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Effect of Clinical Practice Nursing Guidelines on Hypovolemic Shocked Traumatic Patient Outcome

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Abstract

Back ground; Hypovolemic shock is the more form of shock in patients who complain from traumatic injury. **Objective:** to evaluate the effect of clinical practice nursing guidelines on outcome for trauma patients with hypovolemic shock. **Design:** A quasi-experimental research design. **Setting:** In emergency department, trauma, general, and post operative Intensive Care Units of Assuit Main University Hospital. **Subjects:** A purposive sample of 60 adult patients diagnosed with hypovolemic shock including both sex, their age ranged from (20-60 years old) divided equally into two groups. **Tools:** Three tools were used.: **tool I;** patient assessment sheet, **tool II:** fluid assessment sheet, and **tool III:** hypovolemic shock evaluation tool. **Methods:** the researcher was applied the primary survey, applied Injury Severity Score ISS, recorded vital signs, fluid intake and output. **Results:** Finding of this study a highly significant statistical contrast between both groups in relation to total death rate (3.33 % - 40%), no statistical difference as regards to age, sex, type of trauma, ISS, complications. **Conclusion:** Applying nursing guidelines for trauma patients with hypovolemic shock improve vital signs and less in the rate of death. **Recommendation:** Develop a construction protocol for health care services about pre hospital care for traumatic patient with hypovolemic shock.

Key words: *Nursing Guidelines, Patients' Outcome & Hypovolemic shock*

Introduction

Shock is often the first stage of the body's alarm response to trauma or severs tissue damage. Many forms of shock result when the body loses its ability to circulate and adequate supply of oxygenated blood to all its components, particularly the brain. (Mary, 2016). The body tries to compensate for any trauma or insult to its integrity. In order to the central nervous system CNS control all body task. Shock states have historically been classified according to the casual failing organ or system. Hypovolemic shock results in a state of hypoperfusion because of a loss of circulation volume. (Samuel et al., 2013)

Trauma is the main source of death for persons aged from 1 to 44 years in the world wide. (Betty, 2014 & Kumar et al., 2014) the major causes of acute mortality in injured patients are devastating central nervous system injuries and massive exsanguinations. Among the trauma Patients who don't die immediately, some have sufficient blood loss to cause to cause hypovolemic shock. Patients with hypovolemic shock are thought to be at high risk of complications and death. (Brown, 2014)

Hypovolemic shock is the most common type of shock experienced in patients who suffer from traumatic injury. (Blackbourne, 2011) It occurs as the result of sudden and massive loss of circulating volume. The diminishing in flowing volume

diminishes tissue perfusion which keeps the metabolic needs of the tissues and cells from being met (Elliott et al., 2012). Hypovolemic shock occurs when the reduction in intravascular volume of 15% to 25%. This would represent a loss of 750 to 1,300 mL of blood in a person 70-kg Hypovolemic shock can many of your organs to fail. (Brunner, 2010)

Outcome from sever hemorrhage remains poor, with mortality rates approaching 50% for patients need blood transfusion. More than 6 million deaths occur due to trauma out of which 20% are due to uncontrolled bleeding (Kumar et al., 2014)

The nursing guideline and Nursing care of the patient with hypovolemic shock require ongoing systematic assessment. Many of the interventions required in caring for the patient with shock call for close collaboration with other members of the health care team and a physician's orders. Primary prevention of hypovolemic shock is an essential focus of nursing intervention. Hypovolemic shock can be prevented in some instances by closely monitoring who are at risk for fluid deficit and assisting with fluid replacement before intravascular volume is depleted. (Betty J. 2014)

Significance of the study

The numbers of patients with trauma attendance in the trauma intensive care unit at Assuit main

university hospital in duration from January 2014 to December 2014 were average 234 patients per year. About 40% of trauma related deaths are related to hemorrhage or its consequence. There were very limited previously published studies that conducted in Assiut Main University hospital about evaluate effect of implementing nursing guidelines on outcome for trauma patient with hypovolemic shock.

Aims of the study

The aim of this study was evaluate the effect of implementing nursing guidelines on outcome for trauma patient with hypovolemic shock.

Research hypothesis:-

- A significant difference in the ICU stays between the study and control group
- A significant difference in the complications between the study and control group
- A significant difference in the improvement between the study and control group

Patient & Methods

Materials

Research design

A quasi experimental research design was conducted in this study.

Setting

This study was carried out at the health care setting involves Assiut Main University Hospital and The area involves emergency trauma department (6 beds), trauma (10 beds), general (14 bed), and post operative (6 beds) intensive care units (ICUs) of Assiut Main University Hospital.

Patient

A purposive sample of 60 adult patients diagnosed with hypovolemic shock including both sex, their age ranged from (20-60years old) and admitted to the previously mention settings were included in the study. They were divided equally into two equal groups (30patients as control group who received routine hospital care and 30 patients as study group who received nursing care guidelines).

Exclusion criteria

- Aged more 65 year or less 18 year.
- Patients who suffering from coagulation problems.
- Patients complain from lung, kidney, liver diseases or diabetes

Inclusion criteria

- Maximum Age (20-60) years, both sexes.
- Recent accidents
- Trauma patient with internal or external source of bleeding
- for seven months.

