

CASE STUDY

Delayed testicular torsion diagnosis results in orchiectomy

CASE SUMMARY

A 16-year-old male presented to a freestanding emergency center after waking at 3 a.m. with lower abdominal pain radiating to testicles. He vomited and noted pain increasing with ambulation.

The emergency MD noted that reported testicular exam was within normal limits. An abdominal CT was ordered and interpreted as showing mesenteric adenitis (inflammation of lymph nodes along tissue attaching intestines to posterior abdominal wall). No ultrasound of testicles was ordered. Patient was treated with IV fluids, antiemetics, and analgesia and discharged after several hours of observation. The ED physician advised the patient to return to an emergency center if symptoms recurred.

Nine days later the patient presented with continuing pain to a pediatric hospital where a urologist diagnosed torsion and performed left scrotal exploration with detorsion of testis, left orchiectomy and right scrotal orchiopexy (fixation of testicle to scrotum to prevent recurrence of torsion). The operative report showed that the left testis was twisted 720 degrees. Despite complete detorsion, there was no reperfusion.

ISSUES IDENTIFIED

1. Misdiagnosis and failure to order appropriate test

- Serious irreversible complication from testicular torsion where diagnostic delay played a key role in adverse outcome
- Not clear whether testicular torsion was considered in the differential diagnosis of the freestanding emergency center.
- Broader differential diagnosis may have been thrown off by prematurely closing on a likely unrelated finding on CT scan.
- The details of the 9-day delay in following up the patient who had continuing symptoms is unclear. Why didn't the patient contact their primary care or urgent care clinician sooner? How was he ultimately referred to and seen by urologist, and what were the sources of delay in this evaluation?
- Given that there should be a low threshold for testing for testicular torsion, what was the availability of this test for patients seen in the urgent care center?

CHANGE IDEAS

- “Don’t miss” diagnoses: prospectively make a list of diagnoses that includes acute testicular torsion. Testicular torsion should be a “don’t miss” diagnosis in young males due to its features of: a) rapid progression (from compromised blood supply progressing to complete infarction of testes), b) being readily correctable if diagnosed in a timely way and treated surgically, c) availability of a non-invasive screening test (US), which invites a low threshold for use, and d) potentially devastating consequences of failure to diagnose (infertility).
- Follow-up systems that are systematic, reliable, and accessible: patients should have a low threshold and readily accessible mechanisms to contact either their PCP or urgent care clinicians if worsening or failing to improve as expected. Clinics, physician offices, urgent care centers, emergency departments, and healthcare providers should develop efficient systems to proactively reach out to and follow up on patients experiencing urgent care problems several days after the encounter
- Better delineation of “mesenteric adenitis” on CT: what are the radiologic criteria and what is their significance? What is the expected clinical correlation and expected natural history and treatment? How can this information be provided via enhanced radiology reporting and other decision support for the clinician?
- Research: data on differential diagnosis is needed, sensitivity and specificity of pain “radiating to testes.”
- Physical exam: how often is a normal testicular exam found with testicular torsion? Was the physical exam truly negative? What is the proper technique for performing a testicular exam and how are clinicians trained in performing this procedure? American Academy of Family Practice (AAFP) algorithm for evaluating acute scrotal pain (Figure 1) should be widely disseminated and triggered just-in-time in the electronic medical record.
- Education: include this topic in high school health education classes to familiarize students with the symptoms and the importance of timely presentation to the emergency room.

TAXONOMIES

Diagnosis Error Evaluation and Research (DEER) Taxonomy

Where in the diagnostic process an error may have occurred

<p>1. Access/Presentation</p>	<p>a. Failure/delay in presentation b. Failure/denied care access</p>
<p>2. History</p>	<p>a. Failure/delay in eliciting critical piece of history data b. Inaccurate/misinterpreted/overlooked critical piece of history data c. Failure in weighing critical piece of history data d. Failure/delay to follow-up critical piece of history data</p>
<p>3. Physical Exam</p>	<p>a. Failure/delay in eliciting critical physical exam finding b. Inaccurate/misinterpreted/overlooked critical physical exam finding c. Failure in weighing critical physical exam finding d. Failure/delay to follow-up critical physical exam finding</p>
<p>4. Tests (Lab/Radiology)</p>	<p><i>Ordering (also called “pre-analytic phase”)</i> a. Failure/delay in ordering needed test(s) b. Failure/delay in performing ordered test(s) c. Error in test sequencing d. Ordering of wrong test(s) e. Tests ordered to be done in the wrong way</p> <p><i>Performance (also called “analytic phase”)</i> f. Sample mix-up/mislabeled (e.g., wrong patient/test) g. Specimen delivery problem h. Technical errors/poor processing of specimen/test i. Erroneous lab/radiology reading of test j. Failed/delayed reporting of result to clinician</p> <p><i>Clinician Processing (also called “post-analytic phase”)</i> k. Failed/delayed follow-up of (abnormal) test result l. Error in clinician interpretation of test</p>
<p>5. Assessment</p>	<p><i>Hypothesis Generation</i> a. Failure/delay in considering the diagnosis</p> <p><i>Suboptimal weighing/prioritizing</i> b. Too little consideration/weight given to the diagnosis c. Too much weight on competing/coexisting diagnosis</p> <p><i>Recognizing urgency/complications</i> d. Failure/delay to recognize/weigh urgency e. Failure/delay to recognize/weigh complications of a diagnosis</p>
<p>6. Referral/Consultation</p>	<p>a. Failure/delay in ordering referral/consult b. Failure/delay in obtaining/scheduling ordered referral c. Error/suboptimal quality in diagnostic consultation performance d. Failed/delayed communication/follow-up of consultation</p>
<p>7. Follow-up</p>	<p>a. Failure/delay in timely follow-up/rechecking of patient b. Failure to refer patient to close/safe setting/monitoring c. Failure/delay in needed monitoring or lab (BP, INR, repeat CXR) d. Failure/delay in communicating findings among healthcare providers</p>

