RITUALS IN THE OPERATING ROOM: ARE THEY NECESSARY?

by Edward J. Quebbeman

THERE ARE MANY NAMES for the policies and procedures that influence the people who work in the surgical suites, including "sacred cows," "the rules," "the way we have always done it," and perhaps most appropriate, "the rituals." All who work in this environment know the practices referred to, and all have favorites they cling to and others they would like to change or remove. Preservation of these practices is easy, but changing them is difficult and often borders on the impossible. The purpose of this document is to discuss some of these rituals and to suggest that now—during this period of radical changes in health care delivery—may be an appropriate time to analyze critically, review, and change some of our treasured practices.

A ritual (rite) is defined as (1) a ceremonial or formal, solemn act, observance, or procedure in accordance with prescribed rule or custom, as in religious use, or (2) any formal, customary observance, practice, or procedure. Although the operating room environment may not qualify completely as a religion, it certainly is a culture. Many of the rituals common to the surgical suite function to define "us" and differentiate and distance "us" from "them," including the physical design of the surgical suite area and the manner of dress, for examples.

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The rituals have developed with good intent for the purpose of protecting patients from "evils." The concept of evil is common in any culture or religion. In the case of the operating room, these evils cause infection or death. They are known to the scientific community as bacteria, fungi, viruses, and any associated transportation vehicles, such as dust, dirt, and sometimes air.

The fact that a procedure is a ritual does not by itself imply that it is "good" or "bad," nor does it imply that it should persist or be eliminated. Each should be evaluated in light of current knowledge and data. For example, hand washing prior to performing an operation is a ritual of great importance and complexity. It is a time when homage is paid to the concept of preventing infection, the beliefs and intricacies of the practice are passed on to the new initiates (medical students, residents, nursing students), and contemplation of the upcoming surgical procedure occurs, with instructions for other members of the team. This particular ritual has many appropriate aspects and is one of the most firmly embedded in the operating room culture. It is a ritual that practitioners of hospital infection control and the CDC have been trying to bring to the rest of the hospital with only moderate success. However, even hand washing has aspects that often bring science into conflict with traditional practice, such as how long the scrub should last, what chemical products should be used, and what type of brush should be used, if any.

Another ritual involves sterilizing instruments and other materials that will come into contact with the patient. There are few arguments about this aspect of surgical suite procedures, and the science of sterilization is in general agreement. Since this is such a vital ritual, it is rare that unsterile products are used accidentally, and it is also rare that an argument occurs to justify use of sterile material.

A taboo takes the form of a prohibition against some act or practice and is likewise ubiquitous in the surgical suite. For example, one taboo is "do not touch a sterile surface," but then continues, "unless the prescribed cleansing and robing ritual is performed first." This again makes sense and is supportable by scientific data. Another appropriate taboo is "do not use the contents of a package unless marked *sterile*." A taboo that needs to be questioned is often printed on packaging material—"product disposable, do not reuse." While there are many arguments about legal requirements, the

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From the Department of Surgery, Medical College of Wisconsin, Milwaukee, Wisconsin

Address for correspondence: Edward J. Quebbeman, M.D., Ph.D., Department of Surgery, Medical College of Wisconsin, 9200 West Wisconsin Avenue, Milwaukee, WI 53226 (Fax: 414–454-0152)

present economic constraints may take precedence and suggest reuse of some equipment in defined situations.

To examine each of the rituals that has developed in the surgical suite would be impossible since they are numerous and the scientific or investigative data are often nonexistent. However, examining a few of the most common rituals may provide the incentive for looking into others and also may allow improved efficiency, reduced costs, and perhaps availability of better products.

The first of these is wearing a mask in the operating room. People wear masks in the operating room because they believe that the masks prevent infectious agents from leaving the mouth and nose of the wearer and that if they did not wear them, infections in the patient's wound would occur. There are different designs of mask and much discussion about filtration capability. However, much of the exhaled gas goes around the outside and not through the mask material itself. To correct this, tight-fitting masks with improved filtration ability have been used, and some operating room attire includes a head bubble with battery-powered air intake and exhaust at the floor level. These represent high-tech solutions that substantially increase cost and often increase discomfort for the wearer. A very basic question must be answered first: does the existing data suggest an increased infection rate when masks are not used at all?

A few published studies address this issue. One study by Mitchell and Hunt [1] used volunteers under controlled conditions to measure the number of colony-forming units (CFU) released from the nose and mouth. The volunteers breathed directly over an agar plate and either breathed quietly, whispered, or recited out loud while not wearing masks. These activities resulted in 0 CFU during breathing, 5 CFU during whispering, and 28 CFU while talking. They then went to a newly constructed operating room with 20 air changes per hour and repeated the procedure with the personnel 1 m from the surface of the operating table. In no case did any colonies grow on the agar. They concluded that at least those personnel more than 1 m from the table (circulating nurses, observers) need not wear masks.

