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Fainting Spells

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SIMULATION

Fainting Spells

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ABSTRACT:

Audience: The target audience for this simulation is fourth-year medical students, emergency medicine (EM) residents, pediatric residents, and family medicine residents.

Introduction: Brugada syndrome is defined as the combination of specific electrocardiogram (ECG) changes and clinical manifestations of a ventricular arrhythmia, including syncope and sudden cardiac arrest.¹ Brugada syndrome is caused by a mutation in the phase-0 cardiac sodium channel. This mutation can be inherited in an autosomal dominant fashion or it can also occur spontaneously.^{1,2} This syndrome occurs most frequently in men and is one of the most common causes of sudden cardiac death in Southeast Asian males under the age of 50 with structurally normal hearts.^{3,4} The classic type I Brugada ECG findings are defined as down-sloping ST segment elevation of >2mm in more than one lead in V1-3, with an associated incomplete or complete right bundle branch block. This mutation can lead to ventricular arrhythmias, most often polymorphic ventricular tachycardia and ventricular fibrillation, resulting in syncope and sudden cardiac death.^{1,2,3,4,5} These ECG changes are often transient, but can be provoked by a number of factors, including fever and infection, medications, and illicit drugs.⁶ The treatment for this syndrome is placement of an implanted cardiac cardioverter-defibrillator (ICD) to prevent malignant arrhythmias, treatment of any obvious precipitant, and avoidance of specific medications that are associated with inducing arrhythmias.³

Objectives: By the end of this simulation and debriefing, learners will be able to:

1. Identify Brugada pattern on ECG
2. Define Brugada syndrome
3. Discuss the clinical presentation of Brugada syndrome
4. List provoking factors that can often precipitate arrhythmia
5. Review management of adult cardiac arrest
6. Discuss treatment of Brugada syndrome

Method: High-fidelity medical simulation

Topics: Brugada syndrome, syncope, sudden cardiac arrest, advanced cardiac life support (ACLS), simulation.



USER GUIDE

List of Resources:

Abstract	16
User Guide	17
Instructor Materials	19
Operator Materials	27
Debriefing and Evaluation Pearls	30
Simulation Assessment	34

Learner Audience:

Medical students, interns, junior residents, senior residents, faculty

Time Required for Implementation:

Instructor Preparation: 60 minutes
Time for case: 15 minutes
Time for debriefing: 20 minutes

Recommended Number of Learners per Instructor:

3-4

Topics:

Brugada syndrome, syncope, sudden cardiac arrest, advanced cardiac life support (ACLS), simulation.

Objectives:

By the end of this simulation session, the learner will be able to:

1. Identify Brugada pattern on ECG
2. Define Brugada syndrome
3. Discuss the clinical presentation of Brugada syndrome
4. List provoking factors that often precipitate arrhythmia
5. Review management of adult cardiac arrest
6. Discuss treatment of Brugada syndrome

Linked objectives and methods:

Brugada syndrome is a recognized cause of sudden cardiac death in young people with no underlying heart disease or structural abnormality. It is imperative that all patients who present with syncope get an ECG in order to assess for this syndrome. Early detection of Brugada Syndrome is crucial because placement of an ICD (implantable cardioverter-defibrillator) decreases mortality from a lethal arrhythmia. During this simulation exercise, the participants will be asked to interpret the ECG, identify Brugada pattern, manage cardiac arrest, and consult cardiology for definitive treatment with an ICD. If appropriate diagnosis and treatment are delayed, the patient will decompensate and will not obtain return of spontaneous circulation and the patient will die. The debriefing

session focuses on ECG recognition and management of Brugada syndrome.

Recommended pre-reading for instructor:

- Burns E. Brugada type 1 EKG. Life in the Fastlane. <https://lifeinthefastlane.com/ecg-library/brugada-syndrome/>. Published April 8, 2017. Accessed April 5, 2018.
- Prior SG, Wilde AA, Horie M, Cho Y, Behr ER, Berul C, et al. HRS/EHRA/APHRS expert consensus statement on the diagnosis and management of patients with inherited primary arrhythmia syndromes. *Heart Rhythm*. 2013;10(12):1932-1963. doi: 10.1016/j.hrthm.2013.05.014

Results and tips for successful implementation:

This is best implemented on a high-fidelity simulator so the learners can perform cardiopulmonary resuscitation (CPR) when the patient becomes unresponsive and pulseless. The goal of the case is to present the learner with a young patient with a high-risk cause of syncope (Brugada syndrome). If learners are not appropriately interpreting the ECG, a confederate can prompt the learner to review the ECG again.

This simulation was piloted during our monthly simulation conference. The learners included EM residents (PGY 1-4) and fourth-year medical students, with the simulation cases lead by the junior residents (PGY-2). A post-simulation debrief and survey showed that the simulation case was well received by our learners, who found the simulation to be appropriate for their level of training, as well as interesting and applicable to their practice. Many learners were appreciative of the opportunity to participate in a simulation that focused on a topic they had read about but is not often seen in clinical practice. While most learners had some knowledge of this topic, a few commented that they felt “stuck” because Brugada syndrome was not on their differential diagnosis. In order to address this in future cases, we had one of the confederates (either the nurse or admitting service) recommend a Cardiology consult who would then either have the learner describe their interpretation of ECG findings or have them send copies of the ECGs. We found that this allowed the learners to first manage the presentation of syncope and work through a more detailed and complete differential diagnosis before admission and case conclusion.

