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Is the "Sixty to Ninety Minutes" Rule for Upper-limb Tourniquet use Valid for Nigerian Hand-Trauma Patients? — A Call for Local Data and Possible Safety Changes

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Abstract

Tourniquets provide a bloodless field in hand surgery but can cause nerve injury. While international guidelines cite 60 minutes as a warning and 90 minutes as a maximum continuous inflation time, clinical experience at Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH), Bauchi, suggests that neuropraxia do occur when inflation lasts around 60-70 minutes. These editorial reviews relevant literature, considers local risk modifiers, and argues for both immediate precautionary practice changes and a prospective Nigerian study to define safe limits for our population.

Introduction

Tourniquets are indispensable in hand and upper-limb surgery since a clear operative field is one of the cardinal principles of such surgeries. Sixty minutes is mostly taken as a warning and no more than 90 minutes continuous occlusion without reperfusion is advocated in international guidelines [1]. Despite this, tourniquet-related nerve injury (TRNI) remains a recognised complication, with electromyographic (EMG) abnormalities common after routine use [2].

At ATBUTH, Bauchi, we have observed neuropraxia occurring in young male trauma patients undergoing hand surgery within only 60-70 minutes of continuous occlusion. We often use Esmarch bandage or its modification with adequate padding using orthoband at the level of the midarm, after exsanguination, frequently. These observations might suggest that international "safe" thresholds may not reflect the realities of Nigerian patients. Even though ATBUTH, just like most centres in the country do not use pneumatic tourniquets but manual ones, there are other factors that influences the outcome of tourniquet use in a population which underscores need for local studies to enable decision making.

Evidence from the literature

Incidence and outcomes of TRNI

A systematic review highlighted that most patients with TRNI recover, but a few develop permanent deficits [3]. EMG studies have shown that even after routine use, significant number of patients develop transient nerve changes [2].

Time and pressure thresholds

Although many authors recommend 90 minutes as a maximum, reports of TRNI at shorter times have been documented in the literature [4]. Drolet et al studied 500 upper-limb procedures and they observed EMG abnormalities despite adherence to time guidelines, this clearly shows that duration alone does not guarantee safety [5].

Role of cuff pressure and Limb Occlusion Pressure (LOP)

Tourniquet inflation pressure is critical. The pressure used for tourniquets needs to be tailored to the patient. Randomised controlled trials demonstrate that LOP-guided settings reduce required pressures and improves patient comfort [6]. This varies with limb size, blood pressure, width of the cuff and anthropometry. These are parameters that varies with populations. Hence it is not out of place to observe that thresholds established in other populations may not necessarily apply universally [7].

Resource and practice variability in Nigeria

In Nigeria, many surgeons still rely on manual or non-pneumatic tourniquets, which lack precise pressure control [8]. Such practice increases the risk of nerve injury, even when inflation times are within accepted ranges. These are factors that are likely to persist since the surgeon might not be directly responsible for policy making.

Possible explanations for Nigerian observations

Several factors may explain neuropraxia at shorter durations in our patients:

- Use of manual tourniquets without LOP measurement.
- Young male trauma patients often present with swelling and nerve involvement, increasing susceptibility.
- Narrow cuffs or those applied over bony prominences increase local compression.
- Anthropometric differences may alter safe LOP and tolerance.

Practical recommendations

1. Use LOP-guided pressures where available, or lowest effective fixed pressure if not.
2. Prefer pneumatic over manual tourniquets, with alarms and timers.
3. Treat 60 minutes as a strict upper warning in upper-limb trauma surgery, with deflation or reperfusion intervals before 90 minutes.
4. Use wide, well-padded cuffs and avoid placement over bony prominences.
5. Document cuff time and pressure, and assess patients early for neuropraxia.

Call for local research

More prospective study in Nigerian centres should systematically record tourniquet pressure, type, limb circumference, inflation time, and postoperative nerve function. Such data would allow population-specific guidelines. Even a one-year prospective audit would provide invaluable evidence to inform practice.

Conclusion

International tourniquet safety limits may not be directly applicable to Nigerian patients. Observations at ATBUTH suggest neuropraxia can occur at or shortly after 60 minutes of upper-limb inflation. While awaiting more multicentre local data, surgeons should adopt more conservative limits, use LOP-based pressures, and improve equipment standards. Local research is needed to establish safe, evidence-based thresholds for our setting.

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