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Diagnosis of Cancer Beneficial in Improving Quality of Life

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Abstract

It is in the order of cancer control that the tumor be identified and the diagnosis documented microscopically by the pathologist.

Keywords: Phosphotungstic; Cell culture; Fluid; Margins; Malignant degeneration; Anti-angiogenesis;

Introduction

It is also clear that this step is indicated because of the severe morbidity, physical and psychological trauma attendant upon the radical approach to cancer therapy i.e. surgery, radiation, chemotherapy and more recently immunotherapy. Historically, the pathologist has relied on the biopsy and the light microscope as basic tools for diagnosis. For many years, routine staining of tissue was adequate to permit a positive or negative diagnosis of malignancy. The frozen section technique has evolved through the use of carbon dioxide, Freon gas and now the Cryostat permit tissue sections approaching the quality of the permanent section. Special stains are essential in the specific identification of certain tumors. Methyl green pyronin reveals prominent pyronin poorly differentiated neoplasm as an epithelial growth [1]. Phosphotungstic acid hematoxylin emboldens the cross striations of a rhabdomyosarcoma. In the frozen section, a fat stain can confirm the diagnosis of a liposarcoma. Most of these stains have been in our armamentarium for a long time. It is more recent that we have begun to utilize cytochemistry and to employ special stains to demonstrate organelles and enzymes. Electron microscopy, for many years an exclusive research tool, has enriched our understanding of the intracellular environment in both health and disease by its display of structurally distinct organelles. In recent years electron microscopy has been extending the capabilities of the diagnostic laboratory. Ultrastructural techniques have been applied in the diagnosis of plasma cell myeloma, malignant melanoma and sarcoma. However, the light microscope continues to be the mainstay for histologic diagnosis. Tissue culture, an invaluable tool for research, has been used as an adjunct to diagnosis. Cells from a poorly differentiated neuroblastoma, synovial sarcoma, liposarcoma, malignant melanoma and rhabdomyosarcoma have grown out well differentiated cells in the culture chamber. In the past few years a new and potent method for examining living parts of the human being has appeared in the technique of cell culture. We can even use this to preserve for study a living part, including the genome of a person after death. The biopsy has been proven by time to be the most reliable technique for tissue diagnosis. Progressively, the fragments submitted for examination have become smaller and less revealing. The technique of needle biopsy of the liver is practically free of complications today [2]. Encouraged by this success, we can now insert the biopsy needle and biopsy drill into lymph nodes, bone, thyroid, lung, pleura, breast, kidney, and spleen. Some needles e.g. Vim-Silverman and Menghini, have bores of sufficient diameter to obtain an ample core of tissue. In some instances, the procedure is an aspiration biopsy in which the harvest is only a few cells in tissue fluid. These smaller biopsies reduce the opportunity for representative material and introduce the complication of crushing effect of tissue. When only cells are retrieved, the procedure becomes an exercise in exfoliate cytology [3]. Even with these inherent difficulties, it is possible with experience to make accurate diagnoses with needle and aspiration biopsies. When integrated with a plan for possible radical surgery, this procedure can be time saving and thus eliminate a frozen section. Often the large friable tumour mass removed at surgery is readily identifiable as cancer requiring microscopic examination only for documentation. In the modem approach to the management of cancer, this is inadequate. On the other hand, a systematic well thought out dissection of the specimen will disclose the specific point of origin of the neoplasm, the pattern of growth, the extent of infiltration through the invaded organ, the relationship of the mass to the surgical margins, vascular dissemination, if any, and the pattern of its distribution [4]. It is sometimes useful to map out the lymph node spread and diagram the distribution pattern. Such information is most useful in evaluating the prognosis. We have arrived at a point where it is generally accepted that, for few notable exceptions, histologic appearance does not correlate well with the prognosis of cancer. It is more important to emphasize the limits of the tumour and the degree of neural and/or vascular invasion. Surgical margins which show microscopic invasion indicate an inadequate excision. A summary of the gross and microscopic findings to coordinate the total effort is a worthwhile addition to the surgical report. The central problem in the understanding of the pathology of cancer is the appreciation of the biologic control mechanisms, and the decoding of metabolic processes at the molecular, cellular, organ, and body levels. In clinical terms, it is the identification and classification of the lesion; the integration of scientific information from all sources to permit an early diagnosis and contribute to the management of the disease. The following areas must be brought into sharp focus, biological behaviour of cancer, and host reaction to the disease and the various therapeutic agents employed. Specific areas of investigation into the pathology of cancer ponder the origin of the malignant cell. Does the cancer cell arise de novo or is there transformation of benign tumors into malignant tumors. Most surgical pathologists have observed classic examples of sites of transition in the transformation of benign to malignant neoplasia. Common examples are malignant degeneration of adenomatous polyps and villous adenomas of the large bowel. Sarcomatous degeneration can be found in large leiomyomata by

