
Reviews /Analyses

Selected gastrointestinal pathologies in tropical sub-Saharan Africa

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Doctors need to be well informed about differences in the presentation of certain diseases in tropical and temperate climates. In this article the characteristics of some gastrointestinal diseases, as they recur in sub-Saharan Africa, are briefly reviewed. Diseases of the stomach — including ulceration and cancer — are uncommon in Africa, although duodenal ulcer is common all over the tropics. In contrast, colorectal cancer is an extremely rare illness in sub-Saharan Africa, while hepatocellular carcinoma is much commoner than in Europe or North America and the very high incidence of this tumour in tropical countries is cause for concern.

Introduction

Until recently medical practitioners in sub-Saharan Africa had to rely for many conditions on literature written in environments very different from those in the tropics. There is no doubt, however, that some diseases have different patterns, symptoms, incidences, etc. in the tropics than in temperate climates.

Doctors in the tropics must be well-informed about the differences between medical practice in tropical and temperate climates. This article reviews the characteristics of some gastrointestinal illnesses in tropical (sub-Saharan) Africa. In particular, those pathologies are discussed where the differences in disease characteristics between the tropics and other regions are significant, e.g. peptic ulcer and certain malignancies of the gastrointestinal tract. The limitations of the review are acknowledged since the problems discussed are much more complex and have many other aspects than those dealt with here. It does, nevertheless, provide an account of these conditions as they present in tropical Africa.

Peptic ulcers

As with all diseases, reporting the true incidence of peptic ulcer depends on two factors:

- satisfactory case-history data; and
- good diagnostic facilities.

Both these requirements are difficult to meet in Africa since detailed case histories are sometimes very difficult to obtain because doctors often have to use interpreters, and because diagnostic investigations are limited in many parts of the continent. Usually hospitals in major towns are equipped with X-ray equipment but gastroscopy and endoscopy are costly and therefore generally unavailable in most African countries.

Gastric ulcers

Gastric ulcers are rare in some African countries, but have been reported from all parts of the continent (1). Their incidence is much lower than that of duodenal ulcers in all developing countries. Gastric ulcers are probably commoner in East than in West Africa and in general their incidence is low in the continent as a whole (2).

Gastric ulcers affect men more frequently than women in Africa and seem to be a disease of the lower social strata; the majority of the patients are in their fifth or sixth decades of life (3).

The presentation of gastric ulcers in sub-Saharan Africa is no different from that in developed countries, although gastric retention seems to be

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commoner, presumably because of the chronicity of the condition (4).

Duodenal ulcers

Not more than 40 years ago duodenal ulcers were considered to be uncommon in tropical Africa (5), although there is evidence that they have become commoner since the beginning of the 20th century (6).

At present the epidemiology of duodenal ulcers in tropical Africa is as described below.

In West Africa their incidence is relatively high in Nigeria, Cameroon, and Ghana. There are also high incidences in the Nile–Congo watershed, Burundi, Rwanda, eastern Democratic Republic of Congo (Lake Kivu area), south-western Uganda, and the Ethiopian highlands (7).

Barton & Cockshott considered duodenal ulcers to be as common in Nigeria as in the United Kingdom (8), drawing attention to the fact that in Nigeria it is the rural farmer who is usually affected. They also reported a male: female ratio of 4.5:1, but it should be remembered that it is often especially difficult for women to get to hospital in rural Africa.

Reports from Nairobi and from other parts of Kenya indicate that nowadays duodenal ulcers are not uncommon (9). Stenosis is a frequent complication and the ratio of duodenal to gastric ulcers is about 12:1 (10, 11).

In the literature it is commonly stated that genetic factors play a part in determining the incidence of duodenal ulcers. In Uganda there is no doubt that the condition is commoner among Hamites than Bantu tribes, while in Nigeria there are marked differences in incidence between the north and south of the country.

As special African causes, various dietary factors have been considered in the etiology of duodenal ulcers. It has been suggested that spices — mainly pepper and chilli — play an important role in the development of duodenal ulcers, but this has never been proved satisfactorily. It is also unlikely that ascariasis and hookworm infection are important in the etiology of duodenal ulcers in Africa. Most people living in tropical developing countries are infected with these parasites. Also, the symptoms of these infections are quite different from the first signs of duodenal ulcers, with their commonest sequelae being anaemia and consecutive hypoproteinaemia. Since usually only a proportion of the infected population develops severe symptoms, individual immunity is probably important. There is no convincing evidence that either ascariasis or

hookworm infection has a pathological link to duodenal ulcers (7).

Similar to the situation in developed countries, in Africa the causes of duodenal ulcer are multifactorial.