Tools of the study

Three tools were used to collect the data in this study based on the relate literatures. (SMeltzer et al., 2010, Craven et al., 2007).

Tool one: patient assessment sheet for hypovolemic shock.

This tool consists of four parts.

Part I: Demographic and clinical data assessment sheet

This part includes demographic data about the patient such as patients, age, sex, and clinical data as diagnosis, cause and type of trauma, grade of hemorrhage, past history of diseases, hospital arrival methods, date of admission, and date of discharge to assess patients profile and clinical data.

Part II: Assessment of the vital signs and hemodynamic state

This part was developed to assess the vital signs and hemodynamic state it includes: respiratory rate and rhythm, blood pressure, temperature, heart rate and rhythm, and the mean arterial blood pressure taken from the bed side monitor, central venous pressure and tissue perfusion using capillary refill and skin perfusion.

Part III: Acute Physiology and Chronic Health Evaluation Score (APACH-II).

this part was developed for both groups of patients by (APACH-II) scoring was introduced and refined from (Naved et al., 2011) it measures the severity of illness for patient in intensive care unit and it was based on 12 Physiology variables, including Glasgow Coma Scale (GCS), APACHE II score with a maximum of 71 its values was applied and some controversy surrounds ideal time for reading variables, and deriving scores, which reading on admission (base line) and 3rd. day.

Part IV: Injury Severity Score (ISS):

This part adjusted from (Boyd et al., 1987).It was applied by used injury severity score to provide overall score for patient with multiple injuries .each injury is assigned an abbreviated injury score and was allocated to one of six region (head, face, chest, abdomen ,extremities,) including pelvis, external only. Any injury coded as 6 automatically convert the (ISS) to 75.

Tool two: fluid assessment sheet

This tool was developed to assess fluid balance and consists of two parts:-

Part I: Intake and output assessment sheet

This part was created by the researcher to assess patient intake, output and type of fluids using, crystalloid (normal saline (NS), lactated ringers (LR), colloids, and whole blood or blood products.

Part II Assessment Rote of oxygenation and mechanical ventilator data

This part was created by the researcher to assess oxygenation and rout of administration as simple mask, venture mask, nasal annual and mechanical ventilation data as mode of mechanical ventilation, Positive End Expiratory Pressure PEEP), Pressure

support (Ps) Fraction of Inspired Oxygen (FIO₂), mandatory respiratory rate and Tidal Volume (TV) .

Tool three: Hypovolemic shock evaluation tool

This tool was consisting of two parts.

Part I: Complication Assessment sheet

This part was created by the researcher to assess patients complications includes, hypothermia, metabolic disturbances, disseminated intravascular coagulation(DIC),systemic inflammatory response syndrome (SIRS), multiple organ dysfunction syndrome (MODS), and death.by using the assessment and monitoring of the vital signs and the laboratory investigations.

Part II: Laboratory investigations and radiological examination

This part includes, (ABGs, serum lactate , complete blood count CBC, blood glucose level, prothrombine time and concentration, serum electrolytes, sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), renal and liver function testes ,radiological examination (X-ray, computed tomography (CT) scan or an ultrasound)to evaluate patient condition.

Methods

The study was carried on three stages:

1. Preparatory stage for both groups

- Consent to conduct the study was acquired from the hospital responsible authorities' after clarified the aim of the study.
- Development of the study tools were designed after reviewing the related literature was done.
- The tools were examine for content related validity by jury of 5specialists in the area of critical care nursing and critical care medicine
- A pilot study was conducted on 10% (six cases) of the sample in selected scope to evaluate the applicability and clearly of tools, the reliability was tested for tool 1, 2 and 3 by using Cronbach's alpha (tau-equivalent reliability) coefficient ($r=0.821, 0.802$ and 0.824 respectively) which its internal consistency "Good", then tools were modified according to the result of pilot study.
- Informed consent was obtained from each patient or from responsible person for the unconscious patient.
- Confidentiality and anonymity data was under an assured.

Data collection

Start from Augusts 2016 to February 2017 on three stages preparatory stage, implementation stage, and evaluation stage.

the data were collected from the first day of admission after stabilization of the patient condition and for three consequent days, every day and every shift then the data were recorded in the developed tools .Data were collected on three stages.

Implementation stage

For both study and control group

the researcher introduced herself for the patients if oriented or his family if patient is comatosed and for the nursing staff and explained the purpose and nature of the study then recorded and assessed the patients demographic data from the patient or from the nurses if the patient comatosed, such as patients, age, sex, and also clinical data as diagnosis, cause and type of trauma, grade of hemorrhage, past history of diseases, hospital arrival methods, date of admission, and date of discharge, and recorded in tool one part I, when the patient admitted to the emergency department assessed of the vital signs and hemodynamic state includes: assessed respiratory rate and rhythm, blood pressure, temperature, heart rate and rhythm, and the mean arterial blood pressure taken from the bed side monitor and central venous pressure and tissue perfusion using capillary refill and skin perfusion and Symptoms of shock was recorded in Tool one part II.

On admission the researcher measure the severity of illness for patient in the emergency department by using (APACHII) score and was recorded in Tool one part III (base line) and 3rd day.

