Authors: Tina Cocuzza, MD and Tiffany Murano, MD

Reviewer: Leila Getto, MD

Case Title: Small Bowel Obstruction

# Target Audience: medical students, residents

Primary Learning Objectives:

1. Recognition of small bowel obstruction

2. Recognition of dehydration and electrolyte abnormalities

3. Recognition of possible bowel ischemia

4. Demonstration of appropriate treatment plans for dehydration and small bowel obstruction

Secondary Learning Objectives: detailed technical goals, behavioral goals, didactic points

1. Explain the diagnosis and procedures to the patient

2. Effectively communicate with the consultant

3. Appropriate utilization of resources

Critical actions checklist

1. Provide adequate analgesia and anti-emetics
2. Give adequate intravenous fluid hydration and replace potassium, consider early iv antibiotics
3. Place nasogastric tube
4. Order imaging study either KUB or CT scan of abdomen and pelvis and diagnose SBO
5. Call an emergent general surgery consult for admission and discuss with the consult the possibility of bowel ischemia and need for laparotomy

**For Examiner Only**

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**CASE SUMMARY**

**CORE CONTENT AREA**

Gastrointestinal

**SYNOPSIS OF HISTORY/ Scenario Background**

The patient is a 75 year old man who complains of diffuse abdominal pain and vomiting x 2 days. The patient’s wife is at the bedside and is convinced the patient has food poisoning because they tried a new Chinese restaurant right before this began. The wife ate at the same restaurant and is not sick. The patient has a history of prostate cancer and cholecystectomy in the past. The patient has a small bowel obstruction on KUB and CT scan of the abdomen and pelvis. The examinee must, however, recognize the patient has a low grade fever (only apparent if asks for rectal temperature), elevated WBC count, and lactate and consider bowel ischemia. This should be communicated as a possibility to the general surgery consultant by the examinee. The examinee should also recognize dehydration (both clinical and by lab data) and electrolyte abnormalities and give IVF and potassium replacement. The examinee should also place a nasogastric tube, provide analgesia and anti-emetics, and call an emergency general surgery consult for admission and strongly recommend the patient go to the OR given the possibility of bowel ischemia.

**SYNOPSIS OF PHYSICAL**

75 year old male with clinical signs of dehydration including dry mucous membranes and tachycardia. He has a temperature of 99.7F orally but if asked for a rectal temp the patient has a low grade fever of 100.8 F. His abdomen is distended with diffuse tenderness and hyperactive bowel sounds.

**For Examiner Only**

**CRITICAL ACTIONS**

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

1. **Critical Action**

Provide adequate analgesia and anti-emetics.

Cueing Guideline:

1. The nurse may say, “Doctor, the patient still looks very uncomfortable.”
2. The patient may vomit during the exam.

1. **Critical Action**

Give adequate intravenous fluid hydration and replace potassium

Cueing Guideline:

1. The nurse may ask why the patient is still tachycardic.
2. If potassium is not replaced the nurse may ask if there is anything else the examinee wants to do for the patient.
3. **Critical Action**

Order imaging study either KUB or CT scan of abdomen and pelvis and diagnose SBO

Cueing Guideline:

1. The general surgery consult may ask the examinee what he thinks is wrong with the patient.
2. The general surgery consultant may ask the examinee if he obtained any imaging for the patient.
3. **Critical Action**

Place nasogastric tube

Cueing Guideline:

1. The surgery consult can ask if a NGT was placed.
2. The nurse may comment that the patients stomach looks really distended.

1. **Critical Action**

Call an emergent general surgery consult for admission and discuss with the consult the possibility of bowel ischemia and need for laparotomy

Cueing Guideline: The wife may ask if the patient is going to be admitted to the hospital and what is going to happen to her husband

**SCORING GUIDELINES**

(Critical Action No.)

1. Provide adequate analgesia and anti-emetics

2. Adequate intravenous fluid resuscitation and replace potassium, consider early iv antibiotics

3. Order imaging study (KUB or CT a/p) and recognize SBO (suggest that a CT should be ordered on this patient due to fever, tachycardia, concern for ischemia)

4. Place nasogastric tube

5. General surgery consult for admission/laparotomy for bowel ischemia

**For Examiner Only**

**HISTORY**

**Onset of Symptoms:** Last night

**Background Info:** 75 year-old male brought in by wife because he started vomiting at home after eating at a new Chinese restaurant

