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Know Your Test - Culture and Sensitivity – Sh. Nilica Devi

A "culture and sensitivity" (C&S) is a diagnostic laboratory procedure used to identify the type of bacteria and determine which antibiotics can successfully fight an infection. Culture helps find and identify the organism causing illness. The absence of bacteria does not mean there is no infection, since it could be a virus that will not grow in a specific culture medium.

RATIONALE FOR CULTURE

A culture is often ordered when microbiological samples are sent to a laboratory. The sample can be viewed under a microscope within minutes of arriving at the laboratory. It enables a quick initial report, such as "Gram-positive cocci in clusters seen." Combined with an accurate clinical picture, this may be enough to initiate targeted treatment.

A culture is done to find out what kind of an organism (usually a bacteria) is causing an illness or infection. Culturing enables a bacterial count to be made, which can assist in deciding whether a wound is colonised or infected. In colonised wounds, bacteria multiply but do not elicit a host response; infected wounds contain multiplying bacteria which induce a pathological response.

HOW IS A CULTURE DONE?

A culture is done by collecting a sample from any infected (or potentially infected) tissue or body fluid. Reliable culture and sensitivity results are possible only if a good sample is obtained. Samples should be taken aseptically. Body fluids may be collected in a suitable sterile container. Alternatively, a cotton-wool swab is used to collect a small amount of fluid from a wound or surface. The swab is transported in a special medium that encourages growth of bacteria. Specimens should be sent to the laboratory as soon as possible, as some organisms will not survive and others will be overgrown by more vigorous strains. If samples are not sent immediately, they must be stored appropriately – some require storage at room temperature and others refrigeration. The microbiology laboratory attempt to culture (grow) a wide range of organisms (especially bacteria) from this sample by adding it to a culture media that helps to promote the growth of bacteria or other disease-causing organisms. If there are bacteria (or other organisms) in the sample, they will grow in the culture. Bacteria usually grow in a culture (in 2 days), while other types of organisms, such as fungus can take longer.

SENSITIVITY TEST

A sensitivity test checks to see what kind of medicine, such as antibiotic, will work best to treat the illness or infection. Some amounts of antibiotics are applied to determine which are more likely to be effective in treating the infection. A pure culture is "seeded" onto an agar plate containing discs saturated with various antibiotics. If the organism grows up to a disc, it is resistant to that antibiotic; if there is a clear zone around the disc, it is susceptible. This can confirm whether the patient is on the correct treatment or not and can further help with identification. One or two days after growth in culture media, the report will often contain the antibiotic sensitivities as a list antibiotics with "R" (resistant) or "S" (sensitive) next to each drug. This reflects the sensitivity of the organism to the antibiotic in the laboratory disc, "in vitro". This may not always be exactly the same as the clinically observed sensitivity in the human body, "in vivo", in real life.

ANTIBIOTIC RESISTANCE

Antibiotic or antimicrobial resistant bacteria are bacteria that are not controlled or killed by antibiotics. They are able to survive and even multiply in the presence of an antibiotic; often fails to respond to conventional treatment, resulting in prolonged illness, increasing the risk of spreading resistant microorganisms to others, greater risk of complications and higher treatment costs. Antibiotic resistance develops through gene action or plasmid exchange between bacteria of the same species. If a bacterium carries several resistant genes, it is called multiresistant, or informally, a superbug.

Antibiotic misuse are certain to create superbugs. Antibiotic misuse (sometimes called antibiotic abuse or antibiotic overuse) refers to the misuse and overuse of antibiotics which has serious effects on public health. This overuse creates multi-antibiotic resistant life-threatening infections by "superbugs", sometimes out of relatively harmless bacteria. Antibiotic abuse also places the patient at unnecessary risk of adverse effects of antibiotics.

A SERIOUS PUBLIC HEALTH CONCERN

The most serious concern with antibiotic resistance is that some bacteria have become resistant to almost all of the easily available antibiotics. Antibiotic resistant bacteria is a growing threat and becoming increasingly common. The achievements of modern medicine are put at risk by antibiotic resistance. Antibiotic resistance threatens a return to the pre-antibiotic era. Without effective antimicrobials, the success of treatments such as organ transplantation, cancer chemotherapy and major surgery could be compromised.

WHO calls on all key stakeholders, including policy-makers and planners, the public and patients, practitioners and prescribers, pharmacists and dispensers, and the pharmaceutical industry to act fast and take responsibility for combating antimicrobial resistance.

Measures that guide antibiotic prescription are likely to check antibiotic misuse. Taking appropriate and early cultures before initiating empirical antibiotic therapy and streamlining antibiotic treatment based on the culture results are the keys. Being aware of local antibiotic patterns (antibiograms) enable appropriate selection of the initial empirical antibiotic therapy.

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