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Nondisposable Blood Pressure Cuffs as a Potential Source for Cross Contamination

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Abstract:
Background: Methicillin-resistant Staphylococcus aureus (MRSA), *Staphylococcus aureus* and Vancomycin-resistant Enterococci (VRE) are capable of surviving for days to weeks on environmental surfaces. Some healthcare facilities have implemented the use of disposable blood pressure cuffs in a effort to prevent cross-contamination of multiple drug resistant organisms, which can add substantial costs. A prospective study was conducted in June 2008 to evaluate the level of bacterial contamination on 30 BP cuffs and 8 pneumatic tourniquet cuffs used in surgical procedures that require the temporary occlusion of blood flow in the extremity. An infection control measure was implemented to disinfect the equipment with an quaternary/isopropyl alcohol germicidal surface cloth.

Objective: To evaluate the effectiveness of a surface cleaning procedure for the decontamination of BP cuffs and tourniquets prior to each patient use.

National Guidelines:
AMA and SHEA Guidelines – JAMA Vol. 280 No. 6, August 12, 1998

The American Medical Association has passed a resolution recommending the cleaning of stethoscopes and other handheld instruments. We support that resolution and suggest the following ways to implement this practice in health care settings, including outpatient and home care settings.

1.Wipe the bell, diaphragm, and tubing of stethoscopes and the surface of otoscopes with alcohol swabs between patient uses.
2. Wash hands thoroughly with soap and running water between patient contacts.
3. Have alcohol swabs readily available (eg, adjacent to sinks, in patient anterooms, and at nursing stations). Swabs need to be easily accessible to encourage use.
4. Provide a dedicated stethoscope and other handheld instruments (including blood pressure cuffs) for patients who require contact precautions (eg, patients isolated because of multidrug-resistant microorganisms, such as Vancomycin-resistant Enterococci infection). Because topical cleaning with alcohol does not reliablyremove all bacteria, non-disposable, dedicated equipment should be more thoroughly disinfected with an approved topical disinfectant between patients. Disposable stethoscopes are an acceptable choice.
5. Instruct environmental services personnel who perform routine room cleaning between patients about the need for and techniques of thorough cleaning of items that contact patients, such as blood pressure cuffs.

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Centers for Disease Control - Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008
Disinfect noncritical medical devices (e.g., blood pressure cuff) with an EPA-registered hospital disinfectant using the label's safety precautions and use directions. Most EPA-registered hospital disinfectants have a label contact time of 10 minutes. However, multiple scientific studies have demonstrated the efficacy of hospital disinfectants against pathogens with a contact time of at least 1 minute

Methods: Contact plates were applied to the center portion of the BP cuff and pneumatic tourniquet that touches the patient' skin during use. The colony forming units (cfu) were recorded, as well as the identification of the microorganisms that were found on the equipment

Blood Pressure Equipment

Dinamap Equipment goes from room to room and used between patients for efficiency in obtaining vital signs

Surface cleaning wipes

Dual-chain quaternary/isopropyl alcohol
Broad spectrum biocidal activity, including M. tuberculosis (TB) and HIV-1 (Aids virus) Germicidal Surface Wipes are non-woven disposable cloths containing a stable low pH formulated disinfectant deodorant cleaner.Staff is instructed to thoroughly wipe the inside of the blood pressure cuff that touches the patient's skin and allow to dry just prior to each patient use.

Surgical Pneumatic Tourniquets

From AORN Journal, Feb 2002
Preoperatively, the entire tourniquet system should be checked. Before each use, pneumatic tourniquets should be inspected for cleanliness and tested for integrity and function.
If blood or other body fluids come in contact with tourniquet components, more extensive cleaning with an enzymatic solution and an EPA high- or intermediate-level tuberculocidal disinfectant capable of inactivating bloodborne pathogens is necessary.

Contact Plates

Results: There was one BP cuff (3.3%) which grew out *Staphylococcus aureus.* None had MRSA and VRE. Four of the 8 tourniquets grew <9 cfu and 9 of the 30 BP cuffs (30%) grew <10 cfu of bacillus species or Coagulase negative staph.

Organisms	BP Cuff	Pneumatic Tourniquets
S.aureus	1/30 (3.3%)	0/8 (0%)
MRSA	0/30 (0%)	0/8 (0%)
VRE	0/30 (0%)	0/8 (0%)
	< 10 cfu	**< 9 cfu**
CNS, Bacillus	9/30 (30%)	4/8 (50%)

Conclusions: A surface cleaning with germicidal cloths that are active against *Staphylococcus aureus*, MRSA and VRE on non-disposable BP cuffs and pneumatic tourniquets appears sufficient to reduce contamination to safe levels between patient use. The cleaning procedure should be done just before each use to prevent cross contamination from shared equipment.

Discussion: Significant bacterial colonization may occur on surfaces of non-disposable blood-pressure cuffs.Contamination of blood-pressure cuffs can be particularly problematic in intensive care units and operating rooms, where the cuffs are commonly exposed to blood and other bodily fluids, thus making the cuffs a possible source of infection if reused.1 With the increasing recognition that contamination of blood-pressure cuff can be a source of infection, it has been recommended that, where possible, a sterilized cuff, or an unused disposable cuff, be dedicated to each patient upon arrival at a hospital and that the cuff follow the patient around in the hospital. However, dedicating a cuff to each patient requires a large number of cuffs, thereby making the practice expensive. Moreover, it is procedurally difficult to insure that the cuff follows the patient's movements in the hospital. Disposable cuffs are available as a possible solution, but disposable cuffs also lead to substantial additional expense. Consequently , hospital staff commonly reuse blood-pressure cuffs on different patients without cleaning the cuffs between patients. This small scale study was undertaken to evaluate the effectiveness of an infection prevention measure to have staff perform surface cleaning BP cuffs with germicidal wipe before each patient use. Results indicate low levels of exogenous contamination on the cuffs and no multiple drug resistant microorganisms.

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