CASE REPORT

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Concurrent Acute Limb Ischemia and Septic Shock in a Chemotherapy-Treated Squamous Cell Carcinoma Patient: A Multidisciplinary Challenge

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SUMMARY

A 40-year-old male presented with a history of squamous cell carcinoma (SCC) of the cheek, recently treated with cisplatin and 5-fluorouracil, who developed acute limb ischemia and septic shock. The patient arrived with signs of peripheral arterial occlusion and systemic sepsis, including gangrenous changes in the left lower limb and hemodynamic instability. Imaging confirmed arterial thrombosis distal to the common femoral artery. Broad-spectrum antibiotics, vasopressor support, and anticoagulation were initiated, but surgical thrombectomy was initially deferred due to shock. As ischemia progressed to irreversible gangrene, an above-knee amputation was performed for source control, leading to rapid clinical improvement. This case highlights the prothrombotic and immunosuppressive complications of platinum-based chemotherapy, underscoring the need for early vascular assessment, sepsis management, and consideration of prophylactic anticoagulation in high-risk oncology patients. Multidisciplinary coordination remains critical in managing such complex presentations.

Keywords: Septic shock; Acute limb ischemia; Squamous cell carcinoma; Hypercoagulability; Chemotherapy

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Introduction

Squamous cell carcinoma (SCC) is among the most common malignancies globally, with over 1 million cases diagnosed annually, particularly affecting sun-exposed regions of the skin and mucosa. [1] While it typically follows a localized course, advanced cases, especially those requiring cytotoxic chemotherapy, pose systemic risks. Chemotherapeutic agents like cisplatin and 5-fluorouracil, standard treatments for head and neck SCC, are well-documented for inducing endothelial dysfunction and a prothrombotic state, contributing to both venous and arterial thromboembolic events. [2] In fact, cancer patients on cisplatin-based regimens have a thromboembolic risk approaching 18–20%, with arterial events increasingly recognized. [3]

In parallel, chemotherapy-induced myelosuppression compromises host immunity,

predisposing patients to severe infections and fulminant sepsis. [3] Septic shock remains a leading cause of mortality in oncology ICUs, with rapid deterioration and multiorgan failure in immunocompromised hosts. Acute limb ischemia (ALI), a vascular emergency characterized by sudden arterial occlusion, carries a 30-day mortality of up to 15–20%, and amputation rates exceeding 25%, particularly when intervention is delayed. [4] While ALI is often linked to atherosclerotic disease or embolism, emerging evidence points to cancer-related hypercoagulability as an underrecognized etiology.

Here, we report the case of a 40-year-old male with recurrent facial SCC, recently treated with cytotoxic chemotherapy, who presented with concurrent septic shock and critical limb ischemia. This rare clinical intersection, severe immunosuppression, arterial thrombosis, and soft tissue necrosis, highlights the systemic complications of chemotherapy and underscores the importance of early multidisciplinary intervention. The complexity and acuity of this presentation offer valuable insights for clinicians managing high-risk oncology patients, particularly in balancing sepsis resuscitation with vascular salvage. This case also contributes to the growing body of evidence linking chemotherapy to acute arterial events.

Case Presentation

A 40-year-old male presented to the Emergency Department with acute onset of severe pain, numbness, and coldness in his left lower limb. He had a history of biopsy-confirmed, well-differentiated squamous cell carcinoma (SCC) of the left cheek and had completed 20 cycles of combination chemotherapy with cisplatin and 5-fluorouracil nine months earlier. He had no known cardiac history, no prior thromboembolic events, and no history of atrial fibrillation.

At presentation, the patient met clinical criteria for septic shock: he was febrile (38.5 °C), hypotensive (blood pressure 65/35 mmHg), tachycardic (heart rate 148 bpm), and acutely ill-appearing. His left lower limb was pale, cold to touch from the mid-thigh distally, with absent distal motor and sensory function. Dry gangrene with hemorrhagic bullae and purulent discharge was noted over the foot and lower leg, suggestive of necrotic tissue and secondary infection. Peripheral pulses (popliteal, dorsalis pedis, posterior tibial) were diminished on the left but intact on the contralateral limb, which remained warm and neurologically intact. Examination of the head and neck revealed a large, irregular mass on the left cheek with a rough surface—consistent with residual SCC. The remainder of the systemic examination was unremarkable.

