Prediction of mortality among critically ill obstetric patients using the simplified acute physiology score II and the Acute Physiology and Chronic Health Evaluation II scores

A comparative study

Thesis submitted for partial fulfillment of the Master Degree in Critical Care Medicine

By

Mohammed Abd-Elmoneim Ibraheem

M.B.B.Ch.

Supervisors

Dr. Amr Elsayed El-Hadidy

Assistant professor of critical care medicine
Faculty of medicine
Cairo University

Dr. Ayman Nehad Moharram

Lecturer of critical care medicine
Faculty of medicine
Cairo University

Dr. Mohammed Fawzy Abd-Elaleem

Lecturer of critical care medicine
Faculty of medicine
Cairo University

Cairo University
2010

بِسْمِ اللّهِ الرَّحْمَنِ الرَّحِيمِ

" قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا
إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ "

صَدَقَ اللَّهُ العَظِيم

سورة البقرةٌ الآية ٣٢

ABSTRACT

Abstract

Introduction: *Critically ill obstetric patients represent an interesting group with unique characteristics, whose management is challenged by the presence of a fetus, an altered maternal physiology and diseases specific to pregnancy. The Acute Physiology and Chronic Health Evaluation II (APACHE II) and simplified acute physiology score (SAPS II) scores, etc.; have been used to assess the severity of illness and to predict mortality and morbidity in critically ill obstetric patients, with conflicting results.*

Aim of study: *This is a prospective analytical study of obstetric patients admitted to the ICU, aiming at assessing the utility of SAPS II and APACHE II in the prediction of maternal mortality and morbidity.*

Patient and Methods: *60 consecutive obstetrically ill patients were studied for complete physical examination, reporting the hemodynamic data in the first 24 hours and full laboratory investigations, and then all these data were applied to SAPS II, APACHE II and APACHE IV scores.*

Results: *60 female patients with mean age of 27±6 y (range of age between 18 y to 42 y), only 3 patients died (5%) and 57 patient survived (95%),the mean length of hospital stay in the ICU was 2.77±2.27 days (range 1 to 15 days), The mean SAPS II score was 21±13, the mean APACHE II score was 16±7, the mean APACHE IV score was 51±21, The mortality prediction by SAP II, APACHE II, and APACHE IV scores were 8.5%, 26.7% and 6.3% respectively, The mean hospital "ICU" stay in survivors was 2.7±2.3, while that of non survivors was 2.67± 2.1 days showing no significant difference P value (0.938), The mean SAPS II, APACHE II, APACHE IV scores in survivors were 19.5±10.2, 15.4±6.3, 48.2±16.2 respectively, while mean scores among the non survivors were 56.3±18, 28.6±2.6, 107.3±29 respectively, showing higher significant values in non survivors P values (0.0001, 0.001 and 0.0001) respectively, scores were regressed on mortality status using logistic regression analysis. The predictability was assessed by goodness-of-fit test and receiver operated characteristic curve.*

Conclusion: *APACHE IV and SAPS II scores have more accurate mortality predictability than that of APACHE II score, while APACHE II score was more accurate regarding morbidity.*

Key words : *SAPS II - APACHE II - obstetric emergencies .*

Acknowledgment

First and before all, I would like to thank Allah -The Lord of Majesty and Generosity - for giving me strength to perform my abilities in order to achieve this work.

Thank to ***Prof. Dr. Sherif Mokhtar****, our Master mind, we always owe him much. He offered us not only facilities to complete this work but also the spirit of being eager to gain more experience and skills. Words are not sufficient to express my deep gratitude for him.*

Words stand shorter coming to express my deepest appreciation and gratitude to ***Prof. Dr. Amr Elsayed Elhadidi****, Professor of Critical care medicine, Faculty of Medicine, Cairo University, for his generous supervision, valuable remarks and kind guidance to make the realization of this work much easier.*

I would like to express my sincere appreciation and gratitude to ***Prof. Dr. Ayman Nehad Moharram****, Lecturer of Critical care medicine, Faculty of Medicine, Cairo University, who saved no time or effort in supervising this work; his faithful suggestions were helpful and precious.*

I also want to express my cardinal appreciation and gratitude to ***Dr. Mohammed Fawzi Abd-elaleem****, Lecturer of Critical care medicine, Faculty of Medicine, Cairo University, for his patience, constant encouragement and support throughout this work.*

I would like to express my profound gratitude to ***Dr. Lamia Hamed*** *who helped me to accomplish the statistics of this thesis.*

To my family and my friends who always offer me their unlimited support and push me forward.

