Fatal Sequelae of Reperfusion Injury in Post-Operative Gastric Bypass

Zachary J Naser, MD, Karleigh R. Curfman, MD, Meaghan M. Marley, MD, D'Arcy N. Duke, MD, FACS
Conemaugh Memorial Medical Center, Johnstown, PA 15905

Introduction

- Obesity is a global pandemic with the USA having the highest mean body mass index (BMI) for both men and women
- Increasing BMI is associated with increased risk for morbidity and mortality with roughly 112,000 deaths in the USA annually
- Surgical procedures provide an option for successful long term weight loss with benefits and decrease comorbidities and mortality
- Approximately 220,000 bariatric surgeries are performed annually in the USA
- Wide variety of complications can arise including post-operative bleeding, wound infection, and/or venous thromboembolism (VTE)
- Bariatric surgery patients are at higher risk of VTE development when compared to non-bariatric counterparts due to obesity, associated comorbidities and difficult, demanding bariatric surgery

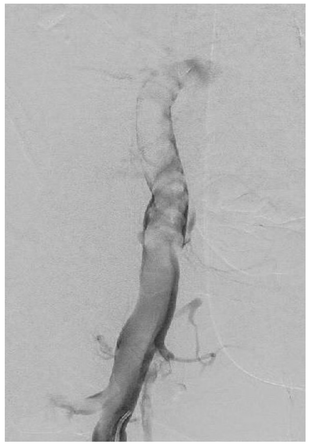


Figure 1: Venogram showing flow through the left popliteal vein until reaching a significant amount of thrombosis in the femoral vein which impeding flow

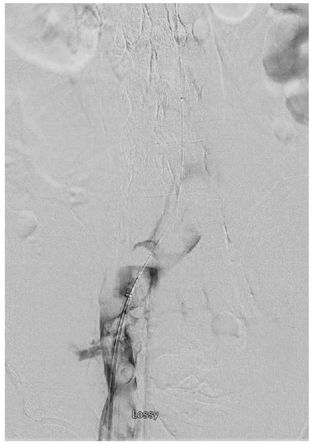


Figure 2: Left iliac vein venogram to the iliac confluence showing considerable, nearly occlusive venous thrombosis throughout the entirety of the left iliac vein.

Case Presentation

- 63-year-old F with prior laparoscopic sleeve gastrectomy experienced initial weight loss, however noted regain and worsening GERD
- EGD identified a large hiatal hernia, and patient underwent technically difficult laparoscopic hand assisted hiatal hernia repair and sleeve conversion to Roux-en-Y gastric bypass (RYGB)
- Uneventful hospital course with discharge home on post operative day (POD) 4, meeting pain, PO intake, and ambulation metrics at follow up on POD8

- Presented to emergency department on POD 18 with left lower leg pain, swelling, and shortness of breath limiting ambulation
- Quickly became hypotensive and unresponsive with cardiopulmonary arrest requiring CPR and transfer to ICU
- Emergent CT scan revealed enlarged left common iliac, external iliac, and common femoral veins with edema
- On examination, had substantial swelling, purple discoloration, and coolness of the left lower extremity (LLE) concerning for phlegmasia cerulea dolens; therapeutic heparin was initiated
- Due to declining status, she was taken to OR for diagnostic laparoscopy and LLE venogram with normal bowel but near occlusion of left iliac (Figure 1) and femoral (Figure 2) due to VTE spanning from iliac confluence to distal femoral vein
- Clot retrieval system was used for thrombectomy, and flow restored

- Following the procedure, patient deteriorated developing multisystem organ failure, shock liver, respiratory failure, and disseminated intravascular coagulation
- Found to have tense LLE, bullous formation over the thigh and calf, mottled digits, and loss of pulses and doppler signals
- With concern for compartment syndrome, returned to OR for four compartment calf fasciotomy showing viable muscle, however thigh fasciotomy revealed copious brown fluid and pale, unresponsive, dead muscle tissue

- Patient returned to ICU postop, but several hours later experienced cardiopulmonary arrest, all options were exhausted, and patient failed to have return of circulation

References: *Available upon request*

Discussion

- Bariatric surgery offers long standing results, but complications do occur. A study evaluated 161,000 patients with 10% - 17% of patients developing post-bariatric complications
- Most common complications including bleeding, wound infection, UTI, VTE, and leak
- VTE complications had greatest impact on readmission rates and mortality
- Post-bariatric VTE occurrence ranges from 0.3% - 5.4%, but importantly 80% are diagnosed after discharge

- Reperfusion injury is a paradoxical exacerbation of cellular dysfunction and death following restoration of blood flood to ischemic tissue caused by hydroxyl radical formation resulting in disruption of cell permeability and cell death
- Lungs and cardiovascular system most affected by reperfusion induced multi-system organ failure with 30-40% mortality rate
- Lack of literature exist for management of phlegmasia cerulea dolens and reperfusion syndrome. Current recommendations include: early diagnosis with physical examination, initiation of anticoagulation, and either mechanical thrombectomy or amputation depending on severity and risk for further injury. No other post-bariatric occurrences have been reported

Conclusion

- Patient had an uneventful bariatric procedure and developed significant VTE, rapidly progressing to phlegmasia cerulea dolens
- Uncontrollable reperfusion injury followed restoration of flow resulting in advanced system alterations, multiple system organ failure, and ultimately death
- Obesity and bariatric surgery are both risk factors for VTE, leading to the need for further awareness in the patient population as well as increased physician suspicion to prevent mortality
- Early recognition and intervention of occlusion is critical for limb salvage and decreasing mortality while acknowledging that reperfusion injury can result in possible limb amputation or even fatality