Sri Lanka Journal of Medicine **SLJM**

Case Report

Citation: Karunarathna JMS & Arudchelvam J .2025. Complex Tibial Arterial Injuries. Sri Lanka Journal of Medicine, pp 31-33.
DOI: https://doi.org/10.4038/sljm.v34i1.563

A Successful Tibial Arterial Repair in a Severely Injured Limb, a Case Report

JMS Karunarathna, J Arudchelvam

National Hospital of Sri Lanka

Correspondence:
JMS Karunarathna
Email: sathyajithkaru@gmail.com
https://orcid.org/0009-0000-7010-0718

ABSTRACT

Management of tibial vascular injuries in conjunction with severe soft tissue and skeletal injury is very challenging. Mangled Extremity Severity Score (MESS) is well-known grading system for such limbs. MESS >7 warrants primary amputation. We describe a case of successful limb reconstruction for a mangled limb on a 28-year-old male. Considering his age, hemodynamic stability and muscle viability, he underwent posterior tibial artery reversed saphenous vein graft repair. A month after the reconstruction, he had cosmetically sound non-infected leg. This case suggests even when the injury-related scores are high, in a young patient with viable muscles, reconstruction should be considered.

Keywords: Tibial arterial injury, mangled extremity limb score (mess), case report

INTRODUCTION

Management of tibial vascular injuries associated with severe soft tissue and skeletal injury is very challenging. The reasons are lack of soft tissue cover and the infection results in failure of the vascular and skeletal reconstruction. Therefore, making correct decisions in severely injured limbs is difficult.

CASE REPORT

A 28-year-old male motorbike rider presented with severe lower limb injury following a head-on collision with a tractor. On admission to the hospital the Glasgow coma score (GCS) was 15/15 and he was hemodynamically stable. He suffered from isolated right Tibia and Fibula compound fracture which is Gustilo type 3c. The skin defect was 30cm*15cm. There was contamination and muscle contusion (Figure 1) (Figure 2). Mangled Extremity Severity Score (MESS) exceeded 7 (ischemia time more than 10 hours), which was suggestive of a mangled limb, which requires a primary amputation of the limb.

He was able to plantarflex his toes but had sensory impairment. The ankle joint was mobile and the patient was then taken to the theatre for the assessment of the muscle viability. All four compartment muscles were viable. However, the lower lateral and the anterior compartments were crushed.

Received: 2024-09-19 **Accepted revised version: 2025-03-17** **Published: 21st April 2025**

Figure 1. Severely injured limb on admission

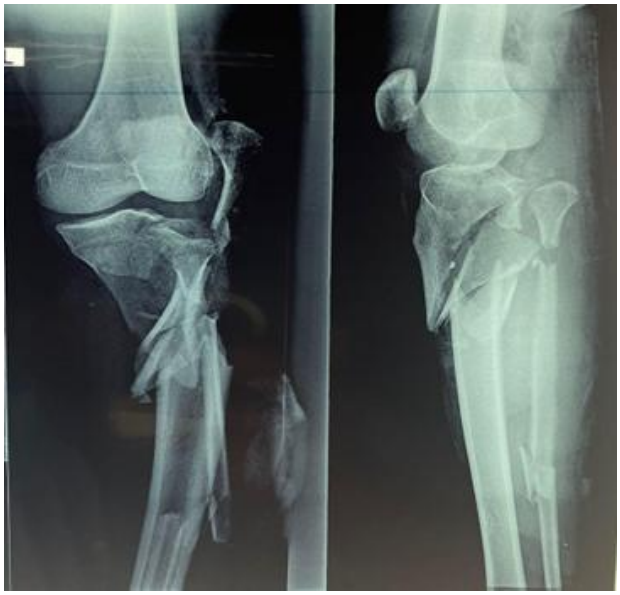

Figure 2: X-ray of injured limb

Considering his age, hemodynamic stability and muscle viability decision of revascularization was made despite the high MESS score.

On exploration, there was a long (about 10cm) segmental loss of the popliteal artery with a contused anterior tibial artery. The tibioperoneal trunk was contused up to the origin of the posterior tibial artery (PTA). The rest of the PTA and peroneal artery were intact with satisfactory backflow. Severely injured vena comitantes and contused tibial nerves were noted.

The great saphenous vein was harvested from the contralateral thigh and a reversed saphenous venous graft (RSVG) interposition repair was done from the distal superficial femoral artery (SFA) to the posterior tibial artery. Venous reconstruction was not attempted. The knee joint was stabilized with a spanning external fixator. Soft tissue cover achieved with the medial head of Gastrocnemius muscle flap and by skin grafting.

Immediate postoperative period was uneventful without any significant evidence of reperfusion injury.

On 5th postoperative day, skin graft site inspection showed uncertain viability of about 10% of the grafted area. There was no evidence of infection at the vascular anastomosis site

On 21th day, there was satisfactory wound healing. There was satisfactory bone alignment (Figure 3).