The researcher used the Injury Severity Score (ISS) is an anatomical scoring system that provides an overall score for patients with multiple injuries. Was recorded in tool one part IV.

The researcher assessed patient intake, output and type of fluids used crystalloid (normal saline (NS), lactated ringers (LR), colloids, and whole blood or blood products. on admission and then every two hours every day and every shift for three days and was recorded in Tool two part I.

the researcher assessed every day and every shift the method and oxygenation and rout of administration as simple mask, venture mask, nasal cannula and mechanical ventilation data as mode of mechanical ventilation, Positive End Expiratory Pressure PEEP), Pressure support (Ps) Fraction of Inspired Oxygen (FIO₂), mandatory respiratory rate and Tidal Volume (TV)and recorded in tool two-part II .

The researcher assess patients complication every day and every shift and was recorded in tool three part I.

Laboratory investigation and diagnostic tests include (ABGs, lactate hemoglobin hematocrit, blood glucose level, prothrombine time and concentration, serum electrolytes, sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), renal and liver function testes) radiological examination (X-ray, computed tomography (CT) scan or an ultrasound)

and was recorded in tool three part II. For both control and study groups.

For the control group (received routine hospital care)

The routine hospital care for the control group when patient come to the hospital introduce to ICU or emergency department. the nurse attached patient to bedside monitor to recorded the blood pressure, heart rate, assisted in insert large IV Line and give patient IV fluids, perform sample for ABGs and take sample to detect cross match, assist in perform sonar and X-ray, put patient on oxygen mask if need, administer blood products, the doctors insert endotracheal tube, chest tube as needed.

Evaluation of clinical outcomes for patient in the control group

Data for this group was collected from 30 patients who met predetermine criteria in the control group who received the routine hospital care using part I, part II, part III, part IV in tool one. Part I, part II in tool two, part I, and part II in tool three.

For the study group, (received the nursing guideline)

The researcher was assess and observe the patients who are received the nursing guide line from the first day of admission

Application of designed nursing guidelines was performed by the researcher.

Implementation phase for the study group

During this phase, the developed nursing guidelines for traumatic patient with hypovolemic shock were implemented for the intervention group which consists of 30 patients who met the predetermined criteria; the following steps were followed during its implementation:

This phase was begun from first day of admission for three consequence days and every shift.

During this phase, the developed nursing guidelines for traumatic patient with hypovolemic shock.

The researcher was record vital signs on admission and every 15 minutes in the first hour then every hour when patient become stable

Performing the primary survey for the trauma patient include (ABCDEs)

A=airway, B=breathing, C=circulation, D=disability, E=Exposure and environment.

Airway assessment

Assess airway patency with cervical spin precautions.

Assess signs of airway obstruction.

Airway intervention

Remove secretion and foreign bodies.

Maintain open airway by sure that neck is midline and stabilized

Perform the jaw thrust or chin left maneuver.

Protect the cervical spin by use modified jaw thrust maneuver to open the airway without extending the neck.

Use nasopharyngeal airway in a conscious patient.

Use oropharyngeal airway in unconscious patient with no gag reflex.

Evaluate level of consciousness use (GCS).

Spine stabilization and perform X-ray.

Breathing assessment

- **Look** (observe deformity, drains)

- Sweating
- Cyanosis
- Use of accessory muscles/abdominal breathing
- Rate & depth of breaths
- Equality of chest movements

- **Listen**

- Near face-note presence of secretions, stridor/wheeze
- Auscultate - note depth & equality, consolidation, sounds

- **Feel**

- Position of trachea
- Palpate for crepitus/emphysema, assess depth & equality
- Percussion note – hyper-resonance: pneumothorax, dullness: fluid
- Assess patient for intubation or tracheostomy

Breathing Intervention

- Administer 100% Oxygen with bag value mask.
- Palpate, percuss and auscultate chest.
- Look for the jugular venous distension suggestive of tension pneumothorax.
- If not successful –assist in Tracheal intubation/tracheostomy
- Treat life threatening conditions (pneumothorax or tension pneumothorax).

Circulation Assessment

- Assess level of consciousness by using "GCS".
- Assess skin color and capillary refill.
- Assess pulse and blood pressure.
- Assess bleeding or hemorrhage (visible).
- Assess the neck veins distended.

Circulation Intervention

- Establish I.V access with two large bore I.V catheter and short fluid therapy
- Direct pressure to control and stop visible bleeding.

Disability assessment

- Assess consciousness by using (GCS).
- Assess pupil size and reaction to light.
- Level of any spinal cord injury (limb movements)
- Assess Oxygenation, ventilation; perfusion may all affect the level of consciousness.

Disability Intervention

- Identify areas to investigate during secondary assessment.

Exposure assessment

- Assess the injuries and environmental exposure.

Exposure Intervention

- Undress the patient completely to identify all injured areas.
- Prevent dropping their core body temperature.
- Institute appropriate therapy (warming therapy for hypothermia and cooling therapy for hyperthermia).
- Assess Hemoglobin, lactate, arterial blood gases base deficit, blood glucose level.
- Assessment for vital signs and symptoms of shock.
- Assess the patient vital signs when the patient arrived to hospital and then every 15 min then every 30 min in the first hour then every hour when the patient become stable then every 2 hours.
- Assess symptoms of hypovolemic shock.

