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Warfarin-induced Wunderlich syndrome in a hemodialysis patient with lupus nephritis: A diagnostic challenge

Abstract

Introduction: Wunderlich Syndrome (WS) is a rare, potentially life-threatening condition characterized by spontaneous renal haemorrhage. Its variable presentation can mimic other conditions, leading to diagnostic delays.

Case report: A 42-year-old woman with systemic lupus erythematosus, lupus nephritis on haemodialysis, and antiphospholipid syndrome presented with acute left-sided flank pain, nausea, and anuria. She was on warfarin, and laboratory evaluation showed a markedly elevated INR. Initial non-contrast CT abdomen suggested pyelonephritis, but contrast-enhanced CT abdomen confirmed a large subcapsular renal hematoma with active bleeding. The patient underwent successful trans arterial embolization after stabilization, with complete resolution of symptoms and no further bleeding.

Conclusion: Wunderlich syndrome should be suspected in anticoagulated patients, particularly those on warfarin, presenting with flank pain. Contrast-enhanced CT is essential for accurate diagnosis, and management should be tailored based on hemodynamic status, presence of active bleeding, and underlying aetiology, with timely intervention critical to optimize outcomes.

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Introduction

Wunderlich Syndrome (WS) is a rare but potentially life-threatening condition characterized by spontaneous, non-traumatic bleeding into the subcapsular and perirenal spaces. Clinical presentation can vary widely, ranging from mild flank discomfort to severe manifestations such as hypovolemic shock. The classic symptom triad of flank pain, flank mass, and hypovolemic shock known as Lenk's triad is observed in only a minority of patients [1]. Neoplastic causes, particularly angiomyolipoma and renal cell carcinoma, account for approximately 60% of reported cases, followed by vascular etiologies such as vasculitis and renal aneurysms, which comprise about 30%. The remaining 10% are attributed to other causes, including cystic renal disease, infections, and urolithiasis [1]. With increasing use of anticoagulants, recent literature highlights a rising incidence of WS associated with coagulation abnormalities [2].

We report a case of warfarin-induced renal subcapsular hematoma in a 42-year-old woman with systemic lupus erythematosus, lupus nephritis, and antiphospholipid syndrome.

Case presentation

A 42-year-old woman presented to the emergency department with left-sided flank pain for one day. The patient reported severe, sharp, persistent pain that radiates to left lower abdomen, with a severity of 8 out of 10. The pain was accompanied by nausea and anuria. She denied fever, abdominal pain, vomiting, or change in bowel habits. The patient has a 10-year history of systemic lupus erythematosus, complicated by lupus nephritis with end-stage renal disease and antiphospholipid syndrome as well as secondary Sjogren syndrome. She is on regular hemodialysis and had a history of arteriovenous fistula thrombosis. No preceding trauma was reported. Her current medications include warfarin for anticoagulation, mycophenolate mofetil, hydroxychloroquine, and prednisolone for SLE, atorvastatin and vedolizumab

for dyslipidemia, calcium and vitamin D supplementation, Nifedipine for hypertension, topical agents for cutaneous lupus, and darbepoetin for anemia secondary to ESRD.

At presentation, her hemodynamic parameters were stable. Vital signs showed; temperature 37°C (98.6°F), pulse 87 beats/min, blood pressure 160/116 mmHg, respiratory rate 18 breaths/min, and oxygen saturation 98% on room air. On examination, she was distressed due to pain but oriented to time, person, and place. Pallor and facial puffiness were noted, along with Cushingoid features. Hyperpigmented, scaly macules were observed over the elbows and forearms, consistent with discoid rash. A tunneled right internal jugular Perm Cath was in situ. Proximal myopathy consistent with steroid use was present. Abdominal examination revealed ascites and left costovertebral angle tenderness. Other systemic examinations were unremarkable. Laboratory investigations revealed a markedly elevated International Normalized Ratio (INR) of 5.8. Complete blood count revealed anemia consistent with her ESRD baseline, with no acute fall in hemoglobin. Serum electrolytes and liver function tests were within normal ranges. Urinalysis was unremarkable, and urine culture showed no bacterial growth.

