A 17-year-old boy with progressive abdominal pain: Questions

Olivia Gilbert¹ · Mingshan Lai² · Jessica Zagory³ · Randall Craver⁴ · Amanda Messer² · Isa F. Ashoor²

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Case summary

A 17-year-old Black male presented to the emergency department (ED) with 2 days of diffuse abdominal pain accompanied by non-bilious, non-bloody emesis, and diarrhea. He had no significant past medical or social history; his family history was significant for a maternal aunt with lupus. On examination, he was afebrile, and his blood pressure was within normal limits. He improved with supportive care and symptomatic management, so he was discharged from the ED with a diagnosis of acute gastroenteritis. Ten days later, he presented to the ED again with persistent abdominal pain and occasional bloody stools. His vital signs were as follows: temperature 98.1 F, blood pressure 119/72 mmHg, pulse rate 56/min, respiratory rate 16/min, and pulse oxygen saturation of 99% on room air. On examination, he appeared uncomfortable and had exquisite abdominal tenderness in the umbilical and left lower quadrant regions. A gastrointestinal pathogen PCR panel was ordered and was negative for all bacterial and viral organisms tested. SARS-CoV-2 PCR was negative. His laboratory findings are summarized in Table 1.

Abdominal x-ray was unremarkable. Abdominal ultrasound revealed a small amount of free fluid in the right lower quadrant and thickened bowel in the left lower quadrant. He

was evaluated by the pediatric surgery team. Due to concern for peritonitis, he was taken emergently to the operating room for a diagnostic laparoscopy. This was converted to an exploratory laparotomy when an area of bowel appeared abnormal. Operative findings included thickened ileum and edematous mesentery with prominently enlarged lymph nodes near the border of the bowel. The possibility of a reduced intussusception was considered as the cause of his abdominal pain. There were no fat creeping or masses concerning for intraluminal pathology. Peritoneal fluid cultures were obtained, and he was started on empiric intravenous (IV) ceftriaxone and IV metronidazole for possible intraabdominal infection.

Post-operatively, intermittent, severe abdominal pain requiring narcotic analgesia persisted. In addition, he developed a localized, painless, non-pruritic, palpable purpuric rash on his right hand that extended to his elbow and included some of the palm. Labs were notable for hypoalbuminemia with a serum albumin of 1.7 gm/dL and an increase in serum creatinine from 0.9 to 1.4 mg/dL on hospital day (HD) #3. Peritoneal fluid cultures remained negative at 96 h, so his antibiotics were discontinued. Blood pressure readings and urine output remained appropriate. Nephrology was consulted due to acute kidney injury; additional labs were obtained and are summarized in Table 2. Ultimately, a kidney biopsy was obtained on HD #4 and revealed the kidney-specific diagnosis.

The answers to these questions can be found at <https://doi.org/10.1007/s00467-021-05037-4>.

✉ Isa F. Ashoor
iashoor@lsuhsc.edu

¹ Louisiana State University School of Medicine, New Orleans, LA, USA

² Department of Pediatrics, Louisiana State University School of Medicine, 200 Henry Clay Ave, New Orleans, LA 70118, USA

³ Division of Pediatric Surgery, Department of Surgery, Louisiana State University School of Medicine, New Orleans, LA, USA

⁴ Department of Pathology, Louisiana State University School of Medicine, New Orleans, LA, USA

Table 1 Basic laboratory findings upon initial presentation

	Patient's value	Reference range
WBC	23.7 k/ μ L	3.7–11.7 k/ μ L
Hemoglobin	15.7 gm/dL	11.3–15.1 gm/dL
Hematocrit	44.6 %	35–46%
Platelet count	319 k/ μ L	135–450 k/ μ L
Peripheral blood smear		
Absolute basophils	0.23 k/ μ L	0.0–0.0 k/ μ L
Absolute eosinophils	0.23 k/ μ L	0.0–0.3 k/ μ L
Absolute lymphocytes	1.16 k/ μ L	1.2–5.2 k/ μ L
Absolute monocytes	2.33 k/ μ L	0.2–0.6 k/ μ L
Absolute neutrophils	19.31 k/ μ L	1.8–8.0 k/ μ L
Schistocytes, ovalocytes	Occasional	---
Platelet estimate	Normal	---
Sodium	128 mmol/L	134–144 mmol/L
Potassium	3.9 mmol/L	3.4–5.5 mmol/L
Chloride	89 mmol/L	98–107 mmol/L
CO ₂	28 mmol/L	20–31 mmol/L
Blood urea nitrogen	16 mg/dL	7–21 mg/dL
Creatinine	0.9 mg/dL	0.2–1.4 mg/dL
Glucose	98 mg/dL	65–110 mg/dL
Protein	6.4 g/dL	6.5–9.0 g/dL
Albumin	2.9 g/dL	3.0–4.8 g/dL
Total Bilirubin	0.5 mg/dL	0.3–1.3 mg/dL
AST	20 U/L	8–53 U/L
ALT	38 U/L	7–56 U/L
Alkaline phosphatase	126 U/L	39–253 U/L
Lipase	24 U/L	5–62 U/L
ESR	9 mm/hr	0–20 mm/hr
CRP	14.6 mg/dL	> 0.4–1.0 mg/dL
Urinalysis		
Ur appearance	Clear	---
Bacteria	None seen	None seen
Ur bilirubin	Negative	Negative
Ur blood	3+	Negative
Ur color	Yellow	Colorless, straw, yellow
Epithelial cells	2–5/HPF	0–5/HPF
Ur glucose	Negative	Negative
Granular casts	0–2/LPF	Negative
Hyaline casts	0–2/LPF	0–2/LPF
Ur ketones	Negative	Negative
Leukocyte esterase	Negative	Negative
Ur nitrate	Negative	Negative
pH, UA	6.0	5.0–8.5
Ur protein	2+	Negative
RBC, UA	5 – 10 /HPF	0–2/HPF
Specific gravity	1.020	1.003–1.035
Urobilinogen	0.2 EU/dL	0.2–1.0 EU/dL
WBC, UA	2–5	0–5/HPF
Fecal calprotectin	1140 μ g/g	< = 49 μ g/g
Fecal occult blood	Positive	Negative

Table 2 Additional laboratory findings obtained at the time of nephrology consult

	Patient's value	Reference range
Creatinine	1.4 mg/dL	0.2–1.4 mg/dL
Albumin	1.7 g/dL	3.0–4.8 g/dL
Urine protein/creatinine ratio	1,207 mg/g	---
Antinuclear Ab (ANA)	Negative	Negative
C3	100 mg/dL	35–181 mg/dL
C4	20 mg/dL	6–49 mg/dL
Antineutrophil cytoplasmic Ab (ANCA), IgG	< 1:20	< 1:20
Anti-double-stranded DNA Ab	Negative	Negative
Glomerular basement membrane IgG	Negative	Negative
Rheumatoid factor	Negative	Negative
Streptolysin O Ab	< 55 IU/mL	0–330 IU/mL

Questions

1. What findings do you expect the kidney biopsy to reveal?
2. Which serological markers might typically be active in patients with this diagnosis?
3. What is the treatment and prognosis?

Declarations

Conflict of interest The authors declare no competing interests.

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