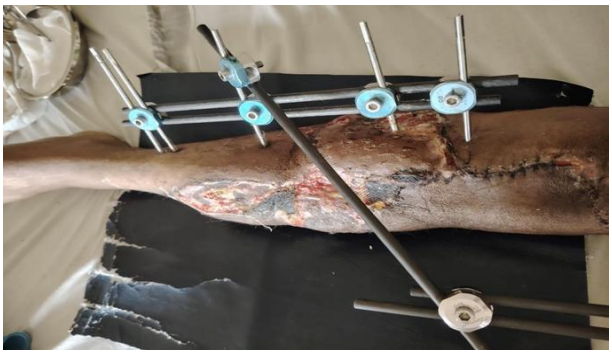

Figure 3: Reconstructed limb on postoperative day21

DISCUSSION

Management of the tibial arterial injuries has remained controversial (1) (2) (3). Decision-making for the reconstruction is difficult and challenging for a severely injured leg as they are often associated with extensive soft tissue injuries and complex skeletal injuries with contamination.

There are multiple scoring systems available for the assessment of severely injured extremities (4). The mangled extremity severity score (MESS), Ganga Hospital Injury Severity Score, and Abbreviated Injury Scale (AIS) are commonly used scoring systems. However, MESS is widely utilized in many centres for the aid of decision making (5) (6).

According to the MESS, a score of greater than 7 is suggested as the requirement for an amputation. However, the modern multidisciplinary treatment approaches for these complex injuries and the development of patient care strategies would elevate the threshold for an amputation (7) (8).

However, it is important to consider which factors may contribute to making the decision of reconstructive surgery challenging.

The knowledge of the anatomy of tibial vessels is important. The popliteal artery runs posterior to the knee joint and divides into the anterior tibial artery and the tibioperoneal trunk at the lower border of the popliteus muscle (9). In the proximal leg there is sufficient soft tissue covering present contrary to the distal leg where vessels are covered by less soft tissues. The bones in the lower leg are superficial, hence the availability of the soft tissue cover is often the critical factor for the reconstruction.

The repair is mandatory for the injuries to the popliteal artery and the proximal arteries. However, since there are two tibial arteries and one peroneal artery, the presence of only one intact artery is thought to be adequate to maintain the foot perfusion. However, if there is evidence of foot ischemia, at least one leg artery should be repaired (10)

CONCLUSION

As a principle, if the foot is ischemic, reconstruction should be always performed if the patient is hemodynamically stable and has the ability to tolerate an ischemic reperfusion injury and there is adequate viable soft tissue cover.

Revascularization of severely injured tibial arteries can be successfully accomplished by multidisciplinary approach with the orthopedic and the plastic surgical teams. The scoring methods that are now in use are outdated. A new scoring system is required in light of the recent advancements in critical care and surgery.

Author declaration

Acknowledgement
None.

Authors' contributions:
Conceptualization and Design: JMSK, JA; Literature Survey: JMSK, JA; Data Collection and Analysis: JMSK, JA; Manuscript Writing: JMSK, JA; Manuscript Review and Final Proofreading: JMSK, JA

Conflicts of interest:
The authors declare that there is no financial or non-financial conflict of interest.

Funding statement:
Self-funded.

Ethics statement:
Written informed consent was obtained from the patient before they participated in the case, ensuring their understanding of the purpose, procedures, and potential implications involved.

Statement on data availability:
All data generated during this study are available upon request from the corresponding author.

REFERENCES

1. Prasarn ML, Helfet DL, Kloen P. Management of the mangled extremity. Vol. 7, Strategies in Trauma and Limb Reconstruction. Springer-Verlag Italia s.r.l.; 2012. p. 57–66.
2. Richerd H. Lang, Allan W. Bach, Sigvard T. Hansen. Open Tibial Fracture with Associated Vascular Injuries: Prognosis for Limb Salvage. The Journal Of Trauma. 1985 Mar;25:203–308.
3. Terry PH, Burke JF, Demers AJ, Moran TE, Weiss DB, Stranix JT. Arterial injury in tibial fracture correlates with trauma severity and orthopaedic outcomes. Orthoplastic Surgery. 2022 Mar 1;7:25–30.
4. Schirò GR, Sessa S, Piccioli A, MacCauro G. Primary amputation vs limb salvage in mangled extremity: A systematic review of the current scoring system. BMC Musculoskeletal Disorders. 2015 Dec 2;16(1).
5. Loja MN, Sammann A, DuBose J, Li CS, Liu Y, Savage S, et al. The mangled extremity score and amputation: Time for a revision. In: Journal of Trauma and Acute Care Surgery. Lippincott Williams and Wilkins; 2017. p. 518–23.
6. Shalini A, Singh D, Dachipalli S, Maddu S, Ram L. The validity of the mangled extremity severity score scoring system for lower limb vascular trauma in a tertiary care center. Indian Journal of Vascular and Endovascular Surgery. 2020;7(2):141.
7. Korompilias A v., Beris AE, Lykissas MG, Vekris MD, Kontogeorgakos VA, Soucacos PN. The mangled extremity and attempt for limb salvage. Journal of Orthopaedic Surgery and Research. 2009;4(1).
8. Croman M, Lamberton T, Covington A, Keeley JA. Outcomes Following Below Knee Arterial Trauma. American Surgeon. 2023 Oct 1;89(10):4045–9.
9. Yadav MK, Mohammed AKM, Puramadathil V, Geetha D, Unni M. Lower extremity arteries. Cardiovascular Diagnosis and Therapy. 2019 Aug;9(S1):S174–82.
10. Ekim Hasan, Kutay Vesley, Demirbag Recap. Management of the lower extremity arterial injuries. Eastern Journal of Medicine. 2004;9:39–43..