

Radiodiagnosis of Endophytic Gastric Cancer

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PREFACE

Cancer of the stomach remains a pressing problem in medicine. However, during recent years, scientific and medical interests in gastric cancer have decreased markedly. Some researchers explain this lack of interest by the reduced incidences of the disease. Another important factor that may explain this situation are the huge bulk of accumulated data. There is a prevailing opinion that all possible research in gastric cancer that might be important to practical medicine has already been accomplished.

Meanwhile, a somewhat different point of view becomes quite apparent today; however, because of the existing tradition in determining gastric cancer, the new approaches are not quite welcome. We have studied the diagnosis of gastric cancer for years, and, in our opinion, the reduced interest in the problem is not legitimate or justified. Moreover, being in close contact with gastric cancer patients, we do not think that its occurrence has decreased.

Mass-scale examination of the population for early diagnosis of gastric carcinoma is a permanent fixture in the literature. The discussion is probably encouraged by an unprecedented experience in Japan, where *early cancer* of the stomach is discovered by X-ray and endoscopic screening of the population on an unrivaled scale. For economic considerations, this approach has not become popular in countries where the incidence of this disease is lower. An alternative concept of examining risk groups was thus produced.

We do not deny the usefulness of the data obtained by examining such risk groups in order to improve early detection of gastric cancer, but during recent years we discovered another important aspect in the diagnosis of gastric cancer that in our opinion explains the difficulty in the diagnosis of this disease. While using double-contrast radiography in combination with the elements of classic X-ray examinations, we were convinced that the leading role among all anatomical forms of gastric cancer is that of endophytic tumors. Endophytic tumors, which are of long duration and become clinically manifest at late stages of the disease, are the most difficult to diagnose. Even recent diagnostic techniques and apparatuses often fail to give sufficient data for an unambiguous diagnosis of the neoplastic process.

We analyzed the results of our observations of more than 2000 patients with gastric tumors and believe that endophytic forms of tumors prevail (80%) among other new growths. This has led us to the conclusion that the existing concepts of the diagnosis of gastric cancer should be revised substantially. This is especially true for radiodiagnosis of gastric cancer due to underestimation of its endophytic growth in the past. Thus, we thought it necessary to revise the existing concepts of early gastric cancer. Being in constant contact with endoscopists, we are convinced that the existing X-ray and endoscopic semeiotics of early cancer in its traditional understanding narrows the framework of the diagnosis of endophytic forms of cancer in their early stages.

With this in mind, we returned to the *linitis plastica* problem, because, in our opinion, this is the source of our present-day difficulties in the diagnosis of gastric cancer in general. In the papers published earlier this century, *linitis plastica* was

regarded as the most common and lethal of diseases. We consider this problem from the perspective of the methodology that is currently used to diagnose the disease in its early stage. Moreover, based on the understanding of the pathogenetic mechanisms of propagation in blastomatous infiltration in *linitis plastica*, we decided that its main mechanisms are active in most cases of gastric cancer as well. This, in turn, helped us to arrive at the main concept of this monograph, that is, underestimation of the fact that gastric cancer may develop according to *linitis plastica* type is among the main causes of its unsatisfactory diagnosis.

We established a specific symptom complex that characterizes the initial manifestations of endophytic gastric tumors, which we called *intramural blastomatous infiltration*. The new concept is not juxtaposed to the classic semeiotics of the *early gastric cancer*, but, in our opinion, is only a substantial supplement to the concept of the so-called *small cancer* of the stomach.

X-ray computed tomography and ultrasonographic examinations of the stomach are described in two chapters of the monograph in which the role of these methods in verification of separate aspects of the infiltrative growth of tumor (submucous spread, specific localization, etc.) is estimated.

The book also describes some organizational factors that suggest efficient methods of X-ray and endoscopic examinations of the population on a mass scale.

We think that endophytic cancer is one of the factors responsible for the disadvantageous situation in gastric oncology and respective social developments. Therefore, we also think it necessary to present our own concept of the economic aspect of the problem as applied to gastric cancer in general.

We express our deep gratitude to Prof. V. Odinokova (deceased), V. Banina, and A. Roslov, Cand. Sci. (Med.), for their fruitful assistance in preparing the material for the chapters: *Pathogenetic and Morphologic Principles of Radiodiagnosis of Endophytic Gastric Cancer* and *Ultrasonographic Examination*.

