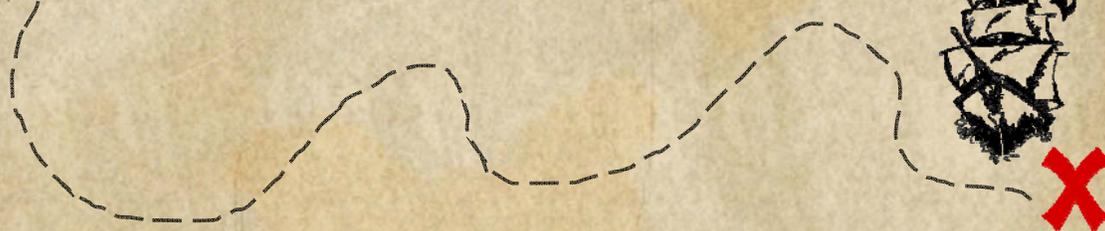


No **X** to Mark the Spot

Marla Chapman, MD and Amanda Hartke, MD PhD
Children's Hospital, Greenville Health System



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Disclosure of Financial Relationships

- No Financial Relationships or other conflicts to disclose

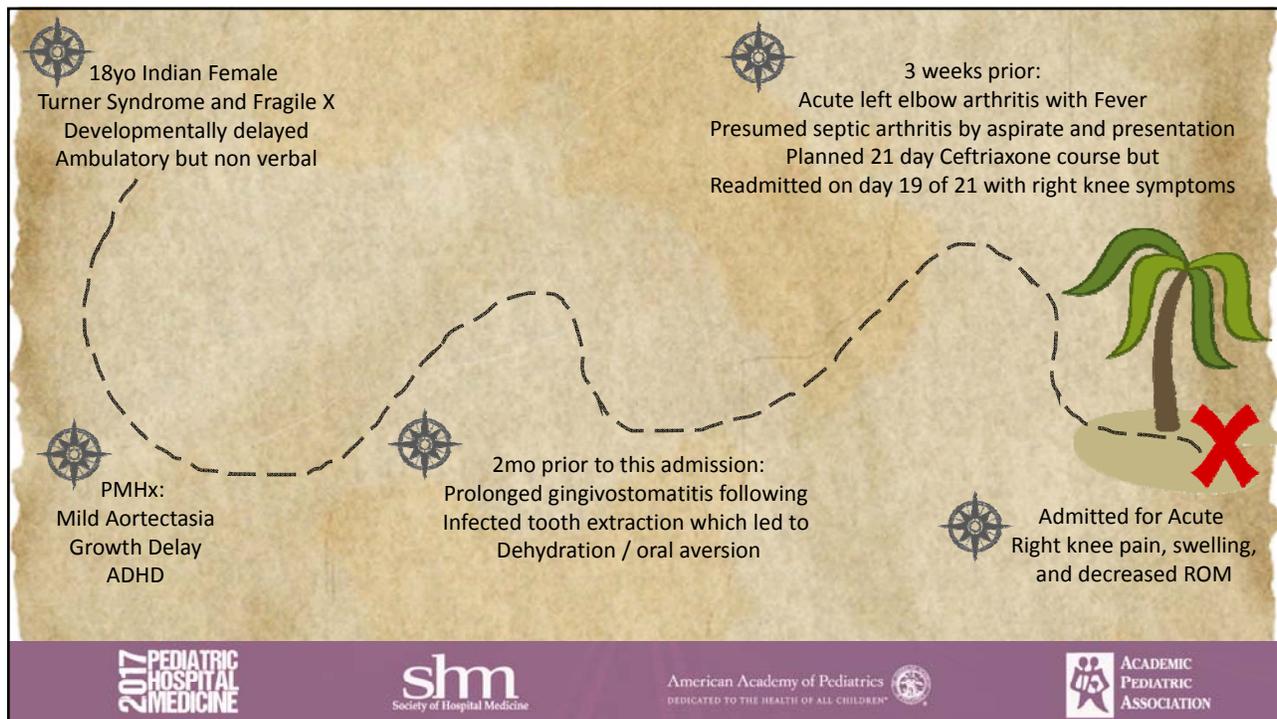


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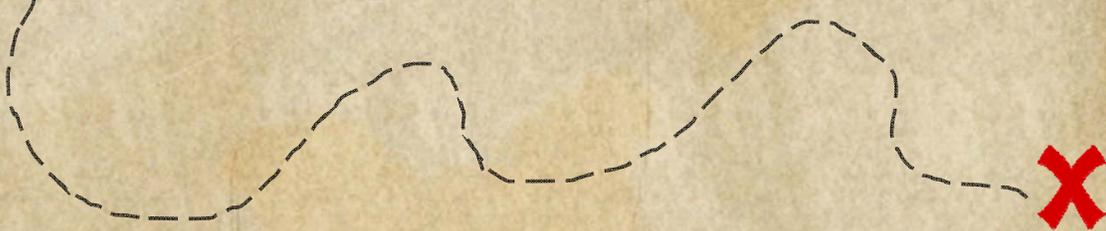
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Route Markers: Prior admission summaries

