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CASE REPORT

FATAL MULTI-ORGAN FAILURE FOLLOWING VASCULAR AND BOWEL INJURY DURING A SURGERY FOR HIP FRACTURE: A CASE REPORT

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ABSTRACT

Introduction: Deaths following major orthopaedic procedures in patients with significant comorbidities often raise medicolegal concerns regarding whether post-operative complications represent unavoidable surgical risk or negligence.

Case Presentation: This report describes a 56-year-old woman with long-standing multiple medical conditions, such as diabetes mellitus, hypertension, dyslipidaemia, and obesity, who sustained an acetabular fracture and underwent open reduction and internal fixation. During surgery, she developed an inadvertent external iliac artery injury resulting in torrential bleeding, which was dealt with by repairing it with a prosthetic graft. A concurrent ileal tear was repaired by end-to-end anastomosis. Despite appropriate operative management and intensive post-operative care, she developed progressive renal, hepatic, and respiratory failure and succumbed 10 days later. Forensic autopsy revealed intact vascular graft and bowel anastomosis, absence of rebleeding or leakage, and generalized pallor of most internal organs with loss of cortico-medullary differentiation of both kidneys, consistent with multi-organ failure secondary to prolonged hypoperfusion.

Conclusion: This case highlights the essential role of a forensic autopsy in differentiating recognized complications from negligence. Correlation of operative records with autopsy findings ensures accurate medicolegal interpretation and fairness to both clinicians and families.

Keywords: *Autopsy; multi-organ failure; negligence; surgical complications*

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INTRODUCTION

Post-operative deaths following major surgical procedures frequently attract medicolegal scrutiny. In cases involving significant intraoperative complications, the role of the forensic pathologist is to be able to determine whether the fatal outcome resulted from a recognized surgical risk or from negligence[1]. Medical negligence is legally defined as a breach of the duty of care in which a practitioner fails to apply the standard of reasonable skill and prudence expected of a reasonably competent practitioner in similar circumstances (either by an act of commission/

doing something improperly or an act of omission/failing to do what should have been done), resulting in harm to the patient. For negligence to be established, there must be a duty of care, a breach of that duty, harm/damage and a clear causal link between injury and harm/damage. The vascular injury in this case, although immediately recognized and promptly acted upon, resulted in a massive haemorrhage (haemorrhagic shock), which has led to systemic hypoperfusion, metabolic acidosis, and multi-organ dysfunction[2-4]. Once negligence is recognized or established, the next step is to categorize it under civil or criminal negligence.

CASE PRESENTATION

A 56-year-old female with multiple comorbidities sustained a right acetabular fracture following a domestic fall and was admitted to the National Hospital of Sri Lanka, a tertiary care institution. Open reduction and internal fixation (ORIF) was performed on an urgent basis due to fracture instability and risk of complications related to prolonged immobilisation.

During surgery, an iatrogenic injury to the right external iliac artery occurred, resulting in significant haemorrhage. Immediate vascular repair was performed using a prosthetic graft (Figure 1), and haemostasis was achieved. A concomitant ileal injury was identified and managed with a primary end-to-end anastomosis (Figure 2). All intraoperative events, including vascular repair, bowel repair, and transfusion requirements, were contemporaneously documented in the bed head ticket.

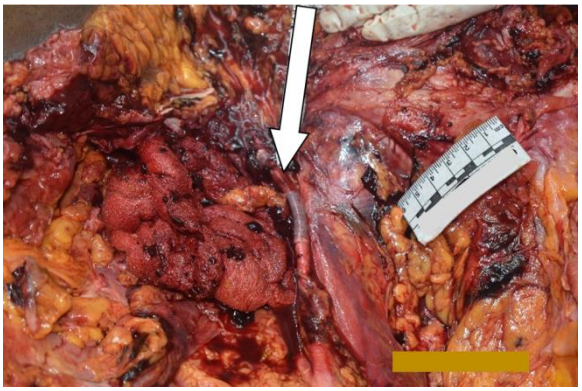

Figure 1: Prosthetic vascular graft in situ (white arrow).

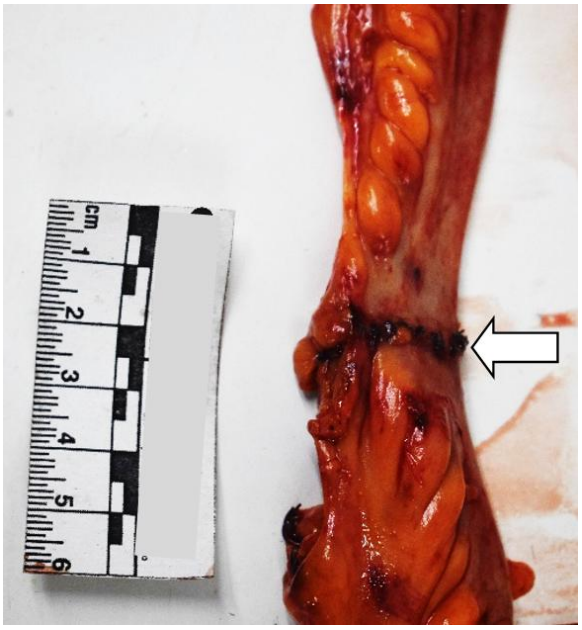

Figure 2: Surgical repair of the ileal tear (white arrow).