Mohammed Abdel-moneim

CONTENTS

List of Tables

List of figures

List of abbreviations

µL	**Micro liter**
ABGs	**Arterial blood gases**
ACE	**Angiotensin converting enzyme**
AF	**Atrial fibrillation**
AIS	**Abbreviated injury score**
APACHE	**Acute Physiology and Chronic Health Evaluation**
APS	**Acute physiology score**
aPTT	**activated partial prothrombin time**
ARDS	**Acute respiratory distress syndrome**
ARF	**Acute renal failure**
ATN	**Acute tubular necrosis**
AUC	**Area under the curve**
Bid	**Twice daily**
BP	**Blood pressure**
BUN	**Blood Urea Nitrogen**
C.I.	**Confidence interval**
CABG	**Coronary angio bypass graft**
CAP	**Community acquired pneumonia**
CBC	**Complete blood picture**
CHE	**Chronic health evaluation**
CPAP	**Continuous positive airway pressure**
CS	**Cesarean section**
CT	**Computed tomography**

D	**Diagnostic category weight.**
DIC	**Disseminated intravascular thrombosis**
DKA	**Diabetic keto acidosis**
DM	**Diabetes mellitus**
DVT	**Deep venous thrombosis**
e	**The base of the natural logarithm**
ECG	**Electrocardiogram**
EEG	**Electroencephalogram**
EF	**Ejection fraction**
ExpB	**The estimate of the conditional odds ratio**
FFP	**Fresh frozen plasma**
FIO_2	**Inspiratory fraction of oxygen**
FRC	**Functional residual capacity**
GCS	**Glascow coma scale**
GFR	**Glomerular filtration rate**
HCO_3	**Bicarbonate**
HCT	**Hematocrete**
HELLP	**Hemolysis, elevated liver enzymes and low platelet count**
HUS	**Hemolytic uremic syndrome**
ICH	**Intracranial hemorrhage**
ICU	**Intensive care unit**
IM	**Intramascular**
INR	**International normalized ratio**
ISS	**Injury severity score**
ITP	**Idiopathic thrombocytopenic purpura**

IV	**Intravenous**
LDH	**Lactate dehydrogenase**
LMWH	**Low molecular weight heparin**
Logit	**The natural log of the odds**
LOS	**Length of the ICU stay**
Ln	**The Natural logarithm**
LVH	**Left ventricle hypertrophy**
MELD	**Model for end-stage liver disease**
mEq	**Mille equivalent**
mm Hg	**Millimeter mercury**
mmol	**Milli mol**
MODS	**Multi organ dysfunction syndrome**
MRI	**Magnetic resonant irradiation**
MV	**Mechanical ventillation**
P (A-a) O_2	**Alveolar arterial oxygen pressure gradient**
P value	**Statistical significance**
PaO_2	**Partial pressure of oxygen in arterial blood**
PCO2	**Partial pressure of carbon dioxide in arterial blood**
PE	**Pulmonary embolism**
PH	**Power of Hydrogen ions**
PIH	**Pregnancy induced hypertension**
PO	**Per Os**
PPCM	**Peripartum cardiomyopathy**
PPH	**Peripartum hemorrhage**
PRBCs	**Packed red blood cells**

PRN	**Per needed**
PT	**Prothrombin time**
PDR	**Predicted death rate**
r	**Pearson's correlation coefficient**
Rads	**The unit of irradiation intensity**
RBC	**Red blood cell**
ROC	**Receiver Operating Characteristic**
S	**The risk imposed by emergency surgery**
SAPS	**Simplified acute physiology score**
SD	**Standard deviation**
SOFA	**Sepsis related organ failure assessment**
SPSS	**T-test value**
TISS	**Therapeutic intervention scoring system.**
TLC	**Total leukocytic count**
T-test	**Student test**
TTP	**Thrombotic thrombocytopenic purpura**
u	**Mann-Whitney test value**
UOP	**Urine output**
VT	**Ventricular tachycardia**
WBCs	**White blood cells**
Wks	**Weeks**
X^2	**Chi-square test value**

Introduction

Introduction

Critically ill obstetric patients represent an interesting group with unique characteristics, whose management is challenged by the presence of a fetus, an altered maternal physiology and diseases specific to pregnancy.[157]

Pregnant patients account for a small number of the intensive care unit (ICU) admissions in developed countries (≤ 2%), but they can reach up to 10% or more in developing countries.[68]

Separate intensive care units have been developed for cardiac, burns, respiratory, pediatric and neonatal care, but an ICU only for obstetric patients is not yet widely available in developing countries.[9]

Admission to the ICU for obstetric patients can be due to obstetric and non obstetric causes; Obstetric causes include: peripartum hemorrhage, shock, sepsis & multi organ dysfunction (MODS), pregnancy induced hypertension (PIH), HELLP syndrome and disseminated intravascular coagulopathy (DIC).[77]