

General

Deep Vein Thrombosis and Compartment Syndrome in an Intravenous Heroin User: A Case Report

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The authors report on the case of a 34-year-old male intravenous heroin user who experienced severe complications including deep vein thrombosis (DVT), and compartment syndrome (CS), in his left leg as a result of drug abuse. An immediate surgical intervention and subsequent physical therapy led to the patient's successful recovery. The diagnosis, clinical presentation and emergency department management are discussed.

INTRODUCTION

Deep Vein Thrombosis (DVT) is a condition characterized by a blood clot in a large vein, typically in a leg. This often occurs when blood flow slows down or becomes blocked.¹ DVT can lead to complications such as varicose veins, rapid heartbeat, heart failure, and more commonly, pulmonary embolism² (Figure 1). DVT, a venous thromboembolism (VTE), is the third most prevalent cardiovascular disease after myocardial infarction and stroke.³

Compartment Syndrome (CS) is another condition where muscle pressure dangerously increases, potentially reducing blood flow (Figure 2). This typically occurs after significant trauma, drug usage, crush injuries, or heart injuries following a fracture. When an individual has CS, they usually experience decreased pulsation of the arteries.⁴ This can lead to pain, followed by paresthesias, and paresis. It is important to note that heroin is the second leading cause of CS, following trauma.⁵

Heroin is a semi-synthetic opiate, and it is a depressant; its primary side effect is that it aggravates the respiratory system. The mortality rate among individuals who use heroin is between one to three percent. Heroin overdoses have nearly quadrupled in recent years, and heroin users have an increased risk of developing DVT and CS.⁶ Groups at high risk for heroin use, and therefore DVT and CS, include sex workers, women, other opioid and drug users, and young adults.⁷

While DVT and CS don't typically occur in the same cases, certain factors such as fractures, a high body mass index (BMI), or hypertension can indicate a higher likelihood of the development of CS in patients already diagnosed with DVT.⁴ Intravenous drug usage was prevalent in the 1990s, and although that number has decreased over time, it still poses a significant issue in health.

CASE PRESENTATION

A 34-year-old male, recently using heroin and tobacco, visited an emergency department (ED) due to severe left leg pain, swelling, and tenderness (Figure 3). The pain was moderate but enough to prevent the patient from bearing weight on it. The cause of the pain and symptoms was unclear but had worsened since first noticed the day before. The day before his visit to the ED, the patient had fainted due to a heroin overdose. When he woke up, he discovered that his leg was immobile due to the extensive pressure applied on it while unconscious. The patient, who reported intravenous drug abuse (IVDA) but denied injecting his left leg, was also hepatitis C positive. He was diagnosed with deep vein thrombosis (DVT) and compartment syndrome (CS) in the lower left leg.

A four-compartment fasciotomy was performed to salvage the limb, by relieving the tension that can result in loss of circulation to an area of tissue or muscle (Figure 4). In addition, a femoral vein dialysis catheter was also placed. The procedure was successful, and the patient started physical therapy following it. His leg pain continued to improve, until he was able to be discharged from the hospital 12 days later.

DISCUSSION

The case of the 34-year-old male patient who presented with severe left leg pain, swelling, and tenderness is a typical example of the complications that can arise from intravenous drug abuse (IVDA). The patient's reported history of heroin and tobacco use coupled with his hepatitis C-positive status highlights the significant risk factors for deep vein thrombosis (DVT). Specifically, the heroin overdose the night before his visit to the ED resulted in him

