

# Pericardial Tamponade

*Updated by Evan Strobel, MD; Shehni Nadeem, MD*

**Keywords:** Pericardial tamponade, shock, penetrating trauma

**Procedures:** Pericardiocentesis

## LEARNING OBJECTIVES

1. Recognize when an adult has an immediate life-threatening condition
2. Learn to employ a systematic approach to a critically ill trauma patient
3. Create a differential diagnosis for shock in the setting of penetrating trauma
4. Identify pericardial tamponade and performance of a pericardiocentesis

## CRITICAL ACTIONS

- ✓ IV access x2
- ✓ Supplemental oxygen
- ✓ Telemetry monitoring
- ✓ Patient history
- ✓ Physical exam
- ✓ Ask for crash cart
- ✓ EKG
- ✓ CXR
- ✓ Ultrasound (FAST exam)
- ✓ Labs: CBC, coagulation profile, BMP, type and cross, troponin
- ✓ Fluid administration
- ✓ Pericardiocentesis +/- pericardial window
- ✓ Tetanus vaccine
- ✓ Reassessment of vitals
- ✓ Consults called
- ✓ Closed-loop communication
- ✓ Summarize case to team and/or consultant

## CASE ONE-LINER

24-year-old male presents with a stab wound to the left 3rd intercostal space at the midclavicular line

## PRESENTATION

SETTING	Hospital ED
ADDITIONAL ROLES	Sim operator, sim RN, debrief manager CONSULTANTS: Trauma, Cardiothoracic Surgery
PATIENT	24yo male
CHIEF COMPLAINT	Stab wound to the L 3rd intercostal space at the midclavicular line
Hx of PRESENTING ILLNESS	A 24-year old male presents to the ED after suffering a stab wound to the left chest 20 minutes prior in a knife fight outside of the local grocery store. He is experiencing diffuse chest pain, left shoulder pain, and nausea. He denies any dyspnea, abdominal pain, or dizziness. He does not remember the date of his last tetanus shot.
ROS	(+) trauma to L. chest, non-radiating diffuse chest pain, left shoulder pain, shortness of breath, and nausea (-) Loss of consciousness, dyspnea, abdominal pain, dizziness, numbness, tingling
PMH/PSH	None
MEDICATIONS	None
ALLERGIES	None
SOCIAL Hx	Marijuana use

## INITIAL VITAL SIGNS

HR	BP	RR	PULSE OXIMETRY	TEMP	WEIGHT
127	100/60	17	100% on room air	98.9F	80 kg

## PHYSICAL EXAM

Items in red need to be verbalized

**GENERAL:** AAOx3, significant distress and agitation  
**HEENT:** PERRL, no hemotympanum, tongue midline, atraumatic  
**NECK:** +JVD, no crepitus  
**CV:** Tachycardic, muffled heart sounds, PMI difficult to assess. Penetrating wound at L 3rd ICS at mid-clavicular line with frank bleeding. No other deformities or penetrating wounds  
**PULM:** CTAB in all fields  
**ABD:** Non-tender, non-distended abdomen. +BS. No rebound/guarding  
**EXT:** 2+ pulses throughout, strength 5/5 and equal throughout  
**NEURO:** 2+ reflexes throughout, sensation grossly normal  
**SKIN:** 2 cm abrasion to R flank, no other penetrating injuries. Cool/clammy skin

**PHASE 1: INITIAL PRESENTATION**

TIME	CLINICAL PROMPT	EXPECTED MANAGEMENT	CONSEQUENCES	CRITICAL ACTIONS
00:00-03:00	24yo male presents w/ stab wound to L chest	<ul style="list-style-type: none"> <li>Order full set of vital signs, cardiac monitor, continuous oxygen saturation monitoring</li> <li>Order 2 large bore IVs</li> <li>Begin assessment of ABCs</li> </ul>	<ul style="list-style-type: none"> <li>RN prompts, “Do you want vitals/patient on the monitor/ IV access?” if not requested</li> </ul>	<ul style="list-style-type: none"> <li>Obtained a complete set of vital signs? I P N</li> <li>Obtained a focused history? I P N</li> <li>Performed focused physical exam? I P N</li> <li>Ordered 2-large bore IVs? I P N</li> <li>Recognized abnormal VS? I P N</li> </ul>

**PHASE 2: REASSESSMENT AND SECONDARY INTERVENTION**

TIME	CLINICAL PROMPT	EXPECTED MANAGEMENT	CONSEQUENCES	CRITICAL ACTIONS
3:01-6:00	<p>Patient still in severe pain, thrashing on bed. Becoming more agitated/diaphoretic</p> <p><b>Repeat Vital Signs</b> BP: 84/52 HR: 152 RR: 24 T: 98.8F O2 sat: 98% on RA</p>	<ul style="list-style-type: none"> <li>Order STAT labs</li> <li>Order STAT EKG</li> <li>Order STAT CXR</li> <li>Perform FAST US and rule out tension pneumo, but identify pericardial tamponade</li> <li>Order IV fluid resuscitation</li> <li>Prepare for pericardiocentesis</li> </ul>	<ul style="list-style-type: none"> <li>RN prompts, “Do you want any imaging/labs?” if not requested</li> <li>RN prompts, “What do you want to do about his low BP?” if no action</li> <li>RN prompts, “Do you want me to call anyone for help?” if no consults called</li> </ul>	<ul style="list-style-type: none"> <li>Ordered STAT labs? I P N</li> <li>Ordered STAT CXR? I P N</li> <li>Ordered STAT EKG? I P N</li> <li>Conducted FAST? I P N</li> <li>Ordered IV fluids? I P N</li> <li>Prepared for pericardiocentesis? I P N</li> </ul>

