
Histopathology in Tropical Medicine: a Perspective

CARLO M. PESCE, MD

Dr. Pesce is a Pathologist at the Istituto di Anatomia Patologica, Università di Genova, in Italy. He formerly served at Mekane Hiwot Hospital in Asmera, Ethiopia, where the histopathology laboratory was financed by the Italian Ministero degli Affari Esteri as part of the Italian-Ethiopian Technical Cooperation Program.

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Dr. D. S. Ridley, the Hospital for Tropical Diseases, London, provided useful suggestions on the organization of a histopathology laboratory in tropical settings.

Tearsheet requests to Dr. Pesce, Istituto di Anatomia Patologica, via De Toni 14, 16132 Genova, Italy.

Synopsis

Histopathology may serve a wide spectrum of diagnostic purposes in tropical medicine other than

for infectious and parasitic diseases. In addition, it is essential in defining new pathological entities and collecting statistical data on morbidity and mortality. It should also constitute a basic support for advancement and research in tropical diseases.

For practical purposes, both histopathology and cytopathology are often more effective than clinical chemistry and microbiology in providing the clinician with a final diagnosis. They do not rely on complicated and delicate equipment, and the few reagents they require can be stored indefinitely. Formalin fixation permits most histological methods to be used, including special stains and immunohistochemistry. Formalin-fixed material can be examined several days after excision.

Implementing pathology laboratories in tropical countries may constitute a practical, cost-effective approach to the planning of diagnostic services at the regional or district level. A fraction of the medical graduates in developing countries should be devoted to the staffing of these laboratories.

THE PROVISION OF SPECIALIZED HEALTH CARE to the rural populations of developing countries has long been neglected. Selective primary health services, including extensive vaccination campaigns, environmental sanitation, and care of illnesses requiring uncomplicated therapies constitute the first objectives of most health planners. Modern laboratory technology seems to fall more in the province of the affluent western societies than in heavily indebted countries with few human and financial resources.

However, if hospital infrastructures of secondary care are to be established at the regional or district level, the organization of a histopathology section in the laboratory facilities should be seriously considered. Such a section is also recommended by the World Health Organization Committee on Public Health Laboratories (1). Laboratories of histopathology are now generally found only at university hospitals in developing countries and are intended more for teaching purposes than for routine work.

Preparation of Specimens

Histopathology, as well as cytopathology, is more cost-effective than other, more sought-after branches of laboratory medicine, considering that in most cases it provides the clinician with a final diagnosis.

The personnel of even remote outposts can be easily instructed to perform biopsies of the skin, liver, and bone marrow that may prove essential for the diagnosis of common problems of tropical medicine, such as fever of unknown origin. With the major exception of leprosy specimens, the material can be properly fixed right on location and kept in formalin until it becomes available to a laboratory, which is often many miles or days from the patients.

Prelabelled, disposable containers with formalin can be supplied to inpatient wards and to outpatient clinics. The specimen is simply immersed in the fixative, and the patient is identified on the label. If the diagnosis is not urgent, these contain-

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ers can be stored until a suitable number have been collected to justify delivery costs. Unfortunately, this does not hold true for most clinical chemical and microbiological tests.

Basic Purposes

Histopathology serves a wide spectrum of purposes in tropical medicine besides the diagnosis of infectious and parasitic diseases. In these fields, it occasionally may be more practical than microbiology, if microbiology's costs of equipment and manpower and the fastidiousness of processing are considered. For instance, in maduromycosis, histopathology permits rapid identification of the pathogens involved, which is crucial for therapy. Similar results could be achieved through culture, although with longer and more sophisticated procedures.

Formalin fixation and paraffin-wax embedding open the way to most histopathological methods, including special stains and immunohistochemistry. The peroxidase technique has recently taken over immunofluorescence for most immunodiagnostic purposes, and it can be performed on paraffin-embedded material as well as on fresh tissue. Even if complex techniques might not be available in many tropical laboratories, the slides can always be referred to better equipped centers, since there are no time limitations.

Additional Purposes

The role of the pathologist in medical research has been eclipsed in the last decade by the tremendous advances in the biological sciences. There is still much space left, however, for those who work at this crosspoint between clinical and basic medical sciences, especially in tropical medi-

cine. Research has been acknowledged to be the most cost-effective approach to the solution of major health problems of the tropics (2). Incidentally, there is also a need currently for laboratories and personnel specialized in tropical histopathology in developed countries, where research and reference work would be obvious priorities (3).

