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Short Communication

Microbiological Testing And Antibiotic Usage In General Internal Medicine Wards: The Effect of Microbiological Cultures On Antibiotic Prescriptions. A Multicenter Hospital Cohort Research on the use of Microbiological Tests in the Context of Rising AMR Rates

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INTRODUCTION

When there is a clinical suspicion of infection and the findings of the microbiological study are not yet available, antibiotics are routinely administered. Microbiological culture findings may have an impact on empirical therapy, either by causing therapy to be stopped in the event of negative cultures or by enlarging or contracting (streamlining) the range of antibiotics. Several tactics have been proposed to enhance antibiotic prescribing, including monitoring and auditing antibiotic usage, tracking antibiotic resistance, using consensus guidelines or computer decision assistance, and enhancing interdisciplinary collaboration (John JF et al., 1997).

Although some have looked into whether administering antibiotics is acceptable, there haven't been many analyses of how microbiological culture findings affect antibiotic use. In two long-term investigations conducted in internal medicine wards, microbiological examinations were carried out in roughly 70% of all infection episodes, relevant microorganisms were isolated in roughly 50% of episodes, and this led to a change in antibiotic therapy in roughly 50% of instances. Another research found an association between the adjustment of antibiotic medication and cultures taken within the first seven days of hospitalization and the isolation of Staphylococcus aureus or Gram-negative bacteria. In three general internal medicine wards at a Dutch university hospital, the effect of microbiological tests on antibiotic prescription was prospectively examined (Goldman DA et al., 1996).

The use of therapeutic antibiotics was prospectively observed in the general internal medicine wards (69 beds) at the Maastricht University Hospital in the Netherlands from June 1996 to June 1997. The research did not include individuals who had undergone kidney or bone marrow transplants or had HIV infections. All patients receiving antibiotics had their demographic information, medication regimens, dosages, and routes of administration tracked daily. The outcomes of microbiological tests (bacteria growth and susceptibility testing) and their influence on the prescription of antibiotics were assessed. The definitions listed below were used.

A verified or suspected bout of infection for which antibiotic therapy was initiated was referred to as an infection episode and an antibiotic episode, respectively. A prescription for one or more antibiotics for the treatment of an infection episode was referred to as an episode of antibiotic usage (a change in therapy was not regarded as a new episode).

Evaluation of the micro biome includes microbiological samples taken from people who had taken antibiotics. The number of episodes per patient and the number of antibiotic-days (i.e., the total number of days that antibiotics were administered divided by the total number of patient days) were used to indicate antibiotic usage.

Site of infection: Five groups of infections were distinguished: infections of the skin and soft tissues, bacteremia, catheterrelated infections, and fever of unknown origin. These groups included respiratory tract infections (RTI), urinary tract infections (UTI), abdominal infections (cholangitis, peritonitis, pancreatitis, and gastro-enteritis), and infections of the skin and soft tissues.

Community- and hospital-acquired infections: An infection episode was classified as community-acquired when antibiotic treatment was initiated within 48 hours of admission and an infection was suspected. After this period, infections were regarded as hospital-acquired.

It has been demonstrated that using the results of microbiology tests effectively can affect patient outcomes, healthcare costs, and the necessity of prescribing and using antibiotics. Antimicrobial resistance (AMR) surveillance data from microbiology tests has long served as a source of information for empiric antibiotic treatment recommendations. Sensitive, precise, and reasonably priced microbiological tests might be crucial tools in providing patients with personalized antibiotic therapy in light of the rising AMR rates throughout the world. The tests could make it easier to switch from wide to narrow spectrum antibiotic treatments, which would reduce the selection of bacteria that are resistant to antibiotics(Kothari A et al., 2014).

Numerous studies, however, suggest that the promise of microbiological testing is not being completely realized. First of all, because of the lengthy return times, practitioners believe they cannot fully utilize microbiological testing (TATs). Second, studies reveal that microbiological test ordering and use of test findings are subpar, despite the fact that numerous guidelines include suggestions for ordering microbiology tests as well as advice on how to interpret and use test results. These shortcomings might worsen as diagnostic microbiological techniques advance and grow more complex, which would lead to ineffective utilization of human and laboratory resources as well as improper antibiotic administration to patients (Schiff GD et al., 2009).

DISCUSSION

This study's key conclusion was that, despite numerous requests for microbiology tests, only a tiny portion of test findings were used to guide antibiotic decision-making. We saw good adherence to the national guideline's test ordering guidelines, but excessive testing across diagnoses, which reduced yield. The poor use of the tests was caused by both the lengthy TATs and the underutilization of causal pathogen microbiological test findings (Baron JM et al., 2011).

In conclusion, this study raises a number of concerns about the direction of microbiological testing. How might laboratory resources and microbial tests be used more effectively? What diagnostic procedures do we need to create?

And how might our interdisciplinary patient care partnership is strengthened? The collection of microbiology samples must therefore be optimized, new diagnostic techniques must be developed and put into use, and TAT for microbiology tests must be shortened, all while considering the potential effects on patient outcomes, the use of human and lab resources, the prescription of antibiotics, and the development of AMR.

The study has a few drawbacks. Results from microbiology tests were mostly based on Maldi-T of MS and conventional culture. The TAT might have been shortened and the percentage of test findings utilized to guide antibiotic therapy boosted with the introduction of cutting-edge technologies, such as molecular diagnostics. The patient information included in this research's analysis was initially gathered for an interventional study on the hospital prescription of antibiotics. To meet the demands of this investigation, we supplemented relevant microbiological data, though. The external validity may have been lowered since the data collection was restricted to internal medicine departments in Western Norway (Blaschke AJ et al., 2015).

However, this is a rather sizable, multi-center study that applies a substantial amount of diverse data and covers a wide range of clinical circumstances.

CONCLUSION

High compliance with the national guideline's requirements for microbiological testing was found in this investigation. However, several more tests were ordered, many of them had low yields, and only a tiny fraction of test data were used to guide antibiotic decision-making. This demonstrates how poorly microbiological laboratory services are currently being used.

Both tests with higher performance characteristics and better test ordering procedures are required. Furthermore, in order to provide optimal patient care and more focused therapy, the utilization of microbiological test findings to guide antibiotic decision-making needs to be optimized. To bridge these gaps, a comprehensive strategy that makes it apparent that microbiological testing must achieve its goal of giving fast, accurate test results to each patient while simultaneously promoting responsible antibiotic usage is required.

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