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Infection Control in the Intensive Care Unit

Infection control is taken very seriously in the Intensive Care Unit, or ICU. The many patients who are in need of care there are closely monitored so that nosocomial infections are kept to a minimum. Nosocomial infections are defined as infections that occur at least 48 hours after a patient is admitted to the hospital without proof of being sick beforehand, infections that occur up to 3 days after being discharged from the hospital, or infections that occur within 30 days of a surgical procedure (Eggimann). While many believe that merely being sure that hospital employees always wash their hands is enough to prevent these infections, there are other ways that diseases can be contracted in the hospital besides through the employees' contaminated hands. How can the risk of nosocomial infections be further reduced? Simply putting patients in separate rooms can prevent many infections; unfortunately, the answer is not as simple as that. Many hospitals have ICU rooms with multiple beds instead of single beds. In order to put patients in separate rooms, many more rooms would need to be built. However, if the hospitals decide to build all of those single-bed rooms, it will cost a substantial amount of money. However, if we look at the health care system as a whole, we can see that building separate ICU rooms will decrease the amount of government money spent on health care by $3.5 billion (Peeples). Although it is an effective way of inhibiting the spread of disease, building single-bed rooms may not be in hospitals' best interests right now. In the meantime, health care providers can practice many smaller scale ways to prevent patients from contracting nosocomial infections in the ICU.

In order to protect patients, it is necessary for all health care providers to become familiar with nosocomial infections. When they know the symptoms of particular strains and how those strains are spread, they can treat the infection much more effectively or even prevent the infection altogether. Knowing how the infections came to be and what is being done to treat them now can also help health care providers.

Some nosocomial infections are resistant strains of infections that we already know how to cure, but were treated improperly. For example, one strain of staphylococcus aureus has evolved into methicillin-resistant staphylococcus aureus, known by the acronym MRSA (Broadhead). According to Staff Sergeant Jon Broadhead of the U.S. Air Force, the S. aureus bacteria strain used to be treated with penicillin, but it soon grew too strong, which rendered penicillin ineffective (Broadhead). A stronger form of penicillin called methicillin was then created to combat the penicillin resistant strains, but soon after being exposed to it, S. aureus became resistant to that as well (Broadhead). Vancomycin-resistant enterococci (VRE) and azole-resistant Candida spp are also drug resistant bacteria (Broadhead). In the opinion of many health care providers, the problem of resistant pathogens such as these came about because of the inadequate or excessive use of antibiotics and antimicrobials (Broadhead, Lin). Broadhead states that "bacteria are extremely adaptive to the challenge of antimicrobial therapy and have evolved a variety of resistance mechanisms" (Broadhead). An important thing to remember when treating bacteria is that you must take all of the prescribed antibiotic drug. If it isn't, then the bacteria left behind that were able to resist the drug will multiply, bringing with it its resistance to the antibiotic. When it grows resistant to the antibiotic, it creates what some call a super-strain. When it spreads to

other people, they cannot be treated with the original drug, so they are prescribed a different drug, which is exactly what happened with the S. aureus bacteria. If people remain uneducated about the dangers of antibiotic misuse, then the cycle will continue.

Other nosocomial infections are harder to prevent because they are spread through the use of ICU devices. Device-associated nosocomial infections are the biggest threat to ICU patients because it is a place for those who are in critical condition (Leblebicioglu). Patients are often hooked up to machines that help them perform basic functions, such as breathing and excreting waste. As a result, device-associated nosocomial infections, such as ventilator-associated pneumonia (VAP), catheter-related bloodstream infections, and urinary catheter-related infections, account for over 80% of all nosocomial infections (Eggimann). Ventilator-associated pneumonia is actually the second most common infection and is the cause of up to 62,000 deaths per year in the United States (Hoffken). As with resistant strains, inadequate antibiotic use contributes to the high death rate associated with VAP (Hoffken). To combat this, Luna et al conducted a study on the effectiveness of antibiotic treatment on VAP during different stages of infection (Hoffken). They found that the group of patients that was treated as soon as there was a sign of infection had a much lower mortality rate than those who weren't, 38 to 91% respectively (Hoffken). This shows that health care providers need to keep a close watch on their patients so that they can quickly treat any infection that they acquire.

