A Case Report of Warfarin-Induced Nephropathy

Daniel Fatemi, DO[6], df245837@pcom.edu, **Jessica Gibbons, DO[7]**, jessicagi@pcom.edu, **Erik Polan, DO [8]**
1. Department of Philadelphia College of Osteopathic Medicine
2. Division of Transitional Year Internship Program

INTRODUCTION

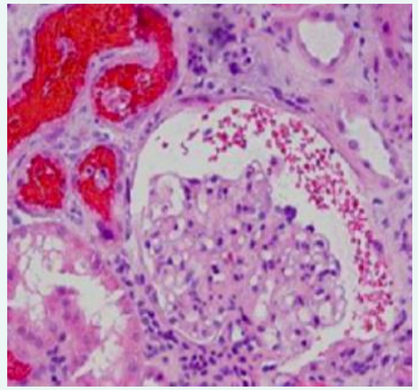
This is a case presentation of a 63 year old male with a past medical history of unprovoked deep venous thrombosis, hypertension, and atrial fibrillation on warfarin who presented to the hospital with complaints of week-long lethargy and fatigue. The patient was noted to have a creatinine level of 9.87 on admission with a previous baseline 2.0-2.5 in 2021, and 1.0 in 2019. The patient had recently consulted with a nephrologist with regards to the gradual rise in creatinine. There was initial concern for rapidly-progressing glomerulonephritis as hematuria and proteinuria were evident on urinalysis, with several dysmorphic RBC and no obvious casts. Additional work-up included auto-immune, hemolytic, and other interstitial disease processes. Hematology/Oncology was also consulted for additional management of elevated INR in the setting of a potential renal biopsy.

METHOD

Initial testing included daily creatinine levels, urine studies, and renal ultrasound which was initially inconclusive. ANCA, ANA, anti-GBM, SPEP/UPEP, free light chains, and hemolytic lab tests were also sent. Hemodialysis for acute renal failure of unknown origin was initiated via permcath. A renal biopsy was eventually performed.

RESULTS & DISCUSSION

Oral anticoagulation has been in use since the 1950s. Warfarin-induced nephropathy, also known as anticoagulant-related nephropathy (ARN) is a rare condition of acute, potentially irreversible, kidney injury caused by over use of anticoagulation, such as warfarin or a novel oral anti-coagulant (NOAC). ARN was first theorized when a retrospective analysis studied biopsies of patients presenting with unclear origin of acute kidney injury with presence of macro/microhematuria while receiving warfarin therapy. During this study it was noted that the most common pathologic denominator for the group in question was diffuse dysmorphic RBC accumulation, specifically in the renal tubules as well as Bowman's space (Figure 1, Figure 2,[1]). Over anticoagulation causes profuse glomerular hemorrhage. A renal biopsy will specifically show numerous renal tubules filled with red blood cells and red cell casts. The tubulointerstitial damage could also be caused by an immune allergic reaction. Certain risk factors have been shown to increase susceptibility to ARN such as supratherapeutic anticoagulation and substantially reduced number of nephrons or acute damage to the glomeruli. This allows the glomeruli to bleed profusely under conditions of over anticoagulation. Warfarin has been more strongly associated with risk of renal events.



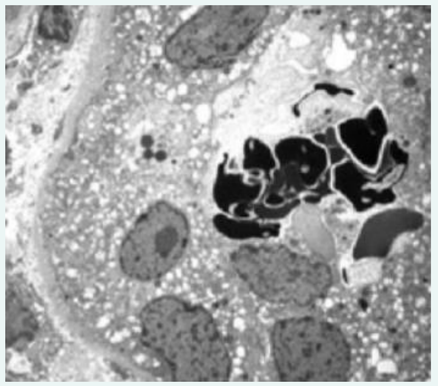


Figure 1: Numerous red blood cells and red blood cell casts noted in Bowman's Space, prepared in H&E stain
Figure 2: Electron microscopy showing dysmorphic RBCs in renal tubules

CONCLUSION

Given the lack of studies, the overall management of ARN is not fully standardized. The general consensus is as follows : if a patient experiences unexplained AKI that does not resolve or unexplained large chronic GFR loss, a renal biopsy is performed. If the renal biopsy is consistent with ARN, the patient should be switched from warfarin to a NOAC or the dose of the NOAC should be lowered.

This patient was eventually discharged from the hospital with nephrology follow up and continued hemodialysis. He is currently being worked-up for a renal transplant. Warfarin-induced nephropathy is a controversial diagnosis in the nephrology community due to the lack of specific histopathologic and clinical presentation. This being said, warfarin-induced nephropathy should be a diagnosis of exclusion with a clinical presentation of acute kidney injury without clear etiology in a patient prescribed warfarin.

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