Another study by Tunevall and Jorbeck [2] compared alternating 30-minute portions of 14 thyroid operations during which all team members wore or did not wear face masks. They had a Sartorious air sampler 20 cm from the surgical wound to measure bacterial CFUs. The operating rooms had 17 to 20 air changes per hour. During the 17 periods with masks and 28 periods with no masks, there was no difference in CFU/m^3, and there were no postoperative infections. Although there was no statistical significance, the number of total CFUs was slightly greater during the masked periods.

During a longer period, Orr [3] studied a hospital operating room and wound infection rates during a 6-month period when all personnel ceased to wear masks. Again, the wound infection rate did not change significantly.

In the emergency room setting, Ruthman et al. [4] found that when masks and caps were no longer used, the wound infection rate did not change. Likewise, in the cardiac catheterization laboratory, Laslett et al. [5] found that eliminating caps and masks had no deleterious infection outcome. Literature in support of wearing masks has not been identified.

These findings should be considered because of their significant cost implications, even if only some personnel stop wearing masks. The current ritual has such strong influence that a person without a mask in the operating room is identified as an outsider or as one who wishes harm to the patient. Therefore, all those who enter a room where an operation of any kind is occurring must wear a mask, and by extension, any procedure even outside the operating room must be accompanied by a mask (and cap, gown, etc.).

However, in the 1990s, protection of the patient is only one aspect of infection control practices; another is protecting the health care worker from the organisms of the patient. There is a major concern to keep blood away from health care workers because of the risk of transmitting AIDS, but the risks of transmitting hepatitis B, C, and potentially other viruses are even greater. These are important concerns, and the federal government has mandated appropriate precautions and protective apparel [6].

This other reason to wear a mask has profound implications on the manufacturers who choose the material and design the size and shape of the mask, and it should influence those who will choose which mask to buy for their operating room. For example, if a mask does not have to function as an efficient air filtration device for bacteria but only needs to keep particles of blood from the mucous membranes of the wearer, more comfortable and breathable materials could be used. Perhaps it could extend below the chin to protect the neck area from splashes or expectorated material. There may be significant cost considerations in choosing a disposable or a reusable material.

Conversely, if the mask needs to perform as an efficient filtration device during treatment of patients with diseases transmitted through the air, such as tuberculosis, the current mask may need to be replaced as an

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inefficient system in favor of a respirator type mask with less leakage around the sides and the ability to filter out more and smaller particles. In either of these conditions, maintaining the existing mask ritual may not be in anyone's best interest.

Wearing a mask is not the only common ritual that has failed to withstand critical analysis. Wearing caps and other head covers in the operating room is another such ritual, and there is frequently debate over how much hair a person has in relation to the style of head covering that should be worn. Those with beards are admonished to achieve almost total head coverage. Humphreys et al. [7] investigated air bacterial counts in the operating room when head covers either were or were not worn. The head covers used were the full-hood design. Volunteers walked or stood in an operating room while air was sampled using two different sampling devices. In addition, room ventilation was either turned off or had 20 room changes per hour. The presence of the hood did not appear to influence the number of CFUs in the air.

Another study by Humphreys et al. [8] investigated the common ritual of placing "booties" or disposable shoe covers over shoes from outside of the operating room. The belief behind this ritual is that bacteria will be lessened in the clean operating room environment. To test this, the study conducted quantitative cultures of the floor in (1) a "dirty" area just outside the operating suite, (2) a "clean" area in an operating room, and (3) an "intermediate" area between the first two. Shoe covers were worn for 2 weeks and not worn for 2 weeks. Not only did the shoe covers not decrease the number of floor bacteria, but there was no quantitative difference between the three designated areas.

Again, this study did not address the other reason for wearing shoe covers—keeping blood and other fluids

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off of the legs and shoes of the health care worker. It is very important to identify the reason to wear shoe covers since not wearing them will decrease purchase and disposal costs, and both the design and materials will be different for fluid protection versus protection from bacteria. A surgeon doing a major abdominal procedure may need knee-high boots capable of fluid resistance for a prolonged period. Others not at the operating table probably do not need any shoe cover.

Many rituals serve a useful purpose in the operating room. Not having rituals in a culture as complex as this one is probably not possible, even if it were desirable. However, even well-established rituals may not have a sound scientific basis and should be periodically reexamined in the light of new findings, new procedures, and the realities of efficiency and expense.

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