Prediction of Hospital Outcome in Septic Shock: A Prospective Comparison of Tissue Doppler and Cardiac Biomarkers

Thesis
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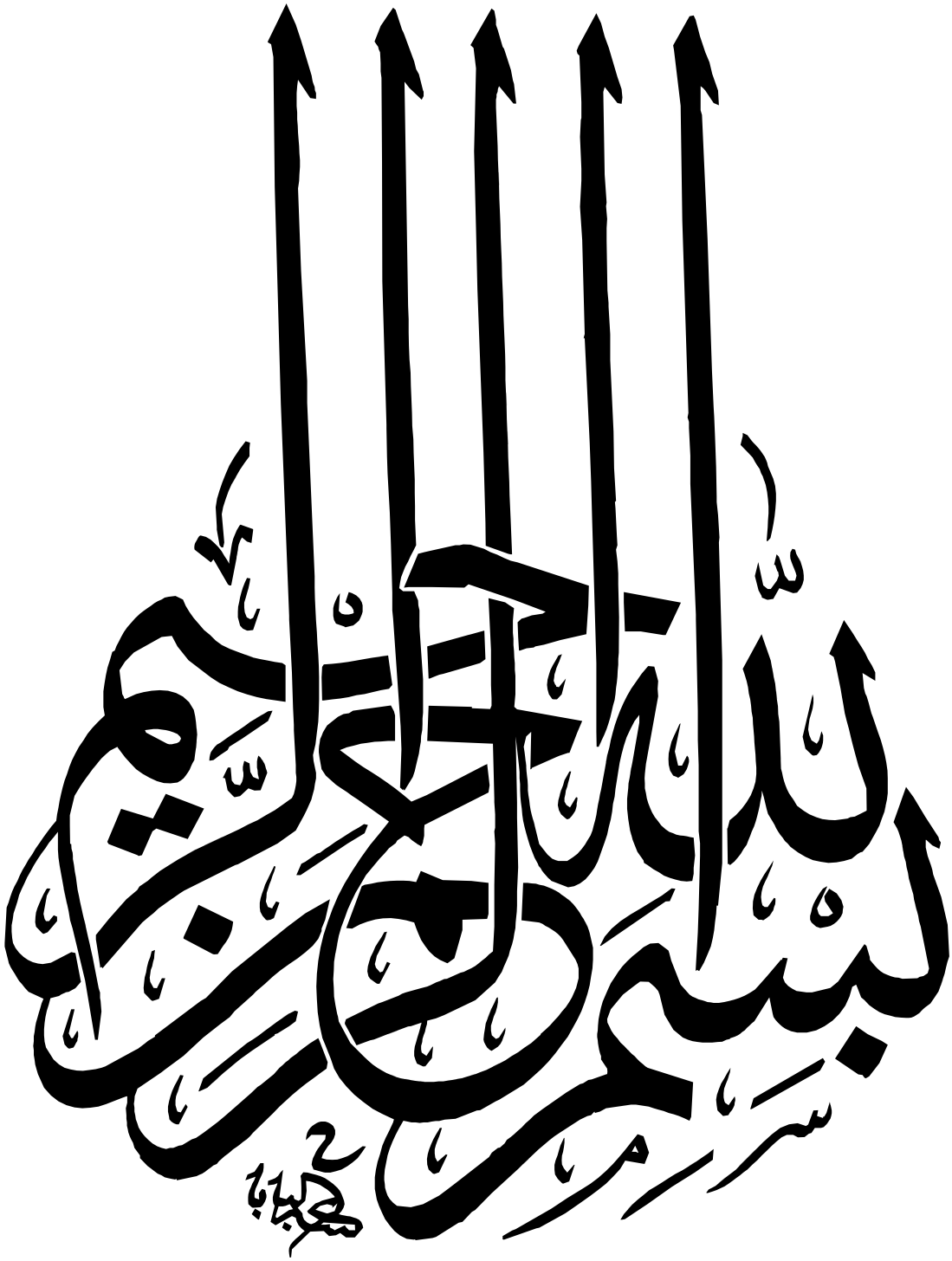
بسم الله الرحمن الرحيم

To

My Father, Mother,

Sister and Brother

With special dedication to my husband

Dr. Waleed Omar

&

My Sweet Heart, Mariam & Nour.

