



# A case of painless exercise-induced gross hematuria in a 9-year-old boy: Questions

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## Case summary

A previously healthy 9-year-old boy was admitted to the Pediatric Nephrology Department for investigation of recurrent painless episodes of red coloration of the urine over the previous 15 days. He reported 3 episodes of passage of red colored urine, occurring immediately after exercise and lasting for 2 or 3 urinations. No fever or other symptoms were reported. The family history was negative for kidney disease and hematological disorders, apart from nephrolithiasis in the father.

On admission, the boy was hemodynamically stable. His blood pressure was 116/78 mmHg (95th percentile for his height—119/80 mmHg), and physical examination revealed no pathological signs. His body mass index (BMI) was 14.6.

The hemoglobin level, white blood cell and platelet counts, levels of serum electrolytes and creatinine, and liver function tests were all within the normal range. The fractions of serum complement C3 and C4 were in the lower normal range (C3 84 mg/dl, normal range 83–177 mg/dl, and C4 15 mg/dl, normal range 15–45 mg/dl). The antistreptolysin O antibodies (ASTO) titer was 613 IU/ml (normal < 200 IU/ml), and throat swab culture was positive for group A  $\beta$ -hemolytic *Streptococcus*, although no clinical symptoms of streptococcal tonsillitis or skin infection were reported.

Urinalysis revealed density 1.015, pH 6, negative albumin, hemoglobin +++, and erythrocytes 80–100 cells/hpf. Twenty-

four-hour urine collection revealed calcium excretion 5 mg/kg/d and total protein excretion 84 mg/m<sup>2</sup>/d, and urine culture was negative. Urinary tract ultrasound was normal, and abdominal X-ray showed no calculi.

He was hospitalized for 4 days, during which time no further episode of macroscopic hematuria occurred. Urinalysis on discharge was normal: density 1.016, pH 6, albumin negative, hemoglobin negative, and erythrocytes 0–2 cells/hpf.

## Questions

1. Which diseases should be considered in the differential diagnosis of this patient?
2. What is the most likely diagnosis?
3. What investigations would you perform to reach a definitive diagnosis?
4. How should this patient be treated?

**Data availability** Not applicable.

## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethics approval** Not applicable.

**Consent to participate** Not applicable.

**Consent for publication** Not applicable.

**Code availability** Not applicable.

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The answers to these questions can be found at <https://doi.org/10.1007/s00467-020-04807-w>.

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