High Risk Abdomen

Emergency Department & Inpatient

Nationwide Children's — When your child needs a hospital, everything matters.

Center for Clinical Excellence

Patient presents with Clinical or Historical Red Flag(s)¥

Inclusion Criteria:

- Neurologic or developmental delay
- Nonverbal or have difficulty communicating
- Any condition prohibiting reliable abdominal exam, such as spinal cord injury

Exclusion Criteria:

- Known and clear diagnosis that explains symptoms
- Provider is confident there is not a parallel intraabdominal process

Initial Assessment:

- H&P
- Vital signs
- Pain assessment

¥ Clinical and Historical Red Flags:

- Feeding intolerance or anorexia
- Change in bowel habits
- Bilious or persistent emesis
- Altered mental status
- Hematochezia, melena
- Focal or diffuse abdominal tenderness/rigidity
- Abdominal distention
- Parent/caregiver believes patient shows signs of abdominal pain
- Previous abdominal surgery

Neurologic or developmental delay with difficulty communicating or unreliable abdominal exam?

No → Off pathway. Manage as appropriate for condition or diagnosis.

Yes → Obtain labs and acute abdominal series

***Abnormal X-Ray Findings:**

- Absolute: free air, small or large bowel obstruction, pneumatosis, portal venous gas
- Relative: constipation, ileus, nonspecific air-fluid levels

If concerned for acute surgical abdomen, immediately consult Surgery and consider sepsis pathway or other appropriate pathways.

*Abnormal X-ray?

Yes → Surgery consult +/- further imaging as deemed appropriate after discussion with Surgery

No → Abnormal labs?

No → ǂ Meets admission criteria?

No → Discharge

Yes → Toxic, in distress, or unstable?

No → Complex care patient?

Yes → Admit to Complex Care Service

No → Admit to Hospital Pediatrics

Yes → Admit to PICU

Yes → Medical management as appropriate

No → Emergent/ urgent surgery planned?

Yes → Admit to Pediatric Surgery

ǂ Admission criteria:

- Need for OR
- Instability
- Dehydration
- Unable to tolerate P0
- Requires additional workup
- Need for observation or inpatient procedure
- Unsafe to return home with caregiver
- Family uncomfortable going home

Inclusion & Exclusion Criteria

- Inclusion criteria:
  - Patients with neurologic or developmental delay that are nonverbal or have difficulty communicating **OR** have a condition prohibiting a reliable abdominal exam, such as spinal cord injury **OR** another condition prohibiting a reliable abdominal exam

    AND
  - One or more clinical or historical red flags
- Historical and clinical red flags:
  - Parent/caregiver believes patient is showing signs of abdominal pain
  - Previous abdominal surgery, including presence of tubes like a VP shunt or feeding tubes and insertion of hardware such as a baclofen pump
  - Feeding intolerance or anorexia
  - Change in bowel habits
  - Bilious emesis or persistent emesis
  - Change in baseline mental status
  - Focal or diffuse abdominal tenderness/rigidity
  - Abdominal distention
  - Hematochezia, melena
  - Signs of sepsis: tachycardia, tachypnea, respiratory distress, fever

- Exclusion criteria:
  - Patients with neurologic or developmental delay but can adequately communicate with providers and have a reliable abdominal exam
  - Patients who have a known and clear diagnosis that explains their symptoms and the physician is confident there is not a parallel intraabdominal process going on

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Diagnosis & Definition

The High Risk Abdomen (Complex Abdomen in Patients with Neurologic or Developmental Delay) Algorithm describes management of
patients with neurologic or developmental delay that are nonverbal or have difficulty communicating or have a condition prohibiting a reliable abdominal exam such as spinal cord injury. These patients can present with vague symptoms that may or may not indicate an underlying surgical abdomen as the primary cause for these symptoms.

While this pathway is tailored towards patients entering through the Emergency Department, it can be applied to patients meeting the inclusion criteria in any setting (ie, patient already admitted on the floor, admitted patient with change in clinical picture, etc).

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Differential Diagnoses

- Potential surgical pathologies:
  - Appendicitis, malrotation, volvulus, small or large bowel obstruction, intussusception, intestinal ischemia, perforated viscous, incarcerated or strangulated hernia (ventral, inguinal, internal, other), ovarian or testicular torsion, VP shunt pseudocyst, cholelithiasis, choledocholithiasis, gallstone pancreatitis, intraabdominal infection
- Findings suggestive of another diagnosis include:
  - Infiltrate on chest x-ray
    - Pneumonia
  - Positive urinalysis with leukocyte esterase, nitrites, or bacteria, with or without flank pain
    - Pyelonephritis
    - UTI
  - History of sexual activity or abuse, vaginal discharge
    - STD, PID
  - Triad of diarrhea, vomiting, and fever
    - Gastroenteritis
  - Hard feces in rectal vault on DRE
    - Fecal impaction or constipation
  - Elevated lipase, amylase
    - Pancreatitis

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Testing

- Laboratory
  - Blood glucose, urinalysis, CBC, CMP, lipase
  - Type and screen
  - Lactate, CRP, ESR and procalcitonin as needed
  - Blood cultures, urine cultures, stool studies, STD testing as appropriate
- Radiology
  - Obtain complete acute abdominal series (supine abdomen, upright or left decubitus abdomen, upright or supine chest) for initial evaluation
  - Additional imaging to be obtained as indicated: (CT, ultrasound, contrast studies)
  - **CT of the abdomen and pelvis with IV contrast (no PO contrast)** can be obtained at any point throughout the algorithm by the providers. If a provider is unsure if a CT scan will be beneficial, then a discussion with the surgery team can help move along the decision. Please obtain CT scans judiciously to minimize radiation risk given high radiation burden in these chronic and complex patients.
  - Again, CT scan should be of the abdomen and pelvis. Contrast should be given IV, not PO.

