with mild LVD are 17.929, the mean APACHE II in patients with moderate LVD is 21.818 and the mean APACHE II in patients with severe LVD is 24. The statistical analysis of the results showed that APACHE II is significant with LVD and that the difference between each group is significant.

aSOFA scores vs LVD function: The mean qSOFA in patients with No LVD is 2.04, the mean qSOFA in

patients with mild LVD are 2.43, the mean qSOFA in patients with moderate LVD is 2.36 and the mean qSOFA in patients with severe LVD is 2.50. The statistical analysis of the results showed that the Mean qSOFA in all the groups is significant and the differences in mean qSOFA value in between the groups is significant.

LVEF vs LVD function: The mean LVEF in patients with No LVD is 55.17%, the mean LVEF in patients with mild LVD is 43.93%, the mean LVEF in patients with moderate LVD is 35.45% and the mean LVEF in patients with severe LVD is 23%.

IVC vs LVD function: The mean IVC in patients with No LVD is 1.25 cm. The mean IVC in patients with mild LVD is 1.68 cm, the mean IVC in patients with moderate LVD is 2.08 cm and the Mean IVC in patients with severe LVD is 2.25 cm. The statistical analysis of the results showed that the difference of IVC diameter between all the groups is significant.

DD vs LVD function: Out of 50 patients, the total number of patients with DD are 25 (50%). Out of all the patients with DD, the percentage of patients with DD in No LVD group is 21.7%, the percentage of patients with DD in mild LVD group is 71.4%, the percentage of patients with DD in moderate LVD group is 72.7% and the percentage of patients with DD with severe LVD group is 100%. The statistical analysis showed significant correlation between LVD and DD with a p-value of 0.003.

LVOT vs LVD function: The mean LVOT diameter in No LVD group is 2.33 cm, the mean LVOT diameter in mild LVD group is 2.00 cm, the mean LVOT diameter in moderate LVD group is 1.71 and the mean LVOT diameter in severe LVD group is 1.00 cm. The statistical analysis showed significant decline in the mean LVOT diameter in LVD groups.

LVEDA vs LVD function: The mean LVEDA in patients with No LVD is 14.17 cm^2, the mean LVEDA in patients with mild LVD are 13.93 cm^2, the mean LVEDA in patients with moderate LVD

is 15.45 cm^2 and the mean LVEDA in patients with severe LVD is 16.50 cm^2. The statistical analysis showed no significance in the mean LVEDA in LVD groups.

The mean age was 43.31 ± 13.11 years in survivors and 44.04 ± 13.18 years in non-survivors. The difference between the two age groups was insignificant. The mean GCS was 14.15 ± 1.8 in survivors and 12.33 ± 3.4 in non-survivors. The difference in GCS between the two groups was significant. The mean heart rate (HR) was 116.31

± 18.05 beats per minute in survivors and 117.58 ± 15.75 beats per minute in non-survivors. The difference in LVEDA between the two groups was insignificant. The mean length of hospital stays (LOHS) was 6.42 ± 1.92 days in survivors and 3.13 ± 2.66 days in non-survivors. The difference of LOHS between the two groups was highly significant (Table 3). In gender in outcome, the number of female survivors are 14 and number of male survivors are 12. There is no statistical significance between the two groups in terms of outcome with a 'p' value of 0.786.