Just as nosocomial infections can be contracted in many ways, they can also be treated and prevented in many different ways. Antibiotics are definitely a well-known way of treating infections, but there are also other ways that are just as effective. Some

hospitals have employees that are specifically trained to deal with more advanced infection control, but all health care providers are taught basic infection control (Grant).

Infection control professionals, or ICPs, are trained to help hospital employees such as nurses prevent nosocomial infections (Grant). Unfortunately, many employees don't know how to utilize the ICP's knowledge (Grant). Patti Grant, the author of "The role of the infection control professional in the intensive care unit," states that the programs are designed to protect not only the patient, but also employees, volunteers and visitors from the various diseases as well as "prevent "extra" pain and suffering from the hospital environment", which is a fancy way of saying "preventing nosocomial infections" (Grant). Many studies say that all nosocomial infections can be prevented, but according to Grant, there are some that can't (Eggiman, Grant). Many of the surgeries that lessen the intensity of the patients' symptoms and keep them alive are very invasive, so some nosocomial infections are expected, such as ones of the urinary tract, blood, and lungs (Grant). The information that the ICP collects and analyzes can help reduce or prevent some of these expected nosocomial infections (Grant). ICPs also use the National Nosocomial Infection Surveillance (NNIS) system for its data on device-use, which allows ICUs to compare their practices with devices and the spread of disease to other ICUs (Grant). If enough reports of using a specific ICU device correlate with the spread of a nosocomial infection, they know that they should check to see if they are actually related (Grant).

Just following good infection control practices can decrease the risk of spreading infections (Rigdon). Major Robert Rigdon of the U.S. Air Force states in his article entitled "Protocols for the Prevention of Intravascular Device-Related Infections" that

though intravascular devices (IVDs), devices that go into veins or arteries, are an important part of the ICU, they "also provide potential routes for microorganisms to enter the bloodstream and are a possible source of serious illness or death for patients" (Rigdon). Starting out, the health care provider just needs to do simple things, like carefully choose IVDs or any other ICU device and be sure that it isn't made of a material that irritates the patient's skin or veins (Rigdon).

Handwashing, as basic as it is, is an extremely important part of preventing the spread of infection (Rigdon). It is important for the health care providers to keep their hands clean any time they touch the patient, such as when they put in the IVD, when they maintain it, and when they take it back out (Rigdon). Health care providers must be sure to clean every part of their hands, even under their nails. While on the job, it is important for health care providers to have short, unpolished nails and to keep jewelry to a minimum. Long nails and acrylic nails are frowned upon in the health care profession because they give pathogens more places to hide (Rigdon). Nail polish makes it hard for the health care provider to see under their nails, meaning anything could be under there, just waiting for the opportunity to infect another patient (Rigdon). Wearing excessive amounts of jewelry lessens the effectiveness of hand washing by giving pathogens another place to hide (Rigdon). According to Rigdon, although all health care providers know that hand washing is extremely important, there are some instances where they feel less inclined to wash their hands or they feel they can't (Rigdon). Such instances include the lack of available places to wash hands, and chapped hands due, which may be due to harsh soaps, the absence of hand lotion, or hands not being rinsed or dried properly (Rigdon).

It is also important for the patient to have clean skin. Before IVDs are used or injections given, the patient's skin must be properly cleaned and prepared (Rigdon). If the skin is not clean, the organisms that live on the skin could be pushed down into the bloodstream along with the IVD or needle (Rigdon). After the IVD is inserted into the skin and vein or artery, the health care provider must properly dress the site so as to not allow pathogens to enter (Rigdon). Just dressing the insertion site with gauze is enough, but new types of dressings that claim to be better for monitoring have been used as well (Rigdon). By current guidelines, either is fine as long as they are both monitored and changed when needed (Rigdon).