INTRODUCTION

This monograph discusses the diagnosis of gastric cancer, one of the most pressing problems in current medicine. The book is based on the vast practical experience of the authors in the diagnosis of this lethal malignancy. What makes this book different from similar treatises is that the authors give priority to endophytic infiltrative cancer and its preoperative diagnosis, which makes the book sort of unique. As a matter of fact, endophytic cancers (i.e., neoplasms, mainly those with intramural growth and latent clinical course) account for the discouraging statistics of morbidity and mortality in current gastric oncology. Surprisingly, this form of malignancy is studied least of all among all carcinomas. The problem with early diagnosis of this pathology is not discussed sufficiently in the literature.

Based on the study of more than 2000 cases of endophytic cancer, among which early carcinoma was 25%, the authors propose an original approach to the detection of such carcinomas. Their concept is based on a thorough study of the morphologic substrate of early endophytic infiltrative cancers. Maximum radiologic and endoscopic imaging of carcinomatous infiltration in the stomach wall is presented by the authors as a factor of paramount importance in the estimation of detected pathomorphologic changes, which they termed “intramural blastomatous infiltration”.

This is virtually an original definition of the early stages of neoplasms of the stomach, which is a universal morphologic substrate, the detection of which is decisive for the diagnosis of gastric cancer.

The authors give their opinion of the currently used methods of radiologic and endoscopic diagnosis of intramural neoplasms.

This monograph not only discusses the diagnostic problems, but also describes the two main trends that currently exist in the diagnosis of early gastric cancer, namely, the traditional clinical examinations and the screening of the population. The practical knowledge of the authors is based on more than 25,000 examinations, which encouraged them to produce their own approach to screening of the population for the detection of gastric cancer patients.

This monograph is richly illustrated with radiographs, endophotographs, computed tomographs, echograms, and sections of micro- and macro-specimens.

Because of the great variety of problems discussed, the book will be helpful to radiologists, endoscopists, oncologists, and general practitioners.

Chapter 1

Radiology in Gastric Oncology: Historical Perspective and Present Status

When reviewing gastric cancer in a historical perspective, it is impossible to avoid mentioning some facts that were landmarks in the development of gastric oncology and that strongly influence the situation in this branch of medicine at present. One of these important facts is the publication of works by E. Pean (1879) and T. Billroth (1881), in which they postulated the principles of surgical tactics, and, in addition, the publications of Roentgen (1895) are also significant. These studies are considered to be the onset of a new era in the development of this branch of oncology. Thus, at the dawn of the twentieth century, medicine had sufficient experience in the treatment of gastric cancer, and it was now given a method that soon became the major tool in the diagnosis of this deadly disease. At that time, the incidence of gastric cancer was so high that no other disease could rival it with respect to mortality rate (Ewing, J., 1936). It is no wonder that in 1906 to 1908, Holzkneht and Cannon proclaimed the necessity of X-ray examinations in primary and early diagnosis of the disease.

As more experience in X-ray diagnosis and surgical treatment of cancer was accumulated, it became apparent that the best therapeutic results can be obtained with radical treatment of noninvasive carcinoma localized in the mucosa and submucous layer of the gastric wall (Verse, R., 1908; Lyons, H., 1924; Ewing, J., 1936). Tumors of the *linitis plastica* type were recognized as the most disadvantageous with respect to their surgical treatment (Lyons, J., 1924; Wyard, S., 1925). This term, *linitis plastica*, was proposed by W. Brinton in 1865 to designate intramural lesions attended by fibrous proliferation. The classification of cancer proposed by R. Borrmann (1926) is irrefutable proof of the high level of knowledge of morphology at that time; moreover, this classification, in the unchanged form, is actually used today.

In the 1930s the experience accumulated in the treatment of initial gastric carcinoma was sufficient for systematization. In 1937 the problem of early detection and treatment

of this pathology was widely discussed at the 2nd International Congress of Gastroenterologists. E. Konjetzny and J. Bertrand reported their observations and demonstrated the potential of X-ray techniques when applied to the diagnosis of the early stages of gastric cancer. Guttmann and Prevot also reported their findings on the clinical and X-ray symptoms of the disease. These reports have become classic works in gastric oncology. These results from long and intensive studies gave an impetus to further development of surgical treatment of malignant tumors of the stomach. They demonstrated the importance of a timely diagnosis of these oncological diseases.

