MICROBIOLOGICAL SPECIMENS

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Cerebrospinal Fluid

Bacteriological examination of spinal fluid is an essential step in the diagnosis of any case of suspected meningitis. Meningitis is infection of the meninges caused by bacteria, viruses, fungi and protozoa. The three most commonly encountered pathogens are Haemophilus influenzae, Neisseria meningitidis and Streptococcus pneumoniae. Meningitis affecting mainly neonates are caused by E.coli, Group B Beta haemolytic streptococci, Coagulase negative Staphylococci, Listeria monocytogenes, Salmonella species, Pseudomonas species, Flavobacterium and Bacillus cereus. Bacterial meningitis also may be secondary to infections in other parts of the body or following trauma and surgery in which case organisms encountered also include Staphylococci, Streptococci, col informs, Pseudomonas, Anaerobes, Mycobacteri um tuberculosis, Treponema pallidum and Leptospira species. Viral causes are due to Enteroviruses, Paramyxovirus, Herpesvirus, Adenovirus and Arbovirus. Fungal causes are due to Yeast, Aspergillus and Mucor species and protozoa such as amoeba can also cause meningitis. It is advisable that whenever meningitis is suspected both CSF and blood cultures be collected, where possible before any antibiotic therapy. Extreme care must be taken to collect the specimen which must be collected under sterile conditions and transported to the laboratory without delay. If a viral etiology is suspected, a portion of the fluid must be immediately frozen and sent to the laboratory.

Respiratory Tract Specimens

The pathogens most likely to be found in the upper and lower respiratory tract are:
Streptococcus pyogenes (Group. A Beta haemolytic Streptococci), Corynebacterium diphtheria, Streptococcus pneumoniae, Neisseria meningitidis, Borderella pertussis, Haemophilus influenzae, Mycobacterium species, Klebsiella pneumoniae, Pseudomonas species, Legionella species, Mycoplasma Chlamydia and Fungi. The specimens for the diagnosis of respiratory tract infections varies from throat swab to transtracheal aspirate depending upon the site of infection. The most important thing is to collect appropriate specimen in a proper manner and where possible before the initiation of antimicrobial therapy. Some suggestions for the collection of specimens are given below.

1. Throat and Nasopharyngeal specimens

Throat and Nasopharyngeal cultures are important as an aid in the diagnosis of infections such as Streptococcal sore throat, diphtheria, or thrush in establishing the focus of infection in diseases such as scarlet fever, acute haemorrhagic glomerulonephritis, and also in the detection of the carrier state of organisms such as Beta haemolytic Streptococci, Meningococci, Staphylococcus aureus and Corynebacterium diphtheria. Throat swab should always be taken with a sterile swab and preferably be transported in a suitable transport medium to the laboratory immediately If it is necessary to hold the specimen for more than an hour, it should be refrigerated. Throat swab be taken with the patient’s tongue depressed and the throat well exposed and illuminated, the swab be rubbed firmly over the back of throat, both tonsils or tonsillar fossae, and any areas of inflammation, exudation, or ulceration; care should be taken to avoid touching the tongue or lips with the swab. If Diphtheria is suspected two swabs should be taken; one should be inoculated immediately on Loeffler's or Tellurite medium and the other sent to the laboratory. Nasopharyngeal specimens are recommended when attempting the isolation of Pneumococci, Meningococci, or Haemophilus influenzae because these organisms are found more commonly in the Nasopharynx than in the nose or throat. Nasopharyngeal swabs are essential for the recovery of Neisseria meningitidis from suspected carriers or Bordetella pertussis from suspected cases of whooping cough. Nasopharyngeal swabs are most useful in culturing specimens from infants and small children, where sputum specimens are not readily obtainable. Nasopharyngeal

swabs are best taken with cotton tipped nichrome or stainless steel wire applicators in a sterile tube containing a few drops of broth; with the patient's head firmly held, the wire swab is gently inserted without force through nose to the posterior nasopharynx, allowed to remain there for a few seconds, and then deftly withdrawn. A second method is by bending the wire swab at right angle near the cotton tip and then inserted through the mouth and behind the ulva and soft palate into the nasopharynx. Care must be taken to avoid mouth and throat contamination of the swab. Anterior nares specimens are occasionally required, particularly for the study of Staphylococci or Streptococcal nasal carriage. They are taken by introducing a cotton swab moistened with broth about 2 cms into the nares, gently rotating the swab and sending into the laboratory in broth tube.

Sputum Specimens

Bacterial pneumonia, pulmonary tuberculosis and chronic bronchitis constitute a most important group of human diseases. Since specific treatment frequently depends upon bacteriological diagnosis, the prompt and accurate examination of a properly collected sputum specimen by smear, culture, and antibiotic susceptibility testing becomes imperative. Sputum specimens are also submitted from patients with bronchiectasis, lung abscess, suspected pulmonary mycotic infections, pulmonary tuberculosis, or infections with Mycoplasma pneumoniae, Legionella species and Chlamydial pneumonia. Recovery of an etiologic agent from sputum depends not only upon the laboratory methods used but also upon the care taken in securing the specimen. Too often, the culturing of unsuitable material results in misleading information for the clinician, the true infecting agent having been missed entirely. The collection of sputum for culture also requires the cooperation of the patient and should include instructions to obtain material from a deep cough (tracheobronchial sputum), which is expectorated directly into a sterile container. The volume of specimen need not be large 1 - 3cc of purulent or mucopurulent material will be sufficient for most examinations. Ideally morning specimen is most valuable.

Transtracheal Aspirates

Since severe and sometimes fatal necrotizing pneumonia caused by Gram negative bacilli and other unusual pathogens including anaerobes is occurring more frequently, the reliability of routine sputum culture has been questioned in such cases, transtracheal aspirates are recommended. The aspirates are collected with a small-gauge catheter threaded into the trachea through J a needle introduced at the cricothyroid ligament. The technique is safe and the results are bacteriologically reliable, yielding a high number of pulmonary pathogens.