

## Effect of Compartment Syndrome in Knee Amputation

Richard Fernando\*

Department of Pharmacognosy, Midlands State University GBSL, Senga Road, Gweru, Zimbabwe

### ABOUT THE STUDY

Compartment syndrome is a rare complication of below-knee amputation. Postoperative pain management can mimic or mask early clinical symptoms of acute compartment syndrome after below-knee amputation. Following surgery, the patient experienced severe postoperative pain and required a high dose of pain medication. The infection was caused by necrotic tissue caused by compartment syndrome. To further manage the infection, multiple irrigation and debridement procedures were performed, and the patient was eventually deemed stable for discharge. Acute Compartment Syndrome (ACS) after below-knee amputation (BKA) is a rare but serious complication. This case describes how a compartment syndrome can be concealed by postoperative pain management and infection. Orthopedic surgeons should be aware of the various risk factors and manifestations of Acute Compartment Syndrome (ACS), as it is a potentially fatal complication.

Below-Knee Amputation (BKA) is a surgical procedure that removes ischemic, infected, necrotic, or otherwise nonfunctional tissue from the lower extremity. BKA amputation techniques range from posterior flap transtibial amputation to sagittal, skew, medial, and fish-mouth flaps. A randomized trial found no statistically significant differences in rates of primary stump healing, postoperative surgical site necrosis, or mortality between amputation techniques. Because of the nature of the procedure, complications following lower extremity amputation are common. The National Surgical Quality Improvement Program (NSQIP) found an overall major complication rate of 12.8% within 30 days in a sample of 4,631 below-knee amputations. Other vascular issues were the most common major complications. 9.63% of patients in this cohort had unplanned reoperations [1].

The most common unplanned reoperations were above-knee or transfemoral thigh amputations (28.7% of reoperations), debridement/secondary closure (25.6%), and revision leg amputations (10.32%). According to additional research, postoperative wound infection after a major lower extremity

amputation occurs in 13-40% of cases. However, compartment syndrome is not a well-known complication of below-knee amputation. Compartment syndrome is a potentially fatal condition caused by an increase in intracompartmental pressure, which can impair vascular perfusion and cause tissue hypoxemia, leading to necrosis. Acute Compartment Syndrome (ACS) is most common after a traumatic event, but it can occur in up to 30% of cases without a fracture. Furthermore, studies show that muscle necrosis is more common in acute compartment syndrome without a fracture than in ACS with a fracture. Finally, ACS can occur as a result of any pathologic condition (including swelling and/or bleeding) that causes an increase in compartment pressure that exceeds tissue perfusion pressure without increasing the volume of the myofascial compartment [2].

We present a case in which a patient with Proteus syndrome and congenital deformity underwent elective below-knee amputation due to pain and difficulty managing, cleaning, and using modified footwear for the affected lower extremity. Following surgery, the patient experienced severe postoperative pain, required a high dose of pain medication, and developed a stump infection. When we returned to the operating room to treat the infection, irrigation and debridement were performed, and the necrotic tissue, which we believe developed as a result of a missed ACS, was discovered and removed. The infection was most likely caused by necrotic tissue caused by compartment syndrome, which was treated with multiple irrigations, debridement, and antibiotics. This case exemplifies the uniqueness of a possible postoperative outcome [3].

Compartment syndrome after below-knee amputation is a rare complication, and we believe this is the first documented case of this complication occurring. However, there have been notable reported cases of compartment syndrome after a free fibula osteocutaneous flap was used as a donor site in mandibular reconstruction. While both procedures require a significant bony lower leg amputation, the preoperative diagnoses and clinical reasoning for these surgeries are frequently very different. These cases, however, highlight a critical potential complication of any

**Correspondence to:** Richard Fernando, Department of Pharmacognosy, Midlands State University GBSL, Senga Road, Gweru, Zimbabwe, E-mail: richardfernando291@gmail.com

**Received:** 08-Sep-2022, Manuscript No. LDAME-22-20261; **Editor assigned:** 12-Sep-2022, PreQC No. LDAME-22-20261 (PQ); **Reviewed:** 03-Oct-2022, QC No. LDAME-22-20261; **Revised:** 10-Oct-2022, Manuscript No. LDAME-22-20261 (R); **Published:** 19-Oct-2022, DOI: 10.35248/2165-7556-22.08.023.