Initial labs showed leukocytosis (WBC 18,000/mm³), elevated inflammatory markers, and a serum lactate level of 4.5 mmol/L. Renal function and serum electrolytes were within normal limits. Cardiac markers (troponin I) were negative, ECG showed sinus tachycardia, and continuous telemetry revealed no arrhythmias. Imaging for other embolic sources was unrevealing: Doppler ultrasound showed no deep vein thrombosis, and chest CT ruled out pulmonary embolism.

Microbiological cultures (blood, wound, urine) yielded polymicrobial growth consistent with necrotic soft tissue infection. Chest X-ray and abdominal ultrasound were non-contributory. Doppler ultrasound of the left lower limb demonstrated absent arterial flow beyond the common femoral artery, confirming acute arterial occlusion. Given the patient's oncological history, contrast-enhanced CT of the neck was performed and showed a large, heterogeneously enhancing left cheek mass involving the mandible and maxilla, consistent with residual SCC.

The primary differentials for the acute presentation included: Arterial thrombosis secondary to chemotherapy-induced hypercoagulability, Septic shock from necrotic limb infection, Tumor-associated hypercoagulable state, Paraneoplastic vasculitis (less likely due to lack of systemic features or autoimmune markers). The absence of cardiac arrhythmias, embolic sources, or pre-existing peripheral vascular disease supported chemotherapy-related arterial thrombosis as the likely etiology. The patient was managed in the intensive care unit (ICU). On admission (Day 0), broad-spectrum intravenous antibiotics (piperacillin-tazobactam) were initiated, alongside aggressive fluid resuscitation and norepinephrine for vasopressor support. By Day 1, vascular imaging confirmed acute limb ischemia, and vascular surgery consultation was obtained. Despite medical stabilization efforts, the patient remained hypotensive and was deemed unfit for immediate surgical intervention.

On Day 2, anticoagulation with intravenous unfractionated heparin was initiated. Surgical thrombectomy was considered but deferred due to persistent hemodynamic instability and elevated surgical risk under general anesthesia. Catheter-

directed thrombolysis was not pursued, given concerns for systemic bleeding risk in septic shock, the likely extent of necrotic tissue, and limited time window for limb salvage.

By Day 3, there was clear demarcation of non-viable tissue, with progression to irreversible gangrene. On Day 4, once cardiovascular parameters had stabilized, an above-knee amputation was performed for definitive source control.

Following amputation, the patient's vasopressor requirement diminished rapidly, and inflammatory markers trended downward. He was successfully weaned off hemodynamic support, transitioned to ward-level care, and discharged in stable condition with planned follow-up in oncology and vascular surgery clinics.

Discussion

This case illustrates a rare but clinically significant convergence of oncologic therapy complications, namely, chemotherapy-induced arterial thrombosis, soft-tissue necrosis, and septic shock in a relatively young patient with squamous cell carcinoma (SCC) of the cheek. The simultaneous presentation of acute limb ischemia and systemic infection poses diagnostic and therapeutic challenges, particularly in the context of recent platinum-based chemotherapy, a treatment known to confer both hypercoagulable and immunosuppressive risks.

Cisplatin-based chemotherapy has long been associated with an increased risk of venous thromboembolism; however, accumulating evidence now implicates it in arterial thrombotic events, including myocardial infarction, stroke, and limb ischemia. [3] Proposed mechanisms include endothelial dysfunction, elevated von Willebrand factor levels, and enhanced platelet aggregation, all contributing to a prothrombotic state. Previous literature demonstrated that cisplatin confers a significant risk for thromboembolism, with arterial events comprising up to 12% of all reported complications. [5] Additionally, elevated levels of circulating tissue factor and cytokines during chemotherapy may further promote coagulation cascades.

In parallel, myelosuppression and neutropenia, common adverse effects of cytotoxic regimens reduce host defenses against infection. [6] Immunocompromised patients are particularly vulnerable to rapidly progressing soft-tissue infections, which, in the absence of early intervention, may evolve into septic shock. In this patient, both thrombosis and infection likely shared a common upstream trigger chemotherapy-induced systemic dysregulation, culminating in a rapidly deteriorating clinical picture.

While the arterial occlusion was likely driven by chemotherapy-related thrombosis, other etiologies were considered. Cardioembolic sources were ruled out by sinus rhythm on ECG, normal troponin levels, and negative telemetry. There was no evidence of paraneoplastic vasculitis, given the absence of systemic inflammatory signs or autoimmune serologies, nor was tumor embolism suggested on imaging. Therefore, the diagnosis of cisplatin-induced arterial thrombosis superimposed on a background of immunosuppression remains the most plausible pathogenesis.

