**ELEO™ Einweg-Tourniquet/Venenstauer**

**Fakten und Studien** (gesammelt von GA-Healthcare & ZEM GmbH www.zemgmbh.ch)

Diese Anforderungen werden vom **ELEO™-Einweg-Tourniquet** erfüllt:

- Infection Control / vermindertes Infektionsrisiko
- Hygienic / hygienisch
- Patient friendly / patientenfreundlich
- Single Use / einmalige Anwendung, oder
- Single Patient Use / ein-Patienten-Anwendung
- One-Touch, controlled release / Kontrollierte Auslösung, einhändig
- Easy to use / Einfache Handhabung
- Latex-free / Latex-frei
- Perfect control / perfekte Kontrolle
- Tension Guide / Spannungsanzeige
- Patient safety / Patientensicherheit
- Click to close - Click to open / Einhand-Verschluss & -Öffnung
- Soft and comfortable / weich und komfortabel
- Improved properties / verbesserte Eigenschaften

**Protocol - Questions / Protokoll - Fragen:**

1) You wash/disinfect your hands between each patient contact?
2) You wear fresh gloves between each patient contact?
3) You use single patient use disposables to avoid patient-to-patient contact?
4) Then why would you consider using the same tourniquet for hundreds of patient contacts? (scientific research shows that re-usable tourniquets are covered in bacteria either from patients’ skin or contaminated surface areas where it has been in contact)

Are you aware that various clinical studies **on re-used tourniquets** have shown the presence of:

- coagulase negative staphylococci
- and micrococci, also β-haemolytic streptococci and coliform colonies.
- Methicillin sensitive *Staphylococcus aureus* was also isolated.
Various Facts and Figures / gesammelte Daten und Fakten

In 2000 Golder et al. concluded in the Lancet that the use of re-usable tourniquets in hospitals contravenes hospital cross infection policy.

Why would any person go to the trouble of decontaminating their hands and to then pick up a piece of medical equipment which has been shown to harbour pathogens? Whilst the tourniquet is usually at least 5-10cm away from the venepuncture site itself, the gloved hand which applies the tourniquet is then used to palpate the area to find a vein.

Tourniquets from a large London hospital and two district general hospitals were tested them for infections.

- Of these 68% were stained with blood along the surface in contact with patient skin.
- Just under a quarter of the tourniquets cultured grew the pathogen Staphylococcus aureus.
- Some healthcare professionals were using their tourniquet up to 30 times per day for 104 weeks without any form of cleaning
- The overall colonisation rate of 100 tourniquets randomly collected from general wards, ambulatory care areas and critical care areas was 78%

Reusable tourniquets can be colonised with MROs (multi-resistant organisms) and may be a potential source of transmission of MROs to hospitalised patients.

While disposable tourniquets are readily available, their use is not universal due to perceived difficulties in application and patient discomfort. However, a study found that 85% of patients found disposable tourniquets at least as good as reusable tourniquets, and 95% of doctors found them as easy to use.

It is untenable that patients are exposed to potentially virulent pathogens on reused equipment.

Non-disposable venepuncture tourniquets become contaminated with MRSA and pose a risk to patients. The majority of clinical staff do not clean them between patient contacts as recommended by Guidelines. The use of non-disposable venepuncture tourniquets should be abandoned. The introduction of disposable tourniquets to clinical practice should be an adjunct to current measures for MRSA prevention.

Initially, a considerable number of tourniquets were contaminated with MRSA. Even with daily tourniquet replacement, MRSA could be detected on almost 25% (32/131) of the tourniquets sampled.

Golder: We found that a high proportion of reusable tourniquets are contaminated with blood and bacterial pathogens. Their use contravenes hospital cross-infection control protocols and we therefore recommend the use of disposable tourniquets.
OBJECTIVE: A study was undertaken to determine the incidence of *Acinetobacter baumannii* and methicillin resistant *Staphylococcus aureus* (MRSA) contamination on reusable phlebotomy tourniquets at Wilford Hall Medical Center, Lackland AFB, TX.