**Citation:** Fernando R (2022) Effect of Compartment Syndrome in Knee Amputation. *Adv Med Ethics J.* 08:023.

**Copyright:** © 2022 Fernando R. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

procedure that involves the amputation of any amount of bone [4]. While compartment syndrome is most commonly associated with a traumatic event, it is important to note that ACS can also occur as a result of minor trauma or nontraumatic cases that result in an increase in intracompartmental pressure. ACS is more common in patients under the age of 35, and young men appear to have the highest incidence of cases, possibly due to a higher incidence of fracture injuries in this population. Furthermore, the use of prophylactic anticoagulation after surgical procedures may contribute to the development of ACS. Cases of compartment syndrome have been reported following other lower extremity surgeries such as total knee arthroplasty and vein harvest for coronary artery bypass surgery, in addition to fibula flap harvests for oral maxillofacial grafts [5,6].

The medical history of our patient may have also played a role in the progression vascular anomalies in 22/22 of their current Proteus syndrome patients and 70/100 of their previously reported Proteus syndrome patients in a study that reviewed 22 current Proteus syndrome patients and 100 previously reported Proteus syndrome patients. It is possible that the high prevalence of vascular anomalies in this patient population contributed to the increase in intracompartmental pressure observed in this case. Medical and nursing staff should be aware of the potential for compartment syndromes to present in a variety of ways, particularly postoperatively, when the use of analgesics may mask certain symptoms. This case also highlights an important caveat in describing compartment syndrome developing even after the majority of the lower leg was removed. These remaining tissues and compartments are still vulnerable to bleeding, increased pressures, and the development of acute compartment syndrome.

## CONCLUSION

When several factors are present, such as severe pain, paresthesias, paralysis, and visible swelling of the compartment

with a tense, "woody" feeling on palpation, compartment syndrome must be suspected. Furthermore, a creatine kinase level greater than 4,000 U/L has been linked to compartment syndrome, and our patient had a CK of 10,013 U/L on postoperative day two. However, because creatine phosphokinase levels have been shown to be dose-dependently related to the extent of surgical invasiveness, it is possible that this increase was caused by the major surgery performed. Direct measurements of compartment pressures can confirm the diagnosis of compartment syndrome when it is suspected, but this was not done in this case. Because haemorrhage or hematoma can cause compartment syndrome in the absence of acute trauma, it is possible that our patient developed compartment syndrome postoperatively due to bleeding.

## REFERENCES

1. Heikkinen M, Saarinen J, Suominen VP, Virkkunen J, Salenius J. Lower Limb Amputations: Differences between the Genders and Long-Term Survival. *Prosthet Orthot Int*. 2007;31(3):277-286.
2. Ciufu DJ, Thirukumaran CP, Marchese R, Oh I. Risk Factors for Reoperation, Readmission, and Early Complications After Below Knee Amputation. *Injury*. 2019;50(2):462-6.
3. Fisher Jr DF, Clagett GP, Fry RE, Humble TH, Fry WJ. One-Stage versus Two-Stage Amputation for Wet Gangrene of the Lower Extremity: A Randomized Study. *J Vasc Surg*. 1988;8(4):428-433.
4. Berridge DC, Slack RC, Hopkinson BR, Makin GS. A Bacteriological Survey of Amputation Wound Sepsis. *J Hosp Infect*. 1989 ;13(2):167-172.
5. Sadat U, Chaudhuri A, Hayes PD, Gaunt ME, Boyle JR, Varty K. Five Day Antibiotic Prophylaxis for Major Lower Limb Amputation Reduces Wound Infection Rates and the Length of In-Hospital Stay. *Eur J Vasc Endovasc Surg*. 2008;35(1):75-78.
6. von Keudell AG, Weaver MJ, Appleton PT, Bae DS, Dyer GS, Heng M, Jupiter JB, Vrahas MS. Diagnosis and Treatment of Acute Extremity Compartment Syndrome. *Lancet*. 2015 ;386(10000): 1299-1310.