**PHASE 3: REASSESSMENT, TERTIARY INTERVENTION, RESULTS, RESOLUTION**

TIME	CLINICAL PROMPT	EXPECTED MANAGEMENT	CONSEQUENCES	CRITICAL ACTIONS
6:01-10:00	AFTER appropriate intervention (ie, pericardiocentesis), pt begins to calm, BP improves	<ul style="list-style-type: none"> <li>Order blood products</li> <li>Call consultant for definitive management and admission</li> <li>Complete secondary exam and trauma imaging (eg, CT chest/abd/pelvis)</li> </ul>	<ul style="list-style-type: none"> <li>After pericardiocentesis, RN to prompt, “Who is admitting this patient?” if no service identified</li> </ul>	<ul style="list-style-type: none"> <li>Ordered blood products? I P N</li> <li>Called consultant? I P N</li> <li>Succinct and direct handoff to specialist? I P N</li> <li>Interpreted FAST accurately? I P N</li> <li>Performed pericardiocentesis correctly? I P N</li> <li>Updated patient at any point? I P N</li> </ul>

#### PHASE 4: CONCLUSION & DEBRIEFING

TIME	ACTIONS
10:00-20:00	Debrief Q&A Session/Teaching Evaluations

#### DEBRIEFING POINTS

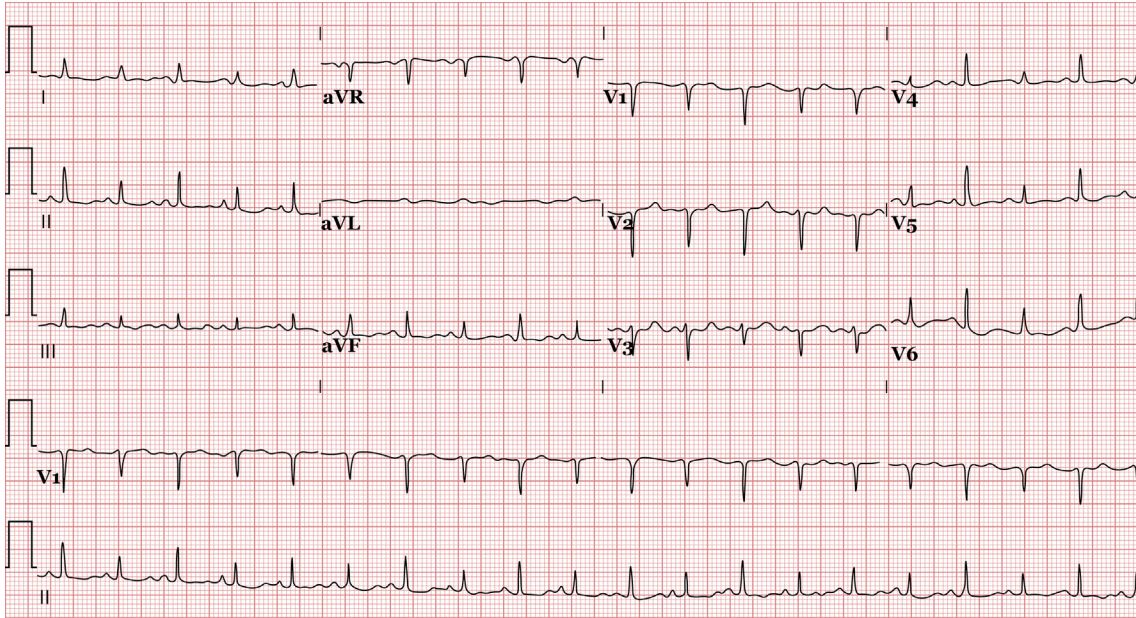
GENERAL POINTS	SCENARIO-SPECIFIC POINTS
<ul style="list-style-type: none"> <li>• What went well?</li> <li>• What are some opportunities for improvement?</li> <li>• Did you identify any gaps in knowledge?</li> <li>• Was there any delay in treatment?</li> <li>• How was communication between team members?</li> </ul>	<ul style="list-style-type: none"> <li>• Fluid choices in the setting of penetrating trauma</li> <li>• Differential diagnosis of shock in penetrating trauma</li> <li>• Diagnostic adjuncts</li> <li>• How to perform a pericardiocentesis</li> <li>• For advanced learners, consider exploration of ED thoracotomy</li> </ul>

#### SCENARIO STIMULI

Complete Blood Count		Coagulation Profile	
WBC	10.0 (Normal 5.0 - 14.5 x 10 <sup>3</sup> /mL)	PT	12 (Normal 11-13.5 seconds)
Hemoglobin	13.5 (Normal 11.5-15.5 gm/dL)	PTT	25 (Normal 25-35 seconds)
HCT	39.5 (Normal 35%-45%)	INR	1.0 (Normal 0.8-1.1)
Platelets	240 (Normal 150-450 x 10 <sup>3</sup> /mL)		
MCV	84 (Normal 76-90 fL/red)		
Basic Metabolic Panel		Additional Tests	
Sodium	136 (Normal 136-145 mEQ/L)	Troponin I	< 0.02 (Normal < 0.08 ng/mL)
Potassium	4.0 (Normal 3.5-5.5 mEQ/L)	Type/Cross	Type B Positive
Chloride	105 (Normal 95-105 mEQ/L)		
CO <sub>2</sub>	23 (Normal 17-29 mEQ/L)		
BUN	14 (Normal 5-20 mg/dL)		
Creatinine	0.9 (Normal 0.5-1.1 mg/dL)		
Glucose	95 (Normal 70-110 mg/dL)		

## IMAGING

### Representative EKG



### Representative CXR



### Representative POCUS