CONCLUSIONS: Reusable tourniquets could serve as a potential reservoir for bacterial pathogens

Tourniquets are a potential source of methicillin-resistant *Staphylococcus aureus* (MRSA), with up to 25 percent of tourniquets contaminated through reuse or lack of hand hygiene on the part of the phlebotomist

“Each day, the phlebotomists were supplied with a fresh sterile tourniquet, and after use, the tourniquets were swabbed and cultured. The rate of contamination with MRSA was 32 of 131 (25%) tourniquets…. In conclusion, phlebotomy tourniquets may be potential vectors for transferring bacteria, including MRSA.”

A report in the Lancet from 2000 found that 52 of 77 tourniquets had visible blood stains, and grew a wide range of potential pathogens. The authors concluded that “The potential risk of cross-infection is obvious … We recommend the use of disposable tourniquets.”

A constant problem is that medical facilities are reusing tourniquets on multiple patients, which is leading to the spread of infection. The solution to this problem is using disposable, single-use tourniquets to reduce the risk of patient infection or contamination. Especially in the medical setting, it’s easy to spread infection and contamination among patients when disposable products are not used.


*Survey Says: Reusing tourniquets*

Beginning in February, the Center for Phlebotomy Education launched what will become a quarterly survey on its home page asking healthcare professionals to weigh in on different aspects of specimen collection in their facility. Given the widespread attention toward reducing nosocomial infections, the first survey asked visitors to our site about their facility's policy on tourniquets. Here are the results of the survey:

**Question:** Does your facility have a single-use policy for tourniquets?

**Response:** Yes: 33.3%  No: 66.7%

It's difficult to say just how many of the estimated 98,000 deaths attributed to hospital-acquired (nosocomial) infections are due to using the same tourniquet patient after patient. It stands to reason,
however, that they may play a significant role. Last year, the *Journal of Hospital Infection* reported a study that showed 25% of tourniquets were contaminated with MRSA after one day's use. Poor hand hygiene between patients was cited as a contributing factor. The same journal earlier reported the results of a survey on tourniquets in the United Kingdom. The authors of the 2001 study reported the average tourniquet was kept in use for nearly two years.

Cost is often a significant factor for facilities considering the transition. Some facilities lessen the impact by assigning a tourniquet to each patient upon admission, which will be kept in their room for use on that particular patient exclusively. However, without proper hand hygiene, phlebotomists can quickly contaminate them, negating the benefit.

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**MRSA contaminated venepuncture tourniquets in clinical practice.**

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**Abstract**

**INTRODUCTION:**

Meticillin-resistant Staphylococcus aureus (MRSA) hospital-acquired infection is associated with increased patient mortality. National guidelines state that shared patient equipment must be cleaned after use. The authors sought to identify MRSA contamination in a sample of non-disposable venepuncture tourniquets and audit cleaning habits between patient contacts.

**MATERIALS AND METHODS:**

Fifty tourniquets were collected from junior doctors, nursing staff and wards from two district general hospitals in Essex, UK in 2007. A questionnaire was completed at the time of collection for each tourniquet. The tourniquets were cultured using standard microbiology techniques.

**FINDINGS:**

18/50 (36%) tourniquets were positive for S. aureus and of these 6/50 (12%) were MRSA positive. 33/43 (77%) healthcare professionals using non-disposable tourniquets for venepuncture made no attempts at cleaning their tourniquets. 10/43 (23%) staff admitted to cleaning their tourniquets. The tourniquets were used for an average of 14 weeks on approximately three different patients per day. 30/50 (60%) tourniquets were visibly soiled and of these 13 were blood stained and 20/50 (40%) appeared 'clean'. Worn tourniquets when compared with the 'clean' tourniquets were more likely to be contaminated with S. aureus, 15/30 (50%) vs 3/20 (15%), and MRSA 5/30 (17%) vs 1/20 (5%).
CONCLUSION:

Non-disposable venepuncture tourniquets are contaminated with MRSA and pose a risk to patients. The majority of clinical staff do not clean them between patient contacts as recommended by guidelines. The use of non-disposable venepuncture tourniquets should be abandoned. The introduction of disposable tourniquets to clinical practice should be an adjunct to current measures for MRSA prevention.

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Reusable venesection tourniquets: a potential source of hospital transmission of multiresistant organisms

Angie N Pinto, Thuy Phan, Gabriela Sala, Elaine Y L Cheong, Steven Siarakas and Thomas Gottlieb

doi: 10.5694/mja11.10333

Abstract

Objective: To determine the prevalence of multiresistant organism (MRO) colonisation of reusable venesection tourniquets.