Table 3: Independent Samples T-Test for Patient's Clinical Profile

Variable (s)	OUTCOME (Mean ± SD)			t Value	p-value
	Survivors [n=26]	Non-survivors [n=24]	Total [n=50]		
AGE	43.31 ± 13.11	44.04 ± 13.18	43.66 ± 13.01	−0.20	0.84
GCS	14.15 ± 1.8	12.33 ± 3.4	13.28 ± 2.81	2.39	0.03*
HR	116.31 ± 18.05	117.58 ± 15.75	116.92 ± 16.83	−0.27	0.79
MAP	55.14 ± 9.56	55.08 ± 13.75	55.11 ± 11.63	0.02	0.99
RR	32.38 ± 8.56	35.38 ± 9.86	33.82 ± 9.24	−1.15	0.26
CBG	122.31 ± 39.01	154.54 ± 71.2	137.78 ± 58.48	−2.01	0.05
APACHE II	12.5 ± 4.27	23.25 ± 5.33	17.66 ± 7.22	−7.90	< 0.0001**
qSOFA	2.00 ± 0.29	2.5 ± 0.51	2.24 ± 0.48	−4.23	< 0.0001**
LVEF	51.08 ± 7	41.33 ± 10.07	46.4 ± 9.84	4.00	< 0.0001**
IVC	1.28 ± 0.4	1.93 ± 0.4	1.59 ± 0.52	−5.78	< 0.0001**
LVOT	2.29 ± 0.32	1.79 ± 0.42	2.05 ± 0.45	4.70	< 0.0001**
LVEDA	13.77 ± 2.67	15.25 ± 3.18	14.48 ± 2.99	−1.79	0.08
LOHS	6.42 ± 1.92	3.13 ± 2.66	4.84 ± 2.82	5.06	< 0.0001**

*p < 0.05 - Significant, **p < 0.0001 - Very High Significant

The Figure 1 represents the outcome of the clinical diagnosis the number of survivors out of 6 patients with Acute Gastroenteritis was 6. The number of survivors out of 2 patients with cellulitis was 0. The number of survivors out of 3 with Dengue shock syndrome was 2. The number of survivors out of 2 in patients with liver abscess was 1. The number of survivors out of 6 in patients with meningitis was 5. The number of survivors out of 2 patients with peritonitis was 0. The number of survivors out of 10 patients with pneumonia was 7. The number of survivors out of 5 patients with Pneumonia with ARDS was 1. The number of survivors out of 12 patients with urosepsis was 6.

APACHE Score vs Patient outcomes: The outcome in different APACHE II groups is represented that the number of survivors in APACHE II <10 points is 6/6. The number of survivors in APACHE II 10–20 points is 19/27 and the number of survivors in APACHE II >20 points is 1/17. The statistical analysis showed significant difference

qSOFA vs Patient's outcome: The number of survivors with qSOFA 1 is 1/1, number of survivors with qSOFA 2 is 24/36 and the number of survivors with qSOFA 3 is 1/13. The statistical analysis showed significant difference amongst the groups.

LVD vs Patient's outcome: The number of survivors in patients with No LVD was 17/23, the number of survivors in patients with mild LVD was 6/14, the number of survivors in patients with moderate LVD was 3/11 and the number of survivors in patients with severe LVD was 0/2. The difference of outcome amongst the groups was statistically significant.

IVC vs Patient's outcome: The number of survivors with IVC diameter <1 cm was 6/6, number of survivors with IVC diameter 1–2 cm was 20/38 and the number of survivors with IVC diameter >2 cm was 0/6. The difference amongst the groups was statistically significant.

DD vs Patient's outcome: The correlation between the DD and outcome is represented that the number
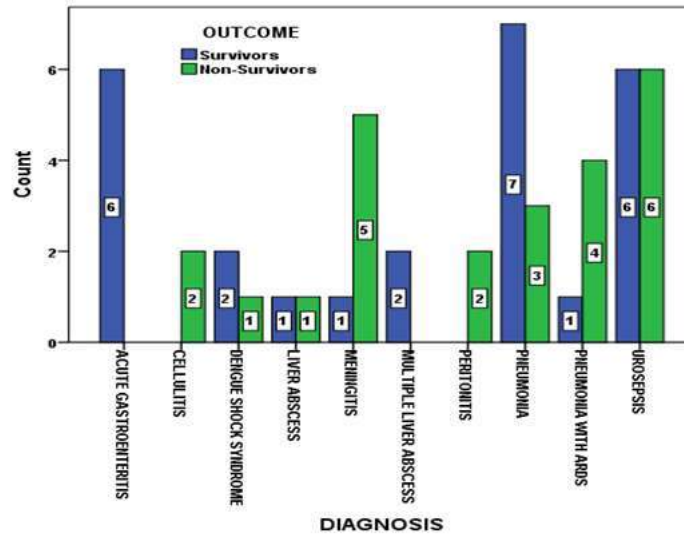
Fig 1: Diagnosis vs patient outcomes

of survivors in patients with No DD was 19/25 and the number of survivors in patients with DD was 7/25. The difference in outcome between the two groups was statistically significant.