- Identify the sources of Hemorrhage

- Carefully inspect for external bleeding sources and examine the long bones.
- Perform supine chest X-ray and pelvic x ray within 10 minutes of arrival. Perform an ultra-sound on the abdomen.
- Identify the class of hemorrhage based on percentage of blood volume loss.

- The best management of the bleeding patient.

- Establish patient airway.
- Ensure adequate ventilation and Oxygenation.
- Usually applying firm, direct pressure and elevating the extremity.
- I.V fluids will need to be given rapidly usually 250 ml warmed boluses to maintain systolic blood pressure between 80-90 mmHg.
- External bleeding should be controlled with direct pressure.
- Internal bleeding requires operative intercostal drain insertion.

- Fluid resuscitation for hypovolemic shock

- Early use of blood.
- If blood is not available or delayed compound sodium lactate is preferred.
- 0.9 Normal saline is also an acceptable alternative large volumes may result in metabolic acidosis.
- Colloids used in resuscitation.
- Assess intake and output after insert urinary catheter.
- Identify medical and surgical history by using tool one part I and perform physical examination from head to toe.
- Follow up for the hemodynamic state every shift and every day by using tool one part II.
- measure the severity of illness for patient in intensive care unit by using (APACH II) score in

the first and 3rd day in tool one part III and (ISS) score in tool one part IV .

- Follow up intake and output by using tool two parts I for 3 days.- Laboratory investigation include (ABGs , lactate hemoglobin , hematocrit , blood Glucose level prothrombin time , prothrombin concentration , electrolytes renal and function tests using tool three part I .
- Provide good nursing care for the patient includes:
- Change patient position every 2 hours.
- Make oral and eye care regularly.
- Use sterile technique during any procedure.
- provide for the patient (suction – dressing)
- Give the medication in time as order.
- Provide good nutrition for the patient.
- Provide reassurance for patient's family

Evaluation phase

This phase was done to evaluate the outcome of using nursing guidelines for traumatic patients with hypovolemic shock .This was done by comparing the results of outcomes of the both groups by using tool one, part I ,II, III,IV, tool two part I,II and tool three part I,II.

Ethical Consideration

- Research proposal was confirmed from ethical committee in the faculty of nursing
- There was no hazard for study during application of the research
- The study was follow common ethical principle in clinical research
- Written consent was acquired from patients or guidance that was participated in the study after clarified the nature and purpose of the study.
- Confidentiality and anonymity will be confirmed.

Statistical analysis

- The gathered information were investigated,, prepared for computer entry, coded, analyzed and tabulated and using computer program (SPSS/ Version 22).data were presented uses descriptive statistics in the form of frequencies, percentages, mean and standard deviation. Independent sample T-test, Chi-square and One-way-ANOVA tests used in the relationship between study and control groups'. The critical value of the tests P was considered statistically significant when P less than 0.05 and Cronbach's alpha was done to test reliability of the tools.

Result

Table (1): Distribution of the study sample related to demographic and clinical data of patients: (n=30).

Items	Study Group		Control Group		F-test	P-value
	No	%	No	%		
Gender					1.839	0.180
Male	28	93.3	28	93.3		
Female	2	6.7	2	6.7		
Age					0.000	1.000
20 to < 35	21	70.0	17	56.7		
35 to < 50	8	26.7	11	36.7		
50 to < 60	1	3.3	2	6.6		
Mean ± SD	30.4±10.0		34.1±10.7			
Range	18-58		18-60			
Type of trauma:					0.985	0.325
Blunt	23	76.7	26	86.7		
Penetrating	7	23.3	4	13.3		

Independent sample T-test for comparing tow groups

Statistical significant differences ($P < 0.05$) CT, Computed tomography ICU, intensive care unit

Table (2): Distribution of the study sample related to clinical manifestation data in the emergency department: (n=30).

Items	Study Group		Control Group		F-test	P-value
	No	%	No	%		
Symptoms of shock						
Tachycardia	15	50.0	18	60.0	0.492	0.486
Tachycardia & Hypotension	7	23.3	5	16.7		
Tachycardia & Oliguria	2	6.7	2	6.7		
Tachycardia & Shallow breathing	4	13.3	4	13.3		
Tachycardia & Hypotension & Shallow breathing	2	6.7	1	3.3		
Skin and mucous membrane integrity						
Pale skin color	15	50.0	22	73.4	4.437	0.040*
Pale skin color & Cyanosis	10	33.3	1	3.3		
Pale skin color & Others	5	16.7	3	13.3		
Others	0	0.0	3	10.0		
Muscle-skeletal system						
Fr cervical	0	0.0	1	3.3	0.573	0.452
Fr upper extremities	3	10.0	2	6.7		
Fr lower extremities and pelvic	13	43.4	10	33.3		
Fr upper & lower extremities	4	13.3	3	10.0		
Fr lower extremities & Other	1	3.3	0	0.0		
Fr cervical & upper extremities	0	0.0	1	3.3		
Others	1	3.3	3	10.0		
No	8	26.7	10	33.4		
Mental state assessment						
A-Alert	14	46.7	10	33.1	0.604	0.440
V-response to verbal	9	30.0	13	43.3		
U-un response	2	6.7	2	6.7		
R-response to painful	2	6.7	4	13.3		
V-response to verbal & Un response	3	10.0	4	13.3		
V-response to verbal & painful	0	0.0	1	3.3		