**Chief Complaint:** “My stomach hurts and I can’t stop vomiting”

**Past Medical Hx:** Prostate Cancer, Hypertension, Diabetes

**Past Surgical Hx:** Cholecystecomy 5 years ago

**Medications:** HCTZ, Glucophage

Prostate Cancer was successfully treated with Radiation therapy 10 years ago

**Allergies:** NKDA

**Habits:** Smoking: Quit 10 years ago

ETOH: Occasional

Drugs: None

**Family Medical Hx:** Non-contributory

**Social Hx:** Marital Status: Married

Children: 2 adult children

Education: High School

Employment: Retired, previously worked as a janitor in a local elementary school

**ROS:** General: No fever/chills

CV: No chest pain, No SOB

GI: (+) N/V. (+) generalized abdominal pain. One episode of watery stool just PTA, Last normal BM 2 days ago; No coffee ground emesis or gross blood in vomit. No melena or hematachezia.

**For Examiner Only**

**PHYSICAL EXAM**

**Patient Name:** Keith Williams **Age & Sex:** 75 year-old male

**General Appearance:** Well-developed, well-nourished male in moderate distress, retching into a basin.

**Vital Signs:** T: 99.7°F (oral), 101.8°F (rectal) BP: 135/85 HR: 120 RR: 18

O2 Sat: 99% on room air FSG: 320

**Head:** NCAT

**Eyes:** Normal

**Ears:** Normal

**Mouth:** Dry mucous membranes

**Neck:** Normal

**Skin:** Poor skin turgor

**Lungs:** Normal

**Heart:** Tachycardic at 110 bpm, no murmurs, rubs, or gallops

**Back:** Normal

**Abdomen:** Distended with diffuse tenderness. Hyperactive bowel sounds. No rebound or guarding

**Extremities:** Normal

**Rectal:** Brown stool, guaiac negative (consider making this guaiac positive to make the learner think more about ischemia)

**Pelvic:** n/a

**Neurological:** Normal

**Mental Status:** Normal

**For Examiner Only**

**STIMULUS INVENTORY**

#1 Emergency Admitting Form

#2 CBC

#3 BMP

#4 U/A

#5 ABG

#6 Cardiac Enzymes

#7 Lactate

#8 Urine toxicology

#9 CXR

#10 KUB

#11 CT abdomen/pelvis

#12 EKG

#13 Debriefing Materials

**For Examiner Only**

**LAB DATA & IMAGING RESULTS**

**Stimulus #2 Stimulus #5**

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

WBC 14.7/mm3 pH 7.30

Hgb 13.2 g/dL pCO2 40 mm Hg

Hct 39.6% pO2 95 mm Hg

Platelets 269/mm3 O2 Sat99 %

Differential

Segs 85% **Stimulus #6**

Bands 0% **Cardiac Enzymes**

Lymphs 11% Myoglobin ng/ml

Monos 2% Troponin < 0.02 ng/ml

Eos 2%

**Stimulus #7**

**Stimulus #3** Lactate 3.0

**Basic Metabolic Profile (BMP)**

Na+ 137 mEq/L

K+ 2.7 mEq/L

CO2 19 mEq/L

Cl- 101 mEq/L

Glucose 328 mg/dL **Stimulus #8**

BUN 40 mg/dL **Urine Toxicology**

Creatinine 1.4 mg/dL Cocaine Neg

AcetonenegativeCannabinoids Neg PCP Neg

**Stimulus #4** Amphetamines Neg **Urinalysis (U/A)** Opiates Neg

Color yellow Barbiturates Neg

Sp gravity 1.010 Benzodiazepines Neg

Glucose neg

Protein neg

Ketone >150

Leuk. Est. neg

Nitrite neg

WBC 0-1 **Diagnostic Imaging**

RBC 0-1 **Stimulus #9** CXR: Negative

**Stimulus #10** KUB: Dilated loops of small bowel with multiple air/fluid levels

**Stimulus #11**

CT a/p: Small Bowel Obstruction

**Stimulus #12** EKG: sinus tachycardia; no acute ST-segment changes

**Learner Stimulus #1**

**ABEM General Hospital**

**Emergency Admitting Form**

Name: Keith Williams

Age: 75 year-old

Sex: Male

Method of Transportation: Private car

Person giving information: Patient

Presenting complaint: Abdominal Pain

**Background:** Patient was brought to the hospital by his wife because he started vomiting at home after eating at a new Chinese restaurant.

