Author: Tina Cocuzza, MD and Tiffany Murano, MD Reviewer: Lisa Jacobson, MD

Case Title: Incarcerated Hernia

# Target Audience: medical students, nurses, paramedics, residents, other

Primary Learning Objectives:

1. Recognition of incarcerated hernia

2. Recognition of possible bowel ischemia

3. Demonstration of appropriate treatment plan for incarcerated hernia and bowel ischemia

Secondary Learning Objectives:

1. Explain the diagnosis and procedures to the patient

2. Employ effective communication with the consultant

3. Appropriate utilization of resources

Critical actions checklist

1. Provide antipyretics and appropriate analgesia
2. Diagnose hernia on physical exam and attempt reduction
3. Attempt reduction of hernia with Trendelenberg, further pain control, and/or anxiolytics/sedation
4. Call an emergent general surgery consult for incarcerated hernia and discuss possibility of bowel ischemia/strangulation

**For Examiner Only**

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**CASE SUMMARY**

**CORE CONTENT AREA**

Gastrointestinal

**SYNOPSIS OF HISTORY/ Scenario Background**

The patient is a 32 year old male with no significant past medical history who presents with right lower quadrant pain and subjective fever at home x 2 days. The patient’s surgical history (which turns out to be of no significance) is of an exploratory laparotomy due to a stab wound four years ago. The patient does not mention and does not volunteer the information that he has scrotal pain and swelling unless specifically asked by the examinee. If asked, the patient admits he has scrotal pain and swelling. There is no penile discharge or dysuria. If not specifically asked the patient will only complain of right lower quadrant pain. There is no nausea, vomiting, or diarrhea. His bowel habits have been normal.

**SYNOPSIS OF PHYSICAL**

On triage vitals the patient is tachycardic and febrile orally. He has diffuse abdominal tenderness that is worse in the RLQ, with voluntary guarding in the RLQ. The patient has a firm, tender, right inguinal hernia on GU exam, but this is ONLY discovered if the examinee fully undresses the patient and asks specifically about genital/GU exam. The examinee may try to reduce the hernia and will be unsuccessful. The examinee should make serious attempts to reduce hernia, including Trendelenberg position, administration of pain medications, and possible anxiolytics/sedatives. The hernia will not be reducible. The examinee should consult the on-call general surgeon and communicate that the hernia is incarcerated and the concern for possible strangulation given the patient’s fever, leukocytosis, and elevated lactate. The examinee should not obtain a CT scan prior to calling general surgery. If a CT scan is obtained it will reveal bowel ischemia. The examinee should be marked down if a CT scan is obtained prior to surgical consultation.

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**CRITICAL ACTIONS**

**Scenario branch points/ PLAY OF CASE GUIDELINES**

1. **Critical Action**

Provide antipyretics and appropriate analgesia

Cueing Guideline:

1. The nurse may say, “Doctor, the patient still looks very uncomfortable.”
2. The patient may say, “Doctor, my stomach still really hurts.”
3. **Critical Action**

Diagnose hernia on physical exam and attempt reduction

Cueing Guideline:

1. The general surgery consult may ask the examinee what he thinks is wrong with the patient.
2. The nurse may ask if she can place a foley and when she does she may say, “Doctor, I noticed a swelling in the patient’s scrotum.”
3. If the hernia is recognized but no attempt made, the general surgery consultant may ask the examinee if he was able to reduce the hernia.
4. **Critical Action**

Attempt reduction of hernia with Trendelenberg, further pain control, and/or anxiolytics/sedation

Cueing Guideline:

1. The general surgery consultant may ask the examinee what he/she did to attempt to reduce the hernia.
2. The nurse may ask if there’s anything else the examinee would like to try.
3. **Critical Action**

Call an emergent general surgery consult for incarcerated hernia and discuss possibility of bowel ischemia/strangulation

Cueing Guideline:

1. The patient may ask if he is going to be admitted.
2. If examinee attempted reduction the nurse may ask if there’s anyone else the doctor is going to call for help.

**SCORING GUIDELINES**

(Critical Action No.)

1. Provide antipyretics and appropriate analgesia

2.Diagnose hernia on physical exam and attempt reduction

3. Attempt reduction of hernia with trendelenberg, further pain control, and/or

anxiolytics/sedation

4.Call an emergent general surgery consult for incarcerated hernia and discuss possibility of bowel ischemia/strangulation

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**HISTORY**

**Onset of Symptoms:** Yesterday

**Background Info:** 32 year-old male presents with right lower quadrant pain and fever since yesterday. The pain began suddenly and was so severe patient was unable to sleep last night so came to ED first thing this morning.

**Chief Complaint: “**My stomach won’t stop hurting.”

**Past Medical Hx:** None

**Past Surgical Hx:** Exploratory laparotomy secondary to stab wound 4 years ago

**Habits:** Smoking: 1 PPD

ETOH: Socially

Drugs: Marijuana occasionally

**Family Medical Hx:** Non-contributory

**Social Hx:** Marital Status: single

Children: None

Education: High School

Employment: Employed as a salesman at local appliance store

**ROS:** General: (+) fever/chills

GI: No nausea, no vomiting. No diarrhea. Last bowel movement was the day prior. He has had no flatus today.

