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| **Audience and Participants** | | | |
| **Target Learning Group**   * PGY-1 * PGY-2 * All groups | | | |
| Learning Objectives | | | |
| **Educational Goal**   * Recognize the presence of acute coronary syndrome (ACS) and treat a STEMI * Initiate appropriate therapy for pulseless VT and show knowledge of current ACLS algorithms.   **Crisis Resource Management (CRM) Objectives:**  **Medical Objectives:** | | | |
| Case Summary: | | | |
| 60 year old male with an ST-elevation myocardial infarction (STEMI) who suffers a brief cardiac arrest.  Note to make this case slightly more difficult, the administrator can make the case occur in Salmon Arm or other location with transfer to PCI capable center being greater than 120 minutes away. This will force the participant to use TPA. | | | |
| Physical Props / Equipment | | | |
| **Mannequin:**   * High fidelity patient simulator * No moulage necessary | | | |
| **Monitors:**   * **Telemetry** | | | |
| **Personnel:**   * RN or bystander playing RN | | | |
| **Other:**   * Code blue cart with ACLS algorithms | | | |
| Room | | | |
| **Set-Up:**   * Like typical resuscitation bay | **Medications & Fluids:**   * ASA PO * Nitro Spray * Epinephrine 1 mg IV | **Diagnostics:**   * Labs * ECG with anterior STEMI * CXR with mild pulmonary edema | **Documentation Forms:**   * RN resuscitation form. |

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| Scenario | | | | | | |
| Patient Identification: 60 year old male. | | | | | | |
| Chief Complaint / History: Chest pain  You are working in the emergency department in Salmon Arm. The ambulance has brought in a 60 year old male. He was shoveling snow approximately one hour ago when he developed crushing, substernal chest pain radiating to his left neck and jaw. | | | | | | |
| Past Medical History:   1. Hypertension 2. High cholesterol | | | Medications:   1. Hydrochlorothiazide 2. Atorvastatin | | | |
| Allergies: NKDA | | | |  | | |
| Family History: Father with MI in 60’s. | | | | Social History:   * Occasional alcohol. * Ex-smoker; 20 pack-year history. * Denies illicit drug use. * Married with two children. | | |
| Key Management Interventions: | | | | | | |
| **Stage 1: Initial Presentation of STEMI** | | | | | | |
| Vitals: | | | | | | |
| HR: 118 | BP: 160 / 95 | Temp: 36.2°C | | | O2 Sat: 93% RA | RR: 20 breaths / min |
| Physical Exam Findings: | | | | Review of Systems (ROS) | | |
| * **CNS:** A&O X 3, moderate distress. WNL otherwise. | | | | Positive ROS:  Chest pain with radiation to neck and jaw. Pain was exertional. Mild shortness of breath and diaphoresis. The patient is nauseous and has vomited once. He is lightheaded. | | |
| * **CVS:** PPPX4. N S1, S2, no murmur. | | | |
| * **RESP:** Crepitations at bases X 2. | | | |
| * **GI:** Soft, minimally obese, non-tender, non-distended. | | | |
| * **GU:** Non-contributory | | | | Negative ROS:  Pain is non-positional and non-pleuritic. He has no headache, numbness or motor weakness. There is no fever, chills, or abdominal pain or urinary symptoms. | | |
| * **MSK:** Non-contributory | | | |
| * **SKIN:** Pale appearing. | | | |
| Interventions | | | | | | |
| * Obtains IV access * Applies supplemental O2 * Asks for continuous cardiac monitoring / telemetry * Orders ECG; Identifies STEMI * Orders Portable chest x-ray * Obtains appropriate labs / cardiac panel * Administers nitro 0.4 mg SL q5 min X 3 * Administers ASA 162 mg – 325 mg PO * Loading dose of a P2Y12 receptor inhibitor: Clopidogrel 600 mg or Ticagrelor 180 mg PO (no Ticagrelor if fibrinolysis) * Anticoagulant therapy - Unfractionated Heparin (UFH) 60 U/Kg bolus then 12 U/Kg infusion (enoxaparin also in guidelines) * If case calls for primary PCI   + Consults cardiology; states need for cath lab activation and transfer to PCI capable centre. * If case calls for thrombolysis (i.e. transfer to PCI capable centre > 120 minutes)   + Administers tenecteplase (TNK-tPA) IV weight based bolus (dose is 40 mg for a 70 – 79 kg individual)   + Arranges for ultimate transfer to PCI-capable centre. | | | | | | |