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Abstract

Prediction of hospital outcome in septic shock; comparison of tissue Doppler and different biomarkers

Background: assessment of the diastolic dysfunction by tissue Doppler imaging (TDI) and cardiac biomarkers such as B-type natriutic peptide BNP together can be a good tools for prediction of hospital outcome in septic shock patients **Purpose:** to evaluate and compare the prognostic significance of (TDI) particularly E/é (peak early diastolic transmitral / peak early diastolic mitral annular velocity), cardiac biomarkers (N- terminal proBNP (NTproBNP); cardiac troponin I (cTnI)) and high sensitive C- reactive protein (hs CRP) in septic shock. **Methodology**: twenty eight patients with septic shock were involved in a prospective randomized clinical study (mean age were 62±*9.3* yrs, 62% male) were divided into 2 groups according to mortality and were subjected to all fluid resuscitation, transthoracic echocardiography TTE and laboratory measurement of the mentioned cardiac biomarkers. **Results:** there were 20 pt (71.4 %) died Group A, 8 patients (28.6%) survived Group B. E/é ratio was significantly lower in survivors than non-survivors (8.59± 2.29 vs.12.32± 2.37, *P*- value=0.001), hs CRP was found to be significantly lower between survivals and non survivals (33.49±10.82 vs. 41.65±7.33, *P*-value =0.02). There was a strong positive correlation between E/e' and PMR, (*P*- value=0.002, and r= 0.6). There was a positive correlation between hs-CRP with PMR (*P*-value= 0.01 r=0.4). By cox regression analysis 5 parameters were found to be independent predictors of mortality in septic shock which were: E/e ratio, APACHE IV, SOFA 1, SOFA 3 and DT as P value (0.009, 0.002, 0.003, 0.007 and 0.0001) respectively. **Conclusions:** E/é and DT obtained by PW and TDI both offer independent and better prognostic prediction of hospital outcome in septic shock as compared with cardiac biomarkers (NT,proBNP & cTnI).

Key words: TDI, septic shock, mortality, pro BNP, hs CRP, cTnI

Table of Content

List of Abbreviations

A:	Atrial peak velocity
a':	Peak active late diastolic septal mitral annulus velocity
ACCP:	The American College of Chest Physicians
ACS:	Acute coronary syndrome
ADP:	Adenosine diphosphate
AIS :	Abbreviated injury score
ALI:	Acute lung injery.
ANP :	A-type natriuretic peptide
APACHE :	Acute physiology and chronic health evaluation
APC:	Activated protein C
APS :	Acute Physiology Score
ARDS:	Adult respiratory distress syndrome.
ARF :	Acute renal failure
ATP:	Adenosine triphosphate
ATS :	The American Thoracic Society
AUC:	Area under the curve.
BNP :	Beta naturetric peptide,
bpm:	Beat per minute,

cGMP-	Cyclic guanosine monophosphate
CHF:	Congestive heart faluire.
CI:	Cardiac index
CNS :	Central nervous system
CO :	Cardiac output
CVP :	Central venous pressure
CWD :	Continuous wave Doppler
DBP:	Diastolic blood pressure
DIC :	Disseminated intravascular coagulopathy
DNA:	Deoxy ribonucleic acid
D Nase:	Deoxyribo nuclease
DT :	Deceleration time
E :	Peak early diastolic transmitral velocity
e' :	Peak Early diastolic septal mitral annulus velocity
E/é	Peak early diastolic transmitral / peak early diastolic mitral annular velocity
ED :	Emergency department
EGDT :	Early goal directed therapy
ESICM :	European Society of Intensive Care Medicine
FiO_2:	Fraction of inspired oxygen
Fmol/l:	Ficomole/l

GCS :	Glasgow Coma Scale
G-CSF :	Granulocyte colony-stimulating factor
GIT:	Gastrointestinal tract
GM-CSF :	Granulocyte macrophage colony-stimulating factor
HR :	Heart rate
hs- CRP:	High sensitive C- reactive protein
ICU:	Intensive care unit
IL :	Interleukin
iNOS :	Inducible nitric oxide synthase
ISS :	Injury severity score
IVRT :	The isovolumic relaxation time
LA:	Left atrium
LAP :	Left atrial pressure
LOD :	The Logistic Organ Dysfunction
LOS:	Length of stay
LV	Left ventricle,
LVEDP:	Left ventricular end diastolic pressure
LVEDVI:	Left ventricular end diastolic volume index.
LVEF :	Left ventricular ejection fraction
LVESVI:	Left ventricular end systolic volume index.

