CASE STUDY

Testicular torsion in a 19-year-old patient

CASE SUMMARY

A 19-year-old male with no past medical history presented to an urgent care clinic just before closing on a Friday night complaining of right testicular pain. A physician assistant (PA) conducted a limited history and physical and noted "moderate" pain that had started gradually earlier in the day, progressively worsening over the following hours. No objective scale was used to measure the pain.

The PA initially considered testicular torsion but ruled it out based on the patient not seeming to be in significant pain and the history suggesting a gradual rather than sudden pain onset. The nursing note had differing information suggesting the onset was quite acute. Cremasteric reflex test and testicular ultrasound (US) were not performed. According to the PA, US at the urgent care clinic was not available after 6 in the evening and having one would require going to the emergency room.

Despite the nursing note indicating no recent sexual activity, the PA diagnosed epididymitis with chlamydia. The patient was prescribed doxycycline and Vicodin for pain and instructed to return for re-check if not improving in a few days.

The patient presented to the emergency department a few days later with persistent right testicular pain. He was sent to the operating room immediately for right orchiectomy (removal of testicle) due to testicular torsion. As a result, the patient now has reduced fertility.

ISSUES IDENTIFIED

1. Inconsistent accounts in nursing and PA notes

- Nurse's version points to acute onset that is more suggestive for the correct diagnosis (testicular torsion). The PA note indicated a gradual onset.
- Could the patient have given a different history to each? Or did the PA fail to appreciate the acuteness and severity of the patient's symptoms?

2. Erroneous additional history and diagnosis drawn by PA

- Diagnosed with chlamydia, a sexually transmitted disease, despite contradicting information in nurse's notes indicating patient was not sexually active
  - i. Did PA read RN's notes?
  - ii. Did PA ask the patient about his sexual history?

3. Incomplete physical exam

- The absence of the cremasteric reflex as well as elevation, transverse location and/or anterior rotation of the testes are important physical exam findings suggesting testicular torsion. It is not clear that this was done.
  - i. Was this due to a knowledge deficit?
  - ii. Was this done due to possible social awkwardness of performing the test, perhaps due to gender discordance or PA or patient reluctance?

4. No testicular ultrasound done

- Lack of availability of US at the urgent care clinic at time of presentation
  - i. Lack of formal referral to emergency department for US
  - ii. Critical need to urgently make a diagnosis of testicular torsion, with literature suggesting the need for US and/or urology consultation within 6-12 hours. Further delays may worsen ischemia of the testes.
  - iii. Can and should a primary care physician or PA attempt to manually "detorse" (untwist) a testicular torsion, prior to sending patient to urologist?
  - iv. Often the availability of a test can influence decision making and hence clinical outcomes, which is likely the case in this instance.
- Testicular torsion or abnormality is, reportedly, easy to definitively diagnose on US
  - i. The symptoms may be intermittent, so ultrasound will not always be conclusive, but largely accurate.
- Male patients often delay seeking care for bothersome or severe pain, and are generally unaware of the consequential significance of testicular torsion.
  - i. Young males are often not well connected to health care systems.
  - ii. Given the sensitive nature of testicular pain, young males may be more reluctant to report this symptom in a timely way.
    1. If sexually active, there is a need to consider additional fear, embarrassment, or anxieties related to sexual trauma or infection.

- "Don't miss" diagnosis: Acute testicular torsion is a diagnosis that should be prospectively prioritized as a "don't miss" diagnosis given 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 (ultrasound), which invites a low threshold for use, and d) potentially devastating consequences of failure to diagnose (infertility)
- Diagnostic pitfalls: misdiagnosis of testicular torsion as epididymitis is a frequent pitfall. In addition to prompt availability of ultrasound, further research is needed to pinpoint more differentiating features to better delineate the sensitivity, specifically, time course and values of clinical and physician exam variables.
- Better protocols: triage protocols for urgent care settings to identify patients who need urgent ultrasound to rule out this diagnosis, with expedited referrals for testing and urology evaluation, particularly to deal with late or after-hours contingencies.
- Clarification and/or research: Further knowledge regarding who should perform manual detorsion of testicular torsion (e.g., primary care providers, PAs)and optimal technique, required training, success rates, and complications should be supported and conducted.

TAXONOMIES

Diagnosis Error Evaluation and Research (DEER) Taxonomy

Where in the diagnostic process an error may have occurred

1. Access/Presentation	a. Failure/delay in presentation b. Failure/denied care access
2. History	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
3. Physical Exam	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
4. Tests (Lab/Radiology)	*Ordering (also called "pre-analytic phase")* 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 *Performance (also called "analytic phase")* 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 *Clinician Processing (also called "post-analytic phase")* k. Failed/delayed follow-up of (abnormal) test result l. Error in clinician interpretation of test
5. Assessment	*Hypothesis Generation* a. Failure/delay in considering the diagnosis *Suboptimal weighing/prioritizing* b. Too little consideration/weight given to the diagnosis c. Too much weight on competing/coexisting diagnosis *Recognizing urgency/complications* d. Failure/delay to recognize/weigh urgency e. Failure/delay to recognize/weigh complications of a diagnosis
6. Referral/Consultation	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
7. Follow-up	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

Reliable Diagnosis Challenges (RDC) Taxonomy

Factors that may have contributed to making diagnosis difficult

1. Challenging Disease Presentation	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
2. Patient Factors	a. Language/communication b. Signal: noise (noisy pts with multiple nonspecific sx) c. Patient failure to share d. Patient failure to follow-up
3. Testing Challenges	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
4. Stressors	a. Time constraints b. Discontinuities c. Fragmentation of care d. Memory reliance/challenges e. EMR challenges
5. Broader Challenges/ Failures	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

1. Diagnosis/ Assessment	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
2. History/ Physical	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
3. Testing	a. Failure to appreciate limitations of a test result(s) b. Failure in follow-up of abnormal/critical result
4. Communication	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)
5. Follow-up	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
6. Other	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.

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