X-ray examinations have become an indispensable aid in selecting therapeutic tactics that is especially vivid in patients with ulcers. X-ray studies conducted by U. Haudek (1929), S. Sproull (1931), and Hampton (1933) stimulated the surgeons to turn their attention toward ulcers in the prepyloric part of the stomach, which, in turn, helped detect cancer in its uninvolved stage in some cases. However, the number of cases where cancer was detected in its early stage remained insignificant. In most patients malignant carcinomas were diagnosed in the late stage of the disease (Ewing, J., 1936).

At the same time, advances in anesthesiology and surgery substantially broadened the scope of surgical intervention. It soon became clear, however, that the decisive prognostic factor is the stage of the tumor, the depth of invasion, and the presence of metastases. At that time all these factors were detectable only by their clinical symptoms and X-ray examination.

The absence of effective means of early diagnosis of gastric cancer precluded the change in the traditional concept of the clinical picture of the disease. The requirements of gastric oncology for improved diagnosis of the lethal disease stimulated modernization of the X-ray apparatus. Routine techniques were supplemented by X-ray TV, high-quality barium meal for examination of the gastrointestinal tract, serial X-ray, generators of power, fluoroscopic tables, and many other appliances that resulted from the vigorous developments in medical technology of the 1950s and 1960s.

Technical modernization solved the problem that remained the subject of much discussion: which method is more suitable for the diagnosis of gastric disease — roentgenoscopy or roentgenography. This situation became especially clear after T. Uji (1950) developed his gastrofluoro-chamber. During the same time, initiated by T. Takagi, gastrofluorography was used in Japan (the province of Mjagi) for the mass-scale examination of the population. We mention this fact in order to reemphasize the unprecedented and highly effective results that Japan experienced in the detection of gastric cancer (especially its early forms) using X-ray techniques.

In the mid-1950s, publications by S. Shirakabe, H. Ichikawa, and T. Kamakura opened a new era in roentgenology. They developed the method that not only visualizes the barium-impregnated mucosa but also helps evaluating, in every detail, elasticity of the wall by inflating the stomach with air (double-contrast radiology). The diagnosis made using this method acquired unprecedented accuracy. One of the principles underlying this method implies using barium meal of very high quality, with a density of not less than 100 to 200% w/v, containing additives that quench foaming and improve its physical and chemical properties. The discussion of significance of fluoroscopic and radiographic components in the diagnostic studies was

thus completed. It was shown that maximum accuracy can be attained only with the multiposition roentgenograms (or fluorograms) under the guidance of X-ray TV. It should be noted that explorers can be replaced by fluorochambers in modern X-ray apparatus. This solved several problems: more sparing use of fluorographic film helped standardization of the entire photographic cycle during X-ray examination and substantially decreasing radiation exposure of the patient and medical personnel (Rabkin, I., 1986). S. Shirakabe and H. Ichikawa (1959) integrated the double-contrast technique with the study of the mucosal relief according to Berg, tough-fill contrast and compression to improve effectiveness of X-ray diagnosis of early cancer. This scheme of X-ray examination, in its unchanged form, remains the main component of the standardized system of examination of the stomach, which has been used in Japan since 1974.

The interest of specialists in the advances in radiology unexpectedly decreased after the invention by B. Hirschowitz of a fiberoptic gastroscope (1958). This became a new stage in gastric oncology. Endoscopes were constantly modified and improved and are now effectively used in the diagnosis of gastric cancer. It is difficult to overestimate the decisive role that the Japanese specialists played in the improvement, the popularization, and the pertinent use of fiberoptic gastroscopy. Thanks to the Japanese scientists fiberoptic gastroscopy has become the most effective and flexible tool available to oncologists.

In 1962 the National Society of Endoscopists and Gastroenterologists of Japan decided on the classification of early cancer, which remains the most comprehensive one for more than 25 years. Beginning in 1964, researchers designed and improved fiberoptic gastroscopes that are used for biopsy of new growths. In 1978 S. Takasu demonstrated possible use of photography and cinematography in combination with gastroscopy, which suggested the possibility of objective documentation of the endoscopic picture.

Preferential use of endoscopy in the diagnosis of diseases of the stomach explains the specific changes that occurred in radiology. In fact, radiologists became interested in endoscopy as well. H. Shirakabe pioneered in this new trend (1983). Radioendoscopy facilitates diagnosis and sometimes will also give a pronounced economic effect. This probably explains the tendency to extrapolate the benefits of the integration of endoscopy and roentgenoscopy (Winner, M., 1986; Sidorov, V., 1987; Rawlison, J., et al., 1990). At the same time, world-wide experience shows that this integration might be disadvantageous because of the great variety of studies in each diagnostic method and qualitatively new requirements for modern roentgenoradiology in general (Portnoi, L., 1992; Gray, J., 1989; Evens, R., 1989).