To date, few published case reports have described the triad of SCC, chemotherapy-associated arterial thrombosis, and septic shock. Most literature on chemotherapy-induced thromboembolic complications centers on venous events. In this regard, our report expands the clinical spectrum by highlighting an arterial thrombotic emergency requiring surgical intervention. The added complexity of sepsis amplifies the clinical relevance and underscores the need for high suspicion in similar settings.

Management required careful prioritization between urgent revascularization and the high operative risk posed by septic shock. Catheter-directed thrombolysis was contraindicated due to coagulopathy and bleeding risk in this unstable patient. Surgical thrombectomy, though suitable given the localized thrombus, was deferred until stabilization. Intravenous heparin was initiated, but irreversible ischemia ensued, necessitating above-knee amputation for definitive source control, which led to rapid clinical improvement.

This case underscores the importance of early multidisciplinary collaboration, including critical care, infectious disease, vascular surgery, and oncology, to guide timely decisions in complex oncologic emergencies. It also highlights the need for risk stratification and consideration of prophylactic anticoagulation in high-risk patients on cisplatin-based regimens. Current guidelines remain unclear on arterial thrombosis prevention in cancer, emphasizing the need for further research into predictive markers, early Doppler use, and thromboprophylaxis strategies.

A visual aid is provided to illustrate the pathophysiological sequence in this case: chemotherapy-induced endothelial injury and

neutropenia contribute to a hypercoagulable and immunosuppressed state, predisposing to arterial thrombosis and severe infection, ultimately resulting in acute limb ischemia and septic shock, as shown in Figure 1.

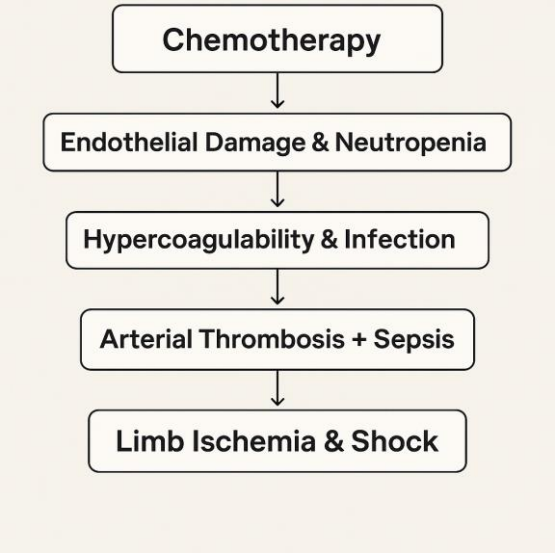

Figure 1: Pathophysiological sequence showing how chemotherapy-induced endothelial injury and neutropenia lead to hypercoagulability and infection, resulting in arterial thrombosis, limb ischemia, and septic shock.

Limitations

This case report is subject to several limitations. Most notably, long-term follow-up data are not available, which restricts our ability to assess the patient's oncologic remission status, postoperative rehabilitation progress, prosthesis use, or overall quality of life after limb amputation. The absence of such outcome metrics limits our understanding of the full clinical trajectory and functional recovery in similar patients.

Additionally, imaging data such as intraoperative photographs, angiograms, or detailed radiologic reconstructions were not included due to limitations in image quality and patient consent. While histopathologic features of the primary tumor are briefly summarized, the lack of accompanying visual documentation restricts interpretability. As an alternative, we suggest the inclusion of literature-derived schematic diagrams or representative angiographic illustrations in future reports to convey the vascular pathology and decision-making process more clearly.

Conclusion

This case highlights the critical need for early recognition of arterial thrombotic and septic complications in oncology patients undergoing cytotoxic chemotherapy. Prompt Doppler assessment for limb symptoms, early initiation of anticoagulation, and rapid infection source control are essential to improving outcomes. Prophylactic strategies should be considered for high-risk patients receiving platinum-based regimens. Multidisciplinary coordination remains vital in navigating complex emergencies at the intersection of oncology, vascular pathology, and critical care.

Author Contributions

AH and ZA were involved in the clinical management, data collection, and drafting of the initial manuscript. TR contributed to the conceptualization, critical revision, and final editing of the manuscript for intellectual content. All authors reviewed and approved the final version and agree to be accountable for all aspects of the work.

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Conflict of Interest

None to declare

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