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Universal MRSA Screening Among Hospital Patients

HEALTHCARE POLICY

Methicillin-resistant Staphylococcus aureus is responsible for 8% of all hospital-acquired infections in the United States leading to nearly 20,000 deaths per year. Several states have passed legislation mandating screening of hospital patients for MRSA. How effective are the screening programs and what is CDC's role in controlling MRSA infections in healthcare settings. You are listening to ReachMD XM157, The Channel for Medical Professionals. Welcome to a special segment focussed on Healthcare Policy. I am your host, Dr. Jennifer Shu practicing general pediatrician and author. Our guest is Dr. John Jernigan, Deputy Chief of the Prevention and Response Risk of The Division of Healthcare Quality Promotion at the Centers For Disease Control And Prevention and assistant professor of medicine at the Emory University School of Medicine.

DR. JENNIFER SHU:

Welcome, Dr. Jernigan.

DR. JOHN JERNIGAN:

Thank you very much, I am pleased to be here.

DR. JENNIFER SHU:

Exactly how common is hospital acquired MRSA infection?

DR. JOHN JERNIGAN:

Well, as you pointed out the data we have from the National Healthcare Safety Network suggest that about 8% of all healthcare associated infections are caused by methicillin-resistant Staphylococcus. Now interpreting that now we have to keep a couple of things in mind, #1 – most of the data that is submitted to the CDC's National Healthcare Safety Network is submitted from Intensive Care Unit data since that has been the most common site in which a hospital will do this type of surveillance that is changing and we are getting a larger number of hospitals and they are doing surveillance over larger part of the hospital, so we hope to get more data on non-ICU settings in the coming years. It also does an account for some healthcare associated MRSA infections that may be rewetted to care that they receive in a hospital, but the infection is not manifested until sometime after they leave. There is reason to believe that these potentially not captured as efficiently as those that actually happen or manifest themselves while the patient is hospitalized. We have data from population-based surveillance systems that suggest that as much as 60% of all the severe MRSA disease falls under this category that is associated with the delivery of healthcare, but does not have its onset while the patient is hospitalized and we need better methods to capture these to get a sense of the true burden of disease.

DR. JENNIFER SHU:

And when we are talking about patients who have the infection in the hospital, does this tend to be serious infection or we are just catching people, who may be colonized, how serious is that?

DR. JOHN JERNIGAN:

Well, it is definitely a serious pathogen. Staphylococcus aureus is probably responsible for a disproportion amount of the morbidity and mortality because it is a particularly resistant pathogen and we know that proportionally all of the Staphylococcus aureus infections somewhere in the neighborhood of 50% or more are caused by the resistant Staph and these resistant staphylococci are not as responsive to the current agents that we have available, although we do have treatment options. There are data suggests that patients with resistant staphylococci have poor outcomes than those who are infected with a sensitive variety of Staph, increased morbidity, mortality, increased length of stay and those issues. If there is a bit by infection type as well, so for urinary tract infections for example Staphylococcus aureus is not a very common cause of infection. If you look at surgical site infections, particularly certain categories of surgery such as cardiac and orthopedic surgery Staph aureus accounts for as high as 50% of those infections and again about half of those or more being caused by resistant strength. So the 8% figure may be a little misleading in terms of the amount of morbidity, mortality that is being caused by Staph and resistant forms of Staph.

DR. JENNIFER SHU:

And you might expect other invasive disease such as bacteremia such as in a patient, who has a central venous catheter may be, ventilator-associated pneumonia. Are those the types of things you might also expect?

DR. JOHN JERNIGAN:

Absolutely. It is a common cause of catheter-associated bacteremia and for ventilator-associated pneumonia as you mentioned and those particular infections are associated with high rates of morbidity and mortality as well.

DR. JENNIFER SHU:

And just how is MRSA transmitted in healthcare settings?