Routine use of the double-contrast technique in the examination of the gastrointestinal tract coincided in time with the endoscopic boom. As a result, the great advantages that are offered by the combined two-phase X-ray examinations were not evaluated properly, even by radiologists. This inflicted serious damage to the prestige of roentgenology, and conversely the popularity of endoscopy increased. In addition, the tendency of the "desirable" rather than "mandatory" use of double-contrast radiology resulted in wrongly evaluating the standardized principles of the examination protocol; hence, discreditation of the method. These circumstances stimulated

radiologists to study endoscopic techniques, which, in turn, produced an adverse effect on further development of roentgenology.

A now popular opinion is that the detection of gastrointestinal pathology is not the prerogative of X-ray diagnosis. This opinion is based on the fact that current theoretical roentgenoradiology is now concentrated mostly on the less studied pathologies, the advances of which at present are most conspicuous (Margulis, A. et al., 1989; Metteler, F., 1990; Miller, A. et al., 1991). Meanwhile, in our opinion, future progress in oncology depends on theoretical developments, which will encourage creation of new approaches to the diagnosis of gastric cancer. We agree with A. Margulis et al. (1989), who believe that the theoretical principles of X-ray diagnosis of gastrointestinal diseases lag far behind the fundamental studies of other organs and systems that are now successfully investigated using recent advances in computed imaging. We believe that the study of endophytic forms of gastric cancer, which is the main cause of inappropriate treatment of gastric tumors, is the field that gastroentgenology can demonstrate its effectiveness.

When characterizing the major importance of fiberoptic gastroscopy, a progressive method in the diagnosis of gastrointestinal tumors, gastric tumors in particular, it is necessary to note that according to most researchers it was endoscopy that increased the frequency of detection of the early forms of gastric cancer to 10 to 20% (Hirschowitz, B., 1988; Misumi, A. et al., 1989; Eckardt, V. et al., 1990, and others). The acknowledgment of the achievements of Japanese oncologists is most intensive: they report effective diagnosis of cancer in its initial stages in 40 to 52% of patients; treatment of these patients gave excellent results, which could not be predicted by the most optimistic physicians (Hisamichi, S., 1989; Noguchi, Y., 1989).

However, one circumstance is disregarded: endoscopy has become a kind of a supplement to the organizational measures taken in Japan in this direction. The standard national program of mass-scale examination of the population was, from the very beginning, based on X-ray methods of examinations, that is, gastrofluorography conducted with mobile units. The examination of the population for gastric cancer according to this program for 5 years resulted in an accumulation of vast data on the therapeutic approaches to gastric oncology, which were also standardized in 1979. X-ray examinations became the primary and basically the main component of the examination of the population. At present, gastrofluorography is the only method applicable to mass-scale examinations, because wide use of endoscopy turned out to be economically undesirable even in Japan, the country where it is used more often than in any other. Moreover, the primary character of fluorographic examination of the stomach plays an important role in verifying fiberoptic gastroscopy.

This organizational scheme for the diagnosis of gastric cancer is, in our opinion, the most reasonable. It is quite possible, that if endoscopy is conducted on a wider scale, then, even if the expenses are fully compensated, the situation will, after all, arrive at a critical point when financial difficulties will compel the medical workers to look for more rational ways of selecting people for endoscopic examinations of the stomach. This will mainly depend not only on the skill of the specialists but also on the social factors. Epidemiology of gastric cancer is another important factor in this respect, and it requires special discussion.

Despite the decreasing incidences of gastric cancer during the past 2 decades, this disease remains on top of the list of oncological mortalities (Kovaleva, N., 1988; Mitsudomi, T. et al., 1989; Murakami, R. et al., 1990; Raab, M. et al., 1991). The highest frequency of gastric cancer is in Japan, China, Poland, and the countries of Latin America. The incidence of gastric cancer is also high in the republics of the former Soviet Union: 18 to 23.8% of all other tumors (Kovaleva, N., 1988).