References/suggestions for further reading:

1. Burns E. Brugada type 1 EKG. Life in the Fastlane. <https://lifeinthefastlane.com/ecg-library/brugada-syndrome/>. Published April 8, 2017. Accessed April 5, 2018.



USER GUIDE

2. Piktel J. Cardiac rhythm disturbances. In: Tintinalli JE, Cline DM, Stapczynski JS, Ma OJ, Cydulka RK, Meckler GD, eds. *Emergency Medicine: A Comprehensive Study Guide*. 7th ed. New York, NY: McGraw-Hill; 2011:151ff.
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6. Postema PG, Wolpert C, Amin AS, Probst V, Borggreffe M, Roden DM, et al. Drugs and Brugada syndrome patients: review of the literature, recommendations and an up-to-date website (www.brugadadrugs.org). *Heart Rhythm*. 2009;6(9):1335-1341. doi: 10.1016/j.hrthm.2009.07.002.
7. Burns E. Ventricular tachycardia-monomorphic. Life in the Fastlane. <https://lifeinthefastlane.com/ecg-library/ventricular-tachycardia/>. Published March 19, 2017. Accessed April 5, 2018.
8. Gaillard F. Normal chest X-ray. rID: 8304. Radiopaedia. <https://radiopaedia.org/cases/normal-chest-x-ray>. Published January 22, 2010. Accessed April 5, 2018.
9. Burns E. Figure showing the three types of Brugada patterns. Life in the Fastlane. <https://lifeinthefastlane.com/ecg-library/brugada-syndrome/>. Published April 8, 2017. Accessed April 5, 2018.



INSTRUCTOR MATERIALS

Case Title: Fainting Spells

Case Description & Diagnosis (short synopsis): The patient is a 35-year-old male with a past medical history of depression, who is brought in by paramedics after having his second syncopal episode this week. The participants should place the patient on a cardiac monitor and obtain vital signs, a point-of-care blood glucose, and ask for an ECG early in the case. After completing a primary survey, the learner should obtain a detailed history and physical exam and specifically ask about any prodromal symptoms, recent illness, past medical history, family history of syncope or sudden cardiac death, medications, and any recreational drug or alcohol use. Of note, the patient is from Thailand, his father died at a young age from cardiac arrest, and the patient started taking amitriptyline one month ago for depression. This medication can be associated with provoking malignant arrhythmias in patients with Brugada syndrome.

The ECG will then be available for the learner to review. Up to this point the patient is well-appearing and the physical exam is benign. Regardless of whether the participants recognize Brugada on the ECG, the patient will lose consciousness and become pulseless. The monitor will show ventricular tachycardia and CPR should be started immediately. The learner will go through the advanced cardiac life support (ACLS) algorithm for ventricular tachycardia. If managed appropriately, the patient will regain pulses after one round of compressions and defibrillation. Once the patient is stabilized, the learner will need to consult cardiology for ICD placement and admit the patient to the coronary care unit (CCU).

Equipment or Props Needed:

- High fidelity mannequin
- Stethoscope
- Cardiac monitor
- Pulse oximeter and Blood pressure cuff
- Crash Cart with defibrillator and pads
- Adult Intubation Tray

Confederates needed:

- Nurse (can relay EMS report in lieu of paramedics)
- Patient's wife (optional; can call in overhead)
- Cardiologist (can call in overhead)



INSTRUCTOR MATERIALS

Stimulus Inventory:

- #1 Electrocardiogram (ECG)
- #2 Monitor rhythm strip of ventricular tachycardia
- #3 Chest X-ray (CXR)
- #4 Complete blood count (CBC)
- #5 Comprehensive metabolic panel (CMP)
- #6 Magnesium
- #7 Troponin
- #8 Urinalysis

Background and brief information: The scenario takes place in the emergency department of a tertiary care hospital. The patient is a 35-year-old male with a past medical history significant for depression who is brought in by paramedics after having his second syncopal episode this week. Five days ago, the patient fainted while sitting at the dinner table with his wife. Today, while sitting at his desk talking to a co-worker, he had a second witnessed syncopal episode. Both events lasted about 30 seconds. No associated seizures or head trauma occurred.

The patient is generally well-appearing and the physical exam is unremarkable. The learner should quickly place the patient on the monitor and order an ECG. At this point, the learner should be considering the differential diagnosis for syncope, including: rhythm disturbances, medication and drug use, situational (vasovagal), orthostatic, and structural heart disease.