- Gingivostomatitis/Dehydration:
 - Abnormal results: Procalcitonin 2.3, WBC 20 (75%Neut, 7%Band), Albumin 2.5
 - Pertinent negatives: RST, HSV wound/serum, CBC/CMP otherwise normal
 - Dispo: Discharged at baseline on 2 week Amoxicillin-Clavulanic acid course
- Left Elbow Arthritis:
 - Abnormal Results:
 - Joint fluid: RBC 164k, WBC 3.8k (85%Neut), protein 5.5, GNR on Gram stain.
 - XR: Left elbow effusion, cortical radial head irregularity "possible fracture"
 - CRP 173mg/L, ESR 97, Hgb 10.9, WBC 15 (58% Neut, 16% Band), Albumin 2.6
 - Pertinent Negatives: Blood/Joint culture, UA
 - Dispo: Clinically improved on day 10 of 21 of Ceftriaxone with ID follow up

Any questions about the current or past presentations or her history?



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Physical Exam – pertinent findings on readmission

- Height 4'9" (63%tile for Turner syndrome); Weight 37.3kg (0%tile); BMI 17.79 (3%tile)
- Oropharynx clear
- MSK:
 - Right knee: warm, small effusion, no erythema, Extension limited by 10°, but full flexion. Weight bearing with antalgic gait and R leg in mild external rotation.
 - Left elbow: minimal limitation of flexion and well healed I&D site.
- No rashes, ecchymoses or other lesions except chronically abraded left hypothenar area where patient chews on hand.
- Other features: Long narrow face, prominent nose/chin, high narrow palate, large ears, no webbing or shortening of neck. Normal nipple spacing. Stable Madelung deformity at wrists.

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All aboard: What are your differential diagnoses at this point?

To answer via Poll:

- Please search for the “No X to mark the spot” session in the mobile app using the search bar or in the agenda layout.
- Select the session to open the session page and select “Live Polls”
- Answer the question under “Live Polls” by selecting your answer
- Select “Finish” to submit your answer

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Q1: What is your leading Differential Diagnosis?

<https://api.cvent.com/polling/v1/api/polls/sp-vx5p4p>

- A) Bacterial Arthritis
- B) First presentation of chronic autoimmune arthritis
- C) Arthritis associated with gastrointestinal disease
- D) Abuse
- E) Reactive Arthritis
- F) Other

For those of you that said other, what differentials were you considering?

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Charting a Course: Our Initial Differential

- Bacterial Arthritis
 - Gram Negatives (by prior Gram stain)
 - Neisseria species, Oral anaerobes, Enteric pathogens, Brucella, Bartonella
 - Gram Positives (ignoring prior stain)
 - Staphylococcus, Streptococcus pyogenes
 - Other
 - TB and non-TB Mycobacteria
- Acute Rheumatic/Inflammatory
 - JIA, Rheumatic Fever, Behcets, SLE
- Arthritis associated with GI disease
 - Celiac, IBD
- Reactive Arthritis
 - Post infectious from GAS, Enteric pathogens, etc.
- Abuse
 - NAT, sexual abuse/activity (as gonococcal source)
- Other
 - Malignancy, Hemarthrosis/Bleeding disorder

While we were gathering our crew....

- Mom reports diarrhea intermittently since the initial episode, with at least one with appearance of blood. She also notes that her daughter has irregular menses that is also present. Mom is not certain of the source of the blood.
- The orthopedic resident has tapped the joint:
 - WBC 6k (61% Neut), RBC 29k
 - Cloudy red, no crystals, gram stain negative

Digging for Buried Treasure:

What tests/imaging would you choose to narrow your differential?



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Q2. What tests/imaging would you choose in order to narrow your differential? (select 1-2)

<https://api.cvent.com/polling/v1/api/polls/sp-ce12q4>

- A. Aspirate/Blood culture, Titers for Lyme/Mycoplasma, C diff PCR
- B. Eye exam, SLE panel, HLA B-27 and inflammatory markers
- C. ASO/DNAseB/Rapid Strep Test
- D. IBD panel/Calprotectin and TTG/Gliadin
- E. Elbow/Knee Xrays for trauma, GC NAAT, SW consult
- F. MRI of the knee and inflammatory markers

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Any additional orders or studies you would consider in the initial evaluation?