LVOT vs Patient's outcome: The mean LVOT in survivors was 2.29 cm and the mean LVOT in non-survivors was 1.79 cm. The difference in mean LVOT between the groups was statistically significant.

In APACHE II group, the survival of patients was assessed and the results in Figure 2 showed that the patients with score more than 20 died in 0–4 days. Very few survived after 10 days.

In qSOFA group, the survival of patients was assessed and the results (Fig. 3) showed that the patients with score of 3 died in 0–4 days. No patient survived after 10 days.

In LVEF group, the survival of patients was assessed and the results (Fig. 4) showed that the patients with score of 3 died in 0–4 days. No patient survived after 10 days.

The AUC value of APACHE II is 0.944. The AUC value of qSOFA is 0.740 and the AUC value of LVD is 0.736 showing significant sensitivity in prediction of outcome (Fig. 5).
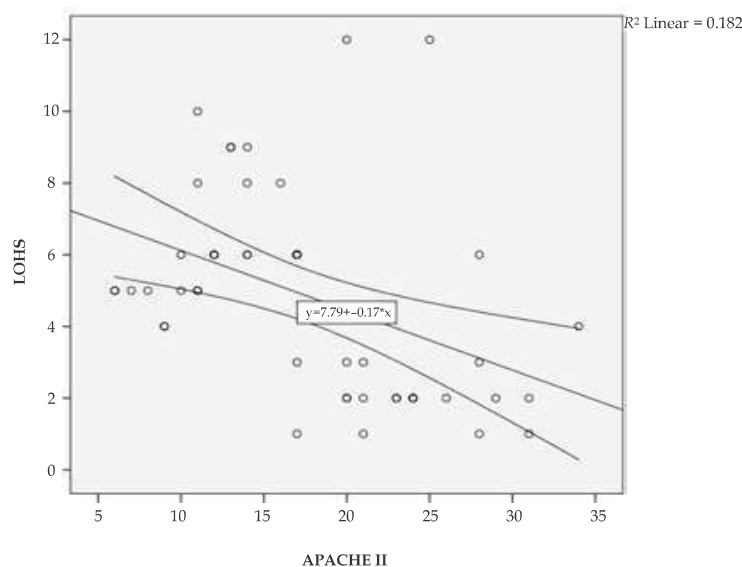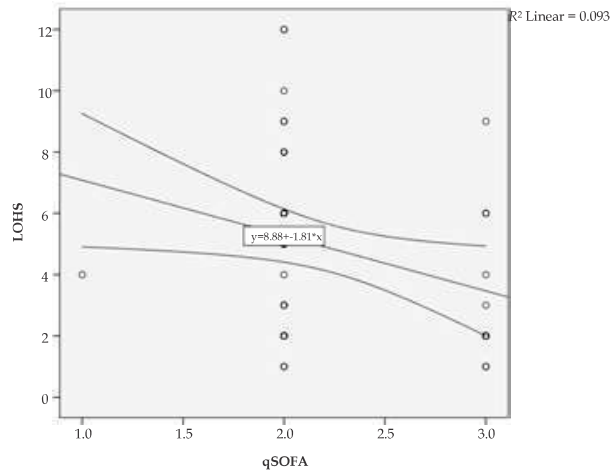