Survival of the patient is the decisive criterion in oncology, which estimates the entire therapeutic process and its separate components. In most countries, this index (5-year survival) varies between 5.5 and 25% (Berezkin, D., 1989; Nielsen, J., 1985; Tersmette, A. et al., 1991). The data given show that the mortality rate among gastric cancer patients is very high despite the recent advances in medicine. It is quite natural, therefore, that the data reported from Japan are striking: 5-year survival is as high as 30 to 56% (Hirota, T. et al., 1984; Murakami, R. et al., 1990; and other authors). During the past 25 years, cancer mortality decreased from 38.4 to 51.6 in 1960 to 23.2 to 26.5% in 1986 (Iruyama, K., 1992). According to H. Fukutomi and T. Sakita (1984), the mortality rate among gastric cancer patients is still 1/3 of all oncological patients. The incidence of gastric cancer in Europe is eight times lower, while the mortality is 8.1 to 9.9% of all oncological diseases; this index is even lower in the U.S.A.: 3.3 to 4.1% (Smith, E., 1988; Green, P. et al., 1988; Appelman, H. et al., 1992).

The disparity between the cancer incidence and survival in Japan and other regions of the world is explained by some authors by the absence of accurate registration of cancer cases and hence underestimation of cancer occurrence (Kovaleva, N., 1988; Marzell, A. et al., 1989; Eckardt, V. et al., 1990). Ineffective treatment of cancer is associated with late diagnosis in patients in whom radical operations are hardly possible and the operative risk is very high (von Wolff, H., Lorf, T., 1989; Percivale, P. et al., 1989; Elias, E., 1992). According to various authors, the incidence of such tumors is 72 to 92% (Kurtz, R. et al., 1985; Correa, P. et al., 1985; Griffin, S. et al., 1989). This can be explained by several reasons, for example, late attendance for medical aid, especially among young patients (Mikulin, T., Hardcastle, J., 1987) and incorrect diagnosis and treatment (Dettori, G. et al., 1990; Raab, M. et al., 1991). However, the decisive factors, which determine the diagnostic situation in general, are the latent course of the disease and nonspecific (in the early stages) clinical symptoms (Hirose, S. et al., 1989). The diagnostic tactics of the physician, the family doctor in particular, is another important factor.

The appearance in the 1970s of highly efficacious antiulcer drugs, such as the drugs of the cimetidine series, and their wide use resulted in even greater obliteration of the course of the disease, which aggravated the diagnostic situation in cases with ulcerative carcinomas (Weed, T. et al., 1981; Mikulin, T., Hardcastle, J., 1987; Griffin, S. et al., 1989).

It is now recognized that "mixed" cancer prevails in the late stages of the disease: the new growth is characterized by the presence of distinct intramural infiltration and intralumen tumor node (Kholdin, S., 1952; Lauren, P., 1965; and others). The data on the incidence of this form of cancer vary within wide limits: the infiltrative, or diffuse, cancer occurs in 30 to 60% of cases (Shiu, M. et al., 1989; Percivale, P. et al., 1989).

The tendency to metastasizing and marked invasion are the most specific properties of the tumors of this anatomical structure. Meanwhile, these two factors are decisive for the prognosis of the disease. K. Maruyama et al. (1987) note that, except in patients with distant metastases, the following factors have the decisive prognostic importance: depth of invasion, the presence of metastases in the regional lymph nodes, the type of tumor according to Borrmann, its localization and the histologic type according to Lauren, in which the risk coefficients are 4.69, 4.04, 1.50, and 1.16, respectively. For the purpose of statistical estimation, the authors used the multifactorial regression analysis. M. Shiu et al. (1989) showed that 5-year survival in various stages of tumor according to the TNM classification is 80 to 88% for stage I (invasion to proper mucous membrane), 55% for stage II (invasion to subserous or muscular membrane), 9 to 30% for stage III (tumor in the wall of the organ; grows into the serous membrane). The authors have no data on 5-year survival among patients with cancer in stage IV. As far as the statistical notion of "survival" is concerned, the figures are the lowest with infiltrative tumors: 11% (Maruyama, k. et al., 1987). Surgical treatment of this cancer is also ineffective. These considerations explain the existing opinion that chemotherapy is more effective in such cases (Hirose, S. et al., 1989; Aranha, G., Georgen, R., 1989).

This unusual therapeutic tactic is explained by some biological properties of infiltrative tumors: diffusion of the malignant process, involvement of various parts of the gastrointestinal tract, the stomach in particular, an asymptomatic course and untimely diagnosis because of prevalence of the obstructive symptoms that develop when the new growth extends onto the gastric antrum, and, less frequently, onto the intestine down to the rectum (Fernet, P., 1965; Correa, P., 1968; Flatau, E., 1982; Stoppa, R., 1986).

