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THE TOURNIQUET, DOUBLE-EDGED SWORD: CASE REPORT AND REVIEW PRECAUTIONS

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ABSTRACT
The time limit for the removal of a tourniquet is short. Any delay in tourniquet deflation exposes to amputation hazards. Our objective was to report a case of ischemic finger gangrene, caused by having forgotten to take a tourniquet off after a finger foreign body removal, to inform healthcare professionals about the risk associated with that negligence.

Keywords: Patient safety, Tourniquet, Ischemic necrosis, Gangrene, Hand injury

1. INTRODUCTION
Fingers tend to bleed during surgical procedures because of their rich blood supply. Distinct surgical fields are necessary for optimal phalangeal surgery. Therefore, self-made finger tourniquets fashioned from Penrose drains, colored rubber gloves and gloves with hemostat are widely used. Ischemic necrosis can occur if such tourniquets are forgotten and left in place at the end of the operation. [1]The time limit for the removal of a tourniquet is short. Any delay in tourniquet deflation, especially if it exceeds the 3-hour limit will lead to complications. [2]

Although many ‘safe’ methods have been previously published and widely used, cases of retained finger tourniquet still unfortunately occur. Vigilance needs to be maintained by the operating surgeon to remove the tourniquet to prevent this devastating event.In this article we present a case of forgotten tourniquet in a 35-year-old patient. Our aim is to alarm physicians about the seriousness of the condition and to highlightthe guidelines of the National Patient Safety Agency (NPSA) to avoid such events.

2. CASE REPORT
A 35-year-old female presented to plastic and reconstructive clinic in the Ghazi Al-Hariri Surgical Specialties Hospital, Baghdad complaining from black discoloration on the tip of middle finger of the left hand.

The discoloration started when the patient presented to a non-eligible healthcare provider for the extraction of a foreign body in the same finger.The foreign body was extracted under local anesthesia and the procedure was terminated with wound dressing.Within the next few hours after the procedure the patient experienced a severe radiatingpain involve the whole hand and was partially relieved by

medications. The pain was associated with bluish discoloration of the tip of the finger which made the patient attend the same clinic once again and found out that the initial healthcare practitioner had forgot to remove the tourniquet used in the operation.

On the next eighth day the patient presented to our clinic after her finger turned black in color and she lost the sensation in the involved finger.She has no history of chronic medical illness or previous surgical operations. She is not a smoker and there was no family history of such condition and other diseases.Physical examination revealed a diffuse edema of the finger with visible gangrene of the tip (see Figure 1,2). Laboratory finding were normal.

The diagnosis of ischemic finger gangrene was confirmed. The patient refused the hospital admission or any surgical intervention and just want medical therapy, for that reason we lost the follow-up of the patient.

Figure 1: Ventral view of patient's hand

Figure 2: Dorsal view of patient's hand

3. DISCUSSION

Although there have been reports of 'fail safe' digital tourniquets, they are only as fail safe as the surgeons make it. We once again stress the importance of being vigilant. Our practice has changed so that commercially available colorful finger tourniquets are used, which was and still is a technique used in many units. According to the Medicines and Healthcare Regulatory Authority (MHRA), the use of gloves as tourniquet in any form is beyond the manufacturer's intended purpose. As with any off-label use of medical devices, it poses possible risks to the patients and the potential for litigation against the hospital or healthcare professional. The cost difference between a pair of sterile gloves and the cheapest commercially available finger tourniquet is about £0.50 as set out by the NPSA but patient care and litigation can cost large sums. [3]

Hence, we recommend that commercially available tourniquets be used for surgery needing finger tourniquets and we should embrace the guidelines as set out by the NPSA, which are:

I. Guidelines include the removal of digital tourniquets as part of the swab counting procedure and specify the need to record the length of time a tourniquet is in place.

II. CE marked digital tourniquets which are labelled and/or brightly colored should be used, in accordance with manufacturers' instructions. Surgical gloves should not be used as tourniquets.

III. The World Health Organization Surgical Safety Checklist is reviewed locally to consider adding tourniquet removal at 'Sign Out' stage.

IV. The NPSA briefing sheet should be read by all those using digital tourniquets.

By following the steps above, we believe that tourniquet associated injuries due to retained tourniquet can be completely prevented. [3]

The ideal digital tourniquet should have the following features to be used in limb or finger surgery:

- safe, predictable pressure adequate to provide hemostasis;
- obvious and therefore difficult to leave *in-situ*;

- ease of use – application and sizing;
- a timed device;
- low cost;
- adequate exsanguination.

4. CONCLUSION

We stress the importance of being vigilant when using finger tourniquet and follow guidelines as set out by the NPSA. Alteration in finger tourniquet practices to more safer methods should effectively eliminate morbidity associated with tourniquet misuse.

5. COMPLIANCE WITH ETHICAL STANDARDS

5.1 Conflict of Interest

We declare that there was no conflict of interest.

5.2 Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profitsectors.

5.3 Patient Consent

written informed consent was obtained from the patient for publication of this case report and accompanying images.

6. REFERENCES

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