Necropsies are essential in defining new pathological entities through tissue examination. But post-mortem examinations are time-consuming and expensive, and in most developing countries there are cultural and religious objections to them. Hence, the rate is low. Necropsies, however, do contribute to the collection of statistical data on morbidity and mortality, especially in noninfectious situations. Such information would be useful in recognizing diseases that are prevalent in a given area and for the planning of health services.

Cost Planning

In a given laboratory, the total cost of fulfilling a research request is the sum of the basic handling charge plus the direct costs of carrying out the tests specifically required. The handling charge per request represents the basic cost of having a properly staffed and equipped laboratory available to meet the demands placed on it. The direct costs of any given test vary, depending on the total number of such tests performed (4).

It is difficult to estimate basic costs in a tropical situation, because too many variables, such as manpower and transportation, the area served, and the workload, are unsettled. Nevertheless, the basic equipment and the quantities of general laboratory consummables required are not expensive in histopathology.

Almost all the direct consumables—alcohol, paraffin wax, solvents, reagents—can be stored indefinitely. Some special precautions are to be taken. Paraffin wax should be of high melting point to facilitate section-cutting in a tropical environment. Most histological techniques can be performed with filtered tap water, even if distilled water is specified in manuals. In some instances, such as silver impregnations, purified water is essential, and it can be obtained either from a still of limited capacity or from a refillable deionizing column. Little electricity is needed for histopathology, so it should not constitute a problem in regional hospitals.

The salaries of the technicians and of the pathologist would certainly represent the largest

expenditures for the laboratory. Some specialized personnel, both technical and medical, can be contributed by international organizations or the governmental agencies of developed countries. If the pathologist has experience in clinical pathology, as it often happens in the Anglo-Saxon world, he or she can also take care of other laboratory sections. In addition, the pathologist might become involved in teaching intermediate-level personnel.

Conclusion

It is important that a fraction of medical graduates in developing countries be instructed in pathology to constitute a network of laboratories at the regional level. Such effort should yield results in health care and in second- and third-level prevention that fully justify the human and financial resources needed for the laboratories.

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Rocky Mountain Spotted Fever in Georgia, 1961-75: Analysis of Social and Environmental Factors Affecting Occurrence

VERNE F. NEWHOUSE, PhD
KEEWHAN CHOI, PhD
ROBERT C. HOLMAN, MS
STEPHEN B. THACKER, MD
LAWRENCE J. D'ANGELO, MD
J. DAVID SMITH, BS

Dr. Newhouse is a Research Entomologist (Medical), Viral and Rickettsial Zoonoses Branch, Center for Infectious Diseases, Centers for Disease Control (CDC), Atlanta, GA. Dr. Choi, formerly of CDC, is now Chief, Division of Biostatistics and Computer Services, American Health Foundation, New York City. Mr. Holman is a Mathematical Statistician, Center for Infectious Diseases, CDC, Atlanta. Dr. Thacker is Director, Division of Surveillance and Epidemiologic Studies, Epidemiology Program Office, CDC, Atlanta. Dr. D'Angelo, also formerly of CDC, is Chairman, Department of Adolescent and Young Adult Medicine, Children's Hospital, National Medical Center, Washington, DC. Mr. Smith is an Epidemiologist, Office of Epidemiology, Georgia Department of Human Resources, Atlanta.

Tearsheet requests to Dr. Newhouse, Viral and Rickettsial Zoonoses Branch, Bldg. 7, Rm B43, Centers for Disease Control, Atlanta, GA 30333.

Synopsis.....

For the period of 1961 through 1975, 10 geographic and sociologic variables in each of the 159 counties of Georgia were analyzed to determine how they were correlated with the occurrence of Rocky Mountain spotted fever (RMSF).

Combinations of variables were transformed into a smaller number of factors using principal-component analysis. Based upon the relative values of these factors, geographic areas of similarity were delineated by cluster analysis. It was found by use of these analyses that the counties of the State formed four similarity clusters, which we called south, central, lower north and upper north.

When the incidence of RMSF was subsequently calculated for each of these regions of similarity, the regions had differing RMSF incidence; low in the south and upper north, moderate in the central, and high in the lower north. The four similarity clusters agreed closely with the incidence of RMSF when both were plotted on a map.

Thus, when analyzed simultaneously, the 10 variables selected could be used to predict the occurrence of RMSF. The most important vari-