Fig. 2: APACHE II vs LOHS
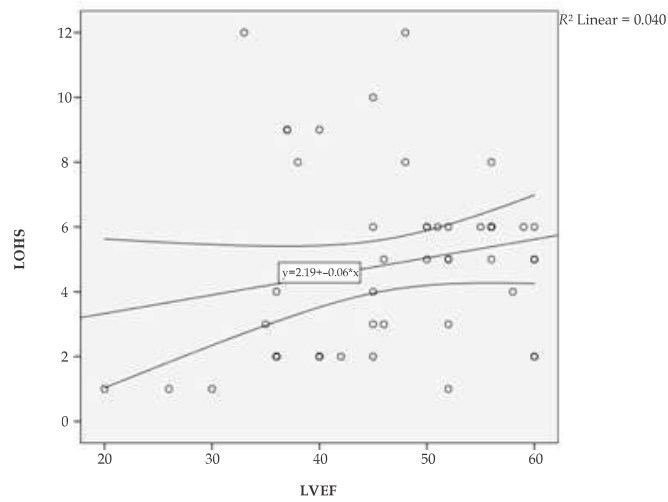
Fig. 3: qSOFA vs LOH

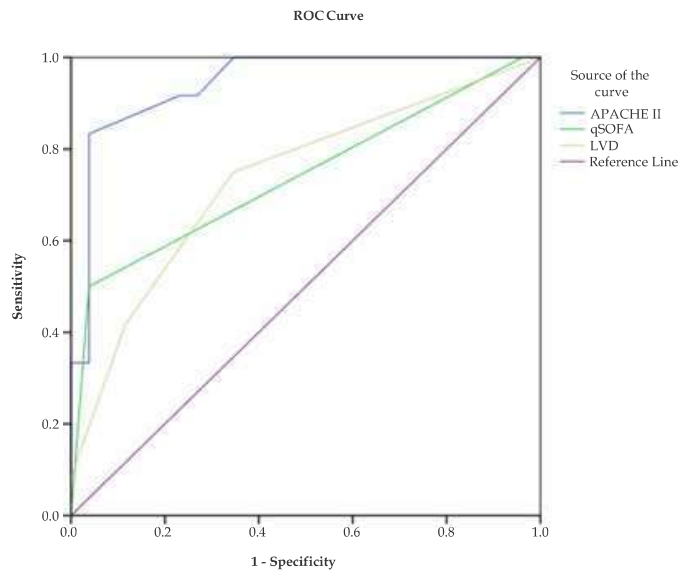
Fig. 4: LVEF vs LOHS

Fig. 5: ROC among APACHE II, qSOFA and LVD.

Discussion

Present study had a total population of 50 patients with 24 (48%) male and 26 (52%) female, out of which there were 12 male non-survivors and 12 female non survivors with no statistical significance of gender in outcome ('p'=0.786), this study is supported by a study conducted by Patil et al.[7] with total of 51 patients with sepsis to determine the role of echocardiography in sepsis in which total non survivors are 9 (28.12%) male patients and 6 (31.57%) female patients with no statistical significance ('p'= 0.793).

In the Present study there were 16 survivors and three non-survivors out of 19 patients with single vasopressor (noradrenaline) support. There were ten survivors and 13 non-survivors out of 23 patients with dual vasopressor (norepinephrine and vasopressin) support. There were 0 survivors and 8 non-survivors out of 8 patients with triple vasopressor (noradrenaline, vasopressin, epinephrine) support.

In a study by Ritter et al.[8] cardiac index and cardiac function index (CFI) both provide prognostic information for patients with serious sepsis or septic shock. In another study by Sawchuk, et al.[9] the authors mention that TTE does not enhance the prediction of outcome over APACHE II in MICU and SICU. 44% of the patients with sepsis or septic shock showed Systolic myocardial dysfunction. In the present study, Systolic myocardial dysfunction is present in 54% of the patients with septic shock.

The present study showed similar results with APACHE II as a good prognostic score for the outcome with a 'p' value of <0.0001 with a very high statistical significance. The present study is supported by Sadaka F et al.[10] studied a total of 2,054 septic patients. With an average APACHE II score 19 ± 7, and average APACHE II score 68 ± 28.