Independent sample T-test * Statistical significant differences ($p < 0.05$)

Fr/fracture

Table (3): Assessment of patients 'vital signs and hemodynamic state in the ICU:

Items	Study Group	Control Group	P-value
	Day	Day	
1st day	Mean \pm SD	Mean \pm SD	
Temp	36.8 \pm 0.5	36.7 \pm 0.9	0.286
Pulse	143.3 \pm 10.9	126.2 \pm 19.1	0.016*
R.R	21.9 \pm 5.9	32.6 \pm 17.1	0.007**
BL.Pr	116.3 \pm 16.7	112.7 \pm 24.0	0.263
C V P	3.5 \pm 1.8	2.0 \pm 4.9	0.464
Capillary refill	No	No	0.241
Delayed	23	18	
Normal	6	11	
Absent	1	1	
2nd day	Mean \pm SD	Mean \pm SD	
Temp	37.0 \pm 0.5	37.3 \pm 0.8	0.459
Pulse	137.6 \pm 10.4	109.6 \pm 29.3	0.0001***
R.R	20.4 \pm 1.8	21.5 \pm 5.1	0.785
BL.Pr	118.6 \pm 4.3	120.0 \pm 14.1	0.581
C V P	4.2 \pm 0.6	4.4 \pm 1.1	0.924
Capillary refill	No	No	0.221
Delayed	4	11	
Normal	26	18	
Absent	0	1	
3rd day	Mean \pm SD	Mean \pm SD	
Temp	36.9 \pm 0.1	37.4 \pm 0.9	0.537
Pulse	127.7 \pm 14.1	101.0 \pm 25.5	0.0001***
R.R	19.9 \pm 0.6	30.3 \pm 20.8	0.018*
BL.Pr	118.3 \pm 7.4	118.6 \pm 20.3	0.511
C V P	8.3 \pm 1.6	8.6 \pm 3.7	0.183
Capillary refill	No	No	0.206
Delayed	0	6	
Normal	30	23	
Absent	0	1	

One-Way ANOVA

* Statistical significant differences ($p < 0.05$)

Temp/, temperature

BL.Pr/ blood pressure

R.R/respiratory rate

C V P/central venous pressure

Table (4): Interpretation of patients' arterial blood gases.

Items	Study Group						Control Group						P-value
	1 st day		2 nd day		3 rd day		1 st day		2 nd day		3 rd day		
	No	%	No	%	No	%	No	%	No	%	No	%	
Compensated metabolic acidosis	2	6.7	1	3.3	0	0.0	1	3.3	3	10.0	4	13.3	0.003 **
Compensated metabolic alkalosis	1	3.3	0	0.0	0	0.0	0	0.0	0	0.0	4	13.3	
Uncompensated metabolic acidosis	0	0.0	1	3.3	0	0.0	3	10.0	4	13.3	5	16.8	
Uncompensated metabolic alkalosis	0	0.0	1	3.3	0	0.0	2	6.7	1	3.3	1	3.3	
Compensated respiratory acidosis	8	26.7	0	0.0	0	0.0	1	3.3	1	3.3	1	3.3	
Compensated respiratory alkalosis	1	3.3	1	3.3	1	3.3	6	20.0	6	20.1	1	3.3	
Uncompensated respiratory acidosis	5	16.7	0	0.0	2	6.7	2	6.7	10	33.3	0	0.0	

Items	Study Group						Control Group						P-value
	1 st day		2 nd day		3 rd day		1 st day		2 nd day		3 rd day		
	No	%	No	%	No	%	No	%	No	%	No	%	
Uncompensated respiratory alkalosis	10	33.3	3	10.0	1	3.3	10	33.3	0	0.0	8	26.7	
Normal	0	0.0	23	76.7	26	86.7	3	10.0	3	10.0	3	10.0	
Not Recorded (death during data collection)	3	0.0	0	0.0	0	0.0	2	6.7	2	6.7	3	10.0	
TOTAL	30	100	30	100	30	100	30	100	30	100	30	100	

One way ANOVA

* Statistical significant differences ($p < 0.05$)

Table (5): Assessment of patients' fluid balance (intake and output).

