

SAFETY

simulation for medical practice

SIMULATION APPROACH FOR
EDUCATION AND TRAINING
IN EMERGENCY

Hypovolemic shock/Hemorrhagic shock

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BODY INTERACT™
VIRTUAL PATIENTS



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DOCUMENT VERSION 01

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Sim-Scenario

Hypovolemic shock /haemorrhagic shock(HS)

Scenario Description

Learning Target	Description	Participants
<p>Medical:</p> <ul style="list-style-type: none">- diagnose Hypovolemic shock (/haemorrhagic shock) based on the history, physical examination findings and lab studies;- consider other diagnostic tools such as an ultrasound (FAST/POCUS protocol) or CT scan;- acknowledge HS as a surgical emergency and call for immediate surgical evaluation;- Optimize hemodynamics to ensure adequate tissue perfusion(main goal) and immediate proceed to surgical ward. <p>CRM:</p> <ul style="list-style-type: none">- understand the importance of interdisciplinary communication;- effective teamwork to deliver a quick diagnosis ;- effective teamwork to deliver rapid management of tissue hypoperfusion.	<p>Where:</p> <ul style="list-style-type: none">- Emergency Room (ER)- patient (O.D.) is a 55-year-old obese female adult who lives with her husband. <p>Frame conditions: Day shift, all ressources available</p>	<ul style="list-style-type: none">- 3-4 participants, 1-2 doctors, 1-2 nurses, all students <p>Husband as actor possible</p>

Notes: If the abdominal ultrasound is facile the diagnosis is too easy.

Sim-Scenario

Hypovolemic shock /haemorrhagic shock (HS)

Scenario Briefing

Briefing (everyone)	Additional Briefing (individual Positions)	Case Briefing (Role-players)
<p>Olga D. is a female adult who has been diagnosed for 5 years with abdominal aortic aneurysm. She also has poorly controlled hypertension and diabetes. Confusion, dyspnea, palpitations, low blood pressure and abdominal discomfort is what prompts her to the ED. Initial clinical examination: tachycardia, polypnea , SpO2=97% in room air, abdominal tenderness, poor peripheral pulses, CRT 4 sec, pale and cold skin and SBP of 88 mmHg. Fluids ,analgesia, oxygen are the initial management strategies. Lab studies show : high lactate level, mild elevated troponin I level, low Hb. After initial improvement, hypotension rebounds under fluids , tachycardia increases, the patient becomes more confused and marbled skin appeared.</p>	<p>Patient: former lawyer who has been diagnosed for 5 years with abdominal aortic aneurysm.</p> <p>-Before admission: her husband recalls that Olga complained of headache, abdominal discomfort and agitation. He measured her blood pressure and it was 170 mmHg. High blood pressure prompted them to call the ambulance service.</p> <p>- In the ambulance her blood pressure began to drop, her SBP was 100 mmHg and a fainting sensation appeared.</p>	<p>Nurse – informs on symptoms ; should be ready to provide labs, X ray. Surgeon – only if medical problem is unidentified or identified too quickly (see below).</p> <p>Background info for trainers: a ruptured aneurysm causes further deterioration.</p> <p>Surgery is the ultimate life-saving intervention, but hemodynamic control is mandatory.</p>

Notes: Cardiac and abdominal ultrasound isn't part of the initial management.

Sim-Scenario

Hypovolemic shock /haemorrhagic shock(HS)

Script Sim Nurse/Co-Instructor

List of Material	Set-Up Room	Set-Up Simulator
<ul style="list-style-type: none">- standard monitoring;- fluids;- pumps;- vasopressors;- EKG;- ultrasound;- blood gas analysis;- troponin assay kit.	<ul style="list-style-type: none">- emergency room (ER).	<ul style="list-style-type: none">- SimMan 3G or TraumaHal GaumardUse a wig (female patient).Dressed informallyIdeally use an obesity kit (patient should be obese, so should look accordingly)

Notes:

Sim-Scenario

Hypovolemic shock /haemorrhagic shock (HS)

Scenario Saver

How to react if the medical problem is not identified	How to react if the medical problem is identified too quickly	Other comments, material needed for savers (e.g. white coat)
Surgeon (role-player) will reassess the patient. He palpates the abdomen , looks at the haemoglobin level and raises the question of intra-abdominal haemorrhage.	Surgeon (role-player) should then discuss the arguments supporting HS diagnosis.	Husband can tell the story of repeated hypertensive events

Notes:

Sim-Scenario

Hypovolemic shock /haemorrhagic shock (HS)