The nurse will hand the learner an ECG which will show a Brugada type I pattern. Soon after the ECG is obtained, the patient will suddenly lose consciousness and become pulseless, with ventricular tachycardia on the monitor. The learner should immediately carry out the ACLS algorithm and the patient will regain pulses shortly after the first shock is delivered. The learner will need to consult cardiology, recognize the Brugada pattern as the etiology, and admit the patient for ICD placement.

Initial presentation: Patient is well appearing and interactive with the learner. His wife is at the bedside (optional; can have confederate provide overhead voice for additional information).

How the scenario unfolds: The learners will enter the room and see a well appearing, 35-year-old man resting comfortably on the gurney (optional to have his wife at bedside). The learners will ask the nurse (or paramedics) for a brief history regarding why the patient was



INSTRUCTOR MATERIALS

brought to the emergency department. Next, the learners should ask the nurse for a set of vital signs, including point-of-care glucose, and have the patient placed on a cardiac monitor. A brief primary survey should then be performed. Given that the patient has had two recent syncopal episodes, the learner should also immediately request an ECG and may ask for a set of labs. The learners should then obtain a focused history and review of systems. If specifically asked about the patient's medication list or management of his depression, the patient or wife will tell the participants that the patient just started a new medication for his depression, amitriptyline. A secondary survey should then be performed, which will show no abnormalities. The ECG will then be provided to the learners, and they should recognize the Brugada pattern. While the learner is interpreting the ECG, the patient will suddenly become unresponsive and pulseless. The learner should recognize ventricular tachycardia on the monitor, initiate chest compressions, apply pads, and defibrillate the patient. The patient will regain pulses shortly after the shock is delivered. The learners should recognize that the patient went into cardiac arrest secondary to underlying Brugada syndrome. Cardiology should be consulted and the patient admitted for urgent ICD placement.

Critical Actions:

1. Obtain a full set of vital signs, including blood glucose level, and put the patient on the cardiac monitor
2. Rapidly assess primary survey: Airway, breathing, circulation
3. Obtain an ECG prior to cardiac arrest
4. Perform a complete history and physical exam
5. Correctly identify Brugada pattern on ECG
6. Recognize ventricular tachycardia on the monitor when patient becomes pulseless
7. Correctly follow the ACLS algorithm for ventricular tachycardia
8. Consult cardiology for ICD placement and admit to CCU



INSTRUCTOR MATERIALS

Case Title: Fainting Spell

Chief Complaint: 35-year-old male with two syncopal events this week

Vitals: *Heart Rate (HR)* 70 *Blood Pressure (BP)* 120/80 *Respiratory Rate (RR)* 16
Temperature (T) 37°C *Oxygen Saturation (O₂Sat)* 100% on room air

General Appearance: Southeast Asian male, appears stated age, resting comfortably, in no acute distress, wife at bedside (optional).

Primary Survey:

- **Airway:** protected, patient tells you his name
- **Breathing:** no respiratory distress, lungs clear to auscultation
- **Circulation:** extremities are warm, strong distal pulses, capillary refill less than 2 seconds

History:

- **History of present illness:** Patient is a 35-year-old male with a history significant for depression who was brought to the Emergency Room for multiple syncopal episodes. Patient states that five days ago he fainted at home while sitting at the dinner table with his wife. Today, while sitting at his desk talking to a co-worker, he had a second syncopal episode and his co-worker called 911. The patient states that both times he was told by bystanders that he only lost consciousness for about 30 seconds and there was no associated seizure activity or head trauma. The patient states that the onset of these syncopal episodes is abrupt and they do not seem to be associated with exertion. He denies feeling lightheaded or dizzy prior to the events. He denies chest pain and shortness of breath but does complain of mild chest palpitations before each syncopal event. Patient denies recent fever, nausea, vomiting, cough, abdominal pain, dysuria, hematuria, diarrhea and skin changes. Review of systems is otherwise negative.
- **Past medical history:** depression
- **Past surgical history:** none
- **Patients medications:** Amitriptyline (started one month ago)
- **Allergies:** No known drug allergies
- **Social history:** Moved from his home in Thailand one year ago, lives at home with wife and two children, works as a cook, denies history of drug or alcohol use.
- **Family history:** father died of cardiac arrest at 50-years-old
- **Review of symptoms:** negative except for two syncopal episodes in one week



INSTRUCTOR MATERIALS

Secondary Survey/Physical Examination:

- **General appearance:** Southeast Asian male, appears stated age, resting comfortably, in no acute distress, wife at bedside
- **Head, ears, eyes, nose and throat (HEENT):** within normal limits
- **Neck:** within normal limits
- **Heart:** within normal limits
- **Lungs:** within normal limits
- **Abdominal/GI:** within normal limits
- **Genitourinary:** within normal limits
- **Rectal:** within normal limits
- **Extremities:** within normal limits
- **Back:** within normal limits
- **Neuro:** within normal limits
- **Skin:** within normal limits
- **Lymph:** within normal limits
- **Psych:** within normal limits