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Severity Assessment

- Evidence of shock or sepsis should prompt a critical care assessment.
- **If the provider is concerned about an acute surgical abdomen at any point throughout the algorithm, a surgery consult should be called and the pathway can be bypassed.**

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Admission Criteria

- Surgical pathology requiring emergent or urgent operative intervention
- Hemodynamic, respiratory, or neurologic instability
- Dehydration
- Inability to tolerate PO or tube feeds (failure of PO trial)
- Unclear diagnosis requiring additional workup
- Need for inpatient procedure (bowel washout, IR, etc)
- Unsafe to return home with caregiver
- Family uncomfortable going home
- Need for admission or observation as deemed appropriate by any involved service

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Assessment & Monitoring

- Airway, breathing, circulation
- Cardiac monitor
- IV access
- Physician assessment on presentation and as indicated
- RN assessment q1h
  - RN to notify physician team of any changes or caregiver concerns
- Pain assessment
- Determine code status
- Direct communication between physician members of each team involved
- ED physician or other provider to order **CT scan of the abdomen and pelvis with IV contrast only** at any point throughout the algorithm according to their clinical judgement
- If a surgical consult is called, the patient will be seen within 30 minutes by a member of the surgery team. If the ED attending feels like the consult is more emergent, they should reach out directly to the surgery attending on call.
- Surgery resident to discuss timing and location of CT scan with surgical attending.
  - If a CT scan is needed to rule in or rule out a surgical diagnosis or to decide disposition, the scan should be done in the ED.
  - If a non-urgent CT scan is needed and can be performed on the floor, this should be discussed between the ED and surgery team.
  - A CT with oral contrast can be ordered after admission if the CT with IV contrast does not elucidate findings clearly.

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Recommended Treatments

- Resuscitation as indicated
- NPO
- Maintenance intravenous fluids as indicated
- PRN pain medication*
- G- or J-tube to dependent drainage
- Nasogastric tube as indicated
- RN to keep all stool, emesis, feeding tube, and drain specimens to be visualized by ED and surgery physicians
- Antibiotics as indicated

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Testing/Treatments Not Recommended

- Allowing patient to have a diet until fully evaluated
- Overall, it appears that auscultation alone is not useful in predicting normal vs abnormal bowel sounds or pathology.**

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Deterioration & Escalation of Care

- Identification of Deterioration
  - Patient should be placed on telemetry and RN will be performing q1h assessments.
  - If there is potential to deteriorate or there is continued deterioration, the patient should be admitted to a ward with a higher level of care, as indicated (example, ICU).
- Escalation of Care Protocol:
  - **If there is concern for a surgical abdomen, then surgery should be consulted at that time, regardless of the pathway.**
  - If the patient becomes toxic, unstable, or distressed, then ICU admission should be considered.

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Discharge Criteria & Planning

- Follow-up: Patient is to follow-up with primary care provider upon discharge from Emergency Department. If applicable, referrals can be made to Gastrointestinal or Complex Care team. After an inpatient admission, patients will be given follow-up as deemed appropriate by the inpatient services involved.
- If a patient is managed by the Complex Care team, please consider alerting them that one of their patients came through the ED (non-urgently).

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Risk Awareness & Zero Hero

- Use of this algorithm will identify patients who may have been overlooked or not diagnosed appropriately otherwise due to the complexity of patient presentation.

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References

1. Tsao KJ, Anderson KT. Evaluation of abdominal pain in children. Evaluation of abdominal pain in children – Differential diagnosis of symptoms | BMJ Best Practice US. https://bestpractice.bmj.com/topics/enus/787. Published 2020. Accessed October 1, 2020.
2. Preddy J, Boyd N, Darvill J, et al. Infants and Children: Acute Management of Abdominal Pain. https://www1.health.nsw.gov.au/pds/Active PDSDocuments/PD2013_053.pdf. Published January 2005. Accessed October 1, 2020.

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Quality Measures

- Monitor provider adherence to the pathway by reviewing monthly admissions
- Use performance based data to continuously validate or improve clinical practice
- Keep track of patients who went to the operating room and see if the pathway was used

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Potential Areas for Research

- Risk factors and signs/symptoms of all patients who were taken to the operating room and had a confirmed diagnosis of a surgical abdomen
- Risk factors and signs/symptoms of patients with neurologic or developmental delay who were taken to the operating room and had a confirmed diagnosis of a surgical abdomen
- Outcomes on application of clinical pathway in this population

*Multiple RCTs and a systematic review and meta-analysis have illustrated that administering analgesia prior to surgical consultation does not decrease diagnostic accuracy in children.[1-4]

** There is conflicting evidence as to the effectiveness and usefulness of auscultation bowel sounds to detect intraabdominal pathology. Several prospective and retrospective studies show low accuracy and inter-observer agreement, while others show a higher PPV of bowel sounds combined with a history and physical.[5-9]

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Team & Process

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Clinical Pathway Development

This clinical pathway was developed using the process described in the NCH Clinical Pathway Development Manual Version 6, 2022. Clinical Pathways at Nationwide Children's Hospital (NCH) are standards which provide general guidance to clinicians. Patient choice, clinician judgment, and other relevant factors in diagnosing and treating patients remain central to the selection of diagnostic tests and therapy. The ordering provider assumes all risks associates with care decisions. NCH assumes no responsibility for any adverse consequences, errors, or omissions that may arise from the use or reliance on these guidelines. NCH's clinical pathways are reviewed periodically for consistency with new evidence; however, new developments may not be represented, and NCH makes no guarantees, representations, or warranties with respect to the information provided in this clinical pathway.

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