

## **Headgear and surgical site infection: is the controversy over?**

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Around 2015, skull caps, the most popular headgear for surgeons, suddenly disappeared from the supply racks by locker rooms in operating room (OR) areas. Available were only bouffant caps and headgear extending around the face for personnel with facial hair. Cloth caps with favorite designs and logos were banned. OR nurse managers supported by infection control and hospital management stood strong against constrained surgeons and other OR personnel. The evidence advanced was from the Association of perioperative registered nurse (AORN) guidelines for perioperative practices: “A clean surgical head cover or hood that confines all hair and completely covers the ears, scalp, skin, sideburns and nape of the neck should be worn”(1). AORN guidelines admit the recommendation is based on research studies with small sample sizes, were of low quality or were conducted in laboratory settings that may not be generalizable to other settings. As such, the evidence on reducing surgical site infection by instituting such measures is indirect at best.

Anyway, to the dismay of surgeons, bouffant caps and headgear with facial extension were in and everything else was out.

The American College of Surgeons rebuffed this recommendation with a statement in August 2016 citing the lack of evidence and the symbolic nature of the skull cap (2). The Center for Medicare and Medicaid (CMS) intervened with a statement supporting AORN recommendations and pointing to its infection control worksheet and the possibility of citation by its surveyors for noncompliance (3).

Surgeons did not give up. They decided to study the issue of caps vs bouffant scientifically. The first study by Haskins et al used the Americas Hernia Society Quality collaborative (AHSQC) database which was augmented by surveying surgeons in the database about their headgear (4). In 6210 cases performed by 68 surgeons, the type of headgear was not associated with an increased risk of 30-day surgical site infections or surgical site occurrences requiring procedural intervention. This study was followed by another by Markel et al funded by the American College of Surgeons (5). In this study, simulated surgeries were performed in real operating rooms by personnel wearing 3 different types of headgear: bouffant hats, disposable skull caps and laundered cloth caps. Airborne particulate matter and microbial contaminants were sampled and the permeability of the different types of hats was studied. The researchers found that bouffant caps performed the worst with greater permeability, penetration and microbial shed than either disposable or cloth caps.

The first study used retrospective data matched with a survey that is not necessarily contemporaneous with the retrieved data. However, the evidence used is direct as it assessed the effect of the headgear on surgical site infection. The second study uses the best available technology to sample air and study headgears with convincing data but provides no direct evidence regarding surgical site infection.

Did the surgeons win the argument in favor of skull caps and cloth caps? I would say that more evidence is now available in favor of these types of headgear but that the hypothesis of superiority of one headgear over the other is difficult to study and would require a very large prospective pragmatic randomized trial, to simulate real life situations.

I am comfortable with reintroducing skull caps and cloth caps to the operating room. However, I also would like to introduce a word of caution to all operating room personnel about the upkeep of operating room attire, arguably a more valuable discussion than that of the bouffant vs the cap. A cloth cap will need to be frequently laundered. Headgear, mask and shoe covers should be removed when taking a trip to the hospital cafeteria and new ones used when re-entering the restricted areas of the operating room. OR personnel should not enter the operating room with street scrubs and should change scrubs when soiled or dirty. Scrubs should be covered with a protective coat when leaving the restricted area in between cases.

I have little proof for advancing any of these arguments and even less proof to state whether scrubs and caps should be laundered at home or by the hospital. AORN guidelines make those recommendations and we unfortunately lack in implementation and surveillance of those measures. Short of having best evidence in any of those areas, myth and reality will continue to co-exist and our common sense augmented by evidence should prevail over emotions.

As delineated in many recent studies, surgical site infection constitutes a third of all hospital acquired infections, and we owe it to our patients to do our best to avoid this complication. Complying with any of these measures is simpler and less harmful to the patient than the use of intravenous prophylactic antibiotics or perioperative oxygen administration.

- 1- Guideline for surgical attire in guidelines for perioperative practice.p 97-119. Conner R editor. AORN, 2015 edition
- 2- Statement on operating room attire. American College of Surgeons. Bulletin of the American College of surgeons, October 2016. First released online August 4, 2016
- 3- Guioa d: CMS response to American College of Surgeons response statement on operating room attire. [https://www.nmhanet.org/files/Documents/Guioa CMS Response to ACS.pdf](https://www.nmhanet.org/files/Documents/Guioa%20CMS%20Response%20to%20ACS.pdf) . Last accessed 11/30/2017
- 4- Haskins N, Prabhu S, Krpata DM et al: Is there an association between surgeon hat type and 30-day wound events following ventral hernia repair? *Hernia* 2017; 21:495-503
- 5- Markel TA, Gormley T, Greeley D et al: Hats Off: A Study of Different Operating Room Headgear Assessed by Environmental Quality Indicators. *J Am Coll Surg* 2017;225:573-581.