Design and setting: A prospective study in a tertiary hospital to collect and analyse reusable venesection tourniquets for the presence of MROs — methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), and extended-spectrum β-lactamase and metallo-β-lactamase-producing Enterobacteriaceae — using a sensitive enrichment method. Tourniquets were collected and tested during a 10-week period between September and November 2010.

Main outcome measure: Prevalence of MRO colonisation of tourniquets.

Results: The overall colonisation rate of 100 tourniquets randomly collected from general wards, ambulatory care areas and critical care areas was 78%. MROs were isolated from 25 tourniquets
collected from a variety of hospital locations, including general wards, the intensive care unit, burns unit and anaesthetic bay. MRSA was isolated from 14 tourniquets and VRE from 19; both MRSA and VRE were isolated from nine tourniquets. There were no microorganisms isolated from 22 tourniquets.

**Conclusion:** Reusable tourniquets can be colonised with MROs and may be a potential source of transmission of MROs to hospitalised patients.

The hospital environment can be a source of transmission of multiresistant organisms (MROs). Hospital infection control policies attempt to minimise cross-transmission of MROs, which include methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci (VRE), and Enterobacteriaceae harbouring transmissible extended-spectrum \( \beta \)-lactamases (ESBLs) and metallo-\( \beta \)-lactamases (MBLs). Surfaces such as keyboards,\textsuperscript{1,2} stethoscopes,\textsuperscript{3-6} ties,\textsuperscript{7-11} lanyards\textsuperscript{12} and tourniquets\textsuperscript{1,13-15} have the potential to act as fomites and can harbour pathogenic microorganisms.

Reusable venesection tourniquets are often used consecutively on multiple patients without disinfection between uses. Current Australian health care guidelines suggest cleaning of these non-critical items with a neutral detergent on a regular basis.\textsuperscript{16} However, the required frequency of cleaning is not specified, nor whether this would prevent transmission of MROs to patients. Previous studies have indicated varying rates of MRO colonisation of reusable tourniquets, and differ based on the sensitivity of the culture method used.\textsuperscript{17} We performed this study to determine the prevalence of MRO colonisation of reusable venesection tourniquets in a Sydney teaching hospital using a sensitive enrichment method.

**Methods**

**Hospital setting**

The study was conducted at Concord Hospital, a 503-bed metropolitan teaching hospital in Sydney. Random sampling and testing of 100 reusable tourniquets took place over a 10-week period between September and November 2010. Tourniquets were randomly collected from locations throughout the hospital, including general wards, ambulatory care areas (defined as outpatient clinics, the blood collection unit, doctors' offices and the emergency department) and critical care areas (defined as the operating theatre, intensive care unit [ICU] and burns unit).

This study was organised by the hospital infection control committee as an investigation into tourniquet contamination and disinfection. As there were no patients involved and no patient specimens collected, ethics approval was not sought.

**Microbiology**

Reusable tourniquets were collected and immediately placed into a polyethylene specimen bag, labelled and transferred to the laboratory. At twice weekly intervals, tourniquets were immersed in an enrichment medium (Brain Heart Infusion Broth; Oxoid Australia, Adelaide, SA) and incubated overnight. Fluid from the broth was then subcultured onto a variety of agar media: horse-blood agar (Columbia HBA; Oxoid), MacConkey agar (Oxoid), and selective agar media for the detection of MRSA (MRSASelect; Bio-Rad, Sydney, NSW), VRE (chromID VRE; bioMérieux, Sydney, NSW) and resistant gram-negative bacteria including ESBL- and MBL-producing organisms (Brilliance ESBL Agar; Oxoid). Significant isolates were identified, and resistance gene testing was performed for the confirmation of MRSA, VRE and MBL resistance.
Growth of isolates from broth enrichment was recorded, and classified as: environmental organisms or bacteria of low pathogenic potential; “potentially significant” bacteria; and MROs (defined as MRSA, VRE, and MBL- and ESBL-producing Enterobacteiracea). We typed VRE isolates using a DiversiLab rep-PCR system (bioMérieux). Tourniquets that tested positive for MROs or other potentially significant organisms were discarded.

