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CLINICAL BULLETIN

The Need to Change Surgical Gloves

Frequent Glove Changes

Surgical gloves are worn as a protective barrier to prevent pathogen transmission and reduce the risk of surgical site infections (SSIs). The intact surgical glove is the most important barrier to protect the patient from micro-organisms transferred from the hands of the surgical team; as preoperative surgical hand preparation, can significantly reduce but not eradicate the resident flora on the surgeon's hands. Conversely, surgical gloves also protect the surgical team from the patient's bloodborne pathogens.[1] Although surgical gloves must meet stringent regulated specifications to serve as an effective barrier during use, gloves can, and do, fail.

The OR is a unique environment with inherent peculiarities that increase the chance of glove failure. Research has demonstrated that surgical gloves cannot always withstand the rigors of lengthy, strenuous procedures and also that perioperative personnel do not always change their gloves frequently enough during a long procedure. A study examining worn surgical gloves found that wearing gloves for 90 minutes or less resulted in micro perforations in 46 of 299 pairs of gloves (15.4%), wearing gloves for 91 to 150 minutes resulted in perforation of 54 of 299 pairs of gloves (18.1%), and wearing gloves for over 150 minutes resulted in perforation of 71 of 300 pairs of gloves (23.7%).[2] Procedures involving a higher percentages of instrumentation, sharp instruments and exposure to boney surfaces have also been associated with higher glove failure.[3] Additionally, the type of surgery is a delineating factor in failure/perforation of surgical gloves and has been studied frequently. A study conducted to estimate and compare the perforation risk in various surgical specialties reported that perforations were found in 203 out of 655 surgical procedures (31%); frequencies observed were 44.5% in gastrointestinal surgery, 34.7% in orthopedic surgery, 31.1% in gynecology, 18.6% in vascular surgery and 9.2% in general surgery.[4] Perforation rates as high as 61% for thoracic surgeons have been reported.[6,2] Due to these findings, it's recommended that surgical gloves should be changed every 90 – 150 minutes of use due to the risk of the glove barrier deterioration [1, 2, 6, 10].

The fact that many glove perforations go unnoticed by members of the surgical team has also been well-documented in the literature. Up to 90% of surgical glove breaches go unnoticed by surgeons, further increasing the risk of SSI's or occupational exposure. [5] Gloves should be inspected when donned and monitored routinely throughout surgery for punctures to help ensure barrier protection against transmission of microorganisms and blood borne pathogens to and from the surgical field.

With the inherent risk of surgical glove failure and the issue that the majority of surgical glove perforations go unnoticed, double gloving has become a best practice standard. The literature sites numerous advantages associated with double gloving compared to the use of one pair of gloves. Double gloving practice has been shown to:

- reduce the number of perforations in gloves by 71%;
- reduce risk of exposure to patient blood by as much as 87%;
- reduce blood stains on the skin of healthcare workers by 65%;
- reduce the risk of perforation of the inner-most glove.[6]

When double gloving, wearing two different color gloves (darker color glove as inner glove and lighter color glove as over/outer glove), significantly increases the awareness of glove perforation and the practice of changing gloves. [7, 8] Removing both pairs

of gloves when a puncture occurs is another best practice. Regardless of whether a color-coded glove indicator system is used, both the inner and outer pairs of gloves should be changed as soon as possible whenever a perforation is detected, since a perforation in the outer pair of gloves is an indication that the inner glove may be compromised as well. [9]

Summary

Research has demonstrated that surgical gloves may not withstand the adversity experienced in some surgical procedures. From a risk management, infectious disease and occupational health perspective, prevention of barrier failure is key to protecting the surgical team and the patient. Routinely inspecting surgical gloves, changing surgical gloves every 90-150 minutes, double gloving and changing both gloves should a puncture occur in the outer glove are sound practices that could certainly reduce the risk of blood borne infections for both the patient and the surgical team. Following glove use, hands should be cleaned.

According to the World Health Organization and numerous regulatory agencies, do not wash or reuse gloves since this practice has been associated with transmission of pathogens. As medical gloves are single-use items, glove decontamination and reprocessing are not recommended and should be avoided, even if it is common practice in many healthcare settings with low resources and where glove supply is limited. At present no standardized, validated and affordable procedure for safe glove reprocessing exists. Cleaning and re-sterilization of medical gloves between uses may lead to glove damage, with loss of glove integrity, leading to increased risk of holes and tears during re-use. Further, re-use of gloves may lead to loss of product traceability, a critical safety requirement for medical devices.

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