New approaches to the rapid diagnosis of tuberculosis

Rapid confirmation of a diagnosis of tuberculosis is important for starting appropriate treatment early and for avoiding the inappropriate use of complex and potentially toxic drug regimens. Detection of the intact bacillus, either by direct smear or by culture, remains the only available way to confirm the diagnosis with certainty. Culture of the organism is too slow to influence initial decisions on treatment but does allow precise identification of bacterial species and assessment of antibiotic sensitivities. The direct smear is easy to perform and is the only readily available rapid diagnostic method, but depends for a positive result on the presence of more than 5000 organisms per millilitre of sample. Sputum is negative in patients with infected, but not infected, lymph nodes or histologically positive local lymph nodes, and in patients with other types of infection, such as isoniazid-induced pleurisy. Smear microscopy of sputum is not useful in the diagnosis of tuberculosis in about 5% of patients and in persons in whom the tubercle bacillus is not known to be present, and is of little value in distinguishing between pulmonary and non-pulmonary disease. In many patients with tuberculous meningitis, the Tubercle bacillus is not present in the cerebrospinal fluid, and the yield is sometimes below 5% in those with tuberculous meningitis. Various diagnostic methods have been developed to detect the micro-organism in sputum, in urine, in biopsy tissue from bone, skin, pleura and other sites, in infected blood, in peritoneal fluid and in other body fluids, but their use is still not widespread for practical reasons.

The potential sensitivity of the polymerase chain reaction method could allow this to replace smear examinations if specificity is maintained, especially in "dirty" samples. In non-industrialised countries, however, the simplicity of the sputum smear and its availability at the point of access to medical care are unlikely to be surpassed by such sophisticated techniques, though they may become a useful addition in smear negative cases. Although the results of both the approaches described are exciting, further work is needed to clarify their specificity and sensitivity in different circumstances and to simplify laboratory procedures. Finally, the practicability of their large scale use requires evaluation.

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