

DR. ISSAM RAAD

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## **Understanding the Vices of Devices: How M.D. Anderson Cancer Center Reduced its Infection Rate**

**NARRATOR:** Today we are talking with Dr. Issam Raad, Professor of Medicine and Chairman of the Department of Infectious Diseases, Infection Control and Employee Health in the Division of Internal Medicine at the University of Texas, M.D. Anderson Cancer Center, Houston, Texas. Dr. Raad, an expert on device-related infections and the prevention of bloodstream infections, reviews how M.D. Anderson Cancer Center was able to drastically reduce its infection rate. It is his belief that a holistic approach is needed to reduce infections, and that technology is a part of the approach. His work with cancer patients has resulted in better infection-rate outcomes, with reduced suffering for this patient population. Our Capella Tucker talks with Dr. Raad about measures hospitals can take to prevent infections with cancer and other patient populations.

**C. TUCKER:** Thank you, Dr. Raad, for joining us here today. First of all, how did you become interested in infection caused by catheters, and how did that lead to your efforts to reduce device-related infections?

**DR. RAAD:** I became aware, based on studies and based on earlier reports by the CDC, that, really, central venous catheters, and devices in general, are the main driving force for the high rates of hospital-acquired infections, particularly bloodstream infections.

The central venous catheter connects this contaminated environment with the sterile environment of the bloodstream. Given that, I realized, "Why don't we do something about the catheter in order to protect the patient? Why don't we do, ultimately, something about the intratracheal tube?" The studies, for example, with Rabih Darouiche, have shown in The New England Journal of Medicine that we can reduce bloodstream infections by twelvefold or even greater compared to other antiseptic catheters if we use a highly effective antimicrobial central venous catheter.

Now the studies have been worked out using the same drainage catheters. You reduce the risk of meningitis, which is more fatal than bloodstream infections, by seven- to ninefold, by using these antimicrobial drainage catheters going into the brain. So, this is extremely important in realizing that you can save lives, ultimately, because devices...as the term goes, the vices of devices are infectious complications. And these are fatal vices, if you may, that are related to these good devices. You need to protect them in order to protect the patient.

C. TUCKER: Hospital-acquired infections affect 2 million people each year, resulting in approximately 100,000 deaths, yet the University of Texas M.D. Anderson Cancer Center has drastically reduced the number of such infections. As Chairman of the Department of Infectious Diseases and Infection Control at M.D. Anderson, you have been at the forefront of this milestone. Can you tell us about your hospital's infection-rate reduction and what measures were put in place to achieve this?

DR. RAAD: The highest rates and frequencies are those situations where you are dealing with infections in intensive care units, as well as immunocompromised neutropenic cancer patients. We had a high rate of infections as well as bloodstream infection. Like any other center with immunocompromised patients like the ones we have, we had a high rate of ventilator-associated pneumonia. We are talking about seven or eight years ago. We also had challenging numbers with other infections that are hospital-acquired. There have been several measures that have been implemented with a significant improvement. We are talking about five- to sevenfold reduction in ventilator-associated pneumonia at our institution over the last eight years, with lifesaving impact. Almost eightfold reduction in the rates of bloodstream infections, particularly in the intensive care unit, but now more in general cancer patient populations.

C. TUCKER: Can you talk a little bit more about the specific measures that were taken in those two incidents?

DR. RAAD: Yes. There are multiple measures. I think the work that has been started with the bloodstream infections has mainly concentrated in preventing central venous catheter-related bloodstream infections. We have now demonstrated that the driving force, and the driving cause, if you may, of bloodstream infections is this open wound that we have in the chest of patients or in the arms of patients where a catheter is going through the skin into the bloodstream. From the standpoint of the general internists and oncologists and the rest of them, this is a very important tool.

Central venous catheters, and intravascular catheters in general, provide the internist, and also the surgeon, the possibility of providing fluids, providing antibiotics, and also chemotherapeutic agents into the bloodstream. But the price of this, is the fact that this is also a portal of entry for bacteria and fungi

into the bloodstream. The measures there have started with preventing central venous catheter-related infections by applying more antiseptic techniques like the maximal sterile barrier.

So this has been the progression with central venous catheters. Ventilator-associated pneumonia: There have been several other measures that have been implemented, and these measures were including good mouth hygiene, 45 degree placement of the patient, and various other measures of decreasing incubation time that have led also to the decrease in the risk of ventilator-associated pneumonia.

C. TUCKER: Can you go more into what role does technology play in fighting hospital-acquired infection?

DR. RAAD: Technology is a very important part and parcel of a good infection-control strategy. If you really think about it, even the antiseptic techniques that we use — they are all based on technology. We test, for example, the cutaneous antiseptics, and now we have shown that chlorhexidine is better than iodine. Well, this is technology. You are producing a new agent, which is more effective than the baseline agent. So, we have to have always an eye on technology. Technology, in my opinion, is a byproduct of good science, and good science is the one that can stand testing in the clinical setting, not only in the bench, but also at the bedside. Even applying the maximal sterile barrier is good technology.

NARRATOR: Issam Raad and Rabih Darouiche are co-inventors of the minocycline/rifampin technology, and this technology is licensed to Cook Medical. Dr. Raad is entitled to compensation through a royalty-sharing contract with the M.D. Anderson Cancer Center.