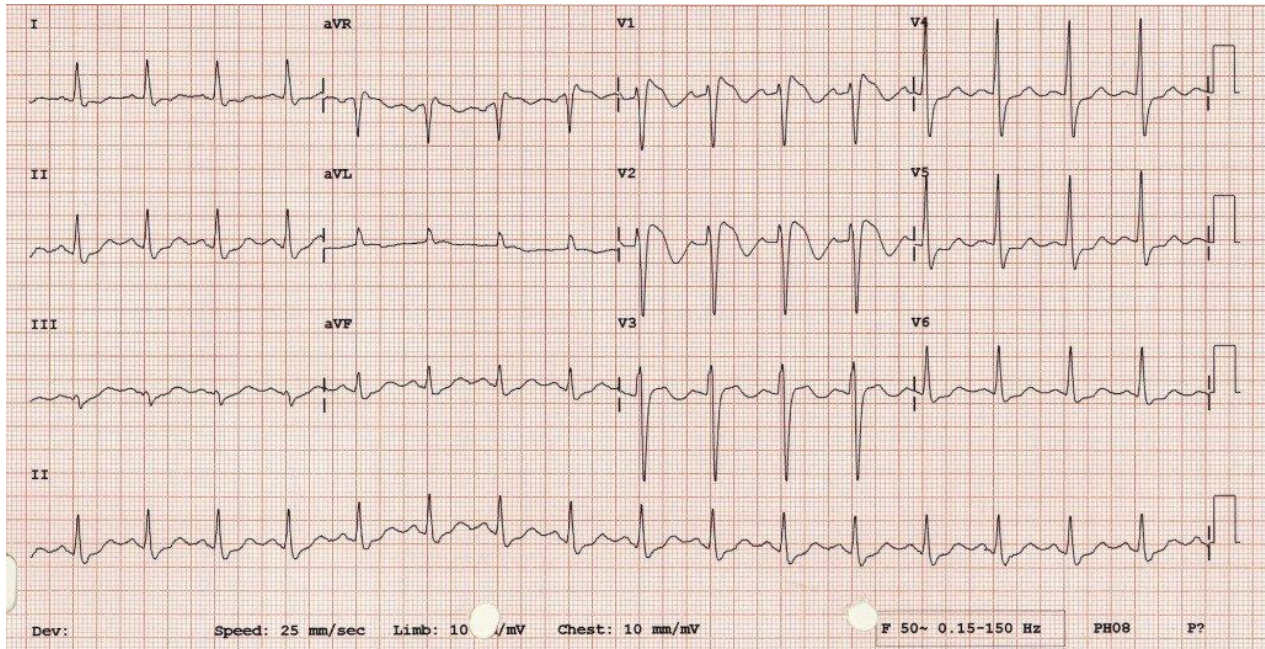


INSTRUCTOR MATERIALS

Results:

Electrocardiogram (EKG) ECG with Brugada Type 1 pattern:

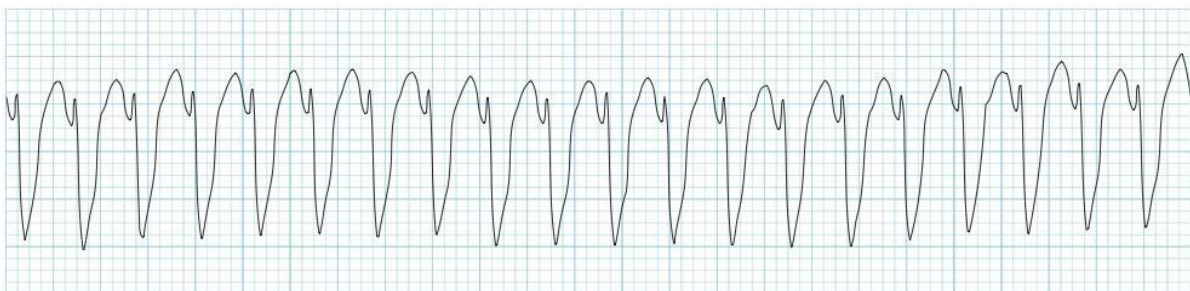
Edward Burns. Brugada Type 1. In: Life in the Fastlane. <https://lifeinthefastlane.com/ecg-library/brugada-syndrome/>. April 8, 2017. CC BY-NC-SA 4.0.



Monitor Rhythm Strip of Ventricular Tachycardia

Ventricular Tachycardia - Monomorphic. In: Life in the Fastlane.

<https://lifeinthefastlane.com/ecg-library/ventricular-tachycardia/>. March 19, 2017. CC BY-NC-SA 4.0.

