

SAFETY

simulation for medical practice

SIMULATION APPROACH FOR
EDUCATION AND TRAINING
IN EMERGENCY

Tachyarrhythmia

Mihai Stefan, Cornelia-Elena Predoi, Liana

Valeanu, Cosmin Balan, Cornel Robu,

Serban Bubenek Turconi, Daniela

Filipescu, EICD

Tachyarrhythmia



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VIRTUAL PATIENTS



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DOCUMENT VERSION 01

AUTHORS

Mihai Stefan, EICD

Cornelia-Elena Predoi, EICD

Liana Valeanu, EICD

Cosmin Balan, EICD

Cornel Robu, EICD

Serban Bubenek Turconi, EICD

Daniela Filipescu, EICD

Sim-Scenario

Atrial fibrillation with instability (FA)

Scenario Description

Learning Target	Description	Participants
<p>Medical:</p> <ul style="list-style-type: none"> - Management of Adult Tachycardia(with pulse) based on ABCDE approach; - consider other diagnostic tools such as an ultrasound (in order to exclude other causes of circulatory shock); - acknowledge AF with cardiovascular instability as a emergency and apply synchronized DC shock +/- amiodarone ; - Optimize hemodynamics to ensure adequate tissue perfusion ; - Asses thromboembolic risk and if necessary consider anticoagulation. <p>CRM:</p> <ul style="list-style-type: none"> - understand the importance of interdisciplinary communication; - effective teamwork to deliver a quick diagnosis as well as management of an emergency 	<p>Where:</p> <ul style="list-style-type: none"> - Emergency department <p>Frame conditions: Day shift in the ED</p> <ul style="list-style-type: none"> -Chest X-ray, EKG, complete blood examination ,blood gas analysis, troponin I, cardiac ultrasound are being done. 	<ul style="list-style-type: none"> - 3-4 participants, students: 1-2 doctors, 1-2 nurses - The cardiologist and intensive care medical doctor on call as backup (confederates)
<p>Notes:</p>		

Sim-Scenario

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Scenario Briefing

Briefing (everyone)	Additional Briefing (individual Positions)	Case Briefing (Roleplayers)
<p>Olga is a 24-year-old female adult who has been partying all night; She barely touched alcohol (she has to work the next day); She has no medical history. - E.D. admission with palpitations, dizziness, shortness of breath and a vague sensation of chest discomfort; At the initial examination signs of circulatory shock are seen. - initial clinical examination: tachycardia(149 bpm), polypnea (RR=20/min), SpO2=94% room air, poor peripheral pulses, CRT 5 sec, pale and cold skin and SBP of 82 mmHg. Fluids and oxygen are the initial management strategies. She is put on iv fluids (500 ml crystalloid and 500 ml G5%) and 3 l of non-invasive oxygen. No improvement is seen, the doctor is called. She is currently with standard non-invasive monitorization and with 1 peripheral IV access (G18).</p>	<p>SP/manikin voice: - patient (Olga) is a 24-year-old female adult who has been partying all night (her best friend's bachelor party); - she barely touched alcohol (she has to work the next day); - she went home at 2 :00 am (she remembers she was tired and a little dizzy) Always healthy, apart for short episodes of palpitations (heart like running) after strenuous work (never investigated).</p> <p>she woke up at 7:00 am complaining of palpitations and dizziness; Scared she went to the emergency department.</p>	<p>Nurse –informs on symptoms ; should be ready to provide labs, X ray.</p> <p>Cardiologist– only if medical problem is unidentified or identified too quickly (see below).</p> <p>Background for Trainers: tachycardia (AF in this situation) can cause cardiovascular instability (e.g. hypotension, tissue hypoperfusion , shock, myocardial ischemia...)</p> <p>Cardioversion is the correct management, but Hemodynamic monitoring is mandatory.</p>

Notes: Clinical, laboratory and monitoring data are prepared to help diagnose AF with instability, according to scenario steps findings
The first step can be a scenario step for the nurse alone

Sim-Scenario

Atrial fibrillation with instability (AF)

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;-defibrillator. -----	<ul style="list-style-type: none">- emergency department.	<ul style="list-style-type: none">- SimMan 3G or TraumaHal Gaumard <p>SP (young woman) can also be used. Consider even participant with good briefing.</p>

Notes: Clinical, laboratory and monitoring data are prepared to help diagnose AF with instability, according to scenario steps findings

Sim-Scenario

Atrial fibrillation with instability (AF)

Scenario Saver

<p>How to react if the medical problem is not identified</p>	<p>How to react if the medical problem is identified too quickly</p>	<p>Other comments, material needed for savers (e.g. white coat)</p>
<p>Cardiologist (roleplayer) will reassess the patient. He raises the question of narrow QRS tachycardia with instability.</p>	<p>Cardiologist (roleplayer) Should then discuss the arguments supporting AF diagnosis. Also patient can become a bit more unstable. However, do not unnecessarily delay a good team.</p>	<p>White coat for consultant</p>

Notes:

Sim-Scenario

Atrial fibrillation with instability (AF)

<p>Scenario End Criteria</p>		
<p>Scenario ends when..</p>	<p>Expected actions during initial</p>	

	assessment and treatment:	
<p>- AF is recognised, correct hemodynamic management is initiated together with cardioversion and hypokalemia is corrected.</p>	<ul style="list-style-type: none"> - physical examination; - check blood-gas; - check ekg; - check X-ray; -ask for cardiac ultrasound; -ask troponin assay; - ask for lab results; - iv fluids (deshydratation); - norepinephrine to aim for MAP 65 mmHg (placement of arterial catheter and central venous line); - correct hypokalemia; - cardioversion under sedation (Synchronised DC Shock) and assess the thromboembolic risk. 	