Results

Tourniquet collection data are summarised in Box 1. The majority of tourniquets were collected from areas where they are frequently used, such as the blood collection unit (n = 7), and from general medical and surgical wards. Bacteria were isolated from tourniquets collected in every week of the study period. The overall bacterial colonisation rate of the 100 tourniquets was 78%. There was no bacterial growth from 22 tourniquets, and 17 grew only environmental organisms or bacteria of low pathogenic potential (coagulase-negative staphylococci and/or Bacillus spp).

Microbial colonisation data are summarised in Box 2. Many tourniquets were colonised with more than one organism. Ten grew potentially significant gram-positive organisms (methicillin-sensitive Staphylococcus aureus or Enterococcus spp), and 38 grew potentially significant gram-negative organisms (Pseudomonas spp and/or Enterobacteriaceae).

MROs were found on 25 tourniquets; however, three had been collected from MRO isolation rooms. An IMP-4 MBL-positive Enterobacter cloacae and an ESBL-positive E. cloacae were each isolated from a single tourniquet. MRSA was isolated from 14 tourniquets. VRE was isolated from 19 tourniquets: vanB-positive Enterococcus faecium from 18, and vanA-positive Enterococcus faecalis from one. Nine tourniquets isolated both MRSA and VRE, and 24 grew one or the other of these. Typing of the 18 vanB-positive isolates demonstrated five VRE clusters (Box 3). There was no apparent association between clusters of enterococci and hospital location.

Six of nine tourniquets collected from the ICU throughout the study period grew at least one MRO, although two had been used on patients known to be colonised with MRSA. MROs were isolated from tourniquets collected in most weeks of the study period (Box 1) from various hospital locations, including general wards, the ICU, burns unit, operating theatre anaesthetic bay, and the blood collection unit. The ICU had the highest rate of MRO colonisation (67% [6/9] v 23% [15/64] in wards and 13% [3/23] in ambulatory care areas).

Discussion

We found that 61% of reusable tourniquets were colonised with bacterial species that would not be considered normal upper-limb skin flora and that can be associated with hospital-acquired bacteraemia. A quarter of randomly collected tourniquets yielded an MRO. If a single patient MRO transmission is perceived to be an avoidable patient care outcome, then any reuse of MRO-colonised tourniquets may present an unacceptable risk.

It is estimated that around 6% of hospitalised patients will acquire an infection during their admission, leading to increased length of stay, further treatment and higher overall cost. To what extent tourniquets contribute to colonisation, and possibly bacteraemia, is uncertain. MRO colonisation of tourniquets may reflect the burden of MROs in the wider hospital environment and provide a measurable index of the level and quality of hospital environmental hygiene. Tourniquets may have higher potential for MRO transfer than other fomites as they are applied under pressure against the patient’s skin. They are also placed in close proximity to vascular access sites, and any skin colonisation could lead to preventable complications or health care-associated infections, such as
phlebitis or cannula site infections. It is untenable that patients are exposed to potentially virulent pathogens on reused equipment.

While disposable tourniquets are readily available, their use is not universal due to perceived difficulties in application and patient discomfort. However, a study found that 85% of patients found disposable tourniquets at least as good as reusable tourniquets, and 95% of doctors found them as easy to use. With adequate training provided, and at a cost of about 50 cents per unit (BD, Sydney, NSW), disposable tourniquets are a viable alternative for preventing acquisition of MROs in the hospital environment. However, there is currently no supporting evidence that introducing disposable tourniquets reduces hospital MRO acquisition rates. Moreover, such a measure should be one element of a bundle of infection control measures implemented to improve hospital environmental hygiene, and hence it may be difficult to measure its contribution to reduced MRO rates.

While previous studies have demonstrated MRSA colonisation rates ranging between 0 and 42%, none have reported rates of VRE colonisation. We also identified colonisation by multiresistant gram-negative organisms with transmissible β-lactamase enzymes, including IMP-4. The presence of such enzymes can result in infections that are virtually untreatable with available antibiotics. These have previously been shown to be transmitted readily throughout the hospital environment.