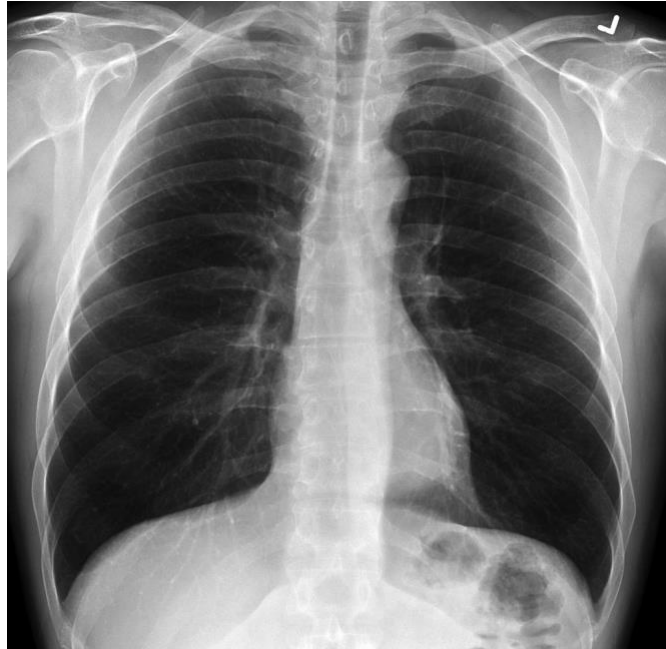




INSTRUCTOR MATERIALS

Chest X-ray: Normal (author's own image)

A.Prof Frank Gaillard. Normal chest x-ray, rID: 8304. In: Radiopedia.
<https://radiopaedia.org/cases/normal-chest-x-ray>. CC BY-NC-SA 3.0.



Complete blood count (CBC)

White blood count (WBC)	9.0 x1000/mm ³ (H)
Hemoglobin (Hgb)	13 g/dL
Hematocrit (HCT)	40%
Platelet (Plt)	300 x1000/mm ³

Differential

PMN	80%
Bands	9%
Lymphocytes	7%
Monocytes	4%
Eosinophils	1%

Prothrombin time (PT)	12s
Partial Thromboplastin time (PTT)	28s
International normalized ratio (INR)	0.8



INSTRUCTOR MATERIALS

Complete metabolic panel (CMP)

Sodium	136 mEq/L
Chloride	102 mEq/L
Potassium	4.5 mEq/L
Bicarbonate (HCO ₃)	24 mEq/L (L)
Blood Urea Nitrogen (BUN)	12 mg/dL (H)
Creatine (Cr)	0.7 mg/dL (H)
Glucose	120 mg/dL
Anion Gap	12 mEq/L
Aspartate Aminotransferase (AST)	17 u/L
Alanine Aminotransferase (ALT)	16 u/L
Total Bilirubin	0.8 mg/dL
Direct Bilirubin	0.4 mg/dL
Alkaline Phosphate	112 u/L
Albumin	4.5 u/L

Magnesium

Magnesium	2.0 mEq/L
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Troponin

Troponin-I	<0.04 ng/mL (wnl)
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Urinalysis

Color	yellow
Clarity	clear
Spec gravity	1.005
Protein	negative
Glucose	negative
Ketones	negative
Bilirubin	negative
Hemoglobin	negative
Leukocyte esterase	negative
Nitrite	negative
Red blood cells (RBC)	< 0/HPF
White blood cells (WBC)	0/HPF
Bacteria	none



OPERATOR MATERIALS

SIMULATION EVENTS TABLE:

Minute (state)	Participant action/ trigger	Patient status (simulator response) & operator prompts	Monitor display (vital signs)
0:00 (Baseline)		EMS rolls patient into room on gurney, with the wife walking alongside the gurney (optional)	
1:00	<p>IV, monitor Perform Primary Survey</p> <p>Ask nurse for blood glucose and ECG</p> <p>Obtain HPI and ROS (review of symptoms) from patient</p>	<p>Patient continues to sit on gurney in no acute distress, answering all questions</p> <p>EMS or nurse will give report to participants</p>	<p>T: 37°C HR: 70 - NSR BP: 120/80 RR: 16 O2: 100%</p>
4:00	<p>Perform a complete physical exam</p> <p>Order labs and CXR</p> <p>Recognize Brugada (Learners must articulate their findings) Place pads on patient and consult Cardiology</p>	<p>Point-of-care glucose and ECG available</p> <p>Patient continues to sit on gurney in no acute distress, answering all questions</p> <p>If learner does not place pads on patient and initiate Cardiology consultation, the patient will develop pulseless ventricular tachycardia (V. Tach)</p>	<p>T: 37°C HR: 72 - NSR BP: 120/80 RR: 16 O2: 100%</p>
6:00		Patient suddenly loses consciousness and becomes pulseless	<p>T: 37°C HR: 180 – ventricular tachycardia BP: unable to obtain</p>