Postoperatively, the patient developed haemodynamic instability with coagulopathy requiring massive transfusion support and vasopressor therapy. Two re-explorations were performed. The first demonstrated no active haemorrhage. The second identified pelvic oozing was managed by internal iliac artery ligation and pelvic packing. Despite intensive care management, she developed progressive renal, hepatic, and respiratory dysfunction and succumbed on the tenth postoperative day.

The autopsy revealed a markedly pale body with icteric sclerae. The prosthetic graft in the right external iliac artery was intact, and the

ileal anastomosis was intact with no evidence of leakage or peritonitis. There was no evidence of rebleeding or sepsis. Multiple internal organs showed features consistent with systemic hypoperfusion, including generalized pallor, heavy oedematous lungs, mild pleural effusions, and ascites consistent with multi-organ dysfunction syndrome secondary to shock physiology following massive haemorrhage[2,4].

Both kidneys were of normal size without cortical shrinkage or scarring. There was an apparent loss of cortico-medullary differentiation, which was interpreted as an acute hypoperfusion-related change in the setting of global pallor of the renal cortex. Chronic kidney disease was excluded based on preserved renal dimensions and absence of chronic structural changes. The altered cortico-medullary distinction was considered secondary to acute circulatory failure rather than pre-existing renal pathology[2].

The cause of death was explained to the next of kin as irreversible multi-organ dysfunction syndrome secondary to prolonged systemic hypoperfusion following massive intraoperative haemorrhage due to iatrogenic injury to the external iliac artery during open reduction and internal fixation of an acetabular fracture. The vascular and bowel injuries were recognised as operative complications that were promptly identified and managed in accordance with accepted surgical principles. There was no autopsy evidence of ongoing bleeding, anastomotic failure, or septic complication.

DISCUSSION

Post-operative death following major orthopaedic trauma surgery often results from a convergence of haemorrhagic shock, systemic inflammatory response, and progressive organ dysfunction rather than a single isolated event[1]. The transition from compensated shock to irreversible multi-organ failure is influenced by the duration and severity of tissue hypoperfusion, even when surgical control of bleeding is achieved[2]. Age-related comorbidities, including diabetes mellitus, hypertension, dyslipidaemia, and obesity, are recognised modifiers of perioperative outcome and may reduce physiological reserve in the context of major surgical stress[5].

In this case, the initial massive haemorrhage created a critical period of global oxygen debt, which likely triggered downstream endothelial injury, microcirculatory collapse, and mitochondrial dysfunction, key mechanisms implicated in multi-organ failure after major trauma and surgery[2-4]. Such systemic derangements may continue despite anatomical correction of the primary injury.

Age, comorbidities, and physiological reserve are important modifiers of outcome in hip fracture surgery, with evidence showing higher perioperative morbidity and mortality in patients with metabolic and cardiovascular risk factors[5]. These factors likely contributed to reduced resilience against the physiological stress imposed by major haemorrhage and repeated surgical interventions in this patient.
From a medicolegal perspective, postoperative mortality must be interpreted in the context of accepted surgical risk and patient vulnerability. Objective correlation of intraoperative events, perioperative course, and autopsy findings is essential to distinguish unavoidable complications from negligent practice, ensuring balanced and evidence-based forensic conclusions[1].

CONCLUSION

This case demonstrates the importance of distinguishing unavoidable surgical complications from negligent practice. External iliac artery injury is a rare but recognized complication of acetabular fracture surgery. In this case, the complication was immediately identified, corrected using standard techniques, and thoroughly documented. Postoperative care followed accepted protocols, and no grossly negligent acts were evident.

Accordingly, the findings are consistent with a recognised but uncommon complication of a high-risk orthopaedic procedure with no pathological evidence of breach of duty of care or operative negligence when assessed in correlation with intraoperative documentation, perioperative course, and autopsy findings[1].

Forensic pathology does play a critical role in objectively assessing postoperative deaths by correlating operative details with autopsy findings. This ensures that conclusions remain scientifically grounded, legally sound, and fair to both grieving family members and clinicians.

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CONFLICTS OF INTEREST

The authors declared no conflicts of interest.

ETHICAL ISSUES

The case was conducted for medicolegal purposes, and the findings were used for academic purposes in accordance with institutional guidelines, without divulging the individual's identity.

SOURCES OF SUPPORT

None.

AUTHOR CONTRIBUTIONS

AMH: Conception and design of the work; the acquisition, analysis, and interpretation of data for the work; drafting the work and revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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