Presentation of duodenal ulcer in the tropics is like that in developed countries; the main difference concerns the high incidence of stenosis. It is not clear whether the high prevalence of the fibrous reaction is due to chronicity, or whether it has an ethnic base in Africans, similar to keloid formation on the skin. Pyloric stenosis may be accompanied by severe vomiting, resulting in dehydration, weight loss, and alkalosis.

Duodenal ulcers may occur at any time from infancy to old age, and Cross has reported the disease among Kenyan children (12).

Treatment of duodenal ulcers as well as gastric ulcers in developing countries is usually limited. For the therapy of both these forms of peptic ulcer, modern drugs (H_2 -receptor blockers and/or enzyme blockers, e.g. omeprazole) are expensive and usually not readily available in sub-Saharan Africa. Older, less satisfactory therapeutic agents have to be used and regimens involving oral antacids and antispasmodics provide symptomatic relief. It is always useful for sufferers to give up smoking (13). Also, in Africa consumption of large quantities of milk should be avoided because of the very high incidence of adult lactase deficiency in most part of the tropics (7). Bed rest (hospitalization) is difficult because hospitals are overloaded with patients who have more acute conditions. Inevitably, therefore, surgery is undertaken at an early stage in many cases of peptic ulceration.

The role of *Helicobacter pylori* infection in the pathogenesis of peptic ulcers is discussed below. This spiral bacterium inhabits the alkaline layer between the gastric or duodenal epithelium and its mucus coat; it may be harmless for many individuals but its presence is strongly associated with gastritis, peptic ulcers and gastric tumours. Interestingly, in Africa the presence of high rates of *H. pylori* infection is not linked with these diseases, but the reasons for this are not understood (43).

Current thinking holds that eradication of *H. pylori* would be useful in curing peptic ulcers. The World Congress of Gastroenterology, held in Sydney, in 1990, recommended a regimen of a fortnight's combined therapy: metronidazole + tetracycline or amoxycillin + a bismuth salt. In sub-Saharan Africa this therapy is difficult to apply because of the widespread lack of patient compliance and because local resources for drugs are insufficient (44, 45).

Gastric and colorectal cancer

Gastric cancer

Gastric carcinoma is less common throughout Africa than in Europe, although it is widespread in the tropics. There are, however, considerable variations in its incidence. The disease is, for example, commoner in Nigeria (where it accounts for about 5% of all malignancies and the male: female is ca. 2.6:1) than in Uganda or Mozambique (7, 14, 15).

In eastern Democratic Republic of Congo and Rwanda and Burundi gastric cancer is the commonest tumour in men, and its incidence is also high around Mt Kilimanjaro, in the West Lake province of the United Republic of Tanzania, and in western Kenya (16).

Apart from a significant relationship between the occurrence of gastric cancer and blood group A, there seems to be no genetic or ethnic factor in the etiology of the condition, and its causes are most probably environmental (17). Smoking and some diets probably also have unfavorable effects (13). In addition *H. pylori* has been causally associated with stomach cancer, at least in other parts of the world (46).

The clinical course of the disease is similar to that in developed countries, with the male: female ratio being ca. 2:1 in most parts of Africa.

Because during the potentially curable initial phase the symptoms of gastric cancer are often minimal or nonexistent, patients usually seek medical assistance too late. Thus, less than 10% of patients survive 5 years.

Colorectal cancer

Colorectal cancer has long been known to be infrequent among Africans (18, 19). So rare is the condition that the report of a single case in 1966 was considered to be significant in Africa (20). However, since then evidence has appeared of a rising incidence of colorectal cancer in the continent (19, 21).

Environmental factors are of great importance in the pathogenesis of colorectal cancer (17). The very low incidence of the condition in the tropics is surprising in view of the very high incidence of parasitic infections and other inflammatory conditions of the colon. Since amoebiasis and schistosomiasis are very common throughout Africa, they are most probably not involved in the etiology of colorectal cancer.

It seems probable also that diets in sub-Saharan Africa are low in carcinogens, but the possible role of different mycotoxins (aflatoxin, ochratoxin, etc.) cannot be ruled out completely.

In developed countries saturated fats are frequently used to fry food; in Africa, on the other hand, intake of animal fat is usually very low and, because of the high carbohydrate and fibre content of the diet, carcinogens may be diluted considerably by large faecal mass, which induces faster colonic movement. The resulting shorter transit time together with the high fibre content of the usual diet may also offer some protection (22), but this hypothesis is still under debate (23, 24).