A non-contrast CT scan of the abdomen revealed a bulky, hyperdense left kidney with intervening areas of parenchymal hypodensity and mild stranding of the surrounding perinephric fat (Figure 1). These findings along with her clinical presentation were initially suggestive of acute pyelonephritis. The patient was treated empirically with intravenous ceftriaxone for one week, with partial symptomatic improvement. However, On the eighth day of hospitalization, the patient developed a recurrence of intense left-sided flank pain, exceeding the severity of the initial episode. This was accompanied by a drop in blood pressure, recorded at 90/60 mmHg, indicating new-onset hypotension.

Point-of-Care Ultrasound (POCUS) revealed a heterogeneous mass in the left kidney (Figure 2). Subsequent contrast-enhanced CT of the abdomen demonstrated a large subcapsular hematoma displacing the lower pole of the left kidney, measuring approximately 9 × 6.7 × 7 cm (Figure 3), with evidence of active contrast extravasation on CT angiography. These findings confirmed the diagnosis of Wunderlich syndrome, representing spontaneous renal hemorrhage secondary to warfarin-induced coagulopathy. Warfarin was discontinued immediately, and the patient underwent left renal artery embolization performed by the interventional radiology team. Following the procedure, her hemodynamic status stabilized, flank pain gradually subsided, and no further bleeding occurred during the remainder of her hospitalization.

Discussion

This case highlights the critical challenge of timely diagnosis in Wunderlich Syndrome (WS). The initial diagnostic delay in our patient occurred because her clinical presentation; flank pain and non-contrast CT findings closely mimicked acute pyelonephritis. Such diagnostic difficulty is not uncommon, as the classical Lenk's triad of flank pain, palpable mass, and hypovolemic shock is observed in only about 20% of WS cases [1]. Similarly, in a case series involving 13 patients, only two individuals (15%) presented with the complete triad [3]. Given this often-subtle presentation, contrast-enhanced CT should be promptly considered in anticoagulated patients, particularly those on warfarin, who present with unexplained flank pain to facilitate early recognition and management.



Figure 1: Coronal non-contrast CT of the abdomen demonstrated a bulky, hyperdense left kidney with intervening areas of parenchymal hypodensity and mild stranding of the surrounding perinephric fat. The right kidney was markedly atrophied, consistent with end-stage renal disease.

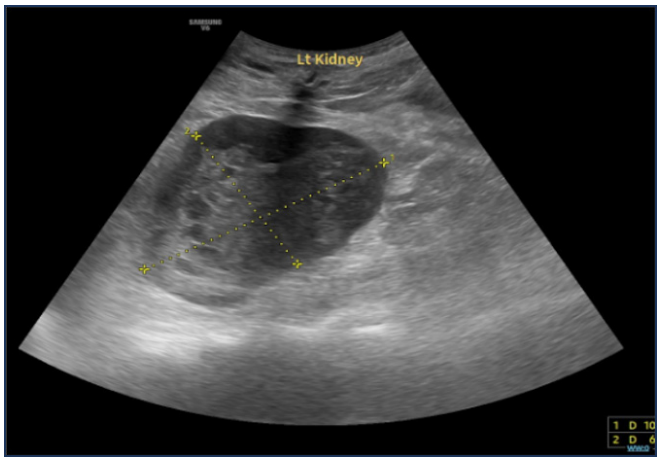


Figure 2: Ultrasound shows heterogenous mass in the left kidney.