OPERATOR MATERIALS

Minute (state)	Participant action/ trigger	Patient status (simulator response) & operator prompts	Monitor display (vital signs)
			RR: 0 O2: 100% with bagging
8:00	<p>ACLS algorithm:</p> <p>Chest compressions Bag-valve-mask (BVM) → prepare to intubate Apply pads Defibrillate once at 120-200 J Give epinephrine</p>	<p>Patient remains in pulseless ventricular tachycardia</p> <p>If learner does not recognize V. Tach as a shockable rhythm or defibrillation is delayed, patient will develop pulseless electrical activity (PEA) and return of spontaneous circulation (ROSC) will not be achieved.</p> <p>Alternatively, learner can be prompted on correct ACLS management (for example nurse can state, “that looks like V. tach to me.”)</p>	<p>T: 37°C HR: 180 – ventricular tachycardia BP: unable to obtain RR: 0 O2: 100% with bagging</p>
10:00		<p>If single shock and 1mg of epinephrine is delivered, the patient will attain return of spontaneous circulation after two minutes of CPR.</p> <p>Patient will awaken and moan, “<i>What happened?</i>”</p> <p>Optional: Wife is terrified and asking what is happening to her husband</p>	<p>T: 37°C HR: 72 - NSR BP: 120/80 RR: 16 O2: 100%</p>
12:00 (Case Completion)	<p>Reassess patient’s airway, breathing, and circulation, all of which will be normal</p> <p>Recognize that patient went into cardiac arrest secondary to Brugada syndrome</p>	<p>Labs and chest X-ray available</p> <p>Consult Cardiology - Cardiology consult will ask the learners to interpret the initial ECG and describe why the patient went into Ventricular Tachycardia</p> <p>Participants must specifically describe their concern for Brugada syndrome and ask for placement of an ICD; otherwise the cardiologist will repeatedly ask, “what are you calling me for? Why does he need to come to my service? What am I supposed to do about the syncope?”</p>	<p>T: 37°C HR: 80 BP: 130/72 RR: 20 O2Sat: 99%</p>



OPERATOR MATERIALS

Minute (state)	Participant action/ trigger	Patient status (simulator response) & operator prompts	Monitor display (vital signs)
	<p>If the learner does not recognize that the patient arrested as a complication of Brugada syndrome, a confederate (nurse or admitting service) will recommend Cardiology consultation to further discuss the ECG and differential.</p> <p>Consult cardiology and admit to CCU for placement of ICD</p>	<p>If the learner is still unable to articulate the appropriate concern for Brugada syndrome and/or is unsure of the necessary intervention, the Cardiologist will ask to have the ECG sent to them and will then express their concern for Brugada syndrome and need for ICD placement.</p>	

Diagnosis:

Cardiac arrest secondary to Brugada syndrome

Disposition:

Admit to CCU



DEBRIEFING AND EVALUATION PEARLS

Brugada Syndrome

How is Brugada syndrome defined?

- A spontaneous or autosomal dominant inherited mutation of the cardiac sodium channel that results in a specific characteristic ECG pattern **PLUS** associated clinical features of ventricular arrhythmia.

Epidemiology:

- Brugada syndrome is more prevalent in Southeast Asian Countries (Thailand, Philippines, Japan) and occurs in 1 per 1000 people.
- This syndrome is 8-10 times more common in men than women.
- The mean age of onset of symptoms or sudden death is 41 years.
- This syndrome often occurs in younger people with healthy and structurally normal hearts without other cardiac risk factors.

What are the clinical manifestations of Brugada syndrome?

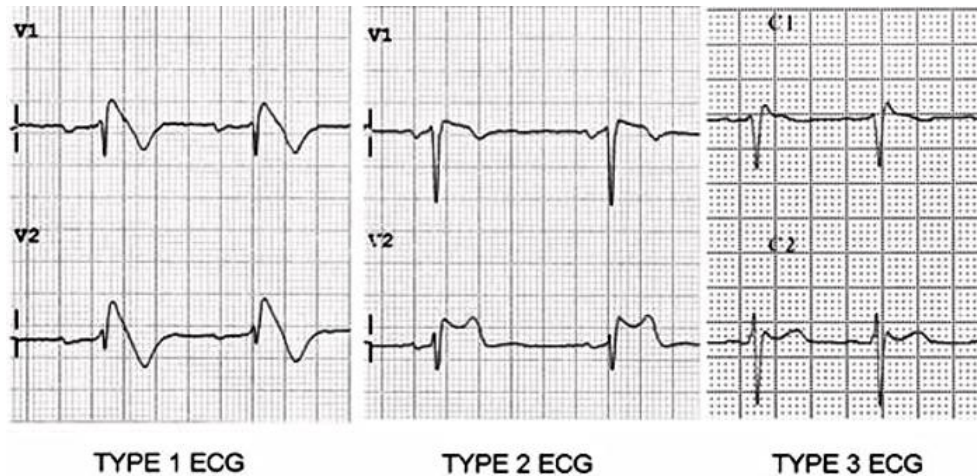
- Brugada syndrome increases the risk of malignant arrhythmias including Ventricular Fibrillation (VFib) and Ventricular tachycardia.
- One third of patient's initial presentation is sudden cardiac death due to an arrhythmia.
- Brugada syndrome can also present with syncope, palpitations, and Atrial Fibrillation. Atrial Fibrillation is seen in 10%-20% of patients with Brugada syndrome, and if present, may indicate a more severe disease and increased risk of Ventricular Fibrillation.
- Symptoms often occur at night while at rest or sleeping. Patients may experience nocturnal agonal respirations which may represent terminated cardiac arrhythmia while sleeping.

