NORTHERN TRAUMA NETWORK NTN

Initial Management of mangled extremity in children SOP

Purpose:
A guide for orthopaedic and plastic surgeons presented with a child with a severe bone and soft tissue limb injury in an emergency setting.
Highlight differences in management in children compared to adults
Optimise chances of successful salvage
Guidance on amputation techniques in children

Introduction:
While the general principals of thorough wound excision and combined orthopaedic / plastic surgical care are the same for children as for adults, aspects of the growing skeleton dictate essential differences in some aspects of management. Young children tolerate weight-bearing stumps better than adults, the whole amputated limb has reduced future growth so as much length as possible must be preserved and sectioned bone is at risk of painful overgrowth making prosthetic wear impossible without repeated surgery.

Scope:
Management of mangled extremity injuries in skeletally immature patients injured in vehicular accidents, domestic or agricultural accidents or involved in ballistic or blast incidents.

Process:

- Children with severe extremity injuries to be transferred to nearest MTC following the secondary transfer protocol and with ED to ED discussion.
- Control bleeding and replace significant blood loss.
- Early involvement of consultants in orthopaedic and plastic surgery.
- If possible involve or discuss with childrens orthopaedic surgeon.
- Urgent surgery involving orthopaedic and plastic consultant surgeons.
- Excise all non-viable tissues.
- Preserve all viable tissues.
- Perform emergency amputation when:
    - a limb is source of uncontrollable life-threatening bleeding, or
    - a limb is salvageable but attempted preservation would pose an unacceptable risk to the child's life, or
    - a limb is deemed unsalvageable after orthoplastic assessment.
- Perform 'delayed primary amputation' when: the limb is of marginal viability but balance of risks favours amputation. Preserve the limb initially to allow observation and discussion of the options. Include the child, if appropriate, and parents / carers in a full discussion of the options if this is possible.

- Perform amputation at most distal viable site. Partial foot amputations are well tolerated in children.
- Avoid amputations through growing bones if possible due to risk of developing painful spur from bone section.
- Amputations through joints are preferable to amputation through bone proximal to joints (e.g. Symes or through-knee).
- Preserve knee joint even if this leaves a very short tibial remnant and / or requires plastic surgical reconstruction to cover the bone.
- Involve limb-fitting services and clinical psychology as soon as practical.
- Transfer to care of children's orthopaedic service when practical.

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