GU: no dysuria, no penile discharge; (+) scrotal swelling and tenderness

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**PHYSICAL EXAM**

**Patient Name:** Kenny Jones **Age & Sex:** 32 year-old male

**General Appearance:** Well-developed, well-nourished male in moderate distress

**Vital Signs:** T: 99.4°F (oral), 100.4 °F (rectal), BP: 135/85 HR: 110 RR: 18

O2 Sat: 99% on room air

**Head:** Normal

**Eyes:** Normal

**Ears:** Normal

**Mouth:** Normal

**Neck:** Normal

**Skin:** Normal

**Chest:** Normal

**Lungs:** Normal

**Heart:** Tachycardic, RRR, no murmur, rub, or gallop

**Back:** No CVA tenderness

**Abdomen:** Soft with diffuse tenderness, worse in RLQ. (+) voluntary guarding. No rebound or peritoneal signs

**GU:** (only evident if examinee completely undressed patient and asks to do GU exam): Right inguinal hernia, firm and tender, not reducible.

**Extremities:** Normal

**Rectal:** Non-tender, heme negative

**Pelvic:** N/A

**Neurological:** Normal

**Mental Status:** Normal

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**STIMULUS INVENTORY**

#1 Emergency Admitting Form

#2 CBC

#3 BMP

#4 U/A

#5 ABG

#6 Lactate

#7 Toxicology

#8 CXR

#9 KUB

#10 CT abdomen/pelvis

#11 Photograph of patient’s presentation

#12 Debriefing materials

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**LAB DATA & IMAGING RESULTS**

**Stimulus #2 Stimulus #5**

**Complete Blood Count (CBC) Arterial Blood Gas**

WBC 15.0/mm3 pH 7.30

Hgb 13.7 g/dL pCO2 32 mm Hg

Hct 41.0 % pO2 95 mm Hg

Platelets 271/mm3 O2 Sat99 %

Differential

Segs 80% **Stimulus #6**

Bands 10% **Lactate** 3.5

Lymphs 8%

Monos 2%

Eos 0%

**Stimulus #7**

**Toxicology** ETOH 0

**Stimulus #3 Urine**

**Basic Metabolic Profile (BMP)** Cocaine Neg

PCP Neg

Na+ 141 mEq/L Cannabinoids Neg

K+ 4.0 mEq/L Benzodiazepines Neg

CO2 17 mEq/L Amphetamines Neg

Cl- 110 mEq/L Opiates Neg

Glucose 107 mg/dL Barbiturates Neg

BUN 10 mg/dL

Creatinine 1.0 mg/dL

**Stimulus #4 Diagnostic Imaging**

**Urinalysis (U/A)**

Color yellow **Stimulus #8**

Specific Gravity 1.010 **CXR:** Normal

Glucose neg

Protein neg **Stimulus #9**

Ketone neg **KUB:** Normal

Leuk. Est. neg

Nitrite neg **Stimulus #10**

WBC 0-1 **CT abdomen/pelvis with contrast:**

RBC 0-1 Right inguinal hernia with evidence of

Ischemia

**Stimulus #11**

Photograph of patient’s presentation

**Learner Stimulus #1**

**ABEM General Hospital**

**Emergency Admitting Form**

Name: Kenny Jones

Age: 32 years

Sex: Male

Method of Transportation: Private car

Person giving information: Patient

Presenting complaint: Abdominal Pain

**Background:** Patient ambulated into the ED c/o right lower quadrant pain and fever since yesterday. The pain began suddenly and was so severe patient was unable to sleep last night so came to ED first thing this morning.

**Triage or Initial Vital Signs**

BP: 130/89

P: 110

R: 18

T : 100.4 °F (rectal)