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multiple sectioning of all fibroid masses of the uterus [5]. Histologic evidence for malignant transformation has been supported by Mallory, Mayo, Enterline and others. This concept has been denied by some investigators and there is ample evidence to indicate de novo origin of many cancers. Those who would deny the concept of transformation of benign to malignant tumors recognize the coexistence of carcinoma with benign tumour and propound a theory of guilt by association rather than guilt by transformation. There is much evidence to support the concept that probably no malignant neoplasm develops from normal precursor tissue. It is safe to conclude that benign aberrant phases precede the development of frank malignancy. Further, any tumour probably represents one of many growths that escaped the immune surveillance network. Recent advances in the pathology of cancer include significant investigation into the biology of the neoplastic cell. It is well known that practically all malignant neoplasms have non-specific abnormal chromosomes. The chronic granulocytic leukemic reveals one constant chromosomal aberration throughout the course of the disease. Most exciting is the work of Folkman, called anti-angiogenesis, a new approach to the therapy of solid tumors. This concept is based on the theory that an angiogenesis factor is needed to initiate vascularization of solid tumors. If the cycle of tumour growth can be interrupted, tumour growth can be aborted. Of comparable significance is the development of sensitive assay techniques possible to quantitate tumour associated antigens viz. CEA, AFP, SRCA, and RAI [6]. Each of the above have now became a part of the clinical diagnostic armamentarium of cancer. Investigation into biological behaviour of cancer and host reaction that will permit early diagnosis is an intermediate phase of the attack. Paralleled studies which result in effective therapeutic agents will arm the clinician with a multifocal capability. In spite of all advances and improvements in investigative and diagnostic methods, an enormous problem remains to be resolved [7]. A mass screening technique is urgently needed for diagnosis of early, unsuspected cancer. Until a method for prevention of cancer is perfected, a mass diagnostic technique is our best hope for cutting drastically the death rate from cancer. Etiological factors emphasized in current investigations are environmental, i.e., air pollutants, smoking, diet, alcohol, and drugs, to cite a few. Carcinogens are converted from foodstuffs; air pollutants have yielded chemical fractions; physical agents persist, recur and occur de novo as etiologic factors. Until total victory over malignant neoplasia is achieved, a plateau that must be scaled is early diagnosis at a time permitting a cure or control of the disease [8]. Obviously health education is basic and should be a parallel attack. Other methods of early diagnosis are: regular physical check-up cancer surveys; immune-diagnosis, e.g., RIA, CEA, AFP; and Pap smears. The aforementioned are diagnostic aids of increasing value. The literature abounds with reports of descriptive techniques, of laboratory experiments and clinical trials [9]. Newer methods are being developed and we are on the threshold of a breakthrough in this area. After the diagnosis is made, often through the assistance or direct intervention of the pathologist, there is need to monitor the progress of cancer therapy [10]. Moreover, there comes a time when it is useful to make some prediction of the subsequent course of the disease based on the known biological behaviour of the tumour. Diagnostic methods alone have accounted for vast improvement in the care of the cancer patient. The pathologist, as a member of the team of medical care, plays an important part throughout the course of life of the individual patient. In the clinical laboratory, at the surgical pathological bench, in the research laboratory, and finally, as the last episode in the continuum of medical care, at the autopsy table.

Conclusion

The pathologist must concern himself more with the manifestations of the disease, rather than the illness does not make the pathologist less involved in the assault on cancer or less anxious to play an active role in probing the mysteries of this dread disease. To date, the solution to the riddle of cancer has been painfully slow in arriving. Much has been added to our store of knowledge in the areas of epidemiology, etiologic factors, and chemical carcinogenesis and to some extent, the biological behaviour of cancer. In recent years, the thrust has been on carcinogenesis, immunology and exploration of the disease at the molecular level.

Acknowledgement

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Conflict of Interest

None

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