

## Journal Club Block 11 Synopsis (April 19, 2016)

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**TOPIC:** Does the use of sterile vs clean, non-sterile gloves alter post-repair wound infection rates for uncomplicated lacerations repaired in the emergency department?

**Scenario:** You are working in the ED when an otherwise healthy 32-year old female presents to the ED complaining of a laceration to her right thigh. After finding out that her “boyfriend” had another “girlfriend”, she had a couple drinks then went to his place to confront him. In typical fashion, she went after him with a broken bottle in one hand and a kitchen knife in the other. Unfortunately, her 6-inch stiletto heels were unable to support her, causing her ankles to buckle as she chased him into the kitchen. She lost her balance and fell to the ground, cutting herself in the right thigh in the process. The brisk bleeding subsided after the ever-so-apologetic boyfriend held pressure for “a minute”. She did not hit her head or suffer any other injuries. Upon seeing the gaping wound, several centimeters long with subcutaneous fat poking through, boyfriend threw her in the car and drove to the hospital. Fearing criminal action, he slowed as he approached the ED entrance, opened her door and threw her out, then quickly drove away.

In the ED, her vitals are BP 126/85, P 68, RR 18, T 37.1°C, and O<sub>2</sub>Sat 100% on room air. She is in no acute distress (other than wanting to kill the boyfriend), and her exam is unremarkable, except for a 6 cm laceration to her right lateral thigh. It is less than 1 cm deep with only subcutaneous fat exposed. X-ray shows no fractures or foreign bodies. There does not appear to be any muscle or tendon injury and she has full range of motion. No active bleeding and sensation is intact throughout. There are no visible vessels, nerves, or foreign bodies on exploration. As you irrigate the wound with tap water (why tap water rather than normal saline? See Moscati and updated studies by Weiss, 2013), you carefully contemplate how you are going to repair it. You decide to use a 3-0 or 4-0 non-absorbable suture due to its location (but absorbable would arguably do as well, see Karounis). As you gather your supplies, your attending reminds you to use sterile gloves and a sterile technique while doing the repair. You remember that while doing other laceration repairs on previous shifts, some attendings have told you to use sterile gloves, but others have said that using clean, non-sterile gloves worked equally well at less cost. You decide to learn what the literature has to say about sterile gloves for ED laceration repair.

### Articles for Discussion:

1. Sterile Versus Nonsterile Gloves for Repair of Uncomplicated Lacerations in the Emergency Department: A Randomized Controlled Trial, *Ann Emerg Med* 2004; 43: 362-370.

Bottom Line: Using non-sterile gloves in immunocompetent ED patients with uncomplicated traumatic lacerations repaired within 3 hours of injury does not increase post-wound infection rates.

- 816 patients randomized, mean age 30 years, 73% male, 62% of lacerations were extremities, 66% were from sharp objects, and 15% were contaminated.
- 88% of wound repairs used lidocaine without epinephrine, 95% used single layer closure, 92% used non-absorbable monofilament suture material and 25% used topical antibiotic.
- The observed infection rate was 6.1% (95% CI 3.8% to 8.4%) in the sterile glove group versus 4.4% in the clean gloves group (95% CI 2.4% to 6.4%).

- The difference in infection rates was not statistically or clinically significant (RR 1.37, 95% CI 0.75-2.52,  $p = 0.295$ ).
- Culture results for infected wounds were available in 8 cases and all demonstrated mixed skin flora with predominance of gram-positive cocci.

This study represents a high quality, low bias study with directly relevant research to assess the infection risk of using non-sterile, clean gloves to repair traumatic wounds in ED settings. However, there remain concerns about selection bias (26% of approached patients were either ineligible or did not consent) and the effect of MRSA rates which limited our confidence in the conclusiveness of this research. This single study is convincing, but additional high quality research is needed.

**2.** A pilot study on the repair of contaminated traumatic wounds in the emergency department using sterile versus non-sterile gloves, *Hong Kong J Emerg Med* 2014; 21: 148-152.

- 89% male with mean age 27.5 years and mean wound size 4.1 cm
- Almost all wounds occurred on either the extremity or the head/neck.
- Overall infection rate 3.2% with 2% in sterile glove group and 4.6% in the clean glove group, respectively

This study of traumatic lacerations contaminated with dirt or stool with suture repair within 12 hours of injury and treated with 3-day course of antibiotics does not inform whether clean non-sterile gloves are non-inferior or equal to sterile gloves to reduce the rate of post-wound repair infection. However, there is a trend favoring sterile gloves technique.

This is a potentially very biased study with incomplete statistical analysis that does not inform the equivalency or non-inferiority of non-sterile gloves for traumatic, contaminated wound closure.

**3.** Comparing non-sterile with sterile gloves for minor surgery: a prospective randomised controlled non-inferiority trial, *Med J Aust* 2015; 202: 27-31.

- 493 patients were randomized (250 non-sterile, 243 sterile) with one protocol violation (antibiotic prescribed for another infection)
- Infection occurred in 9.0% (43/478) with 8.7% (95% CI 4.9%- 12.6% in non-sterile glove group versus 9.3% (95% CI 7.4%-11.1) in the sterile glove group, representing a difference of -0.6% (95% CI - 4.0% - 2.9%) which did not reach the pre-determined margin of 7%
- Sensitivity analysis of the 15 patients lost to follow-up did not alter non-inferiority.

This Australian primary care study suggests that non-sterile gloves do not increase wound infection rates after excisions of skin lesions by trained professionals. Wounds that occur from accidents that are repaired with sutures in the ED are different because they are dirty (bacteria from the object that cut you and your skin are deep in the wound) so the comparison is imperfect. This study does, however, add to a growing body of evidence that non-sterile gloves do not increase infection rates when repairing simple lacerations.

### **Notes from Discussion:**

Overall, the residents were basically split as to whether they currently used sterile or non-sterile gloves for simple laceration repair. If sterile gloves were used, it was less for the sterility as it was for comfort and “feel” during the procedure. Given the number of potential interruptions during lac repair, the increased cost of sterile vs non-sterile gloves, and lack of a significant difference in infection rates when using non-sterile vs sterile gloves, it is appropriate to use non-sterile gloves in a “clean” manner for simple laceration repair in the Emergency Department. It should be noted, however, that one of our residents threw some masterful sutures into the simulation model while using sterile gloves but when using a non-sterile technique, I would not have wanted this resident suturing a simple lac on my Friend’s Uncle’s Brother’s Nephew’s Cousin’s Daughter’s School nurse’s Ex-Husband’s dog (if that even exists).