In present study patients had septicemia along with a documented infectious concentrate at ICU admission, plus they had a higher fatality rate. Therefore, additional considerable studies including patients along with non-septicemia are required to compare qSOFA along with other earlier warning scores as earlier screening tools. The present study is supported by a study done by Freund et al.[11] where the qSOFA score was prospectively validated in an emergency department population in a study including 879 patients in 30 emergency departments in 4 different countries.

Cardiac illness has a high prevalence in hospital patients, which may complicate the management of sepsis.[12] The present study showed similar findings with a percentage of 54% of the total study population with Left ventricular dysfunction.

The present study showed LVEF (–0.441) showed a negative correlation with APACHE II (1) and qSOFA (0.570) scores (Table 4). Parker et al.[13] were the first to describe remaining ventricular hypokinesia in septic shock in which individuals with serious LVEF with an enough LV heart stroke output could be managed through acute LV dilatation.

In the present study, admission LVEF was slightly higher (non-significant) in the group associated with survivors, whereas LVEF was reduced and highly significant in the group of non-survivors with the (p-value = 0.0001). Present hypothesis had been serial LVEF might predict survival in sufferers with septic shock. Wan SH et al.[14] in the evolution from diastolic to systolic dysfunction,

Table 4: Two-tailed Correlations among APACHE II, qSOFA, LVEF and LOHS

		APACHE II	qSOFA	LVEF	LOHS
APACHE II	Pearson Correlation	1	.570**	–.441**	–.426**
	p-value		.000	.001	.002
	N	50	50	50	50
qSOFA	Pearson Correlation	.570**	1	–.413**	–.305*
	p-value	.000		.003	.031
	N	50	50	50	50
LVEF	Pearson Correlation	–.441**	–.413**	1	.199
	p-value	.001	.003		.165
	N	50	50	50	50
LOHS	Pearson Correlation	–.426**	–.305*	.199	1
	p-value	.002	.031	.165	
	N	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

three clinical entities can be discerned. The present study 25 (50%) out of the total population had DD and 18 (75%) patients out of 25 patients with DD succumbed with a significant 'p' value of 0.001.

The mean LVOT diameter in No LVD group is 2.33 cm, the mean LVOT diameter in mild LVD group is 2.00 cm, the mean LVOT diameter in moderate LVD group is 1.71, and the mean LVOT diameter in severe LVD group is 1.00 cm. The statistical analysis showed a significant decline in the mean LVOT diameter in LVD groups and the mean left ventricular outflow tract (LVOT) diameter was 2.29 ± 0.32 cm in survivors and 1.79 ± 0.42 cm in non-survivors. The difference of LVOT diameter between the two groups was highly significant in the present study.

In a previous study by Cardoso et al.[15] demonstrated that each hour of waiting ahead of ICU admission was individually associated with a 1.5% increased the risk of ICU death. The present study showed survival rates were increased among patients by having a length of stay associated with outcomes ($p < 0.0001$).

The LOHS had a negative correlation with APACHE II and qSOFA and positive correlation with LVEF.

Identifying patients who become worse within the hospital secondary to sepsis presents an extra challenge. The populations generally experience concurrent medical or surgical conditions that mystify the diagnosis, making early recognition challenging. There is no exact treatment for patients with sepsis, and management thus relies on infection control with source elimination and useful antibiotics and organ function support. There is good evidence that early management is associated including improved outcomes in these patients, and the ability to perceive the condition as soon as possible is thus important so that treatment could be initiated promptly during disease to prevent worsening. However, the early diagnosis of patients with sepsis continues to be a challenge for an Emergency physician at the bedside in the Emergency Department.

Conclusion

qSOFA being bedside tool in prognosticating sepsis, Clinical prediction scores like APACHE II require multiple variables, where Transthoracic Echocardiography is Non-invasive, less time consuming and bedside tool in ED in resuscitation and prognostication of patients with Septic shock.

Present study results show that the qSOFA score ≥2 in admission could be helpful as a screening device for predicting clinical intensity and medical resource make use of within 72 hours right after admission, and for forecasting the 28–day mortality price.

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