Items	Study Group			Control Group			P-value
	1 st day	2 nd day	3 rd day	1 st day	2 nd day	3 rd day	
	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD	
Intake:							
Crystalloid	3803.3 \pm 1252.6	2949.3 \pm 577.2	2980.3 \pm 713.1	3251.6 \pm 1506	2393.1 \pm 875	2774.1 \pm 949.0	0.128
Colloid	596.1 \pm 245.7	750.0 \pm 0.0	0.0 \pm 0.0	808.3 \pm 361.1	0.0 \pm 0.0	500.0 \pm 0.0	0.041*
Blood products	631.6 \pm 286.6	487.5 \pm 61.2	500 \pm 0.0	466.6 \pm 87.9	472.2 \pm 83.3	400.0 \pm 136.9	0.036*
Output							
Urine	2232.7 \pm 1756.7	2260.3 \pm 1349	1929.6 \pm 958.6	2428.5 \pm 1721.9	2512.5 \pm 1514.2	2558.0 \pm 833.2	0.673
Gastric secretion	1358.3 \pm 1168.0	1650.0 \pm 640.3	1240.0 \pm 779.7	50.0 \pm 0.0	-	-	0.347
Total and balance							
Total intake	4815.0 \pm 1934.2	3446.6 \pm 974.4	3193.3 \pm 938	4101.6 \pm 1596.4	3541.0 \pm 1708.6	3426.7 \pm 1535	0.125
Total output	2845.6 \pm 1945.6	2763.3 \pm 1123.3	2140.0 \pm 876.7	2260.3 \pm 1905	2438.2 \pm 1700.3	2682.7 \pm 786.1	0.244
Balance	3078.3 \pm 1629.9	1735.0 \pm 1126.4	1836.6 \pm 2043.8	2434.3 \pm 2032.8	2010.3 \pm 2288.8	1287.9 \pm 1009.3	0.202

One way ANOVA

* Statistical significant differences ($p < 0.05$)

Table (6): Assessment of patients' injury severity score (ISS): (n=30)

Items	Study Group		Control Group		F-test	P-value
	No	%	No	%		
Minor	1	3.3	0	0.0	1.143	0.290
Moderate	12	40.0	6	20.0		
Serious	7	23.3	12	40.0		
Sever	10	33.3	12	40.0		
Injury Severity Score					2.287	0.136
Mean ± SD	18.6±8.8		21.0±8.2			
Range	4.0-38.0		9.0-40.0			

One way ANOVA

* Statistical significant differences ($p < 0.05$)

Table (7): Distribution of the study sample related to complication: (n=30).

Items	Study Group		Control Group		F-test	P-value
	No	%	No	%		
Hypothermia	1	3.3	0	0.0	1.030	0.315
SIRs	0	0.0	0	0.0		
Metabolic disturbance	19	63.4	11	36.7		
Death without complications	0	0.0	0	0.0		
Metabolic disturbance & Death	1	3.3	6	20.0		
Hypothermia & Metabolic disturbance	0	0.0	4	13.3		
SIRs & Metabolic disturbance	0	0.0	2	6.7		

Items	Study Group		Control Group		F-test	P-value
	No	%	No	%		
Metabolic disturbance & MODs	0	0.0	1	3.3	0.228	0.635
Hypothermia & Metabolic disturbance & Death	0	0.0	1	3.3		
SIRs & Metabolic disturbance & Death	0	0.0	1	3.3		
Metabolic disturbance & MODs & Death	0	0.0	2	6.7		
Hypothermia & Metabolic disturbance & MODs & Death	0	0.0	1	3.3		
Hypothermia & SIRs & Metabolic disturbance & MODs & Death	0	0.0	1	3.3		
No	9	30.0	0	0.0		
ICU stay					0.228	0.635
1 to < 15	23	76.7	25	83.3		
15 to < 30	4	13.3	2	6.7		
30 to < 60	3	10.0	3	10.0		
Mean ± SD	13.2±13.8		11.6±11.4		16.901	0.0001***
Range	2-60		2-52			
Total death rate	1	3.3	12	40.0		

One way ANOVA

(DIC) Disseminated intravascular coagulation

MODS (Multiple Organ Dysfunction Syndromes):

* Statistical significant differences ($p < 0.05$)

SIRS (Systemic Inflammatory Response Syndrome):

