SIMULATION EXERCISE

Curriculum Topic/Title: Massive Hemorrhage Protocol case #1: TRAUMA
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Creation/Modification Date: 2020-Mar-26 / Mod 2020-Jun-18

Learning Objectives:

1. Demonstrate safe and proficient management of an adult patient with injury and significant bleeding.
2. Recognize need for massive hemorrhage protocol (MHP) and demonstrate ability to activate an institutional protocol
3. Achieve high performance in situational awareness, teamwork and communication in a simulated setting.
4. Identify areas of improvement and develop a plan.

References / Review Articles:

Callum JL, Yeh CH, Petrosoniak A et al. A regional massive hemorrhage protocol developed through a modified Delphi technique. CMAJ Open 2019; 7:E546–E561.

PATIENT & SCENARIO INFORMATION

Patient Name: JOHN WILLIAMS

Patient Info: DOB, PMH, current problem/procedure, meds, allergies:

DOB: 1944-04-13
Past medical history only significant for atrial fibrillation for which his is on warfarin. Past surgical history is significant for remote cholecystectomy. No allergies

Location / Setting: Emergency Department

EQUIPMENT FOR EXERCISE:

Comments:

- This exercise does NOT require a high fidelity mannequin, but could be used with one
- A method to communicate vital signs is required. Options include:
  - » Whiteboard or paper-based technique
  - » Tablet-based technique using app based software (example SimMon on and iPad)
  - » Software from high-fidelity mannequin

Monitors required:

Available	On patient		Available	On patient	
☐	☒	NIBP	☐	☒	ECG
☒	☐	Arterial line	☐	☒	Temperature
☒	☐	CVP	☐	☒	Pulse oximeter
☐	☐	PA Catheter	☐	☐	Capnograph
☐	☐	Fetal heart monitor	☐	☐	End-Tidal Agent Concentration
☐	☒	Urinary catheter	☐	☐	Train of four

Other equipment required:

- Equipment that would normally be available in this clinical area per institutional protocols should be available for this simulation.

Simulation Video
A video based on this exercise script is also available for training purposes. Available at this link:
https://transfusionontario.org/en/category/massive-hemorrhage-protocol/simulation-videos/

Supporting Files (assessment, labs, imaging, etc):

1. q1h lab results
2. Observational tool
3. Participant evaluation form available at:

Scenario Content:

Information for Learner:

(place on a separate page as we often give them this 'stem' to read, along with the anesthetic record / supporting documents if appropriate)

A 56 year old man with atrial fibrillation is brought by ambulance to the emergency department after falling off a ladder while cleaning his second floor eavestroughs. He is on warfarin – dose has been stable for 6 months without dose adjustment. Initial assessment shows a broken left femur, a stable, undisplaced pelvic fracture and fractured left ribs 4-7. He is hypotensive (systolic 85 mmHg) and tachycardic (127 bpm). He has received 2 L of saline en route to the ER (no RBCs) without hemodynamic response.

Scenario Content:

Additional Information for Instructor only, including:
Roles of confederates or other participants
Type of HELP available:

Instructor / Leader of this exercise will pre-determine the number and nature of respondents corresponding to realistic local resouce availability

Simulator Setup and Programming Notes:

One facilitator (not the leader) should be assigned to dissemination of current vital signs throughout the simulation. This individual should have sufficient medical knowledge to be able to alter the vital signs in a realistic fashion in response to events and medical decisions as they occur during the simulation.

Baseline Simulator Physiologic State (leave blank if not relevant):

HR: ***127*** BP: ***85*** RR: ***17*** SpO_2: ***99***

Weight: ***88 kg*** BMI: ***31***

Neuro (LOC, orientation etc.): ***GCS 14, in pain***

Respiratory: ***decreased breath sounds left side***

Laboratory, Radiology, or other relevant information, available initially or as the scenario progresses:

Key Processes During MHP Simulation

T7 Framework

- Triggering
- Team
- Testing
- Tranexamic Acid
- Temperature
- Transfusion
- Termination

1. q1h lab results from simulation #1

Lab work	On arrival	60 minutes
Hemoglobin (g/L)	120	90
Platelets (x10^9/L)	210	135
INR	2.4	1.6
Fibrinogen (g/L)	3.0	1.4
Sodium (mmol/L)	131	140
Potassium (mmol/L)	3.5	4.1
Ionized calcium(mmol/L)	1.4	1.0
Glucose (mmol/L)	10	15
Lactate	3.5	2.5
Arterial blood gas		
PH	7.29	7.34
PO2 (mmHg)	150	160
PCO2 (mmHg)	34	38
HCO3 (mmol/L)	16	20
Base Deficit	- 7	- 3
FIO2 (%)	Non-rebreather	Non-rebreather
Blood products and drugs ideally to be administered	RBC 4 units + FFP 2 units or PCC; TXA 2 mg over 15 min	Fibrinogen concentrate
Vital signs	Reflect 25-30% blood volume loss	Reflect slowing of blood volume loss (<15%)

Discussion and Teaching Points for Debriefing:

- Minimum of 2 facilitators required, preferably interprofessional
- Notes should be taken during the scenario to identify processes well done and areas of improvement
- Team debriefing is required, with focus on system improvement and not individual performances

Post Simulation Activities:

- One or more individuals must, a priori, be tasked with compiling a summary from each simulation including areas for system improvement, individual(s) responsible for addressing the issues identified during the simulation
- This process should become part of the routine quality and safety processes at the institutional level
- Follow up, and repeat simulations are mandatory, as a single intervention without follow up will not lead to any improvement in patient care