Reliable Diagnosis Challenges (RDC) Taxonomy

Factors that may have contributed to making diagnosis difficult

<p>1. Challenging Disease Presentation</p>	<ul style="list-style-type: none"> a. Rare diagnosis b. Atypical presentation c. Nonspecific signs and symptoms d. Unfamiliar/outside specialty e. Masking/mimicking diagnosis f. Red herring misleading finding (history, exam, lab/imaging) g. Rapidly progressive h. Slowly evolving i. Deceptively benign (or intermittent) course
<p>2. Patient Factors</p>	<ul style="list-style-type: none"> a. Language/communication b. Signal: noise (noisy pts with multiple nonspecific sx) c. Patient failure to share d. Patient failure to follow-up
<p>3. Testing Challenges</p>	<ul style="list-style-type: none"> a. Test availability, access, cost b. Logistical issues in obtaining, performing tests c. False positive/negative results d. Performance/interpretation challenges e. Equivocal results/reports f. Test follow-up issues
<p>4. Stressors</p>	<ul style="list-style-type: none"> a. Time constraints b. Discontinuities c. Fragmentation of care d. Memory reliance/challenges e. EMR challenges
<p>5. Broader Challenges/ Failures</p>	<ul style="list-style-type: none"> a. Recognition of acuity/urgency/severity b. Diagnosis of complication(s) c. Recognizing failure to respond to treatment d. Diagnosis of underlying cause e. Recognizing misdiagnosis

Generic Diagnostic Pitfalls Categories

Clinical patterns/vulnerabilities leading to missed, delayed or wrong diagnosis

<p>1. Diagnosis/ Assessment</p>	<ul style="list-style-type: none"> a. Disease A misdiagnosed/confused with Disease B b. Misled by atypical presentation c. Rare diagnosis: failure to consider or know d. Chronic disease presumed to account for new symptoms (especially in medically complex patients) e. Counter-diagnosis cues overlooked (e.g., red flags, things that don't fit not recognized) f. Drug or environmental factor overlooked as cause of symptoms, or as cause of disease progression g. No specific diagnosis made
<p>2. History/ Physical</p>	<ul style="list-style-type: none"> a. Non-specific/vague symptom(s); hard-to-pinpoint diagnosis b. Intermittent symptoms- overlooked because findings (e.g., exam, lab, EKG) negative when seen c. Failure to appreciate risk factor (or those at risk) for a given disease d. Failure to appreciate limitations of the physical exam
<p>3. Testing</p>	<ul style="list-style-type: none"> a. Failure to appreciate limitations of a test result(s) b. Failure in follow-up of abnormal/critical result
<p>4. Communication</p>	<ul style="list-style-type: none"> a. Communication failure with patient, including language barriers b. Failure around communication and ordering of lab tests c. Communication failure between physicians (e.g., PCP-specialist, ED-PCP)
<p>5. Follow-up</p>	<ul style="list-style-type: none"> a. Failure to monitor, note, or respond to evolving/continuing/persistent symptoms b. Inadequate follow-up visits/referrals, especially in the presence of diagnostic uncertainty
<p>6. Other</p>	<ul style="list-style-type: none"> a. Urgency of the clinical situation was not appreciated b. Diagnostic findings were masked or misinterpreted due to an intervention or drug (e.g., empiric treatment with oral or topical steroids, PPI, antibiotics, pain medications) c. Problems with inappropriate or over-referral

Cognitive Errors Taxonomy

Selected cognitive biases contributing to diagnostic errors

1. Premature Closure: accepting a diagnosis before it has been fully verified
2. Anchoring: tendency to fixate on specific features of a presentation too early in the diagnostic process and subsequent failure to adjust
3. Confirmation Bias: tendency to look for confirming evidence to support one's hypothesis, rather than disconfirming evidence to refute it
4. Search Satisfying: tendency to call off a search once a piece of data is found, and not considering/searching for additional findings or diagnoses
5. Availability Bias: tendency to give too much weight to diagnosis that come more readily to mind (e.g. recent dramatic case).
6. Base-Rate Neglect: failing to adequately take into account the prevalence of a particular disease
7. Knowledge Deficit (on part of provider)
8. Demographic/Stereotype Bias: Biases from personal or cultural beliefs about women, minorities or other patient groups for whom prejudices may distort diagnostic assessment
9. Other (please specify)

Primary-Care Research in Diagnosis Errors (PRIDE) is an effort to improve diagnostic safety, led by Brigham and Women's Center for Patient Safety Research and Practice in partnership with Gordon and Betty Moore Foundation and the Betsy Lehman Center.

©2021 Betsy Lehman Center for Patient Safety
501 Boylston Street, 5th Floor, Boston, MA 02116
BetsyLehmanCenterMA.gov
617-701-8271 • info@BetsyLehmanCenterMA.gov



**BETSY
LEHMAN
CENTER**
for Patient Safety



**BRIGHAM AND
WOMEN'S HOSPITAL**

**GORDON AND BETTY
MOORE
FOUNDATION**