

Ring Avulsion Injury: The Do's And Don'ts Of Initial Management

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Abstract

A 22 year lady presented to the Emergency Department of a teaching hospital without a plastic surgery department at 2am. She had avulsed the skin off her ring finger of her right (dominant) hand (fig. 1) whilst attempting to jump over a spiked fence, catching her ring on the spike. We describe her treatment.

CASE

A 22 year lady presented to the Emergency Department of a teaching hospital without a plastic surgery department at 2am. She had avulsed the skin off her ring finger of her right (dominant) hand (fig. 1) whilst attempting to jump over a spiked fence, catching her ring on the spike. She had been under the influence of alcohol.

Her friends had presence of mind to “preserve” the skin in an ice-filled beer glass – fig. 2.

Unfortunately, because of time elapsed, damage to the avulsed skin and poor communication to the plastic surgery department, the finger was deemed unsuitable for replantation and a free tissue flap was attempted.

This case report offers advice to the emergency doctor on how to initially “treat” the hand and amputated digit and also how to describe the injury to a tertiary referral centre.

Figure 1

Figure 1: A “pure” degloving injury/ grade IVi



Figure 2

Figure 2: poor presentation of avulsed digit



DISCUSSION

Amputations and degloving injuries represent about 5% of upper extremity injuries and involve about 150,000 people in the United States each year (2). They are usually isolated injuries, but are on the increase because of greater industrial/work place accidents.

Describing injuries is based on the Urbaniak classification (modified by Adani et al (1996) - table 1]. Knowledge of this classification system is vital for the referring physician, as it allows good communication. And it is an accurate predictor of success and hence appropriateness of surgery for the reconstruction team (3)

The amputation of any body part will invariably produce ischaemia. If this ischaemia is allowed to progress for long enough, cell lysis will occur. This is irreversible cell death. However, if flow is resumed (reperfusion) before cell death, tissues may still survive.

The length of time between the onset of ischaemia and irreversible cell death depends upon the type of tissue and the temperature it is stored.(4) Hence speed is of the essence.

Muscle is irreversibly damaged after 6 to 8 hours if left at room temperature. If the tissue is chilled, this may be prolonged to 6-12 hours. However - Because of the absence of muscle in the digit, survival is much longer (if digits are cooled without freezing, they may survive up to 100 hours).

Figure 3

Table 1: Ring avulsion classification

| | |
|-----------------|---|
| Class I | Circulation Adequate |
| Class II | Circulation Inadequate – venous/ arterial with no bony injury |
| Class III | Circulation inadequate – with fracture/ joint involvement |
| Class IVd / IVp | Complete amputation/ degloving – distal (IVd) or proximal (IVp) to the Flexor Digitorum Superficialis insertion |
| Class IVi | Complete degloving with the tendons in tact – aka pure degloving |

CONCLUSIONS/ SUGGESTION FOR TREATMENT & TRANSFER

As with all injuries, the maxim of “airways, breathing, and circulation” must not be forgotten. Once other injuries have been excluded, the patient should receive sufficient analgesia. This centre suggests avoiding using local anaesthesia infusions, as this could potentially damage digital nerves which are already vulnerable.

These injuries are open wounds and as such present problems of post operative patient. While vigorous on table washing of the amputated digit and the remaining stump are essential, principles of dressing and microbial prophylaxis must not be forgotten.

Vigorous cleaning of the stump in the emergency department is more likely to damage the soft tissue structure and microvasculature. Instead, large volumes of water delivered at high pressure are the best way to remove debris in the wound.

The digit may then be dressed. We recommend that this is done saline soaked gauze or gelonet/ mepotel which is then covered with crepe bandage.

Transfer of the amputated digit should be in one of two methods. The first is to place the digit in an airtight bag filled with saline and then into container with ice. The other option is to wrap the digit in moist gauze which is put into an airtight bag and then an ice container (5,6)

Either way, the digit should be ideally kept at -4°C, kept away from direct contact with the ice also prevented from

drying out (7).

Finally, the open wound should be treated as any other with tetanus booster and antibiotic prophylaxis.

CONCLUSIONS

Replantation of amputated digits is one of the most difficult conditions a plastic surgeon may face. The chances of success depend upon good care and communication at the primary centre.

We, as part of the emergency team, can help reduce the ischaemia time and minimise the technical difficulties the reconstructive team face.

Good communication and basic treatment protocols should be followed to maximise the best functional and cosmetic results.

Figure 4

Table 2

Treatment algorithm

- Stabilise patient and eliminate other injuries
- Analgesia patient
- Assess the stump – level and anatomy
- Irrigate the wound and dress in moist gauze/ non-adherent dressing.
- X-ray both segments
- Place the amputated digit/ degloved skin in (1) a moist gauze/ non-adherent moist dressing (e.g. gelonet) or (2) saline solution within ice.
- Provide anti-microbial prophylaxis to the patient – tetanus prophylaxis (if appropriate) and intra-venous antibiotics.

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