Scenario End Criteria

Scenario ends when...	Expected actions	Scenario flow
<p>- HS is recognised and correct hemodynamic management is initiated and surgical evaluation is asked for.</p>	<ul style="list-style-type: none"> - physical examination - check blood-gas - check ECG - check X-ray - ask for cardiac ultrasound and abdominal ultrasound (FAST/POCUS) - ask troponin assay - ask for lab results - iv fluids - activate massive haemorrhage protocol - norepinephrine to aim for MAP 65 mmHg - call surgical evaluation - with the results of cardiac/abdominal ultrasound, diagnose haemorrhagic shock 	<ul style="list-style-type: none"> - E.R. admission with diffuse abdominal discomfort, palpitations, dyspnoea and confusion. - chest X-ray showed no particular signs. - responded well to initial management: intravenous fluids, oxygen and pain relief with morphine and paracetamol. - but worsens soon after : hypotension rebounds under fluids , tachycardia increases, the patient becomes more confused and marbled skin appeared.

Notes: Don't let the patient die!
 General note – end the scenario saying:
 “The patient is now going to be taken care of, thank you for solving the case”

Sim-Scenario

Hypovolemic shock /haemorrhagic shock (HS)

Simulator Set-Up, Steering 1

	Phase 1 Initial and management phase	Phase 2 Reassessment
Vitals	HR: 110/min, sinus rhythm, diffuse nonspecific ST-T changes BP: 88/45 mmHg SpO2: 97% with room air Resp. Rate: 25/min Temp: 36.8 C CRT 4 sec - abdominal sounds (auscultation): ileus; Weak peripheral pulses	HR: 135/min, sinus rhythm and diffuse nonspecific ST-T changes BP: 85/44 mmHg SpO2: 99% with 6l/O2 Resp. Rate: 27/min Temp: 36.8 -but worsens soon after : hypertension rebounds under fluids , tachycardia increases, the patient becomes more confused and marbled skin appeared.
Text for patient	-Patient reports diffuse abdominal pain; -Confused ; -if abdomen is palpated: guarding abdomen	Same as before
Other info	Critical actions:	Critical actions:
Management during scenario	- blood gas analysis: lactate 4 mmol/l, Hb=10 mg/dl. -troponin I assay mild positive X-ray shows no particular signs.	-cardiac ultrasound : LVEF 50% but inferior hypokinesia, TAPSE 18 mm, left ventricular hypertrophy, mild mitral regurgitation, no pericardial fluid, kissing walls and compressive IVC. - abdominal ultrasound: difficult to evaluate because obesity, but the examiner thinks there is fluid in Douglas. Biochemistry: Hb=8 g/dl, all other values are within normal range. BGA: lactate of 4 mmol/L; pH=7,3; PaCO2 of 22 mmHg; PaO2=104 mmHg; HCO3 of 18mEq/L

Notes:

Sim-Scenario

Hypovolemic shock /haemorrhagic shock (HS)

Simulator Set-Up, Steering 2

	Phase 3 Improvement
Vitals	HR: 106/min, sinus rhythm BP: 95/55 mmHg SpO2: 99% with 6l/O2

	Resp. Rate: 18/min Temp: 36.8
Text for patient	Same as before
Other info	Critical actions: - call surgical evaluation - if the patient is stabilized, discuss CT scan evaluation followed by OR transfer - if the patient is unstable, discuss for immediate OR transfer
Management during scenario	

Notes:

Sim-Scenario

Hypovolemic shock /haemorrhagic shock (HS)

Abstract

Learning Target:	Diagnose HS, prompt hemodynamic optimization, activate massive haemorrhage protocol, consider diagnosis tools (FAST/POCUS, CT scan), call for immediate surgical evaluation
Description:	A patient with ruptured abdominal aortic aneurysm is admitted to the Emergency Room; Clinical, laboratory and monitoring data are prepared to help diagnose HS; Surgery is the ultimate life-saving intervention, but hemodynamic control is mandatory.
Participants:	3-4 trainees; 1-2 role-players (nurse, surgeon)

Case Briefing:	Olga D. is a female adult who has been diagnosed for 5 years with abdominal aortic aneurysm. She also has poorly controlled hypertension and diabetes. Confusion, dyspnoea, palpitations, low blood pressure and abdominal discomfort is what prompts her to the ED.
List of Material:	<ul style="list-style-type: none">- standard monitoring/ invasive BP measurement, central venous line- EKG;- ultrasound;- blood gas analysis;- troponin assay kit.
Set-Up Room	Emergency Room
Set-Up Simulator:	SimMan 3G or TraumaHal Gaumard, use wig and maybe obesity kit
Scenario Saver:	Surgeon – only if medical problem is unidentified or identified too quickly (see below) – role-player
Scenario End Criteria:	HS is recognised and correct hemodynamic management is initiated and surgical evaluation is asked for.
Management during Scenario:	See above
Other:	
Notes:	