Case Description
A 78-year-old man underwent urgent coronary artery bypass grafting with mitral and aortic valve replacements. After surgery, he developed severe biventricular dysfunction and hypotension treated with high-dose vasopressors, inotropes, and an intra-aortic balloon pump. Intravenous cyanocobalamin (5 g) and 1% methylene blue (100 mg) were administered for refractory hypotension and vasopressor requirements lessened. Once in the intensive care unit, dark-purple urine, similar in appearance to the purple urine bag syndrome (1,2), was noted (Figure 1A). In the context of AKI, continuous kidney replacement therapy (CKRT) was initiated for hyperkalemia and the effluent was noted to be a light-purple color (Figure 1B). Urinalysis showed 1+ protein, 1+ blood, trace positive leukocytes, and was negative for nitrites. Urine culture was negative.

Purple urine bag syndrome is rare and occurs due to urinary-tract infections with bacterial species that convert a tryptophan-derived metabolite in the urine into blue (indigo) and red (indirubicin) pigments (3). Cyanocobalamin causes red urine (4) (which can be mistaken for hematuria), whereas methylene blue can cause blue-green urine (5) that can be mistaken for infection. In the critical care setting, propofol can also occasionally cause green urine (5). Although many medications cause an abnormal urine color (5), none typically result in it being purple. In this patient, the combined effects of cyanocobalamin and methylene blue being filtered from the blood into the urine mimicked purple urine bag syndrome. Although not a diagnostic challenge, the diagnosis was confirmed by the patient’s urine culture having been negative and the concurrent presence of the light-purple CKRT effluent: the discolored effluent cannot be explained by a process that only occurs in the urine and provides visual evidence of the simultaneous clearance of these medications via CKRT.

Teaching Points
- Purple urine is rare and nearly pathognomonic for purple urine bag syndrome.
- Purple urine bag syndrome is due to infection or colonization with bacteria that convert a urinary metabolite into blue and red pigments.
- Coadministration of methylene blue (causes blue-green urine) and cyanocobalamin (causes red urine) can mimic purple urine bag syndrome.

Figure 1. | Urine bag and CKRT effluent bag photographs. (A) Dark-purple urine, similar to purple urine bag syndrome, after administration of intravenous cyanocobalamin and methylene blue. (B) Light-purple continuous kidney replacement therapy effluent due to simultaneous clearance of cyanocobalamin and methylene blue.
Disclosures
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Author Contributions
P.-A. Brown and S. Sriperumbuduri reviewed and edited the manuscript; E.G. Clark conceptualized the study, provided supervision, and wrote the original draft; S. Sriperumbuduri curated the data; and all authors reviewed and approved the final version of the manuscript.

References

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