

# Gluteal Necrosis Internal Iliac Embolization Diabetic Patient after Renal Transplantation: Analysis of Outcomes and Complications

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## Abstract

**Introduction:** The use of bilateral internal iliac artery embolization to control hemorrhage associated with pelvic fractures is a lifesaving intervention. Gluteal necrosis is a rare but potentially fatal complication of this procedure. Following debridement, reconstruction can present a considerable challenge due to the compromised vascularity of local tissue.

**Presentation of case:** A 17 year old girl suffered an open book pelvic fracture following a road traffic accident. In order to stop profuse bleeding, bilateral internal iliac artery embolization was performed. This procedure was complicated by the development of right sided gluteal necrosis. Following extensive debridement, a transposition flap based on the lumbar artery perforators was performed to cover the soft tissue defect.

**Discussion:** Gluteal necrosis occurs in approximately 3% of cases following internal iliac artery embolization. Following complete excision of the devitalised tissue reconstructive surgery is necessary. Local flaps are suboptimal options when the integument supplied by branches of the internal iliac arteries has been compromised following embolization. Furthermore, the use of a free flap is restricted by the lack of a readily accessible undamaged recipient vessel. In the present case a transposition flap based on the lumbar artery perforators facilitated robust reconstruction of the buttock region.

**Conclusion:** To avoid sepsis, it is imperative that gluteal necrosis following internal iliac artery embolization is recognized and promptly debrided. A transposition flap based on the lumbar artery perforators is a good option for subsequent soft tissue coverage, which avoids use of tissue supplied by the branches of the internal iliac arteries.

**Keywords:** Embolization; Gluteal necrosis; Internal iliac artery; Lumbar artery; Transposition flap

## Introduction

Trans catheter bilateral internal iliac artery embolization is a life saving intervention which is being used with increasing frequency in trauma centres to control hemorrhage associated with pelvic fractures [1]. Gluteal necrosis is a potentially fatal complication of this procedure which can initially be mistaken for a contusion, occurring at the time of injury, or a pressure ulcer. Early recognition and surgical debridement is imperative for patient survival. After debridement has been undertaken, subsequent soft tissue reconstruction can present a considerable challenge due to the compromised vascular supply of local tissue and the absence of a readily accessible patent recipient vessel for micro-vascular anastomosis [2].

In this paper we describe a case of gluteal necrosis following bilateral internal iliac embolization and the use of a transposition flap, based on the perforators originating from the lumbar arteries, to facilitate reconstruction.

## Case presentation

A 34-year-old white male with the background of type 1 diabetes which was complicated by retinopathy and nephropathy scheduled for kidney transplantation and the surgery was done at April 2015 from a live donor. Opium addiction and hypertension from 2 years ago were other main points in his past medical history. In preoperative imaging (CT) the significant finding was heavily calcified mural atherosclerotic plaques in abdominal and iliac arteries [3]. During surgery, the right internal iliac artery had severe atheromatous plaque which after endarterectomy was anastomosed to renal artery in an end-to-end fashion, with ligation of anterior and posterior divisions. Because of insufficient renal filling and no change in renal color, anastomosis

was revised in the same location with acceptable outcome in color and firmness. In recovery room he had an apnea with drop in oxygen saturation, which required resuscitation [4]. He was then transferred to ICU and was under observation for the next 24 hours. After becoming stable, he was transferred to ward with no complication, although the urine output was <500 cc/day the whole time. Doppler showed normal flow in the transplanted kidney.

On postoperative day 2, he complained of pain and inability to move his right leg since the night before. On physical exam, there was an ischemic area 2×2 cm in diameter on the right hip. This ischemic area progressed to a large necrotic area 7×7 cm in the following days. Neurologic exam revealed diminished strength in hip flexion and knee extension with 4/5 strength in ankle dorsiflexion and plantar flexion and toe extension. Sensation was poor in all the right extremity and the patellar and ankle reflexes were lost. He also had no urine and fecal control [5]. EMG study documented profound sensorimotor polyneuropathy and right lumbosacral plexopathy. Lower limb Doppler US was unremarkable. On the following days, because of expanding tissue necrosis, he underwent serial wound debridement. Meanwhile,

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the transplanted kidney did not function and was ultimately removed. In the following weeks, mild improvement was seen in motor control and continence and also the wound showed promising signs of granulation tissue.

Discussion Acute lumbosacral plexopathy and gluteal necrosis are a rare phenomenon in renal transplant patients. The first report of plexopathy dates back to 1990 by Hefty et al., which occurred in four diabetic patients after transplantation. In another report by Jablecki et al, paraplegia following renal transplantation is seen after ligation of hypogastric artery [6]. Similar finding of lumbosacral plexopathy was mentioned after dual kidney transplantation and even as a presentation of iliac artery pseudoaneurysm in transplanted patients. There are also other reports of femoral neuropathy because of compression of malpositioned retractors during surgery [7].

Due to vast arterial network and collaterals in pelvis, ligation of internal iliac artery usually has no adverse outcome. This network stems from anterior and posterior division of bilateral internal iliac artery which supplies blood to sciatic nerve and gluteal musculature [8]. In detail, inferior gluteal artery is a branch of anterior division which supplies the pelvic viscera, the lower hip, and the back of the thigh. The posterior division gives rise to superior gluteal artery, which supplies the gluteal musculature, the femoral nerve, and the sciatic nerve roots.

Atheromatous plaques are always a concern in old and especially diabetic patients and in renal failure condition this process accelerates to an even total obstruction. Internal iliac artery is a favorite artery to use in transplantation because of flexibility in length and also because of drawbacks of external iliac artery use like ischemia of lower extremity [9]. Meanwhile, in diabetic patients, an end-to-end anastomosis of ipsilateral artery, while there is an extensive vascular and micro vascular involvement, ends up in ischemic complications like our patient.

There are other examples of similar events in aneurysmal patients following bypass surgery. Iliopoulos et al. reported eleven patients of aortic aneurysm with hypogastric artery ligation. In eight of them with bilateral hypogastric ischemia, all experienced neurologic deficit. This was accompanied by gluteal necrosis in four, rectal ischemia in two, and anal and bladder sphincter dysfunction in three [10]. Hundred percent of patients with gluteal necrosis passed away in the following weeks; however, mortality rate in patients without necrosis was 25%. This mortality rate was also reported in Picone et al.'s series as well. In a nutshell, our patient's scenario of lower extremity paresis and numbness with gluteal necrosis and EMG findings is best explained by infarction in the area supplied by right superior gluteal artery and its branches to the gluteal musculature, femoral nerve, and sciatic nerve roots.

## Conclusion

Given the catastrophic nature of this complication and high mortality rate, identifying means to prevent such events is essential. Especially in diabetic patients with extensive atheromatous disease, thorough physical exam of peripheral pulses and angiography to determine the patency of pelvic vasculature are prudent. This may allow preplanning the transplant site and avoiding the ischemic complications. One option in these sorts of patients is orthotopic kidney transplantation with use of the splenic artery and native left renal vein for vascular reconstruction.

## Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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