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Recent Advances In Management Of Hemorrhagic Shock

An Essay

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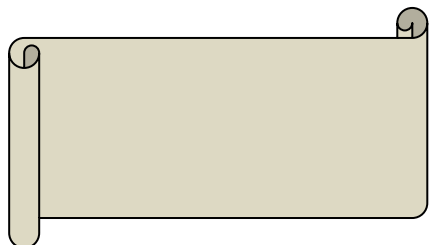
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Abstract

Shock is a life threatening condition. As long as this bleeding is not controlled, neuro endocrine axes are activated, leading to release of catechol amines and non adrenergic stress hormones. However, as hemorrhage persists, these mechanisms are no longer able to compensate, progressing to hemorrhagic shock Definition of shock: condition of low blood perfusion to tissues resulting in cellular injury and inadequate tissue function. 1 – Hypo volemic Hypo volemic shock is the most common type of shock and is caused by insufficient circulating volume. Its primary cause is haemorrhage (internal and external), or loss of fluid from the circulation Vomiting and diarrhea are the most common cause in children. With other causes including burns, environmental exposure and excess urine loss due to diabetic ketoacidosis and diabetes insipidus Usual lines of treatment of hemorrhagic shock Evaluation of the patient in shock requires rapid assessment of the etiology. Although hypotension in trauma patients is assumed to be caused by hemorrhage (until proven otherwise), it is critically important to evaluate and treat the patient for other potential causes of hypotension, including tension pneumo thorax, pericardial tamponade, myocardial contusion, and neurogenic shock, Recent advances in management of hemorrhagic shock. Inotropic and vaso pressor agents have increasingly being used in the management of various types of shock. Inotropes are agents administered to increase myocardial contractility and therefore cardiac index whereas vaso pressor agents are administered to increase vascular tone and thereby elevate mean arterial pressure (MAP)

Key words

MAP:Mean Arterial Pressure; CHF:Congestive Heart Failure; SIRS:Systemic Inflammamatory Response Syndrome; WBC - White Blood Cells.

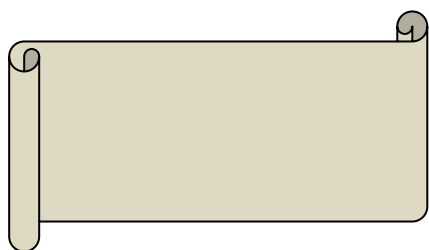


بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا إلا ما
علمتنا إنك أنت العليم الحكيم

صدق الله العظيم

سورة البقرة الآية (□ □)



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Contents	
List of abbreviations	3
List of tables	6
List of figures	7
Introduction	8
Aim of the work	
Chapter 1: Patho physiology of hemorrhagic shock	10
Definition of shock	10
Types of shock	10
Causes of hemorrhagic shock	12
Symptoms and signs of hemorrhagic shock	14
Stages of hemorrhagic shock	18
Chapter 2: Usual lines of management of hemorrhagic shock	27
Aim of management	28
Investigations and diagnosis of hemorrhagic shock	28
Fluid resuscitation	30
Blood products transfusion	33
Chapter 3: Recent advances in management of hemorrhagic shock	43
Use of vasopressors and inotropes in management of hemorrhagic shock	51
Summary	55
References	
Arabic summary	

List Of Abbreviation

MAP - Mean Arterial Pressure.

CHF - Congestive Heart Failure.

SIRS - Systemic Inflammatory Response Syndrome.

WBC - White Blood Cells.

ADH - Anti Diuretic Hormone.

ATP - Adenosine Tri Phosphate.

ADP- Adenosine Di Phosphate.

DO₂ - Oxygen Delivery.

VO₂ - Oxygen Consumption.

RBC_s - Red Blood Cells.

EBV - Estimated Blood Volume.

CTP - Cytidine- 5 -Tri Phosphate.

UTP – Uridine – 5 - Tri Phosphate.

GTP- Guanosine -5-Tri Phosphate.

IL- Inter Leukin.

TNF- Tumor Necrosis Factor.

VCAM - Vascular Cell Adhesion Molecule.

ICAM - Inter Cellular Adhesion Molecule.

CAM_s- Cell Adhesion Molecules.

ROS- Reactive Oxygen Species.

RNS -Reactive Nitrogen Species.

PT - Prothrombin Time.

PTT- Partial Thromboplastin Time.

INR - International Normalized Ratio.

FAST - Focused Assessment With Sonography for Trauma.

EFAST - Extended Focused Assessment With Sonography for Trauma.

CT - Computed Tomography.

LT- Lactated Ringer.

NS - Normal Saline.

HTN - Hyper Tonic Saline.

HSD -Hyper Tonic Saline – Dextran.

TBI - Traumatic Brain Injury.

PRBC_s- Packed Red Blood Cells.

ACOT- Acute Coagulopathy Of Trauma.

TEG - Thrombo Elasto Graphy.

ROTEM -Rotational Thrombo elastometry.

ACT - Activated Clotting Time.

ICU- Intensive Care Unit.

MOF- Multi Organ Failure.

APC- Activated Protein C.

HBOC_s - Hemoglobin Based Oxygen Carriers.

SVR -Systemic Vascular Resistance.

CO – Cardiac Output.

PDE- Phospho Diesterase Enzyme.

PDI- Phospho Diesterase Inhibitors.

HF- Heart Failure.

AKI- Acute Kidney Injury.

DA- Dopamine.