LVSWI :	Left ventricular stroke work index
MAP:	Mean arterial blood pressure
MDS:	Myocardial depressant substance
MELD :	Model for end-stage liver disease
mg/dL :	Milligram per dicilitre
MHC :	The major histocompatibility complex molecules
MIF :	Macrophage inhibitory factor;
mL/kg:	Milliliter per killogram
mm Hg :	Millimeter mercury
mmol/L :	Millimole per litre
µL:	Micro liter
MODS :	Multiple organ dysfunction syndrome
MPM :	Mortality Probability Models
MR:	Mitral regurge
NADPH:	Nicotinamide adenine dinucleotide phosphate.
NK:	Natural killer cells
NTproBNP :	N terminal pro beta naturetric peptide,
OTD:	LV outflow tract diameter
PAC :	Pulmonary artery catheterization
$PaCO_2$:	Arterial carbon dioxide tension,

PAF :	Platelet-activating factor
PAI-1:	Plasminogen activator inhibitor 1
PaO_2:	Arterial oxygen tension
PAWP:	Pulmonary artery wedge pressure
PCWP:	pulmonary capillary wedge pressure
Pmol/l:	Picomole/l
PVAR :	The pulmonary venous atrial flow reversal
PVD:	Pulmonary vein diastolic wave
PVR :	Pulmonary vascular resistance
PVS :	The pulmonary vein systolic flow
RNCA	Radionuclid coronary angiography.
R Nase:	Ribonuclease
RR :	Respiratory rate
RV :	Right ventricle
RVEDV:	Right ventricular end diastolic volume
RVEDVI :	Right ventricular end diastolic volume index
RVEF :	Right ventricle ejection fraction
RVSWI :	Right ventricular stroke work index
SAPS :	Simplified acute physiology score

SBP:	Systolic blood pressure
SCCM:	The Society of Critical Care Medicine
SIRS:	Systemic inflammatory response syndrome
SIS :	The Surgical Infection Society
SMR :	Standardized mortality ratio
SOFA :	Sequential organ failure assessment
SVI :	Stroke volume index
SVR :	Systemic vascular resistance
TAFI:	Thrombin activatable fibrinolysis inhibitor
TDI:	Tissue doppler imaging
TF :	Tissue factor
TISS :	Therapeutic intervention scoring system
TNF :	Tumor necrosis factor
TnI:	Troponin I
TnT :	Cardiac troponin T
t-PA :	Tissue plasminogen activator
TPN:	Total parenteral nutrition
TTE:	Transethroracic echocardiogram
VTI :	Velocity time integrity
WBC:	White blood cell,

List of Master Table Abbreviations

Pts No. Number

Sex: 1: Male

2: Female

DM: 0: no

1: yes

HTN: 0: No

1: Yes

BSA: Body surface area

HR: Heart rate

Ryth: Rhythm

SBP: Systolic blood pressure

DBP: Diastolic blood pressure

MAP: Mean arterial pressure

RR: Respiratory rate

CVP: Central venous pressure on day one

BL bal/OA: Fluid balance after 24 hrs

CVP2: Central venous pressure after fluid resuscitation

NA n/kg/min: Noradrinaline dose mic/kg/min

Dop: Dopamine mic/kg/min

APS score: Acute physiology score

PMR: Predicting mortality rate

SOFA1: Sequential organ failure assessment on day one septic shock

SOFA2: Sequential organ failure assessment on day three septic shock

ICUdur: intensive care unit duration

ICU mort: intensive care unit mortality

28-D Mortality: 28 days mortality

DPDSS: Duration post developing septic shock

S of infection: source of infection

1: Chest 2: Bedsore 3: VTI

4: Abdominal 5: Wound 6: Obstetric

7: encephalitis

Cr-1: Serum creatinine on day one

Cr-2: Serum creatinine on day three

Plt.: Platelets count

Bl Trans: Blood transfusion

Plt: Platelets transfusion

VD/d: Duration of mechanical ventilation in days

VT: Tidal volume