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Hospital Course:

- Infectious testing:
 - All cultures negative (blood, urine, stool, and joint fluid)
 - Procalcitonin 0.06
 - Negative testing for: TB, Mycoplasma, C diff, Giardia, ASO/DNAseB
 - Antibiotics were discontinued based on these results
- Gastrointestinal Disease Testing:
 - TTG negative/IgA normal
 - **Calprotectin: 950mcg/g** (normal <163)
 - **Fecal occult blood positive**
- Rheumatologic Testing:
 - Negative ANA and RF
 - Lupus panel
 - Elevated C3/C4
- MRI:
 - Suggestive of **inflammatory arthritis**-with joint effusion with markedly enhancing synovium. No secondary changes of bone marrow edema or adjacent soft tissue edema seen to suggest infection more likely.

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Coming-About: Revisiting our Differential...

- Bacterial Arthritis
 - Gram Negatives (by prior Gram stain)
 - Enteric pathogens, Borrelia, Kingella, Neisseria, Haemophilus
 - Gram Positives (ignoring prior stain)
 - Staphylococcus, Streptococcus, Enterococcus
 - Other
 - TB, Mycobacteria
- Acute Rheumatic/Inflammatory
 - JIA, Behets, SLE, Rheumatic Fever
- Reactive Arthritis
 - Post infectious from GAS, Enteric pathogens, etc.
- Abuse
 - NAT, sexual abuse/activity (as gonococcal source)
- Other
 - Malignancy, Hemarthrosis/Bleeding disorder
- Arthritis associated with GI disease
 - Celiac, IBD



Narrowing the differential further:

- Preliminary imaging, laboratory studies and negative infectious studies were suggestive but not confirmatory of a diagnosis of IBD arthritis.
- Any features or findings which do not fit?
- What additional testing and/or imaging would you pursue?

X Marks the Spot: Crohn's Disease

- Following discharge, hematochezia episodes increased
- Fecal Lactoferrin returned positive, repeat Calprotectin >2000
- EGD/Colonoscopy: Colitis from terminal ileum to rectum, EGD normal



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18yo XO/Fragile X Female with recurrent arthritis: The initial extra-intestinal manifestation of Crohn's Disease

- Turner Syndrome (TS) autoimmune associations:
 - IBD, Celiac Disease, Autoimmune Thyroiditis, as well as reports of increased rates of T1DM, JIA, and Addisons
- TS patients have 5x increased rates of IBD, up to 12x for X-iso(Xq) variant
- How this case changed my practice:
 - Consider IBD in the DDX of TS patients with growth failure beyond expected, chronic diarrhea/colitis symptoms... and even arthritis
 - Consider TS in the prepubescent female with IBD who has linear growth delay despite well controlled IBD.

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Anchors and other biases....



- Since the initial presentation could not rule out a septic joint and given the risk of not treating, antibiotics were initially continued despite lower suspicion
- Despite the well known association of gastrointestinal diseases and arthritis, this presentation of arthritis prior to frank GI symptoms decreased our early consideration of this differential.
- Although inflammatory and autoimmune conditions were suspected early, by not considering her genetic background, we pursued IBD later in the course.
- Finally, we are frequently challenged by our patients with delays and verbal difficulties and must continue to hone our appreciation of the non verbal communications they offer through posture, vocalizations, and agitation.

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References

- Goldacre MJ1, Seminog OO. **Turner syndrome and autoimmune diseases: record-linkage study.** Arch Dis Child. 2014 Jan;99(1):71-3.
- Lleo A1, Moroni L, Caliari L, Invernizzi P. **Autoimmunity and Turner's syndrome.** Autoimmun Rev. 2012 May;11(6-7):A538-43.
- Larizza D1, Calcaterra V, Martinetti M. **Autoimmune stigmata in Turner syndrome: when lacks an X chromosome.** J Autoimmun. 2009 Aug;33(1):25-30.
- Foeldvari I. **Juvenile rheumatoid arthritis, Crohn's disease and Turner's syndrome.** Clin Exp Rheumatol. 1997 Jan-Feb; 15(1):120.
- Hayward PA1, Satsangi J, Jewell DP. **Inflammatory bowel disease and the X chromosome.** QJM. 1996 Sep;89(9):713-8.

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Questions?