We found that the highest rate of colonisation of MROs was in the ICU. ICUs are recognised as hospital sites with high throughput of patients and staff, and with resultantly higher acquisition rates and difficulty in controlling transmission of MROs. We found that VRE clusters isolated from tourniquets in the ICU did not appear to be clonally related, reflecting the complex pattern of movement of staff, patients and tourniquets within the hospital. Tourniquets in the ICU in this study were allocated for single patient use, which demonstrates that MRO colonisation was not necessarily due to reuse, but that deficiencies in hospital environmental hygiene are likely to contribute to ongoing MRO colonisation of tourniquets in the ICU. Although several tourniquets were obtained from isolation rooms that accommodated patients already colonised with an MRO, and may therefore reflect the patient's own flora, the majority had been used on patients whose screening had not identified MRO colonisation.

MROs may remain viable in the environment for a long time, as demonstrated by an MRO-colonised tourniquet (collected from an office) that had not been used for several months. When tourniquets are carried from ward to ward by hospital staff and used repeatedly, they may become a “sleeping” mechanism for unrecognised hospital MRO transmission. Of concern were the nine tourniquets that were colonised with both MRSA and VRE. This probably reflects a baseline prevalence of co-colonisation of 20%.

A limitation of our study is that data on tourniquet use could not be collected. Previous studies have surveyed health care personnel about hand hygiene practices and glove and tourniquet use. The tourniquets sampled in our study were shared among multiple users and may have been used in many different hospital wards. However, this reflects the hospital’s day-to-day practice of tourniquet use. There was no way of tracking how often the tourniquet had been used, or where MRO acquisition had occurred. A British study demonstrated that contamination of tourniquets could be attributed to the user’s hands rather than the patient’s skin. We hypothesise that MRO colonisation of tourniquets can also be acquired from the surrounding hospital environment. The random hospital locations of the VRE clusters we recovered lends some anecdotal support to this hypothesis. A study examining colonisation of surfaces where tourniquets are stored may resolve this issue.

In this study, we did not culture for *Clostridium difficile*, which requires specialised media and incubation conditions to detect. *C. difficile*-associated diarrhoea can cause significant morbidity and
mortality in hospitalised patients, and it is known that its spores may survive for a long time in the environment.

Previous studies\textsuperscript{16} have determined the limit of detection and performed semi-quantitative bacterial counts for MROs.\textsuperscript{23} Our study used a broth enrichment method, which may have increased sensitivity compared with methods used in previous studies, and we felt it was sufficient to demonstrate viability of bacteria from tourniquets using this method.

Reducing the burden of hospital-associated infections is being addressed through multifaceted approaches such as hand hygiene and antimicrobial stewardship programs. As reusable tourniquets are frequently colonised with MROs and may be a source of cross-transmission, the burden of MRO colonisation from the hospital environment also needs to be considered. With current high prevalence rates of MROs, continued use of reusable tourniquets may not be justified in the hospital.

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Potential risk of cross-infection during peripheral-venous access by contamination of tourniquets

M Golder, C L H Chan, S O'Shea, K Corbett, I L Chrystie, G French

We found that a high proportion of reusable tourniquets are contaminated with blood and bacterial pathogens. Their use contravenes hospital cross-infection control protocols and we therefore recommend the use of disposable tourniquets.

Venous-blood sampling and intravenous cannulation are the most common invasive procedures in hospitals. The usual technique for providing venous stasis is the application of a reusable tourniquet to the patient's limb. The use of such tourniquets, carried between many patients and wards, contravenes basic principles of infection control. The aim of our study was to examine whether reusable tourniquets could act as fomites for microbial pathogens, thus posing a potential cross-infection risk.

77 tourniquets were collected from a London teaching hospital and two large district general hospitals in the UK. They were randomly collected from intensive-care units, and from obstetric, renal, paediatric, orthopaedic, oncology, cardiothoracic, and general surgical and medical wards. All types of reusable tourniquet were sampled. Wearing sterile gloves, we examined 50 tourniquets (group A) for visible bloodstains and then transported the tourniquets to the laboratory in sterile plastic bags. Using aseptic techniques, we pressed each tourniquet three times onto the blood-agar plate which was then incubated at 37°C in air. Plates were examined after 48 h, and purity plates were produced from morphologically different colonies on each plate by standard techniques. Areas of blood contamination were confirmed with the Haemoccult test for faecal blood (Immunostics, NJ, USA). An additional 27 tourniquets with visible bloodstains (group B) were tested for HIV-1 RNA and HBsAg. For HIV, three spots of visible blood were cut from each tourniquet, added to 900 μL lysis buffer (Organon Teknika, Cambridge, UK), and eluted.\textsuperscript{1} 300 μL samples of each eluate were pooled in groups of three and tested for HIV-1 RNA by nucleic acid sequence-based amplification (NASBA QL, Organon Teknika). For HBsAg testing, samples were prepared as for HIV-1, but blood was eluted into phosphate-buffered saline. All 27 samples were tested.
separately with a microparticle EIA (Abbott AxSYM HBsAg V2 assay). 25 of 50 tourniquets in group A had visible bloodstains, confirmed with the Haemoccult test, on the area corresponding to that in contact with the patient’s skin. Cultures from all 50 tourniquets grew heavy skin flora including: coagulase-negative staphylococci, coryneform bacteria, micrococci, Acinetobacter spp, and candida and non-candida fungi. Bacterial pathogens were cultured from 17 of 50 tourniquets. These comprised: meticillin-sensitive Staphylococcus aureus (12), gram-negative bacilli (two Escherichia coli, one Pseudomonas aeruginosa, and one Stenotrophomonas maltophilia) and Enterococcus faecalis (one). Neither HIV-1 RNA nor HBsAg was detected on any of the 27 group B tourniquets. This study showed a substantial reservoir of potentially pathogenic bacteria on reusable tourniquets. This reservoir exists in areas of hospitals where critically ill, injured, immunocompromised, and postoperative patients are being treated. These organisms can be transmitted from patient to patient on staff hands, and for this reason, handwashing between treatment of patients is emphasised as an essential component of hospital cross-infection control. However, despite adherence to local cross-infection control protocols, there is often difficulty in control of meticillin-resistant S aureus infection in patients.2 Some of this crossinfection has been attributed to the "housestaff--patient transfer circuit".3 Reusable tourniquets have been shown to be potential fomites.4 Although 50% of the tourniquets we examined were bloodstained, neither HIV-1 RNA nor HBsAg could be detected. Nevertheless, in areas of high HIV-1 or hepatitis B prevalence such as inner London, there remains a potential risk of viral transmission from tourniquets to patients across areas of broken skin such as venous access and monitoring sites, open wounds, eczema, cuts, and abrasions. Inoculation could potentially occur in both staff and patients. The potential risk of cross-infection is obvious, since, in the average district general hospital of 600 beds, 400 blood samples are taken and 300 cannulations are done each day. In general, however, cross-infection policies ignore this risk. Since it is impossible to disinfect reusable tourniquets, we recommend the use of disposable tourniquets.


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Correspondence to: Dr S O'Shea
From: http://www.sinia.co.uk/page/tourniquets-and-hai  

Tourniquets and HAI

We know tourniquets are potential vectors for transmission. Their use in contact with skin results in their being easily contaminated. One study of 200 tourniquets found that on average they were owned for almost 2 years, with 70% of those used by junior doctors and phlebotomists having visible blood stains⁴.

“The high number of tourniquets with visible blood stains should be a cause for concern, and obvious disregard for cleanliness of tourniquets is surprising... Eighteen [of those questioned] had used their tourniquets in countries other than the UK; 12 were in high-risk areas for blood-borne viruses, e.g. Africa and Thailand.”⁴

A report in the Journal of Hospital Infection in 2006 found 28 of 30 tourniquets were contaminated with S. Aureus or MRSA⁵, while a similar report in the American Journal of Infection Control found 34 colonies of S. Aureus on 36 tourniquets, almost half of which were MRSA.⁶

“As a result of our study, we plan to increase the availability of disposable tourniquets in the trust and produce hospital guidelines for their use.”⁵

“Our survey reveals that there is a substantial reservoir of potentially pathogenic bacteria on reusable tourniquets ... This reservoir exists in areas of hospitals in which critically ill, injured, immunocompromised, and postoperative patients are being treated.”⁶

In an effort to reduce the problem, a study reported in the Journal of Hospital Infection tried replacing every tourniquet used by phlebotomists daily, but found that even then 25% of tourniquets became contaminated with MRSA. The authors also found that although improving hand hygiene helped reduce the rate of contamination, it did not eliminate it.⁷

“Each day, the phlebotomists were supplied with a fresh sterile tourniquet, and after use, the tourniquets were swabbed and cultured. The rate of contamination with MRSA was 32 of 131 (25%) tourniquets.... In conclusion, phlebotomy tourniquets may be potential vectors for transferring bacteria, including MRSA.”⁷