DR. JOHN JERNIGAN:

We think that the major reservoir of transmission is the infected or colonized patient and it is transmitted either directly or indirectly from patient to patient by healthcare workers serving as transient factors and most commonly due to transient colonization on their hands, but also potentially and directly by contaminated equipment. It is important to remember that MRSA when you look at the molecular epidemiology the number of strains that are associated with healthcare-associated MRSA are very, very small. There is quite impressive homogeneity in the characterization of the strength that causes it and what they suggest that it is of course primarily a disease of transmission. We know that the general population, now we have better data on characteristics of MRSA in the general population and in general it is quite low although it might be increasing, the last count about 1.4% of all of the population of Americans carry MRSA in their nose and much of that is actually not even the strength that are associated with healthcare delivery. If we contrast that to what is happening in the hospital we know that in some places as many as 10 to 15% of patients even on admission to a unit or to a hospital are carrying MRSA in their nose. The discrepancy between what we find in the general population and what we find amongst healthcare experienced people suggests that there is a lot of transmission that is happening in the healthcare setting and anything we can do to decrease that will go a long way towards preventing these infections.

DR. JENNIFER SHU:

Now MRSA has gotten a lot of attention lately in the United States today. But why is it getting so much focus as opposed to other hospital-associated pathogens that could be transmitted such as multidrug resistant gram-negative or C. difficile. Do you have any answers to that?

DR. JOHN JERNIGAN:

I think there are a couple of reasons why that might be the case. Number 1 is the point that I made before is that MRSA is probably of the antimicrobial resistant pathogens. It is, you know, probably a posterior trial for that. It is very common, probably the most common and probably still clinically the most important of the antimicrobial resistant pathogens that we follow and because it is very clear that it is potentially preventable because it is a disease of transmission people have focused very much on trying to prevent a transmission and I will point out that I think there are those that argue that if we can control transmission of MRSA in the healthcare setting it will make a big difference in its impact then what we learn in doing that will probably translate to other antimicrobial resistant pathogens that can be transmitted in hospitals. I also think that the emergence of methicillin-resistant Staphylococcus as a

community-associated pathogen has driven public interest and thus we, as you know, in recent decades before year 2000 it was pretty unusual for an MRSA to be isolated from someone who was not very healthcare experienced and we know that has changed dramatically. MRSA has emerged as a very common cause of skin and soft tissue infections in the United States and it can also cause very severe infections and has captured a lot of public attention, so there has been lot of focus on that pathogen. I think that translated to some extent on the interest of MRSA, as a healthcare-associated pathogen as well. It is true that is only one of many important problems you met in Clostridium difficile, which is increasing dramatically in this country and is a very important problem that we will need to learn to control and the emergent multidrug resistant gram-negatives for which many have no answer in terms of antibiotic therapy at least in terms of modern agents. We are pulling off the shelf some very old drugs to try to treat some of the gram-negative infections that simply are resistant to all of the modern antimicrobials.

DR. JENNIFER SHU:

If you have just joined us, you are listening to a special segment focussed on Healthcare Policy on ReachMD XM157. I am your host, Dr. Jennifer Shu. Our guest is Dr. John Jernigan, Deputy Chief of Prevention And Response for CDC's Division Of Healthcare Quality Promotion and assistant professor of medicine at the Emory University School of Medicine. We are discussing universal screening for MRSA among hospital patients.

DR. JENNIFER SHU:

As some facilities have started to screen for MRSA upon hospital admission, is there evidence that supports the use of this screening?

DR. JOHN JERNIGAN:

Well, the genesis of that practice has to do with the fact that, as I mentioned before, it is pretty clear that the molecular epidemiology shows that MRSA is a disease of transmission. If you have a patient who has an MRSA infection or colonization they got that by transmission from another patient or a

