Mangled Extremity Management

Purpose: To aid in the rapid evaluation of a trauma patient presenting with a severely injured limb, providing a decision-making tool for limb salvage vs. amputation in a multidisciplinary fashion.

Background: Patients with a mangled extremity, defined as an extremity with an injury to at least three out of four systems (soft tissue, bone, nerves, and vessels) represent a high-risk patient population requiring expedient care to salvage life and limb. These patients frequently have multi-system and life-threatening injuries and balancing these issues is extremely important. Prompt re-establishment of vascular integrity and fracture stabilization is imperative for limb salvage, when possible. The coordination of multiple surgical services (Trauma, Orthopedics, Vascular, and Plastics) is essential.

Limb salvage versus amputation

Current injury severity scoring systems, specifically the Predictive Salvage Index (PSI) and Mangled Extremity Severity Score (MESS), for mangled extremities do not predict functional recovery of patients who undergo successful limb reconstruction. Limb salvage should be attempted if the other injuries are minimal, the patient is hemodynamically stable and the extremity injuries are amendable to salvage. The involved faculty should have a brief but focused discussion in the OR regarding priorities of care.

Questions for the teams involved:

Orthopedics: can the bone ultimately be saved/reconstructed and/or temporarily stabilized?

Vascular: can the acute arterial injury (if present) be repaired or bypassed in a timely fashion?

Trauma surgery: is the patient stable enough hemodynamically and metabolically to undergo acute revascularization and a prolonged reconstruction?

Plastic surgery: can the wound ultimately be covered or managed? (may be difficult to tell at initial presentation, but should weigh in)

If there is consensus among the involved teams, i.e. all the answers are affirmative to the above questions, then proceed with limb salvage (revascularization/reconstruction procedures). If one or many of the answers to the above questions are are in the negative then proceed with acute amputation.

All services must document their agreement of findings accordingly.

Indications for early amputation:

- Hemodynamic and physiologic instability secondary to complex injured extremity as determined by Trauma surgery faculty, i.e. “life over limb”
- unreconstructible osseous injuries as determined by Orthopedic surgery faculty
- unreconstructible soft tissue injuries as determined by Plastic Surgery faculty
- irreparable vascular injuries as determined by Vascular or Trauma Surgery faculty
- severe loss of soft tissue

Indications for limb salvage:

- all other patients not meeting above criteria

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Authors

Abby Josef, MD

References:

Ly TV, Travison TG, Castillo RC, Bosse MJ, MacKenzie EJ, LEAP Study Group. Ability of lower-extremity injury severity scores to predict functional outcome after limb salvage. J Bone Joint Surg Am. 2008;90: 1738-1743.

Prasarn ML, Helfet DL, Kloen P. Management of the mangled extremity. Strat Traum Limb Recon. 2012;7: 57-66.

Bonanni F, Rhodes M, Lucke JF. The futility of predictive scoring of mangled lower extremities. J Trauma.1993;34:99-104.

Potter BK, Bosse MJ. American Academny of Orthopaedic Surgeons Clinical Practice Guideline Summary for Limb Salvage or Early Amputation. J Am Acad

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