**Learner Stimulus #2**

**Complete Blood Count (CBC)**

WBC 15 /mm3

Hgb 13.7g/dL

Hct 41%

Platelets 271/mm3

Differential

Segs 80%

Bands 10%

Lymphs 8%

Monos 2%

Eos 0%

**Learner Stimulus #3**

**Basic Metabolic Profile (BMP)**

Na+ 141 mEq/L

K+ 4.0 mEq/L

CO2 17 mEq/L

Cl- 110 mEq/L

Glucose 107 mg/dL

BUN 10 mg/dL

Creatinine 1.0 mg/dL

**Learner Stimulus #4**

**Urinalysis (U/A)**

Color yellow

Sp gravity 1.010

Glucose neg

Protein neg

Ketone neg

Nitrite neg

WBC 0-1

RBC 0-1

**Learner Stimulus #5**

**Arterial Blood Gas**

pH 7.30

pCO2 32 mm Hg

pO2 95 mm Hg

O2 Sat99 %

**Learner Stimulus #6**

**Lactate** 3.5

**Learner Stimulus #7**

**Toxicology**

ETOH 0

**Urine**

Cocaine Neg

PCP Neg

Cannabinoids Neg

Benzodiazepines Neg

Amphetamines Neg

Opiates Neg

Barbiturates Neg

**Learner Stimulus #8**

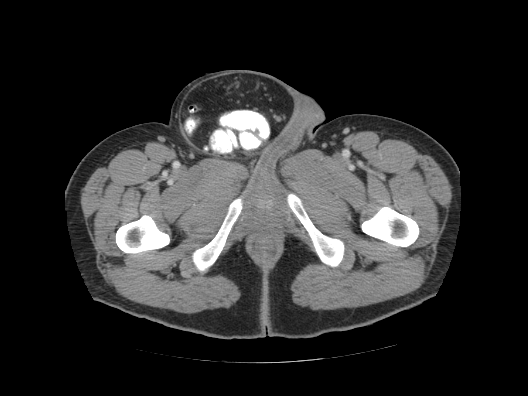
**CXR:** Normal

**Learner Stimulus #9**

**KUB:** Normal

**Learner Stimulus #10**

**CT abdomen/pelvis with contrast:** Right inguinal hernia with evidence of ischemia



**Learner Stimulus #11**

Photograph of patient’s presentation



**For Examiner**

Date: Examiner: Examinee(s):

Scoring: In accordance with the Standardized Direct Observational Tool (SDOT)

The learner should be scored (based on level of training) for each item above with one of the following:

NI = Needs Improvement

ME = Meets Expectations

AE = Above Expectations

NA= Not Assessed

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Critical Actions** | **NI** | **ME** | **AE** | **NA** | **Category** |
| Obtain a focused history pertinent to the chief complaint of abdominal pain |  |  |  |  | P, PC, MK, PBL |
| Performs comprehensive abdominal and genitor-urinary examination |  |  |  |  | PC, MK, PBL |
| Diagnose hernia and attempt reduction |  |  |  |  | PC, MK, PBL |
| Consults general surgery emergently |  |  |  |  | PC, MK, PBL, SBP |
| Recognize possible bowel ischemia |  |  |  |  | PC, MK, PBL |
| Administers analgesia and antipyretics |  |  |  |  | P, PC, MK, PBL |
| Demonstrate effective communication with patient and general surgery consultant |  |  |  |  | P, PC, MK, ICS, |

The score sheet may be used for a variety of learners. For example, in using the case for 4th year medical students, the key teaching points of the case may be the recognition of shock and treatment with appropriate fluid resuscitation. Other items may be marked N/A= not assessed.

Category: One or more of the ACGME Core Competencies as defined in the SDOT

PC= Patient Care

Compassionate, appropriate, and effective for the treatment of health problems and the promotion of health

MK= Medical Knowledge

Residents are expected to formulate an appropriate differential diagnosis with special attention to life-threatening conditions, demonstrate the ability to utilize available medical resources effectively, and apply this knowledge to clinical decision making

PBL= Practice Based Learning & Improvement

Involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care

ICS= Interpersonal Communication Skills

Results in effective information exchange and teaming with patients, their families, and other health professionals

P= Professionalism

Manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population

SBP= Systems Based Practice

Manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value

**Keywords for future searching functions**

Hernia, Incarceration, inguinal, acute abdominal pain

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**Has this work been previously published?** No

**Debriefing Materials:**

A hernia is the protrusion of part of an organ through a weak point in the wall of the body cavity that normally contains it.1 They are classified by anatomic location, the contents contained within the hernia, and whether the hernia is reducible, incarcerated, or strangulated.1 Abdominal wall hernias are one of the most common surgical complaints and inguinal hernias are the most common type of hernia. About 500,000 inguinal hernia are identified annually in the US and general surgeons performed almost 800,000 inguinal hernia repair in the United States in 2003.2,3

A hernia is called reducible when the hernia sac itself is soft and easily reduced through the hernia defect. A hernia is incarcerated when it is firm, often painful, and non-reducible by direct manual pressure. Strangulation develops as a consequence of incarceration and is due to reduced blood flow to the organ. It will present as severe pain at the hernia site, possibly with signs and symptoms of intestinal obstruction, toxic appearance, and skin changes overlying the hernia sac. A strangulated hernia is an acute surgical emergency.4

Diagnosis is primarily clinical, however, more recently, imaging studies have been shown to have a role as both a primary diagnostic tool as well as a way to identify complications.5 Plain films may be helpful in patients with perforation or obstruction but are usually indeterminate or non-diagnostic.4 In patients where the diagnosis is equivocal ultrasound is an accurate diagnostic modality.6 Bedside ED US using a linear high frequency probe with color or power Doppler of the hernia sac can be useful in these borderline cases to establish the presence or absence of blood flow.5 CT scan is the best radiographic test for diagnosis and can identify uncommon hernia types as well as demonstrate incarceration and strangulation.7

If the hernia is easily reduced, the patient can be referred for elective outpatient surgery.4 If the hernia is incarcerated but not strangulated an attempt to manually reduce the hernia should be made. If unsuccessful after one or two attempts, general surgery should be consulted. 4 If there is any concern for strangulation, general surgery consultation should be made immediately.8