healthcare worker. We also know that there is an iceberg effect if you rely on clinical cultures alone, that is cultures that are obtained at the order of the physician for diagnostic purposes, if you rely on those culture results to identify the patients who are carriers of MRSA we only see the tip of the iceberg as much a larger proportion of patients that are carriers that are not picked up by that strategy. If those asymptomatically colonized patients can serve as reservoirs of transmission, then there are those who argue that identifying them through the use of active surveillance culturing and applying additional infection control precautions in those patients may contribute to the prevention transmission. The data on this are difficult to interpret. There is some <_____> in the literature. There are many studies that suggest that the use of active surveillance in combination with other infection control interventions have been successful at preventing MRSA transmission and the outbreak setting and also in the endemic setting. There are other places in the world, who have successfully controlled MRSA or at least prevented its spread that have employed technique similar to these and so there is suggestion in the literature that this practice can have benefit. However, there are more recent studies that are more mixed. There are recent crossover studies that demonstrated no impact of the recently finished randomized control trial, but has not been published yet, but the results of that were presented publicly at infection control meeting last year suggested that there was no impact. On the other hand there are some more recent studies that did have impact. So the literature is somewhat mixed. I think what all would agree; however, is that active surveillance is only one piece in what should be multifaceted and comprehensive approach to the problem of MRSA transmission or antimicrobial resistance in general.

DR. JENNIFER SHU:

We were talking a little bit about active surveillance culture. Are you talking literally about cultures, which could take 2 to 3 days to come back or may be screening PCR test, which are most timely way of doing this and where did you obtain the samples for screening?

DR. JOHN JERNIGAN:

Well. there are several methods available. There are some who have used a more traditional microbiologic approach using an MRSA screening media that can take up to 2 to 3 days to identify the islet. As you mentioned there are newer PCR technologies that have a much more rapid turnaround

time. It remains to be seen what the relative advantage of the more rapid test as opposed to the slower more conventional tests are. There are places that have reported success without using PCR. Again, time will tell whether the increment of <_____> test will have a large impact. In terms of body sites for detecting a symptomatic MRSA colonization, the most commonly screening sites are the anterior nares, which is sort of the natural niche for Staphylococcus aureus carriage in human beings. In addition to that if the patient has an open wound that is another place that Staphylococcus aureus likes to live and it can be a high yield body site in order to identify a symptomatic colonization. The best combination of body sites is something that remains to be determined. If you screen the anterior nares and any open wounds that exist you are probably going to capture 90% plus of MRSA carriers. You will miss some and the question is how important is that epidemiologically in terms of an overall prevention program and again that remains to be seen. There is more research to be done on looking at additional body sites. There was some interest in the oropharynx as a potential body site of carriage, but again I think most places from a practical point of view are using the anterior nares and any open wounds that they exist.

DR. JENNIFER SHU:

And are active surveillance with isolation enough or decolonization regimen is necessary?

DR. JOHN JERNIGAN:

Well, that is a question and one that we need a lot more research to answer. There was a recent study on a group of hospitals in the Chicago area, who coupled active surveillance with the use of decolonization therapy and were able to demonstrate a premarked reduction in their infection rate, which interestingly occurred not only in patients infections identified during the hospitalization, but also seemed to have some impact on infections that occurred in the 30 days following hospitalization. Again, following up on this concept that things that happened during an acute care stay can manifest themselves after the patients leave. Now the problem with this is that was not a randomized controlled study, so I think although they are very interesting data they needed to be followed up with additional work. The downside of doing that is the concern about the emergence of antimicrobial resistant. There are plenty of examples in the literature where widespread use of decolonization therapy, particularly

mupirocin have resulted in a pretty rapid increase in the emergence of mupirocin resistant strains. This was not reported as a major problem at the study of the Chicago Hospitals, but I suppose time will tell and it is not only an issue of resistance to mupirocin, the mupirocin resistance can be plasma-mediated and some times these plasmas can carry resistant determinants for other agents and it is theoretically possible that the use of mupirocin could drive the spread of resistance to numerous antimicrobial agents. So this is a potential downside and something we have to look at carefully as these strategies are employed.

DR. JENNIFER SHU:

I would like to thank our guest, Dr. John Jernigan. We have been discussing universal screening for MRSA among hospital patients. I am Dr. Jennifer Shu. You have been listening to a special segment focused on healthcare policy on ReachMD XM157, The Channel for Medical Professionals. Be sure to visit our website at reachmd.com featuring on-demand Podcast of our entire library. For comments and questions please call us toll free at 888 MD XM157 and thank you for listening.