**Triage or Initial Vital Signs**

BP: 135/85

P: 110

R: 18

T : 99.7°F

**Learner Stimulus #2**

**Complete Blood Count (CBC)**

WBC 14.7 /mm3

Hgb 13.2 g/dL

Hct 39.6%

Platelets 269/mm3

Differential

Segs 85%

Bands 0%

Lymphs 11%

Monos 2%

Eos 2%

**Learner Stimulus #3**

**Basic Metabolic Profile (BMP)**

Na+ 137 mEq/L

K+ 2.7 mEq/L

CO2 19 mEq/L

Cl- 101 mEq/L

Glucose 328 mg/dL

BUN 40 mg/dL

Creatinine 1.4 mg/dL

Acetone Negative

**Learner Stimulus #4**

**Urinalysis (U/A)**

Color yellow

Sp gravity 1.010

Glucose neg

Protein neg

Ketone >150

Leuk. Est. neg

Nitrite neg

WBC 0-1

RBC 0-1

**Learner Stimulus #5**

**Arterial Blood Gas**

pH 7.30

pCO2 40 mm Hg

pO2 95 mm Hg

O2 Sat99 %

**Learner Stimulus #6**

**Cardiac Enzymes**

Myoglobin ng/ml

Troponin < 0.02 ng/ml

**Learner Stimululs #7**

**Lactate** 3.0

**Learner Stimulus #8**

**Urine Toxicology**

Cocaine Neg

Cannabinoids Neg

PCP Neg

Amphetamines Neg

Opiates Neg

Barbiturates Neg

Benzodiazepines Neg

**Learner Stimulus #9**

**CXR:** Negative

**Learner Stimulus #10**

**KUB:**



**Learner Stimulus #11**

**CT a/p with IV contrast:** Small Bowel Obstruction



**Learner Stimulus #12**

EKG: sinus tachycardia; no acute ST-segment changes

**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** |
| Place patient on cardiac monitor with pulse oximetry |  |  |  |  | PC, MK, PBL |
| Obtain a full set of vital signs including an oxygen saturation and FSG |  |  |  |  | PC, MK |
| Recognize SBO and calls general surgery consult |  |  |  |  | PC, MK, PBL |
| Recognizes electrolyte abnormalities and treats appropriately |  |  |  |  | PC, MK, PBL |
| Recognize shock & determine the etiology |  |  |  |  | PC, MK, PBL |
| Recognize possible bowel ischemia |  |  |  |  | PC, MK, PBL |
| Diagnose dehydration and perform adequate intravenous fluid resuscitation, 3-5 L |  |  |  |  | PC, MK, PBL |
| Diagnose and treat SBO with NGT, analgesia and anti-emetics |  |  |  |  | PC, MK, PBL |
| Perform competency with respect to radiographic interpretation |  |  |  |  | PC, MK, ICS, SBP |
| Demonstrate effective communication with patient and general surgery consultant |  |  |  |  | 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**

bowel obstruction, surgical abdomen

**References**

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

**Debriefing Materials:**

Obstruction occurs when there is a blockage of the normal passage of food and bowel contents through the gastrointestinal tract. The most common causes of small bowel obstruction (SBO) are adhesions, malignancies, hernias, and Crohn’s Disease.1 Other less common causes include intestinal polyps, radiation enteritis, and gallstone ileus.1 Peritoneal adhesions account for as high as 50% to 80% of all bowel obstructions.2

Patients with SBO usually present with abdominal pain, which may range from mild to severe and be diffuse or localized, nausea, vomiting, obstipation, and abdominal distention.3 Less than 50% of patients with SBO will have peritoneal signs such as rebound, guarding, and rigidity of their abdomen and these exam findings are neither sensitive nor specific in detecting bowel strangulation.3

Diagnostic imaging usually begins with plain radiographs. Classic findings on plain radiograph include dilated loops of small bowel > 3.0 cm, collapsed colon, air-fluid levels, and thickening of the bowel wall.4 If plain radiographs are inconclusive, obtaining a CT scan with IV and PO contrast is recommended.5 The CT scan offers information about strangulation and bowel ischemia that aid in deciding between operative versus non-operative management. The sensitivity of CT scan with contrast for bowel ischemia is as high as 90%.6 CT scan is also helpful in identifying the transition point, where small bowel loops proximal to this point are dilated and distal to this point are collapsed.3

Once the diagnosis of SBO is made, a nasogastric tube for decompression, a urinary catheter for monitoring urine output, and an IV catheter for fluid resuscitation should be placed.3  Management of SBO should also include emergent surgical consultation.

Current management of small bowel obstruction is largely non-operative. However, it is important to identify patients who require surgery to prevent bowel ischemia and bowel death which significantly increase patient morbidity and mortality.3 Signs and symptoms such as fever, leukocytosis, peritonitis, tachycardia, metabolic acidosis, and continuous pain indicate strangulation 45% of the time.7 Signs of strangulation or complete SBO should have early operative intervention.5