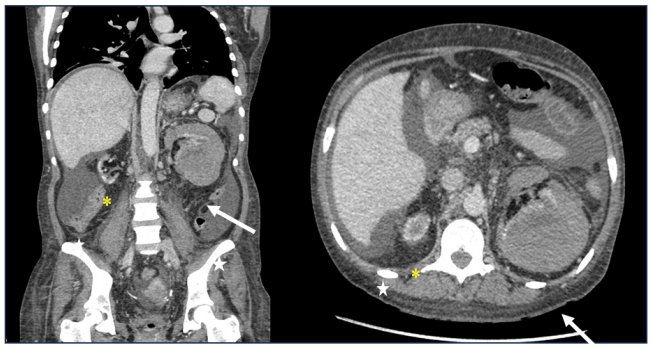


Figure 3: Coronal (left) and axial (right) contrast-enhanced CT images of the abdomen in the portal venous phase demonstrate a large left subcapsular renal hematoma encircling the left kidney and displacing its lower pole, measuring approximately 9 × 6.7 × 7 cm (arrow). Right renal atrophy consistent with end-stage renal disease (asterisk) and mild ascites (star) were noted.

Warfarin is a vitamin K antagonist that inhibits the synthesis of vitamin K-dependent clotting factors (II, VII, IX, and X) and has a narrow therapeutic index, requiring careful INR monitoring. A cohort study demonstrated that patients with Chronic Kidney Disease (CKD) or End-Stage Renal Disease (ESRD) require lower warfarin doses to achieve and maintain therapeutic INR levels compared with those with normal renal function. Furthermore, these patients reach therapeutic INR more rapidly, indicating increased sensitivity to warfarin and a consequently higher risk of INR overshoot and bleeding events [4]. Wunderlich syndrome has been observed among patients receiving warfarin for atrial fibrillation with supratherapeutic INR levels and this aligns with our study where the INR was 5.8 [2]. However, WS has also been reported in patients whose INR levels were within the established therapeutic range [5]. Renal neoplastic lesions are the most common cause of WS followed by vascular causes [6]. In contrast, hemorrhage secondary to coagulation disorders or anticoagulant therapy, as seen in our patient, is relatively rare but increasingly reported [2]. Despite a lower bleeding risk with DOACs compared to warfarin (~22% reduction) [7], WS has still been reported with their use [7,8].

In our patient, contrast-enhanced CT was pivotal in confirming the diagnosis, delineating the size and extent of the subcapsular hematoma, and identifying active bleeding, which guided the decision for trans arterial embolization. This aligns with the literature, which emphasizes that contrast-enhanced CT is the imaging modality of choice for Wunderlich syndrome [1]. While ultrasound can serve as a rapid, bedside screening tool for detecting renal masses or perirenal collections, it has limited ability to reliably distinguish complex hematomas from underlying neoplasms.

Management of WS depends primarily on the patient's hemodynamic status and the presence of active bleeding. In hemodynamically unstable patients with ongoing hemorrhage, trans arterial embolization is an effective first-line approach that preserves renal function. In our case, this approach was successfully performed under interventional radiology guidance. Similar strategies have been reported in a 47-year-old woman with a warfarin-ciprofloxacin-induced hematoma [2] and a 72-year-old woman on edoxaban [9]. For hemodynamically stable patients without active bleeding, conservative management may be appropriate. This typically involves volume resuscitation, blood transfusion if needed, reversal of anticoagulation, pain control, and close monitoring with serial imaging, with favorable outcomes reported in the literature [5].

Conclusion

Wunderlich Syndrome (WS) is a rare but potentially life-threatening cause of spontaneous renal hemorrhage, with a variable presentation that can mimic conditions such as pyelonephritis, often leading to diagnostic delays. Contrast-enhanced CT is the imaging modality of choice for accurate diagnosis, assessment of hemorrhage, and identification of underlying etiologies. Management should be guided by the patient's hemodynamic status, with trans arterial embolization is preferred for active bleeding and instability, while conservative treatment may be appropriate in stable patients. A multidisciplinary approach is essential, and clinicians should maintain a high index of suspicion for WS in patients on warfarin or other anticoagulants, as timely recognition and intervention are crucial to optimize outcomes.

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