| Successful Intervention:   * If nitro is administered patient will say pain is decreased from an 8 /10 to a 3/10. Blood pressure will decrease to 140/80. * If O2 is applied SaO2 will improve to 95% room air. * If STEMI is recognized may proceed to Stage 2 after five to ten minutes. | | | | | | |
| Unsuccessful Intervention:   * If no ECG is ordered or if STEMI is not recognized, confederate or other may prompt. | | | | | | |
| **Stage 2: Pulseless Ventricular Tachycardia (pVT) Cardiac Arrest**  After three to five minutes the patient suddenly becomes unresponsive. His rhythm deteriorates into monomorphic ventricular tachycardia. Pulses cannot be palpated. | | | | | | |
| Vitals: | | | | | | |
| HR: 200 | BP: Not reading | Temp: 36.2°C | | | O2 Sat: Not reading | RR: Apneic |
| Physical Exam Findings: | | | |  | | |
| * **CNS:** Unconscious, pale. | | | |  | | |
| * **CVS:** No palpable pulses. | | | |
| * **RESP:** Apneic | | | |
| * **GI:** See above | | | |
| * **GU:** Non-contributory | | | |  | | |
| * **MSK:** Non-contributory | | | |
| * **SKIN:** pale. | | | |
| Interventions | | | | | | |
| * Identifies pVT as rhythm * Adheres to the 2015 ACLS Guidelines:   + Shocks immediately with 120 - 200 joules (360 joules if monophasic defibrillator)   + Begins CPR with rotation of compressors every two minutes   + Applies 100% FiO2   + Pulse / rhythm checks every two minutes.   + Administers epinephrine 1 mg IV every 3-5 minutes * Considers reversible causes | | | | | | |
| Successful Intervention:   * ROSC will occur after second shock. | | | | | | |
| Unsuccessful Intervention:   * If no shock is administered after 3 minutes then a confederate or other may prompt. | | | | | | |

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| Notes | |
| **Possible Debriefing Points:**   * When to transfer for PCI vs. when to use fibrinolytics see Figure 2 in 2013 STEMI guidelines (reference 1. In references folder).[1] * Indications and contraindications for fibrinolysis (see Tables 4, 6 in 2013 STEMI guidelines)[1] * Review of 2015 ACLS Guidelines (see References 2,3 in folder). [2],[3] | **Debriefer Notes:** |
| References, Resources, Protocols, Algorithms, or Evidence Informed Practice Guidelines: | |
| References:  [1] P. T. O’Gara, F. G. Kushner, D. D. Ascheim, D. E. Casey, M. K. Chung, J. A. De Lemos, S. M. Ettinger, J. C. Fang, F. M. Fesmire, B. A. Franklin, C. B. Granger, H. M. Krumholz, J. A. Linderbaum, D. A. Morrow, L. K. Newby, J. P. Ornato, N. Ou, M. J. Radford, J. E. Tamis-Holland, C. L. Tommaso, C. M. Tracy, Y. J. Woo, and D. X. Zhao, “2013 ACCF/AHA guideline for the management of st-elevation myocardial infarction: A report of the American college of cardiology foundation/american heart association task force on practice guidelines,” *J. Am. Coll. Cardiol.*, vol. 61, no. 4, pp. 78–140, 2013.  [2] M. Hazinski, M. Shuster, M. Donnino, A. Travers, R. Samson, S. Schexnayder, E. Sinz, J. Woodin, and D. Atkins, “Highlights of the 2015 American Heart Association - Guidelines Update for CPR and ECG,” *Am. Hear. Assoc.*, pp. 1–36, 2015.  [3] R. W. Neumar, M. Shuster, C. W. Callaway, L. M. Gent, D. L. Atkins, F. Bhanji, S. C. Brooks, A. R. De Caen, M. W. Donnino, J. M. E. Ferrer, M. E. Kleinman, S. L. Kronick, E. J. Lavonas, M. S. Link, M. E. Mancini, L. J. Morrison, R. E. O’Connor, R. A. Samson, S. M. Schexnayder, E. M. Singletary, E. H. Sinz, A. H. Travers, M. H. Wyckoff, and M. F. Hazinski, *Part 1: Executive summary: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care*, vol. 132, no. 18. 2015.  Adjuncts:   1. ECG Image: Life in the Fast Lane (<https://lifeinthefastlane.com/ecg-library/lateral-stemi/)>. 2. CXR Image: Thesimtech.com (<http://thesimtech.com/xrays)> | |
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