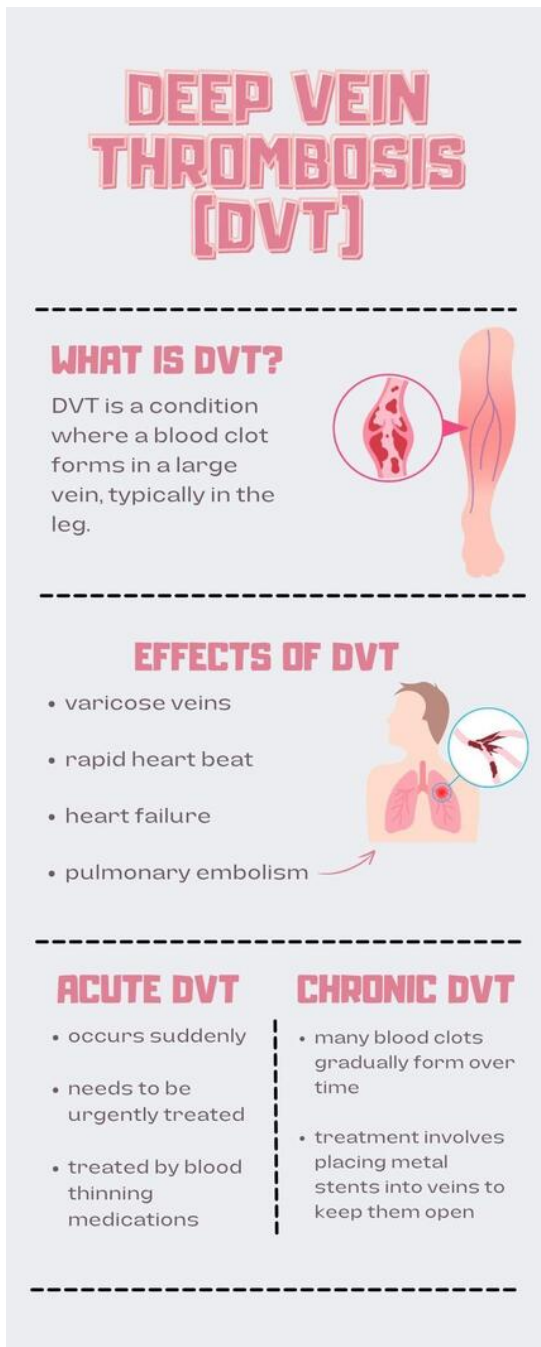


Figure 1. Deep Vein Thrombosis (DVT)

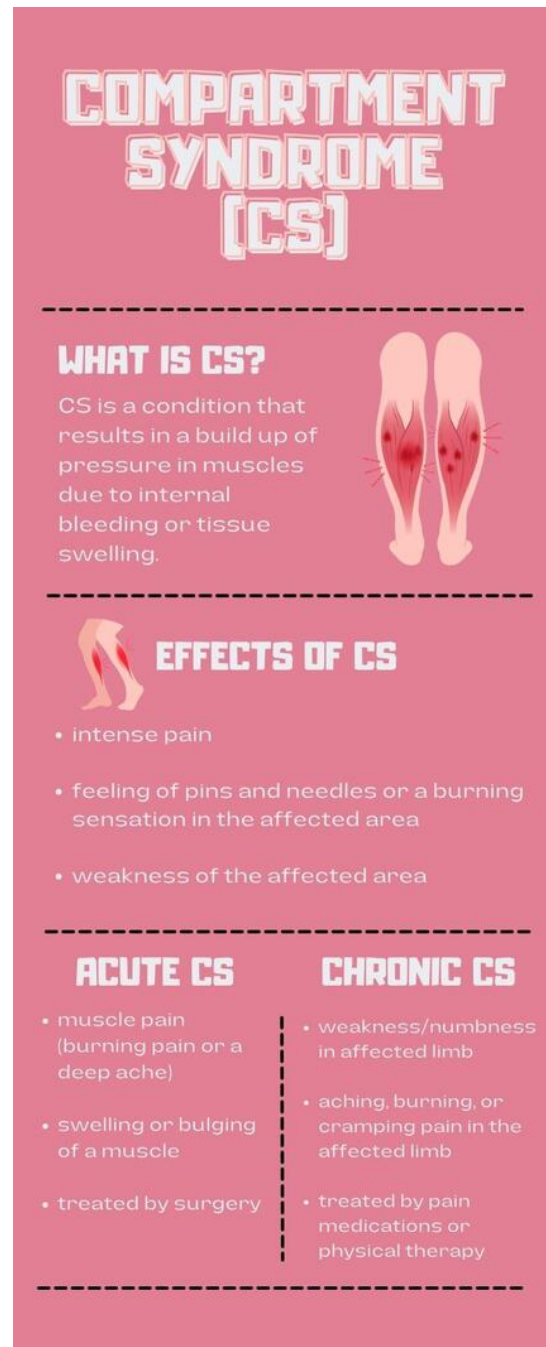


Figure 2. Compartment Syndrome (CS)

fainting in a position that compromised the circulation in his left leg, causing him to develop CS.