General note – end the scenario saying:

“The patient is now going to be taken care of, thank you for solving the case”

Sim-Scenario

Atrial fibrillation with instability (AF)

Simulator Set-Up, Steering

	Phase 1 Start, before doctor arrives in ED	Phase 2 Doctor arrives in ED
Vitals	HR: 149 /min, irregular BP: 82/ 45 mmHg SpO2: 94% (room air) RR: 20 /min CRT 5 sec, pale and cold skin Temp: 36.8	HR: 155/min, irregular ECG: narrow , irregular QRS, BP: 80/45 mmHg SpO2: 98% with 3 l/O2 Resp. Rate: 22/min AV 155 bpm and diffuse ST-T changes

		CRT 5 sec
Text for patient	-Patient reports palpitations, diffuse thoracic pain and dyspnea ; -mild confused ;without other neurological signs (e.g. no , motor deficit);	Same as before
Other info	Critical actions: Recognising the emergency	Critical actions: cardioversion under sedation (Synchronised DC Shock) and assess the thromboembolic risk.
Management during scenario	No changes on fluids and oxygen Findings: -normal abdomen; -marbled skin ; -if peripheral arteries are checked: low pulse;	Findings: Biochemistry: K= 3.3 mmol/l, Na=148 mmol/l, Hb=17 g/dl, albumin= 6.5 g/dl ,BUN=50 mg/dl, glycemia= 90 mg/dl, all other values are within normal range. X-ray shows no particular signs. BGA: lactate of 4.5 mmol/L, ph=7,35,CO2 of 21 mmHg, O2=110 mmHg, HCO3 of 19 mEq/L, K= 3.3 mmol/l, Na=148 mmol/l, Hb=17 g/dl. Troponin I assay mild positive.

Notes: Cardiac ultrasound : LVEF 60%, normal contractility , TAPSE 22 mm, without valvulopa no pericardial fluid, kissing walls and compressive IVC, no thrombus in the cardiac cavities.

Sim-Scenario

Atrial fibrillation with instability (AF)

Simulator Set-Up, Steering

	Phase 3 After cardioversion	Phase 4 Aggravation without cardioversion
Vitals	HR: 88/min, regular rhythm BP: 105/58 mmHg SpO2: 99% with 3l/O2 Resp. Rate: 18/min Temp: 36.8 ECG: sinus rhythm , no other anomalies	HR: 160/min, irregular ECG: narrow irregular QRS, BP: 70/42 mmHg SpO2: 98% with 5 l/O2 Resp. Rate: 24/min AV 160 bpm and diffuse ST-T changes CRT 6 sec
Text for patient	- conscious, cooperating , no confusion; -reduction of dyspnea; -no chest pain,no palpitations;	-Patient reports palpitations, angina and dyspnea ; -aggravation of confused ;

	-normal abdomen; -normal skin color; -if peripheral arteries are checked: regular pulse;	-normal abdomen; -marbled , cold skin ; -if peripheral arteries are checked: low pulse;
Other info	Critical actions: No analgesia is provided	Expected actions: - correct hypokalemia; - Still aim for Synchronised DC Shock up to 3 attempts ; -amiodarone 300 mg iv over 10-20 min (after the 3rd shock) , repeat shock and start amiodarone 900 mg over 24 h
Management during scenario	Findings: New BGA: lactate of 3 mmol/L, ph=7,37, CO2 of 35 mmHg, O2=120 mmHg, HCO3 of 24 mEq/L, K= 3.6mmol/l, Na=147 mmol/l, Hb=15g/dl, glycemia 90 mg/dl. New cardiac ultrasound: LVEF 60%, normal contractility , TAPSE 23 mm, without valvulopathies, no pericardial fluid, no thrombus in the cardiac cavities.	Findings: New BGA: lactate of 5 mmol/L, ph=7,33, CO2 of 20 mmHg, O2=105 mmHg, HCO3 of 18 mEq/L, K= 3.3 mmol/l, Na=148 mmol/l, Hb=17 g/dl. New cardiac ultrasound: LVEF 60%, normal contractility , TAPSE 22 mm, without valvulopathies ,no pericardial fluid, kissing walls and compressive IVC, no thrombus in the cardiac cavities.

Sim-Scenario

Atrial fibrillation with instability (AF)

Abstract

Learning Target:	Recognition and treatment of hemodynamic unstable AFib
Description:	Hemodynamically unstable Atrial Fibrillation
Participants:	1-2 doctors, 1-2 nurses (all students)
Case Briefing:	Young woman, no medical history, E.D. admission with palpitations, dizziness, shortness of breath and a vague sensation of chest discomfort;
List of Material:	Device to allow shock administration to actor (shock-link or similar)
Set-Up Room	ED
Set-Up Simulator:	Has to be Actor

Tachyarrhythmia

Scenario Saver:	Cardiologist
Scenario End Criteria:	Recognition and treatment of tachycardia
Management during Scenario:	
Other:	

Notes: