Your Power for Health

Bio-One Lab Minute

greiner bio-one

Vol.N°16 07/2014

Disposable Tourniquets

EDITORIAL

The Evolution of Tourniquets

"The awareness of many institutes of the importance of the single-use products has been increasing over the last decade."*

Tourniquets have a long history and the use of this product has not always been the application that we are familiar with nowadays. The use of the tourniquets goes back to ancient Greek times. [1]

Originally it was applied as a compressing device to control bleeding, for example, during surgical procedures. Other uses of tourniquets are known from military settings, such as at war, to control or stop bleeding by application of direct pressure on the wound. Moreover several studies have shown that the application of prehospital tourniquets are a life-saving first aid measure. [2]

In the area of preanalytics, tourniquets are not applied to influence bleeding but to help doctors, phlebotomists and other healthcare workers in routine blood collection to find the veins more easily. The only aim of using a tourniquet is to apply pressure to the arm in order to help find the veins of the patient.

In practice various tourniquets are available which differ in the length, material, application method, intended use etc. There are also special tourniquets intended for use on children. Another choice to be made is between single-use and multiple-use products. Multiple-use tourniquets are often made of textile for reasons of disinfection whereas single-use products tend to be made of silicone or natural rubber.

Both types are very common in practice but the awareness of many institutes of the importance of the single-use products has been increasing over the last decade. The use of disposable tourniquets has been proven to help reduce nosocomial infections, e.g. MRSA. Therefore patients are protected from potential cross-contamination due to the use of single-use products.

Today, the material of choice is soft, elastic silicon material as it prevents skin irritations and feels comfortable on the skin. Furthermore it is recommended to ensure that the softener DEHP is not used in the manufacture, and that the tourniquet is free of dry natural rubber in case of latex allergies.

[1] J.A. McEwen (2014): http://www.tourniquets.org/tourniquet_overview.php; Last updated in May 2014
[2] S. Brodie (2007): p. 311; J.F. Kragh (2013); Lance (2010);

Lance E. Stuke, M.D. MPH (2010): Prehospital Tourniquet Use – A review of the current literature; PHTLS, J.F. Kragh et al. (2013): Tragedy Into Drama: An American History of Tourniquet Use in the Current War; in: Journal of Special Operations Medicine Volume 13, Edition 3/ Fall 2013

* Jasmin Braunreiter,
Assistant Product Manager,
Tourniquets, MiniCollect®
jasmin.braunreiter@gbo.com

PRODUCT STUDIES

Single-Use Tourniquets - Literature Research

The use of disposable tourniquets in hospitals and by phlebotomists is becoming increasingly popular with the aim of protecting patients from cross contamination and nosocomial infections.

Multi Resistant Staphylococcus Aureus (MRSA) cross contamination in particular is seen as a problem.

Different studies and assessments were carried out in different hospitals to show the transmission of multi resistant organisms (MRO) through multiple use of tourniquets without disinfection or cleaning between patients.

Various studies were evaluated for the frequency of bacterial isolates from multiple use tourniquets which may be spread to different patients.

The first study was conducted in a teaching hospital where 100 reusable tourniquets were microbiologically cultivated over a 10 week period. Tourniquets were randomly collected from different wards, including ambulatory, general wards and critical care areas. The study used a broth enrichment method with consecutive cultivation on agar plates. Main focus of attention was put on MROs as MRSA, VRE (Vancomycin resistant Escherichia Coli) and ESBL (Extended Spectrum Beta Lactamase) producing bacteria. The study shows that 35% of tourniquets were colonised by MROs, and 3 of these tourniquets were from high risk infection wards. [1]

In the study carried out by Golder et al. [2] 50 reusable tourniquets from different wards were cultivated. Bacteriological culture showed, that Staphylococcus aureus was cultivated in 24% of tourniquets besides 10% of other gram-negative and gram-positive pathogens, but no MRSA. [2]

The third study carried out by Leitch et al. [3] investigated the MRSA rate in a hospital over a period of six months including 131 multiple use tourniquets. The study showed that even with daily tourniquet replacement, MRSA could be detected in 24% of cases. [3]

Graph 1 shows a summary of microbiological colonisation rates on tourniquets of the three different publications described earlier.

Greiner Bio-One GmbH I Bad Haller Straße 32 I A-4550 Kremsmünster
Phone: (+43) 75 83 67 91-0 I Fax: (+43) 75 83 63 18 I E-mail: office@at.gbo.com

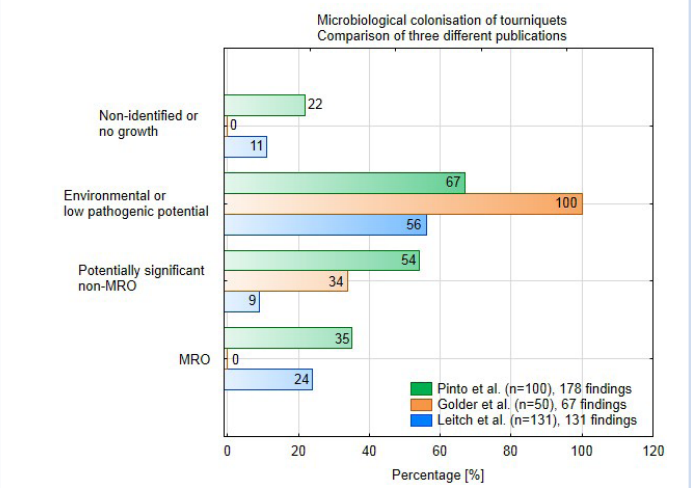
Disposable Tourniquets

The bacterial findings were classified into three significance levels: environmental or low pathogenic bacteria (as Coagulase negative Staphylococci or Bacillus spp.), potentially significant non-MROs (as Meticillin-sensitive Staphylococcus aureus or Enterococcus spp.)and MROs (as MRSA, VRE and ESBL).

The colonisation rate of multi-resistant organism ranges from 35 % to no findings (0 %). Data includes multiple findings, as many tourniquets were colonised with more than one organism. [1,2,3]

These studies clearly indicate the advantage of using single-use tourniquets which – when combined with accurate hand disinfection and good phlebotomy practice – contributes to prevention of cross contaminations between patients.

[1] Pinto, A. et al. Reusable venesection tourniquets: a potential source of hospital transmission of multiresistant organisms. MJA (2011); 195: 276-279.
[2] Golder, M. et al. Potential risk of cross-infection during peripheral-venous access by contamination of tourniquets. The Lancet, 1st January 2000, 355:44.
[3] Leitch, A. et al. Reducing the potential for phlebotomy tourniquets to act as a reservoir for meticillin-resistant Staphylococcus aureus. Elsevier. Journal of Hospital Infection (2006) 63, 428-431.

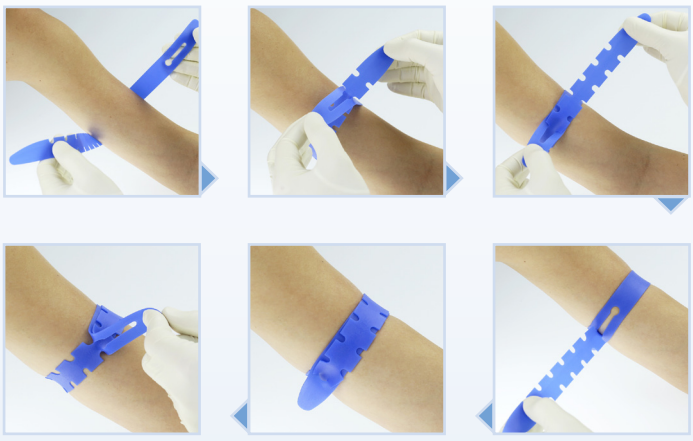


Graph 1: Studies carried out by Pinto et al., Golder et al. and Leitch et al. (Results in percentage of total findings)

Eva Steindl
eva.steindl@gbo.com

APPLICATION

Tourniquet Application



Application of **VACUETTE®** Super-T, disposable tourniquet. [4]

Tourniquets are used in routine blood collection for applying pressure to the arm to make the veins more prominent and easier to feel and find. However some evidence from studies indicates that prolonged tourniquet application may alter laboratory results.[1]

The efflux of water could, for example, be promoted, thus increasing the concentration of various analytes at the puncture site which in turn has an influence on the correct interpretation of test results. For some special tests, such as platelet function, the venous stasis should be reduced to a minimum or even avoided completely. Correct tourniquet application could in any case help to eliminate the effects of venous stasis impact, which may be a source of unpredictable laboratory variability. [2]

A tourniquet should be applied 3 – 4 inches or 7.5 -10cm above the puncture site, tight enough to make the veins more prominent but without impairing the arterial flow to the extremity or causing discomfort to the patient. [3] Veins are easier to enter when the patient also forms a fist without pumping.

The optimum application time for routine tests is less than 1 minute and it is recommended to release the tourniquet as soon as blood begins to flow. [3]

If finding the appropriate vein is challenging and the tourniquet has been applied for longer than 1 minute, it should be released and only re-applied after waiting 2 minutes. [3]

Single-use tourniquets are usually applied in a way that allows easy loosening or removal of the tourniquet with one hand. Both **VACUETTE®** Disposable Tourniquets and **VACUETTE®** Super-T have graphic instructions printed on the packaging to show the proper application technique for each individual product.

[1] Clin Chem Lab Med 2009;47(6):769–776
[2] Biochemia Medica 2013;23(3):308–15
[3] CLSI GP41-A6
[4] IFU 980387 www.gbo.com/preanalytics

Melanie Schimpl
melanie.schimpl@gbo.com

Greiner Bio-One GmbH I Bad Haller Straße 32 I A-4550 Kremsmünster
Phone: (+43) 75 83 67 91-0 I Fax: (+43) 75 83 63 18 I E-mail: office@at.gbo.com