

Quality Review of Urinalysis in the Workup of Transfusion Reactions: Diagnostic Utility and Cost Implications

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Background

- When a transfusion reaction (TR) is suspected, an order is placed in the electronic health record that includes blood bank testing (clerical check, hemolysis assessment, ABO/Rh confirmation, and direct antiglobulin test [DAT]) and urinalysis (UA) .
- Urinalysis has limited utility in most transfusion reactions, but hematuria and hemoglobinuria may provide supportive clues in acute and delayed hemolytic transfusion reactions.

Transfusion Reaction	Number	Urinalysis Performed	Urinalysis Not Performed	UA Contributed to Diagnosis?	UA Changed Management?
Acute Hemolytic Transfusion Reaction (AHTR)	3	3 (100%)	0 (0%)	None	None
Acute Pain Transfusion Reaction (APTR)	2	2	0	None	None
Delayed Hemolytic Transfusion Reaction (DHTR)	15	1 (6.7%)	14 (93.3%)	None	None
Delayed Serological Transfusion Reaction (DSTR)	20	3 (15.0%)	17 (85.0%)	None	None
Fibril Non-Hemolytic Transfusion Reaction (FNHTR)	69	56 (81.2%)	13 (18.8%)	None	None
Hypotensive Transfusion Reaction	5	4 (80.0%)	1 (20.0%)	None	None
Mild Allergic Transfusion Reaction (MATR)	64	50 (78.1%)	14 (21.9%)	None	None
Severe Allergic Transfusion Reaction (SATR)	3	2 (66.7%)	1 (33.3%)	None	None
Transfusion Associated Circulatory Overload (TACO)	7	5 (71.4%)	2 (28.6%)	None	None
Transfusion-Associated Dyspnea (TAD)	3	1 (33.3%)	2 (66.7%)	None	None
Transfusion Related Acute Lung Injury (TRALI)	3	3 (100%)	0 (0%)	None	None
Test Cancelled (TC)	6	0 (0%)	6 (100%)	None	None
Not A Transfusion Reaction (NART)	37	36 (97.3%)	1 (2.7%)	None	None
Total	237	166 (70.0%)	71 (30.0%)		

SMART Aims

To evaluate the diagnostic and clinical utility of routine urinalysis in transfusion reaction workups and to reduce unnecessary utilization by 50% over 6 months without compromising patient care through a quality improvement initiative.

Methods

We conducted a retrospective review of patients who presented at Albert B. Chandler Hospital (CH) and at Good Samaritan Hospital (GSH), between 2021 and 2023. Reactions were classified based on the National Healthcare Safety Network Surveillance Protocol. Data collected included reaction type, urinalysis utilization, and its contribution to diagnosis and clinical management. The primary outcome was the diagnostic and clinical utility of urinalysis.

This study represents the baseline phase of a quality improvement initiative. A Plan Do Study Act cycle is planned. In the Plan phase, baseline data are used to identify overutilization and define appropriate clinical indications. In the Do phase, targeted education and modification of electronic order sets will be implemented in collaboration with clinicians, transfusion services, and hospital administration.

In the Study phase, post intervention utilization, cost savings, and patient outcomes will be assessed. In the Act phase, iterative refinements will be made to sustain improvements and ensure patient safety.

Results or Outcomes

- A total of 237 transfusion reactions were analyzed. Urinalysis was performed in 166(70.0%) cases.
- Hemolytic transfusion reactions were uncommon, comprising 18 cases (7.6%), including 3 AHTR and 15 DHTR. UA was performed in 4 of 18 hemolytic cases (22.2%).
- Despite frequent utilization, urinalysis did not contribute to the diagnosis in any case (0%) and did not change clinical management in any case (0%) as hemoglobinuria was not consistently documented.
- UA was most frequently performed in non-hemolytic reactions, including febrile non-hemolytic transfusion reactions (56/69, 81.2%) and mild allergic reactions (50/64, 78.1%), where its diagnostic relevance is limited.
- Laboratory costs based on Current Procedural Terminology (CPT) to perform a urinalysis without microscopic examination (CPT code 81003) is \$5.12.

Discussion

Routine urinalysis demonstrated no diagnostic or clinical value in this cohort. The overutilization driven by default order sets rather than clinical need is identified.

Conclusion

Urinalysis may be safely omitted from routine transfusion reaction workups except when hemolysis is strongly suspected. This quality improvement initiative supports a more efficient, cost-conscious, and evidence-based approach to transfusion reaction evaluation.