

Anticoagulation With Platelet Transfusions for Acute Limb Ischemia With Severe Thrombocytopenia

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Khalid Shakfeh ^{1,2}, Damian A. Laber ³

¹. Internal Medicine, University of South Florida Morsani College of Medicine, Tampa, USA ². Internal Medicine, Tampa General Hospital, Tampa, USA ³. Satellite and Community Oncology, Moffitt Cancer Center, Tampa, USA

Corresponding author: Khalid Shakfeh, kshakfeh1@gmail.com

Abstract

Acute limb ischemia (ALI) is a medical and surgical emergency, and the mainstays of treatment are therapeutic anticoagulation and surgery. These interventions require adequate platelet count and functionality. Anticoagulation and surgery can be complicated in thrombocytopenic patients and require interdisciplinary management for optimal outcomes, as literature is limited in this population. We present a case of a patient with severe thrombocytopenia who developed limb ischemia from cancer-associated thrombosis (CAT). We propose a management strategy for anticoagulation and perioperative platelet transfusion, with successful revascularization without adverse bleeding events. While successful, more data is required to investigate long-term outcomes.

Categories: Cardiac/Thoracic/Vascular Surgery, Internal Medicine, Hematology

Keywords: systemic anticoagulation, mycosis fungoides, protein calories malnutrition, thrombocytopenia, acute limb ischaemia

Introduction

The most common causes of acute limb ischemia (ALI) are typically divided into embolic and thrombotic events. Thrombotic events are mostly found in patients with peripheral vascular disease. Common risk factors include uncontrolled hypertension, diabetes, and smoking. Conversely, embolic events are more frequently found in arrhythmia, mostly atrial fibrillation [1]. Regardless, the standard management for both remains the same. ALI with Rutherford grades I-IIb is typically managed by therapeutic anticoagulation, most frequently a heparin drip, followed by surgical intervention [2].

As of the writing of this report, we found no objective published data on anticoagulation for ALI with severe thrombocytopenia. Here, we report the management of a patient who developed ALI treated with anticoagulation and platelet transfusions while his platelet count was less than $30,000 \times 10^9/L$.

Case Presentation

A 65-year-old gentleman with refractory cutaneous T-cell lymphoma (mycosis fungoides subtype) presented to the emergency department for worsening oozing from his wounds, with associated pain for several days (Figure 1). The patient had been recently admitted to a local hospital with similar complaints. At that facility, he was found to have *Klebsiella bacteremia* and was hospitalized and treated with IV cefazolin for two weeks. Upon presentation, he was hypotensive, tachycardic, and with approximately 67% of his body covered in wounds associated with his lymphoma. Laboratory tests revealed anemia and thrombocytopenia with a platelet count of $33,000 \times 10^9/L$ (Table 1). Sepsis protocol was initiated, and after fluid resuscitation, his vitals improved.

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FIGURE 1: Representative photo of the severity of mycosis fungoides in our patient

	Admission values	Reference range (male)
WBC ($\times 10^9/L$)	5.54	3.8-10.4
Hemoglobin (g/dL)	7.9	13.6-16.9
Hematocrit (%)	23.7	40-50
Platelets ($\times 10^9/L$)	33	153-361

TABLE 1: Admission complete blood count

Repeat laboratory values demonstrated a thrombocytopenia of $18,000 \times 10^9/L$. Throughout the remainder of his hospitalization, his platelets remained around $18\text{--}27,000 \times 10^9/L$. On HD 7, he developed unilateral leg poikilothermia, pulselessness at his dorsalis pedis and posterior tibial arteries, and worsening sensorimotor changes, consistent with Rutherford IIB ALI. He had a biphasic popliteal artery pulse with absent distal pulses. He was transfused four units of platelets until his platelet count was greater than $50,000 \times 10^9/L$ and started on a heparin drip. He was taken to the operating room, where a small clot from his anterior tibial artery was removed. Given his high risk of developing compartment syndrome, fasciotomies were performed prophylactically.

He was thereafter transferred to the intensive care unit for hourly neurovascular checks. He remained on the heparin drip, and his platelets postoperatively were $45\text{--}50,000 \times 10^9/L$. Given planned returns to the operating room for his fasciotomy revisions, he was transfused for a platelet goal of greater than $50,000 \times 10^9/L$ while on the heparin drip. On HD 11/POD 4, he had progressive ischemic changes with signal loss and was taken back to the operating room for a repeat thrombectomy, bovine patch angioplasty, and common iliac artery stenting. Postoperatively, his dorsalis pedis signals remained biphasic.