The tumor often descends along the intestine loops, the mesenterium, and the peritoneum, and it metastasizes into the liver and the lymph nodes. For these considerations, dissection of the carcinoma is very difficult. G. Aranha and R. Georgen (1989) think the endophytic new growths of the *linitis plastica* type are not the "surgical" pathology and operative intervention gives no positive results. Of course, one cannot reconcile with this situation, the more so that, according to Marzcell et al. (1989), the proportion of infiltrative cancer among gastric tumors steadily increases. These data confirm the results of our practical work.

Unfortunately, it is necessary to state that researchers do not give sufficient attention to such tumors, which occur (according to most clinicians) only in one third of blastoma patients (Hirota, T. et al., 1984; Hirose, S. et al., 1989; and others). No doubt, these tumors prevail among the untreated forms of cancer (Saveliev, V. et al., 1985; Curitis, R. et al., 1985; Aranha, G., Georgen, R., 1989). M. Sowa et al. (1988) report higher (52 to 88%) incidence of tumors with predominantly submucous spread in their early stages. It can be concluded that the greatest difficulties arising in the diagnosis and treatment of endophytic cancer are due not only to its specific biological properties but also due to the absence, in the researchers, of a unified concept of the nature of this process. And no wonder, as the progress in the diagnosis of early forms of cancer is mainly attained at the expense of the so-called prolapsing or ulcerative forms that are readily detected by

X-ray and endoscopic examinations. The diagnosis of superficial (type II) early cancer and submucous endophytic tumors is most difficult for specialists (Portnoi, L., 1983; Balthazar, E. et al., 1980; Doi, H. et al., 1984; Hedenbro, J. et al., 1990). The studies conducted by T. Hirota et al. (1984) are interesting in this respect. The authors observed the changes in the morphologic symptoms of early gastric cancer for many years, and revealed a distinct tendency to the reduction in the incidence of prolapsing forms and to the increase in the number of cases (68 to 75% of all tumors) where malignant ulcers were diagnosed. The incidence of diagnosed superficial tumors remains unchanged because of difficult detection of tumors of this type. The diagnosis of submucous new growths is also very difficult (Itabashi, M. et al., 1984; Letessier, E. et al., 1988; Raab, M. et al., 1991).

According to A. Marzell et al. (1989) and V. Eckardt et al. (1990), improvement in the diagnosis of these forms of cancer is the reason for the progress in the treatment of malignant tumors of the stomach. With this in mind, special importance is attached to the diagnosis of infiltrative endophytic cancer. Determining the depth of invasion, propagation of the tumor, its submucous and intramural growth are among the most important aspects of this problem. The potentialities of fiberoptic gastroscopy in the diagnosis of these tumors are not very high compared with the lesions manifesting on the mucosal surface, for example, carcinogenic ulcers (Milbradt, H. et al., 1988; Caletti, G. et al., 1989; Cusso, X. et al., 1989; and others), because the intact mucous membrane overlying the tumor is an insuperable barrier for endoscopic examination. M. Itabashi et al. (1984), A. Misumi et al. (1989), and other authors indicate that only serial biopsy can help avoid errors in the evaluation of a pathological focus. However, E. Kaneki et al. (1983), D. Graham et al. (1989), and G. Caletti et al. (1989) believe that even recently modified endoscopic biopsy (taking of material using gigantic forceps, hot and needle aspiration biopsy, the so-called "lift and cut" technique, and others) often give pseudo-negative results.

These circumstances stimulated the development of integrated methods that might combine the possibilities of endoscopy, ultrasonography (Tio, T. et al., 1989; Dancygier, H. et al., 1989; Yasudo, K. et al., 1989; and other authors), and computed tomography (Malinovsky, N. et al.). It should be noted that the use of new possibilities of radiodiagnosis was stimulated not only by the difficulties in endoscopic determination of the extent of malignant process propagation. Ultrasonographic examinations and X-ray computed tomography themselves have great potentialities and therefore they are widely used now in gastric oncology. Thus, many papers describing the advantages of computed tomography in this field of medicine were published recently (Portnoi, L. et al., 1991; Thompson, W. et al., 1983; Pradel, J. et al., 1988; Dulshavsky, S. et al., 1989; and others). According to most authors, these methods are useful for the verification of the extent of tumor propagation and, first and foremost, for exclusion of unnecessary operations in incurable cases (Angelleli, G., Macarini, L., 1989; Oberstein, A. et al., 1989; Baert, A. et al., 1989; and others). These methods are usually nonspecific in verification of the character of the pathology in the initial stages of cancer (Sussman, S. et al., 1988; Mijake, H. et al., 1989).

