Limb Salvage is Possible in Select Patients with Arterial Injuries and Elevated Mangled Extremity Severity Scores

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Introduction: Lower extremity trauma with vascular compromise requires emergent and complex decision-making. The Mangled Extremity Severity Score (MESS) has been established to assist in this process. The purpose of this study was to investigate incidence of traumatic lower extremity amputations in patients with traumatic lower extremity arterial injuries and associated MESS score.

Methods: Retrospective chart review was performed on patients ≥18 years old with traumatic lower extremity arterial injuries at a level I trauma center from July 2012 to December 2023. Demographics, injury characteristics, interventions, and outcomes including primary amputation, secondary amputation, and later/eventual amputation following limb salvage therapy were recorded.

Results: Our cohort consisted of a total of 238 limbs with lower extremity arterial injury (233 patients, 8 with bilateral injuries). Average age was 36.8 years (range 18-87 years). Majority of our patients were male (196/238, 84.1%). Mean Injury Severity Score (ISS) was 14.2. Most lower extremities were affected by penetrating injury (155/238, 65.1%). Majority of penetrating injuries presented with a gunshot wound (148/155, 95.5%). Eighty-four lower extremity injures had concomitant injuries (35.3%). Average MESS score was 4.87 and median was 5 (IQR 3-6). Vascular repair was performed on 179 lower limbs (75.2%); 168 open repair (93.9%), nine endovascular intervention (5.0%), and two hybrid interventions (1.1%). Ninety-two injuries underwent orthopedic repair (38.7%). Thirty-two lower extremities underwent amputation; 6 primarily. Five amputations occurred after discharge. All 6 primary amputations had MESS of 7 or greater. Of the 179 lower limbs that underwent vascular repair, 15 required amputations prior to discharge, and 5 required eventual amputation after discharge. A total of thirty-three lower extremities with a MESS of 7 or greater underwent vascular repair. The majority did not require a subsequent amputation (22/33, 66.7%). In the entire cohort, a MESS of greater than or equal to 7 was found to be significantly associated with any amputation ($p<.0001$), primary amputation ($p<.0001$), secondary amputation ($p<.0001$), but not significantly associated with amputation after discharge ($p=0.1487$). Mechanism of injury is significantly associated with amputation ($p<.0001$). Each one-point increase in MESS had an odds ratio of 2.117 (95% CI 1.651-2.713) related to any amputation.

Conclusion: Increasing MESS, penetrating injury, and presence of multiple vascular injuries were significantly associated with amputation. MESS of 7 or greater was found to be significantly associated with amputation during hospitalization. Excellent limb salvage can still be achieved, however, in select patients with prompt vascular repair despite a high MESS score.