Please describe the three types of Brugada ECG patterns (10):

- There are three types of Brugada ECG patterns. The Brugada type 1 ECG pattern was seen in this simulation case and is the only type associated with Brugada syndrome.
- Type 1: down-sloping ST segment elevation > 2mm in > 1 lead in V1-V3
- Type 2: saddle-back ST segment > 2 mm in V1-V2
- Type 3: similar morphology to either type 1 or type 2, but ST segment elevation < 2mm



DEBRIEFING AND EVALUATION PEARLS



Life in the Fastlane. Figure showing the three types of Brugada patterns. April 8, 2017. Available at: <https://lifeinthefastlane.com/ecg-library/brugada-syndrome/>.

What is the differential diagnosis for ST segment elevation in precordial leads?

- Early repolarization
- Myocardial infarction
- Right and left bundle branch block
- Acute pericarditis
- Acute myocarditis
- Hyperkalemia
- Hypercalcemia
- Hypothermia (Osborn wave)

What are some factors that can provoke Brugada syndrome?

Brugada ECG changes can be transient, and there are many factors that can unmask Brugada pattern ECG changes and increase the risk of lethal arrhythmias.

- Fever is the most common factor to provoke a malignant arrhythmia in children.
- Medications such as Class I anti-arrhythmics (sodium-channel blocker), tricyclic antidepressants, and analgesics.
 - See link for complete list [http://www.brugada_dadruugs.org/avoid/](http://www.brugada-dadruugs.org/avoid/).
- Toxins including cocaine and alcohol.



DEBRIEFING AND EVALUATION PEARLS

Please list the diagnostic criteria for Brugada syndrome:

- Strongly consider Brugada syndrome IF Brugada type 1 ECG pattern is observed spontaneously or after administration of Na-channel blocking agent PLUS at least one of the following:
 - Personal history of VT or Vfib
 - Family history of sudden cardiac death at < 45 y/o
 - Family member with history of Brugada type 1 ECG
 - Nocturnal agonal respirations
 - Unexplained syncope
 - Inducible VT on electrophysiology study

What is the treatment and disposition for a patient with Brugada syndrome?

- Patients with Brugada type 1 ECG pattern and any of the above history should be admitted to the Cardiac Critical Care unit for placement of ICD.
 - The use of Quinidine can be considered in the following situations:
 - Current ICD with recurrent shocks
 - Bridge to ICD
 - When ICD contraindicated (neonates)
- Type 2 and 3 are not diagnostic for Brugada syndrome, but they can convert to type 1 and therefore may require electrophysiology study.
- It is important to avoid all medications and toxins that unmask the type 1 ECG pattern and are associated with malignant arrhythmias.
- Early treatment of fevers, especially in the pediatric population, can help prevent occurrence of malignant arrhythmia.

Why is it important to get an ECG on patient's presenting with syncope?

- There are 4 major causes of syncope which include reflex syncope, orthostatic syncope, cardiac arrhythmias and structural cardiopulmonary disease. Reflex syncope, or vasovagal syncope, is the most common cause of transient loss of consciousness in younger patients.
- Patients presenting with syncope need an ECG to evaluate for presence of:
 - Brugada
 - HOCM (hypertrophic obstructive cardiomyopathy)
 - Prolonged QT
 - Wolf-Parkinson-White



DEBRIEFING AND EVALUATION PEARLS

- Arrhythmogenic Right Ventricular Dysplasia (Epsilon wave)
- The above ECG patterns increase the risk of tachyarrhythmias which can lead to decreased cardiac output and decreased cerebral perfusion, resulting in syncope and possible death.

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1. Burns E. Brugada Syndrome. Life in the Fastlane. August 1, 2017. Available at: <https://lifeinthefastlane.com/ecg-library/brugada-syndrome/>. Accessed 4/5/18.
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SIMULATION ASSESSMENT

Fainting Spells

Learner: _____

Assessment Timeline

This timeline is to help observers assess their learners. It allows observer to make notes on when learners performed various tasks, which can help guide debriefing discussion.

Critical Actions

1. Obtain a full set of vital signs, including blood glucose level, and put the patient on the cardiac monitor
2. Rapidly assess primary survey: Airway, breathing, circulation
3. Obtain an ECG prior to cardiac arrest
4. Perform a complete history and physical exam
5. Correctly identify Brugada pattern on ECG
6. Recognize ventricular tachycardia on the monitor when patient becomes pulseless
7. Correctly follow the ACLS algorithm for ventricular tachycardia
8. Consult cardiology for ICD placement and admit to CCU

0:00



SIMULATION ASSESSMENT

Fainting Spells

Learner: _____

Critical Actions:

On initial presentation:

- Obtain a full set of vital signs, including blood glucose level, and put the patient on the cardiac monitor
- Rapidly assess primary survey: Airway, breathing, circulation
- Obtain an ECG prior to cardiac arrest
- Perform a complete history and physical exam
- Correctly identify Brugada pattern on ECG
- Recognize ventricular tachycardia on the monitor when patient becomes pulseless
- Correctly follow the ACLS algorithm for ventricular tachycardia
- Consult cardiology for ICD placement and admit to CCU