A report in the Lancet from 2000 found that 52 of 77 tourniquets had visible blood stains, and grew a wide range of potential pathogens. The authors concluded that “The potential risk of cross-infection is obvious ... We recommend the use of disposable tourniquets.”⁸
5.6 Potential of Cross-infection During Peripheral Venous Access by Contamination of Tourniquets

Venepuncture for blood tests and intravenous cannulation are the most common invasive procedures carried out in hospitals. The usual method for providing venous stasis is the application of a reusable tourniquet. The use of such tourniquets in many patients and many wards contravenes the basic principles of infection control. One study has revealed a substantial reservoir of potentially pathogenic bacteria on these tourniquets, which can be transmitted from patient to patient on the hands of staff. Reusable tourniquets have been shown to be potential fomites. Since it is impossible to disinfect reusable tourniquets (they are not made of durable material), the use of disposable tourniquets is recommended.
## Isolation practice

Some patients may require an isolation room to protect either themselves or other patients from infection:

- A closed room/bay notice should be displayed outside the room or bay.
- Always check with ward staff before you enter; keep entries to a minimum.
- Personal belongings should be kept outside the isolation room.
- Follow the isolation protocol for personal protective equipment (gloves and aprons) hand hygiene, linen and equipment.
- Do not take the notes or charts into the isolation room.
- Patients in isolation must have dedicated equipment (BP cuff, commode, sling hoist etc)
- Patients in isolation can usually be moved to other departments for essential investigations if appropriate precautions are taken. Inform the receiving department of the patient's status, check with Infection Prevention and Control if in doubt.

When leaving an isolation room:

1. Remove gloves, aprons and masks (if worn) in the room.
2. Wash hands with soap and water in the room.
3. Step outside the room, then use the alcohol gel.

### Tourniquets

In a study of tourniquet contamination, *Staphylococcus aureus* was isolated from 5% of the sample. 38% of tourniquets were blood stained with the majority of those belonging to house officers and phlebotomists. It should be recognized that there is a potential source of infection from such medical equipment and to avoid this, disposable tourniquets are provided by the trust for use with infected patients.

### Prevention of Intravascular Device (IVD)-Related Bloodstream Infections (BSIs)

**Questions and Answers**
Reusable venesection tourniquets: a potential source of hospital transmission of multiresistant organisms

Objective: To determine the prevalence of multiresistant organism (MRO) colonisation of reusable venesection tourniquets.

Design and setting: A prospective study in a tertiary hospital to collect and analyse reusable venesection tourniquets for the presence of MROs — methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci (VRE), and extended-spectrum β-lactamase and metallo-β-lactamase-producing Enterobacteriaceae — using a sensitive enrichment method. Tourniquets were collected and tested during a 10-week period between September and November 2010.

Main outcome measure: Prevalence of MRO colonisation of tourniquets.

Results: The overall colonisation rate of 100 tourniquets randomly collected from general wards, ambulatory care areas and critical care areas was 78%. MROs were isolated from 25 tourniquets collected from a variety of hospital locations, including general wards, the intensive care unit, burns unit and anaesthetic bay. MRSA was isolated from 14 tourniquets and VRE from 19;
both MRSA and VRE were isolated from nine tourniquets. There were no microorganisms isolated from 22 tourniquets.

Conclusion: Reusable tourniquets can be colonised with MROs and may be a potential source of transmission of MROs to hospitalised patients.

Angie N Pinto

From Salisbury NHS Foundation Trust as seen on:

http://www.icid.salisbury.nhs.uk/ClinicalManagement/InfectionControl/Pages/PeripheralVenessection.aspx

| Tourniquet | Either disposable or made from a material that can be cleaned effectively with a detergent wipe in between patients. The tourniquet should be of a design that allows the operator to release the tourniquet single handed |

Reusable tourniquets may be spreading infections in hospitals

Tweet

04/09/2011

Reusable tourniquets may be a source of transmission of multiresistant organisms (MROs) in hospitals, according to research published in the latest Medical Journal of Australia.

It is estimated that around six per cent of hospitalised patients will acquire an infection during their admission, leading to increased length of stay, further treatment, and higher overall cost, Dr Thomas Gottlieb and co-authors, from Concord Repatriation General Hospital in Sydney, said.