NO - Nitric Oxide.

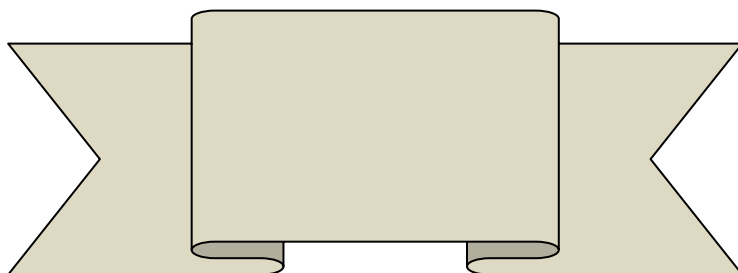
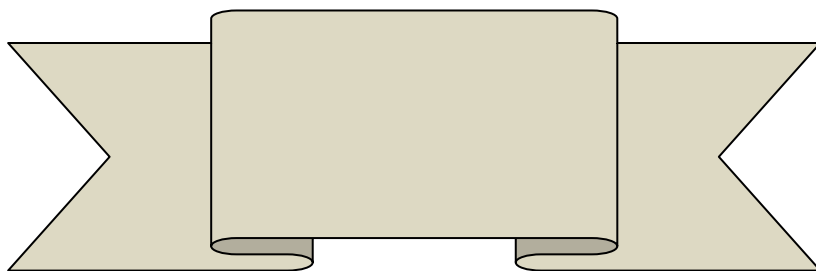
ARDS – Acute Respiratory Distress Syndrome.

List Of Tables

No	Titel	Page
1	Common causes of hemorrhagic shock.	13
2	Systemic inflammatory response syndrome .	15
3	Classification of hemorrhage .	17
4	Differential diagnosis for shock in trauma .	27
5	Indication of blood transfusion in management of hemorrhagic shock.	34

List Of Figures

No	Title	Page
1	Stages of hemorrhage.	23
2	Effects of inadequate perfusion on cell function.	26
3	Effect of fluid replacement on patient with hemorrhagic shock.	35



Introduction

Shock is a life threatening condition. As long as this bleeding is not controlled, neuro endocrine axes are activated, leading to release of catechol amines and non adrenergic stress hormones. However, as hemorrhage persists, these mechanisms are no longer able to compensate, progressing to hemorrhagic shock. (Megevan B, Celi J, 2014)

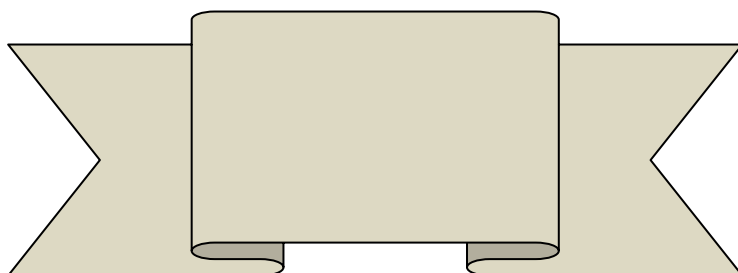
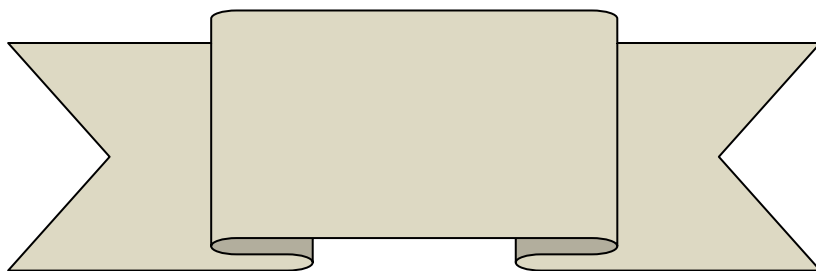
The management of an hemorrhagic shock, whether traumatic or not, requires early identification of the bleeding source and adequate hemodynamic support. The diagnosis accuracy is based on clinical, hemodynamic, radiologic and biochemical findings which also allow appraisal of the treatment efficiency. Treatment should be goal-oriented with rapid hemorrhage control by surgery, interventional radiology or drug support. Circulatory resuscitation is aimed to restore adequate tissue perfusion and oxygenation and should be closely monitored. (Johnson KB, Pearce FJ, 2006)

Allogeneic blood resuscitation is the treatment of choice for hemorrhagic shock. When blood is unavailable, plasma expanders, including crystalloids, colloids, and blood substitutes, may be used . (Cheung AT, To PL, 2007)

Although mortality from the hemorrhagic shock remains high, recent advances in management have significantly improved patient outcome including use of different vasopressors and inotropes as Dopamine, Adrenaline, Noradrenaline, Dobutamine, Isoprenaline, Phenylephrine, Vasopressin. (Garg S, Singhal S, 2012)

Inotropic and vasopressor agents have increasingly being used in the management of various types of shock. inotropes are agents administered to increase myocardial contractility and there for cardiac index where as vasopressors agents are administered to increase vascular tone and there by elevate mean arterial pressure (MAP).these agents are

used in critically ill patient with profound haemodynamic impairment to such extent that tissue perfusion is not sufficient to meet metabolic requirements. (Overgaard CB, Dzavik V, etal, 2008).



AIM OF THE ESSAY

The aim of this essay is to discuss recent guidelines of management of hemorrhagic shock and role of vasopressor agents in hemorrhagic shock in intensive care unit.