A study of 734 patients undergoing opioid addiction treatment found a DVT prevalence of 13.9%.⁸ Another study involving 322 women found that 21.4% of patients with IVDA had DVT.⁹ The prevalence of DVT among patients with IVDA history is a result of bloodstream infections, opioid intoxication, and endothelial damage from injections. Specifically, these patients are more likely to experience thromboses in the femoral vein. The patient’s positive hepatitis C status also underscores the additional risks associated with needle sharing. Patients with IVDA who arrive at Emergency Departments (EDs) with venous throm-

bosis are more likely to test positive for hepatitis C, as the needles they use could have been shared.

While relatively uncommon, non-traumatic Compartment Syndrome (CS) may present in DVT cases.⁴ CS is a condition where increased pressure in a muscle compartment leads to reduced blood supply and function, which can cause functional deterioration after 12 to 24 hours of total ischemia. Further complications such as necrosis, amputation, or renal failure may arise.¹⁰

A fasciotomy is a surgical procedure to relieve pressure in the leg and can be useful to treat CS by restoring circulation. However, it must be performed promptly. In a review of 100 lower extremity CS cases, 75% of amputations were associated with a delayed or incomplete fasciotomy.¹¹ Fas-



Figure 3. Clinical image of the patient before the fasciotomy where the left leg is experiencing visible swelling

ciotomies are typically performed in the calf or the lower leg when a patient has CS.¹² The techniques vary between single and double-incision approaches. The single incision method is often disregarded due to its potential damage to the peroneal nerve.⁴ However, the double incision technique requires a strong anatomical understanding and is frequently performed incorrectly, with complications arising from missing the anterior and deep posterior compartments.¹² A fasciotomy can effectively restore circulation and function to treat acute CS if performed correctly and promptly.¹³

CONCLUSION

In conclusion, this case underscores the severe complications that can arise from intravenous drug abuse, including

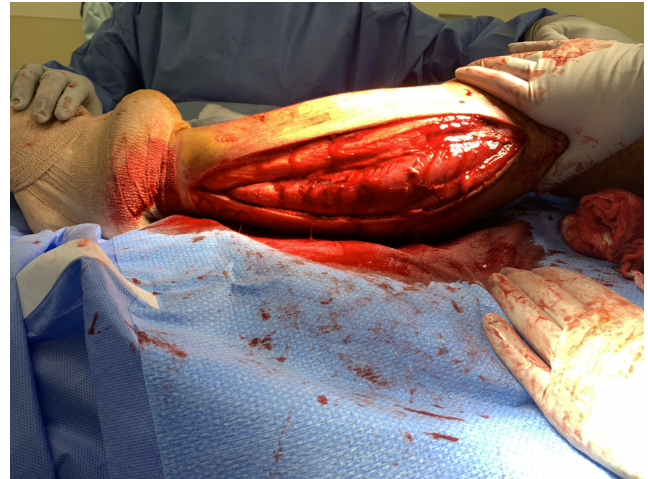


Figure 4. Image of patient's leg during the four-compartment fasciotomy

deep vein thrombosis and compartment syndrome. It highlights the importance of timely identification and intervention in managing these conditions to prevent any further complications that can arise. The patient's successful recovery also demonstrates the effectiveness of an immediate surgical intervention, such as the fasciotomy, and the necessity of physical therapy in the post-operative period. Overall, this case serves as a reminder of the potential health risks associated with substance abuse, emphasizing the need for better preventative measures and comprehensive care for this vulnerable population.

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