Barrier precautions are also necessary for preventing the spread of infection. There are several different levels of barrier precautions. Health care providers follow basic barrier precautions when they wear gloves and gowns (Rigdon). Sometimes, though, just gloves and gowns are not enough and a health care provider must follow more advanced barrier precautions and wear full gear, comprised of: sterile gloves, long-sleeve sterile gown, mask, cap, and a large sterile drape (Rigdon). If a patient has tuberculosis, the health care provider must be fitted for a special mask before they can even enter the room since it can be spread through water droplets in the air.

If all multiple-bed ICU rooms were switched to private rooms it would decrease the rate of nosocomial infections by over half (Telsch). In an article called "Infection Acquisition Following Intensive Care Unit Room Privatization", a team of doctors studied hospitals that had single-bed ICU rooms and hospitals that had multiple-bed ICU rooms (Telsch). They recognized that similar studies had been done before, but the focus of those studies had been limited to specific types of infection; for example, many dealt

with MRSA, but few paid attention to VRE or Clostridium difficile (Telsch). Separate ICU rooms would inhibit the spread of hospital infections because airborne pathogens wouldn't be able to spread.

There are many things that can be done to prevent the spread of nosocomial diseases in the ICU, from large scale renovations to hospitals so ICU patients can have their own rooms to small scale practices like hand washing. If health care providers get to know their coworkers, the ICPs, then they can further reduce the chances of spreading diseases. Learning to prescribe antibiotics correctly and not using them inappropriately can help reduce the amount of drug-resistant strains of infections, thus limiting the time in the ICU. All of these things are done to help the patient make a full and speedy recovery.

Works Cited

Grant, PS. "The role of the infection control professional in the intensive care unit." *Critical Care Nursing Quarterly* 24.2 (2001): 1-12. CINAHL Plus with Full Text. EBSCO. Web. 21 Feb. 2011.

Eggimann, P, and D Pittet. "Infection control in the ICU." *CHEST* 120.6 (2001): 2059-2093. CINAHL Plus with Full Text. EBSCO. Web. 21 Feb. 2011.

Broadhead, JM, DS Parra, and PA Skelton. "Emerging multiresistant organisms in the ICU: epidemiology, risk factors, surveillance, and prevention." *Critical Care Nursing Quarterly* 24.2 (2001): 20-29. CINAHL Plus with Full Text. EBSCO. Web. 21 Feb. 2011.

Hoffken, G, and MS Niederman. "Critical care review. Nosocomial pneumonia: the importance of a de-escalating strategy for antibiotic treatment of pneumonia in the ICU." *CHEST* 122.6 (2002): 2183-2196. CINAHL Plus with Full Text. EBSCO. Web. 21 Feb. 2011.

Rigdon, RO. "Protocols for the prevention of intravascular device-related infections." *Critical Care Nursing Quarterly* 24.2 (2001): 39-47. CINAHL Plus with Full Text. EBSCO. Web. 21 Feb. 2011.

S Lin, et al. "Relationship of antimicrobial control policies and hospital and infection control characteristics to antimicrobial resistance rates." *American Journal of Critical Care* 16.2 (2007): 110-120. CINAHL Plus with Full Text. EBSCO. Web. 23 Feb. 2011.

H Leblebicioglu, et al. "Device-associated nosocomial infections in 55 intensive care units of 8 developing countries." Annals of Internal Medicine 145.8 (2006): 582-591. CINAHL Plus with Full Text. EBSCO. Web. 23 Feb. 2011.

Peeples, Lynne. "Private ICU rooms may lower infection risk." *Reuters* 10 January 2011: n. pag. Web. 26 Feb 2011. http://www.reuters.com/article/2011/01/10/us-private-icu-idUSTRE7095XP20110110.

Teltsch, Dana. "Infection Acquisition Following Intensive Care Unit Room Privatization." *Arch Intern Med* 171. (2011): 32-38. Web. 15 Mar 2011. < http://archinte.ama-assn.org/cgi/reprint/171/1/32?maxtoshow=&hits=10&RESULTFORMAT=&fulltext=private+icu+rooms&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>.