Summative and formative comments:



SIMULATION ASSESSMENT

Fainting Spells

Learner: _____

Milestones assessment:

	Milestone	Did not achieve level 1	Level 1	Level 2	Level 3
1	Emergency Stabilization (PC1)	<input type="checkbox"/> Did not achieve Level 1	<input type="checkbox"/> Recognizes abnormal vital signs	<input type="checkbox"/> Recognizes an unstable patient, requiring intervention Performs primary assessment Discerns data to formulate a diagnostic impression/plan	<input type="checkbox"/> Manages and prioritizes critical actions in a critically ill patient Reassesses after implementing a stabilizing intervention
2	Performance of focused history and physical (PC2)	<input type="checkbox"/> Did not achieve Level 1	<input type="checkbox"/> Performs a reliable, comprehensive history and physical exam	<input type="checkbox"/> Performs and communicates a focused history and physical exam based on chief complaint and urgent issues	<input type="checkbox"/> Prioritizes essential components of history and physical exam given dynamic circumstances
3	Diagnostic studies (PC3)	<input type="checkbox"/> Did not achieve Level 1	<input type="checkbox"/> Determines the necessity of diagnostic studies	<input type="checkbox"/> Orders appropriate diagnostic studies. Performs appropriate bedside diagnostic studies/procedures	<input type="checkbox"/> Prioritizes essential testing Interprets results of diagnostic studies Reviews risks, benefits, contraindications, and alternatives to a diagnostic study or procedure
4	Diagnosis (PC4)	<input type="checkbox"/> Did not achieve Level 1	<input type="checkbox"/> Considers a list of potential diagnoses	<input type="checkbox"/> Considers an appropriate list of potential diagnosis May or may not make correct diagnosis	<input type="checkbox"/> Makes the appropriate diagnosis Considers other potential diagnoses, avoiding premature closure



SIMULATION ASSESSMENT

Fainting Spells

Learner: _____

	Milestone	Did not achieve level 1	Level 1	Level 2	Level 3
5	Pharmacotherapy (PC5)	<input type="checkbox"/> Did not achieve Level 1	<input type="checkbox"/> Asks patient for drug allergies	<input type="checkbox"/> Selects an medication for therapeutic intervention, consider potential adverse effects	<input type="checkbox"/> Selects the most appropriate medication and understands mechanism of action, effect, and potential side effects Considers and recognizes drug-drug interactions
6	Observation and reassessment (PC6)	<input type="checkbox"/> Did not achieve Level 1	<input type="checkbox"/> Reevaluates patient at least one time during case	<input type="checkbox"/> Reevaluates patient after most therapeutic interventions	<input type="checkbox"/> Consistently evaluates the effectiveness of therapies at appropriate intervals
7	Disposition (PC7)	<input type="checkbox"/> Did not achieve Level 1	<input type="checkbox"/> Appropriately selects whether to admit or discharge the patient	<input type="checkbox"/> Appropriately selects whether to admit or discharge Involves the expertise of some of the appropriate specialists	<input type="checkbox"/> Educates the patient appropriately about their disposition Assigns patient to an appropriate level of care (ICU/Tele/Floor) Involves expertise of all appropriate specialists
9	General Approach to Procedures (PC9)	<input type="checkbox"/> Did not achieve Level 1	<input type="checkbox"/> Identifies pertinent anatomy and physiology for a procedure Uses appropriate Universal Precautions	<input type="checkbox"/> Obtains informed consent Knows indications, contraindications, anatomic landmarks, equipment, anesthetic and procedural technique, and potential complications for common ED procedures	<input type="checkbox"/> Determines a back-up strategy if initial attempts are unsuccessful Correctly interprets results of diagnostic procedure



SIMULATION ASSESSMENT

Fainting Spells

Learner: _____

	Milestone	Did not achieve level 1	Level 1	Level 2	Level 3
20	Professional Values (PROF1)	<input type="checkbox"/> Did not achieve Level 1	<input type="checkbox"/> Demonstrates caring, honest behavior	<input type="checkbox"/> Exhibits compassion, respect, sensitivity and responsiveness	<input type="checkbox"/> Develops alternative care plans when patients' personal beliefs and decisions preclude standard care
22	Patient centered communication (ICS1)	<input type="checkbox"/> Did not achieve level 1	<input type="checkbox"/> Establishes rapport and demonstrates empathy to patient (and family) Listens effectively	<input type="checkbox"/> Elicits patient's reason for seeking health care	<input type="checkbox"/> Manages patient expectations in a manner that minimizes potential for stress, conflict, and misunderstanding. Effectively communicates with vulnerable populations, (at risk patients and families)
23	Team management (ICS2)	<input type="checkbox"/> Did not achieve level 1	<input type="checkbox"/> Recognizes other members of the patient care team during case (nurse, techs)	<input type="checkbox"/> Communicates pertinent information to other healthcare colleagues	<input type="checkbox"/> Communicates a clear, succinct, and appropriate handoff with specialists and other colleagues Communicates effectively with ancillary staff