A thromboembolic workup, including transthoracic echocardiogram, protein C and S levels, factor V, antiphospholipid, cardiolipin, fibrinogen, partial thromboplastin time, prothrombin time, platelet factor 4 antibodies, flow cytometry, and haptoglobin were all normal. A bone marrow aspiration and biopsy one month prior to his presentation demonstrated 20-30% cellularity, without bone marrow involvement from his malignancy. His thrombocytopenia was deemed likely either due to his active malignancy or acute illness.

The platelet goal was decreased to $>30,000 \times 10^9/L$ with platelet transfusion support while on a heparin drip. He ultimately received a total of nine units of platelets. He had no significant bleeding complications or ischemic complications.

Unfortunately, due to his progressive malignancy, he decided to transition to comfort measures only and died on HD 17.

Discussion

There is little data on systemic anticoagulation in patients with ALI and profound thrombocytopenia. Most published studies have revolved around the management of cancer-associated thrombosis (CAT) in patients with thrombocytopenia, mostly venous thromboembolic disease [3], where it is common practice to implement full anticoagulation with platelets greater than $50,000 \times 10^9/L$, halved between $30,000 \times 10^9/L$ and $50,000 \times 10^9/L$, and held less than $30,000 \times 10^9/L$ [4]. Anticoagulation is held for platelets less than $30,000 \times 10^9/L$ for concerns of life-threatening bleeding; however, thrombocytopenia is not seen as protective against emboli or thrombi [5]. Another strategy commonly used in CAT during the first 30 days (highest risk for recurrent venous thromboembolism) is full-dose therapeutic anticoagulation with supportive platelet transfusions to maintain platelet count $>40-50 \times 10^3/\mu L$ [6-7].

In our patient with ALI after the initial thrombectomy, we opted for anticoagulation with supportive platelet transfusions to maintain an initial platelet goal of greater than $50,000 \times 10^9/L$. With this strategy, he had no bleeding complications but developed re-thrombosis four days later necessitating a repeat thrombectomy. After the second thrombectomy, he was maintained on therapeutic anticoagulation with supportive platelet transfusions, but the platelet goal was decreased to greater than $30,000 \times 10^9/L$. With this strategy, he had no bleeding complications and no re-thrombosis.

Conclusions

We acknowledge that this is a case report with very limited data that might not be reproducible since each patient is unique. We hope our experience can be informative for treating physicians encountering similar problems in their practice. Anticoagulation in thrombocytopenic patients with ALI is a very tricky matter. A balance must be obtained between decreasing complications related to clots and the risks of bleeding. We hope our case might stimulate urgently needed studies in the management of ALI with severe thrombocytopenia.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Fluck F, Augustin AM, Bley T, Kickuth R: Current treatment options in acute limb ischemia. *Rofo*. 2020, 192:319-26. [10.1055/a-0998-4204](#)
2. Olinic DM, Stanek A, Tătaru DA, Homorodean C, Olinic M: Acute limb ischemia: an update on diagnosis and management. *J Clin Med*. 2019, 8:1215. [10.3390/jcm8081215](#)
3. Di Micco P, Monreal M: Platelet count and bleeding in patients receiving anticoagulant therapy for venous thromboembolism: lesson from the RIETE registry. *J Blood Med*. 2019, 10:453-6. [10.2147/JBM.S234053](#)
4. Mantha S, Miao Y, Wills J, Parameswaran R, Soff GA: Enoxaparin dose reduction for thrombocytopenia in patients with cancer: a quality assessment study. *J Thromb Thrombolysis*. 2017, 43:514-8. [10.1007/s11239-017-1478-0](#)
5. Jinna S, Khandhar PB: Thrombocytopenia. 2022 (ed): StatPearls Publishing, Treasure Island, Florida;
6. Napolitano M, Saccullo G, Marietta M, et al.: Platelet cut-off for anticoagulant therapy in thrombocytopenic patients with blood cancer and venous thromboembolism: an expert consensus. *Blood Transfus*. 2019, 17:171-80. [10.2450/2018.0143-18](#)

7. Samuelson Bannow BT, Lee A, Khorana AA, Zwicker JI, Noble S, Ay C, Carrier M: Management of cancer-associated thrombosis in patients with thrombocytopenia: guidance from the SSC of the ISTH. *J Thromb Haemost*. 2018, 16:1246-9. [10.1111/jth.14015](https://doi.org/10.1111/jth.14015)