Urinalysis is an Inadequate Screen for Rhabdomyolysis

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Background

The classic screening test for rhabdomyolysis is a positive urine dip for blood, but negative microscopy, though this test has not been validated in the Emergency Department (ED) setting.

Objectives

Our objective was to determine the sensitivity of the urinalysis (UA) in the diagnosis of rhabdomyolysis.

Methods

Design: Retrospective electronic medical record review

Setting: University-affiliated, Level 1 Trauma center with Emergency Medicine residency program

Patients: All patients with a primary or secondary discharge diagnosis of rhabdomyolysis admitted from September 1, 2003 through December 31, 2008. A creatine phosphokinase (CPK) > 1000 U/L and UA within 24 hours of presentation were also required for inclusion.

Data Collection: Using a standardized data form, we collected demographic information, laboratory values (initial, peak, final), treatment and disposition...

Definitions: For study purposes we defined a "positive" UA as dip positive for blood (trace or more) but negative microscopy (3 RBC or fewer). Rhabdomyolysis was defined by discharge diagnosis, CPK > 1000, and case review by a panel of 3 emergency physicians.

Statistics: We calculated the sensitivity and 95% confidence interval (CI) of the UA in the detection of rhabdomyolysis.

Results

- 1,796 records reviewed
- 228 patients met all inclusion criteria
- Mean age was 46 years (range 15-102)
- 79% were males

- Cases were associated with:
  - 29% illicit drug use
  - 12% seizure
  - 11% sepsis
  - 4% trauma
  - 1% heat illness
  - Overall mortality was 18%

Mean initial CK was 17,371 (range 56 - 278,000)
Mean peak CK was 27,509 (range 1,166-404,700)

- 195 (86%) had a urine dip positive for blood
- Only 94 (41%) had positive dip AND negative microscopy

Sensitivity = 41% (95% CI, 35%-47%)

- Changing the study definitions in ways that are most favorable to increasing the sensitivity of the UA:
  1) Subset of 66 patients with more severe rhabdomyolysis and an initial CK greater than 10,000 (mean CK 53,363):
     Sensitivity = 55% (95% CI, 43%-67%)
  2) Broadening the definition of negative microscopy to < 10 RBC (instead of ≤ 3 RBC):
     Sensitivity = 79% (95% CI, 73%-83%)

Figure: Sensitivity of UA for Rhabdomyolysis

- Any Urine dip positive: 86%
- Urine dip +, and < 3 RBC: 41%
- Severe Rhabdo: 55%
- Urine dip +, and < 10 RBC: 79%

Limitations

- Retrospective design
- Missing or inaccurate data
- Definitions were arbitrary
- Rhabdomyolysis
- What constitutes a "positive" UA?
- Specific clinical outcomes of cases were not tracked
- Renal failure
- Patients selected from a single hospital.
- Results may not apply to all populations.

Conclusion

The combination of a positive urine dip for blood and negative microscopy is an insensitive screening test for rhabdomyolysis and should not be used alone to exclude the diagnosis.