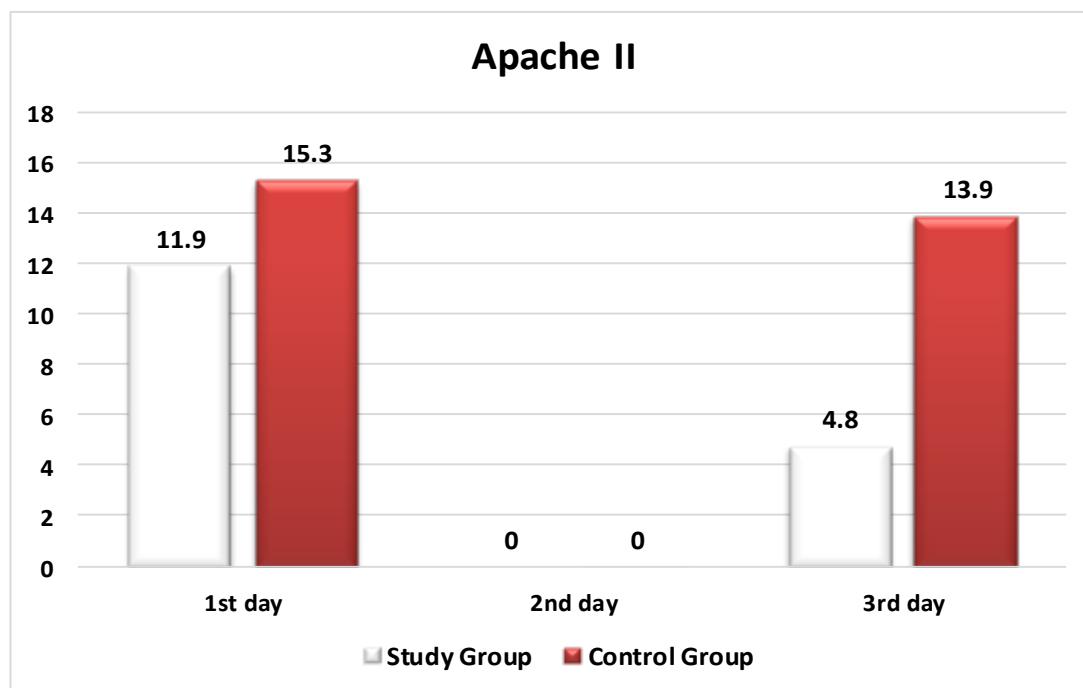


Figure (1): Percentage distribution of Apache II mean.

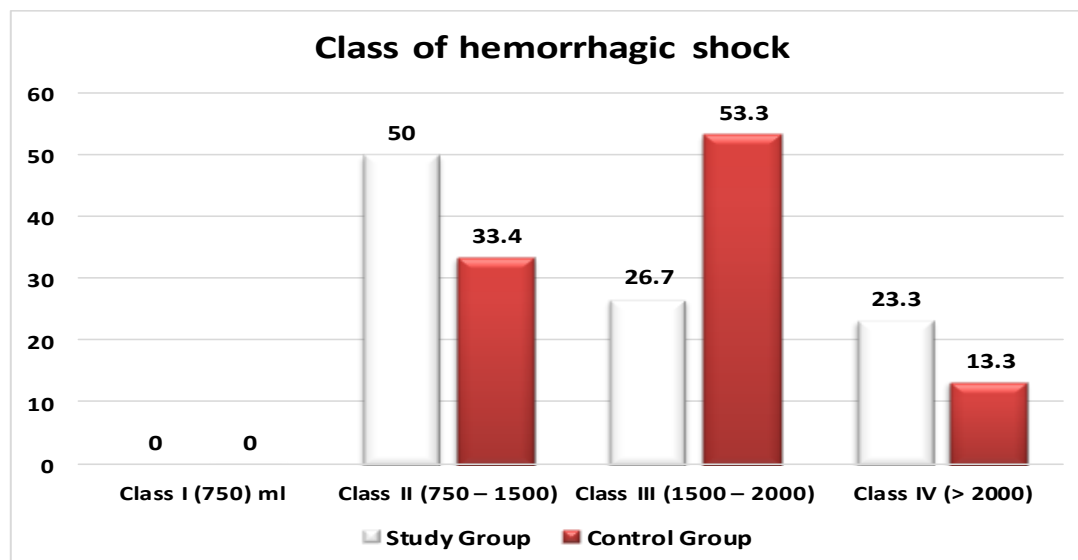


Figure (2): Percentage distribution of patients' class of hemorrhagic shock.

Table (1): This table demonstrates that; there were no statistical significant differences regarding age and gender between study and control groups. The vast majority of groups were male with percentage (93.3%). Greater than half of groups aged 20 to < 35 years (70.0%, 56.7%) and most of them were blunt type of trauma (76.7%, 86.7%).

Table (2): This table demonstrates that concerning symptoms of shock most of study and control groups had tachycardia (50.0% and 60.0%). Most of patients in both study and control groups (43.4%-33.3%) had fracture lower extremities and pelvic respectively with no statistical difference between the two groups. there was statistical difference regarding skin and mucous membrane integrity between study and control groups.

Table (3): This table demonstrates that there were statistical differences among groups' vital signs and hemodynamic state between study and control groups in regards to (RR 3rd day & pulse 1st day) with p-value (0.016 & 0.018 respectively). There was very highly statistical difference among study and control groups related to (Pulse 2nd day & pulse 3rd day) with p-value (0.0001).

Table (4): This table demonstrates that There was highly statistical difference among study and control groups in regards to arterial blood gases interpretation in the 2nd day and 3rd day (P-value 0.003).

Table (5): This table demonstrates that There was statistical difference among study and control groups in regards to (colloid & blood products) with p-value (0.091 - 0.036 respectively).

Table (6): This table demonstrates that There was no statistical difference as regard injury severity score (ISS) between study and control groups.

Table (7): This table demonstrates that There was no statistical difference between groups' hypovolemic shock evaluation tool (complications assessment) in study and control groups. There were no statistical significant differences related to ICU stay and highly statistical difference between groups' related to total death rate with p value (0.0001).

Figure (1): Percentage distribution of Apache II mean this figure show There was statistical difference between groups' Acute physiology and chronic health Evaluation score (Apache II) in study and control groups at 1st day. There is very highly statistical difference between groups' Acute physiology and chronic health Evaluation score (Apache II) in study and control groups at 3rd day.

Figure (2): Percentage distribution of patients' class of hemorrhagic shock. That show There was no statistical difference as regard injury severity score (ISS) between study and control groups.