Thus, despite availability of many highly informative means of obtaining computed images, the diagnosis of gastric cancer is still based on X-ray and endoscopic

examination. Of course, the mentioned methods will be used for accurate and early detection of new growths in the stomach. Many aspects of using these methods have not been solved completely yet, and they require further investigation. However, in our opinion, the main problem with current gastric oncology, in addition to improvement of organizational and methodological approaches to the diagnosis of gastric cancer, is revision of the essential concepts of tumor. This, in the first place, concerns the so-called endophytic forms of gastric cancer, the diagnosis and treatment of which have many difficulties. Attracting of specialists' attention to endophytic cancer is the necessity of purposeful research aimed at detecting the initial symptoms of infiltrative new growths with a special emphasis placed on invasion and tumor infiltration in the overwhelming majority of cancer forms, including the so-called exophytic cancer. All of this must have an effect on roentgen-endoscopic semeiotics on these tumors. Indistinct criteria for differentiation of tumors depending on prevalence of these or other morphologic signs do not meet the exacting requirements of current medicine. This accounts for the requirements for higher accuracy and standardization of endoscopic diagnosis with respect to the so-called minor signs of malignancy (Yoshida, S. et al., 1984) and criticism by some investigators of the most common histomorphologic classifications, such as those developed by P. Lauren and S. Ming (Correa, P. et al., 1985; Douglass, H., Nava, H., 1985; Marzell, A. et al., 1989).

Vast amounts of data are now accumulated. They suggest the necessity of a revision of the out-of-date concepts in gastric oncology and in roentgenology in particular. The progress achieved in the diagnosis of gastric tumors, which makes it possible to cast a new glance on the situation in this field of medicine, and also deceleration of this progress, suggests the necessity of an urgent correction of methods for the detection of gastric cancer and the interpretation of the discovered changes. This, in the first place, concerns some purely pathological aspects associated with the attachment of special importance to cancer invasion proper and infiltrating intramural component of the tumor, which is of greatest danger in both prognostic and diagnostic aspects, because the resection level determines the prognosis and probability of complete cure (Yokota, T. et al., 1988, 1989; Farinati, F. et al., 1988; Percivale, P. et al., 1989; Eckardt, V. et al., 1990).

At the same time, the traditional choice of techniques in roentgenology precludes effective use of X-ray examination for the diagnosis of endophytic tumors. This, in the first place, is due to the absence of adequately defined semeiotics of infiltrative forms of cancer, which is still based on the symptoms of advanced pathologies and which does not account for the recent methods of obtaining visual information on early cancer, including infiltrative cancer. The traditional differentiation of tumors into primary and secondary ones, absolutization of the most conspicuous symptoms of exophytic cancer, and extension of this approach to all other forms of cancer, the determination of priority of specific (according to modern concepts) symptoms without thorough parallel examination of the pathomorphologic substrate. These are all vicious traditions that should be overcome in order to finally determine the role of X-ray examinations in the diagnosis of gastric cancer.

The first stage should include revision of the entire structure of tumor processes in the stomach, which is directly associated with revision of the role of infiltrative cancer. While assuming the great importance and scientific value of all previous works dealing with the clinicopathological changes associated with gastric tumors, we nevertheless think it necessary to develop an entirely new approach to the study of infiltrative cancer, which was discussed in earlier publications and discussed the traditional methods. The new approach must be based on a correct interpretation of all carcinomas with the infiltrative component as endophytic tumors, which must, to a certain degree, change the existing evaluation of the proportions of various forms of gastric cancer.

We dare not present a new classification of gastric cancer. We only want to generate interest in some special properties of infiltrative malignant tumors of the stomach and to stimulate the development of a new approach to the cancer problem in general. We also want to displace the emphasis in the diagnosis of gastric cancer toward the endophytic form of the pathology that now prevails in the structure of gastric cancer morbidity. This, in our opinion, will stimulate improvement in the early diagnosis and treatment of this lethal malignancy.

SUGGESTIONS FOR READING

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