They randomly collected 100 of the reusable tourniquets, which are wrapped around a patient’s arm to assist with gaining access to a vein for blood removal, and found that 61 per cent were colonised
with bacterial species that would not be considered normal upper-limb skin flora. A quarter of the tourniquets yielded an MRO.

“If a single patient MRO transmission is perceived to be an avoidable patient care outcome, then any reuse of MRO-colonised tourniquets may present an unacceptable risk,” Dr Gottlieb said.

“While disposable tourniquets are readily available, their use is not universal due to perceived difficulties in application and patient discomfort.

“However, a study found that 85 per cent of patients found disposable tourniquets at least as good as reusable tourniquets, and 95 per cent of doctors found them as easy to use.

“Reducing the burden of hospital-associated infections is being addressed through multifaceted approaches such as hand hygiene and antimicrobial stewardship programs.

“As reusable tourniquets are frequently colonised with MROs and may be a source of cross-transmission, the burden of MRO colonisation from the hospital environment also needs to be considered.

“With current high prevalence rates of MROs, continued use of reusable tourniquets may not be justified in the hospital setting.”

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**Reusable tourniquets may be spreading infections in hospitals**

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Tweet

04/09/2011

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British Society of Paediatric Dermatology / British Paediatric Allergy Immunology and Infection Group
Phlebotomy tourniquets- vectors for bacterial pathogens


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Phlebotomy tourniquets- vectors for bacterial pathogens

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Abstract

Nosocomial infection is a significant problem. Good hand hygiene is the single most effective preventive measure. However, maintaining a clean patient environment is also necessary. Studies have shown that objects found in the clinical area, including blood pressure cuffs, stethoscopes and keyboards, can be contaminated with pathogens, including MRSA.

Aim This pilot study aimed to assess tourniquet practice in a tertiary paediatric hospital and assess the potential for microbial spread on phlebotomy tourniquets.

Method 85 episodes of venepuncture and cannulation were observed by one researcher to determine tourniquet selection in medical/surgical wards and out-patient areas by medical, nursing and auxiliary staff. Thereafter, awareness of potential cross-infection was raised (information sheet and questionnaire) among those responsible for phlebotomy and single-use tourniquets were made widely available. A further 90 episodes were observed to assess if availability of single-use, disposable tourniquets (SUDT) improved practice. To confirm potential for transmission of microbes, 10 elastic tourniquets from medical, nursing and auxiliary staff were swabbed. Samples were applied to MacConkey agar and blood agar plates, incubated for 48 h and assessed for bacterial growth.

Results Prior to the introduction of SUDTs, 85 procedures were observed: 52% used elastic tourniquets; 39% human tourniquets (applying pressure manually with/without assistant); 8% plastic, wipable tourniquets and gauze was used once (1%). Following the introduction of SUDTs, 53% of 90 observed procedures used elastic tourniquets, 20% human tourniquets and 27% SUDTs. Mixed skin organisms were cultured from all 10 tourniquets: predominantly coagulase negative staphylococci and micrococci, but also β-haemolytic streptococci and coliform colonies. Methicillin sensitive Staphylococcus aureus was isolated from three tourniquets and one yielded a mixed growth of faecal organisms (figure 1).
Poor hospital infection control practice in hand hygiene, glove utilization, and usage of tourniquets

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Background: Hospital-acquired infection often occurs because of lapses in accepted standards of practice on the part of health care personnel. The aim of this study is to attract attention on poor hospital infection control practice in venepuncture and use of tourniquets and emphasize the importance of hand hygiene.

Methods: Overall compliance with hygiene during usage of tourniquets and routine patient care before and after implementation of a hospital infection control measures was evaluated.

Results: According to the questionnaire, only 26.9% of respondents always washed their hands both before and after venepuncture. In the second step of the study, based on direct observation, hands were washed both before and after venepuncture on only 41 (45.1%) occasions. Failure to remove gloves after patient contact was observed on 23.1% occasions.

Conclusion: Our survey reveals poor infection control practice in hand hygiene, glove utilization, and usage of tourniquets and the implementation of infection control measures produced a moderate improvement in compliance with them. (Am J Infect Control 2006;34:606-9.)