Discussion

Consistently, around 5.8 million individual die worldwide due to events related to trauma, which compares to around 9.7 per10000 population making trauma one of the main sources of death and disability in all age bunches in both genders. Around 40% of trauma related deaths are due to hemorrhage or its outcomes. (Dünser, 2013, Campbell et al., 2015)

The present study was clarified that most of patients were males in study and control group respectively with no measurable distinction amongst study and

control gatherings. The results of the study agree with (Magnon, et al., 2016) who reported that there was no measurable distinction between the groups was found in gender, and agree with (Rozil, 2006) who reported that was a significant difference between the groups related to the sex.

As regard the average age of study and control groups, greater than half of groups aged 20 to < 35 years respectively with no statistical difference amongst study and control groups. The result of the present study disagree with (Magnon, 2016) who reported that there was only statistically significant parameter was age of patients in the study group tended to be older also, this finding was nearly similar to the results of (Heckbert et al., 2014) and (Rozil, 2006) they reported that no statistically significant difference between study and control groups. The population was predominantly young males will as no significant differences were noted between the two groups regarding age,

In this study as regard type of trauma most of them were blunt type of trauma. Respectively with no measurable contrast amongst study and control groups. This in according with (Heckbert et al., 2014) who reported that no statistically significant difference between study and control groups regarding type trauma most of them blunt trauma

In the present study regarding heart rate was not found to be a good predictor of hypotension, but its sensitivity and specificity make it clinically unreliable in diagnosing hypovolemic hypotension. Concerning symptoms of shock most of study and control groups had tachycardia. But less than half of groups had tachycardia and hypotension respectively with no statistical difference between study and control groups. This in according with (Sharene, 2010) who found that tachycardia was not to be a reliable indicator of hypotension.

In this study most of patients in both study and control groups had fracture lower extremities and pelvis. respectively with no statistical difference between study and control groups that agree with (Manson, 2010) who reported most of patients in both study and control groups had fracture lower extremities and pelvis in the study.

Regarding vital signs, there were statistical difference between groups' vital signs regarding (RR 3rd day & pulse 1st day). There were very highly statistical difference between study and control groups regarding (Pulse 2nd day & pulse 3rd day) that disagree with (Morrison et al., 2011) who report that no statistical difference between groups' hemodynamic state and vital signs.

In this study there were no significant difference regarding systolic blood pressure. This in according with (Yanagawa, et al., 2007) who reported no

significant differences were noted between the two groups of shock regarding systolic blood pressure

In the present study there was statistical difference between groups regarding (colloid & blood products) that disagree with (Yanagawa, et al., 2007) who reported that no significant differences were evident between the two groups regarding volume of infusion, volume of transfusion, and agree with (Rozil, 2006) who reported there was statistical difference between the study groups regarding colloids and blood product in my opinion that was highly statistical difference regarding to hemoglobin was related to overcrowding in the hospital, shortage in facilities, and shortage in blood groups, colloids, and blood product.

In this study there was no statistical difference between groups regarding crystalloid intake in the emergency department that come accordance to the study of (Rozil, 2006) who reported there was no statistical difference between the study groups regarding crystalloid intake in the emergency department

In this study there was no statistical difference between the study groups' regarding injury severity score (ISS) and LOS between groups study and control groups was in accordance with study of (Rozil, 2006) & (Magnon, 2016) they was reported no significant difference between the groups was found in, overall LOS, or ISS, The result of our study was disagree with (Morrison et al., 2011) who reported There were no statistically significant differences between the two groups with regard to any of these scores except for ISS, which was higher in the HMAP group than that in the LMAP group.

The present study clarified that there was no statistical difference between groups' in the ISS was ≥ 25 in most of study and control group that was accordance with (Heckbert, 1998) who reported the ISS was ≥ 25 in most of patients, indicating severe injury.

In this study that was no difference regarding organ failure between the studies groups that were agree with (Sharene, 2010) who reported that was organ failure, affected the two groups equally.

In this study metabolic disturbances was common complication in both study and control group agree with (Gonce, 2013) who reported metabolic disturbances was common complication of hypovolemic shock.

This study clarified there was difference in rates of death between groups that disagree with. (Sharene, 2010) who reported there was no difference in rates of death

The current study clarified that there was measurable contrast between gatherings' Acute physiology and chronic health Evaluation score (Apache II) (Apache

II) between study and control groups at 1st day. There is very highly statistical difference between groups' acute physiology and chronic health Evaluation that disagree with (Nguyen, 2004) who detailed there was no measurable contrast between gatherings' between groups' acute physiology and chronic health Evaluation score (Apache II) between study and control groups

Conclusion

Hypovolemic shock is the more widespread kind of shock experienced in patients who suffer from traumatic injury. Applying nursing care guide lines for trauma patients with hypovolemic shock improve acute physiology and chronic health Evaluation score (Apache II), improve vital signs regarding respiratory rate and heart rate, laboratory investigation regarding arterial blood gases interpretation, serum lactate, blood glucose level, CBC Picture, electrolytes, coagulation profile, liver and renal functions, and less in the rate of death.

Recommendation

In light of the investigation discoveries, the accompanying proposals are recommended

- Develop a construction protocol for health care services about pre hospital care for traumatic patient with hypovolemic shock
- develop a training program for health care provider about first aide for trauma patient with hypovolemic shock
- Reapply this research on a larger probability sample acquired from different geographical areas in Egypt for generalization.

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