In parts of the world that have a high risk of colorectal cancer there is also a high prevalence of various premalignant conditions, e.g. adenomatous polyps, multiple polyposis, villous adenoma and chronic ulcerative colitis. These conditions are uncommon in tropical Africa also.

In tropical Africa the tumour and clinical pictures of colorectal cancer are similar to those observed in developed countries. The tumour is an adenocarcinoma — ulcerative, protuberant and infiltrative growths occur — the last-mentioned being commoner in Africa than temperate countries (25). More than two-thirds of the tumours develop in the left half of the colon and, apart from the rectosigmoid region, the caecum is also involved, whereas the intermediate areas have a much lower (almost negligible) incidence, perhaps because of the shorter transit time.

Interestingly, in Nigeria right-sided colon cancers and obstructing tumours are more frequent than in developed countries (26). The mean age at presentation is lower than in developed countries (26) and the prior history of the disease is longer (27).

According to Owor, on the whole, patients with colorectal cancer are about 10 years younger in Africa than their counterparts in Europe and North America (28). This has been corroborated by Adenkuler & Lawani (26) and by Opiyo & Din (29), but it should be noted that in Africa older patients may never reach hospital and therefore can not be included in the statistics.

Rectal amoebiasis is the most important complicating diagnostic problem in the tropics. In a tropical country the presence of a mass in the right iliac fossa is likely to be caused by pyomyositis (in the iliopsoas muscle), an appendix mass or abscess, or possibly, by helminthoma; carcinoma of the caecum is very low on the list of possible diagnosis. In areas where schistosomiasis is common, peritoneal granulomas (in association with a hard liver) can be mistaken for abdominal and hepatic metastases from a colorectal cancer. A course of metronidazole should be given initially based on the supposition that the lesion is caused by amoeba; if this is the correct diagnosis, some reduction in the size of the mass should occur in about 3 days.

Neither colorectal cancer nor appendix abscess responds to this treatment (7).

The current approach to treating colorectal cancer is primarily surgical.

The generally accepted preventive steps against colorectal cancer: detection of occult bleeding, screening by endoscopy, etc., in selected vulnerable groups (30) — are out of the question in most developing countries, because of the related expenses; in fact, currently no population-based screening strategies are being implemented in any country, although some experimental programmes are being tried.

Hepatocellular carcinoma

In contrast to colorectal cancer hepatocellular carcinoma is the commonest of all tumours in sub-Saharan Africa, accounting overall for 10–30% of total malignancies seen in men (31, 32). In Mozambique it accounts for two-thirds of tumours in men, i.e. much higher than the incidence in Europe (33). A high rate has also been reported from Senegal (7).

In Nigeria and in East Africa, although a common tumour, hepatocellular carcinoma does not reach the high rates seen in Mozambique and Senegal. In Nigeria the incidence is 5.9 per 100 000 person-years (male: female ratio, 4:1), while in Uganda it constitutes 7.9% of all tumours, and it is thus the fourth commonest malignancy (34).

In Zimbabwe the incidence of hepatocellular carcinoma among natives has been reported to be 20.9 per 100 000 population, among South African Bantus it was 14 per 100 000, while in Mozambique the incidence generally cited is 98.2 per 100 000 person-years (34).

A high incidence of hepatocellular carcinoma has also been reported from the Sudan. The male to female ratio was 6:1 and the disease seems to be commoner in western Sudan than elsewhere in the country (33). In Ethiopia and Kenya, 11.0% and 5%, respectively, of tumours are hepatocellular carcinoma (35). There is apparently a five-fold variation, on average, in the incidence of this tumour in sub-Saharan Africa (7, 36). It should be noted that cholangiocarcinoma is not more common in Africa than in developed countries.

The reason for the high incidence of hepatocellular carcinoma in Africa is probably related mainly to the high carrier rate of hepatitis B surface antigen (HBsAg) but there are other possible factors:

— relationship to macronodular cirrhosis;

— possible role of hepatitis C infection;

— aflatoxins from *Aspergillus* spp. and other mycotoxins (e.g. ochratoxin, etc.); and

— others (hormonal, nutritional, genetic, etc.).

It is generally known that hepatitis B virus (HBV) is highly endemic in Africa. Most people are infected in childhood, resulting in the highest prevalence of chronic carriage in the world (37).

Clinical studies also have shown unequivocally that individuals with hepatocellular carcinoma have a highly significantly increased prevalence of being HBV carriers (38, 39). It seems very likely that viral hepatitis B is a predisposing factor for hepatocellular carcinoma and that the intermediary stage is usually cirrhosis of the liver (7, 32). More than 90% of Africans with hepatocellular carcinoma have antibodies to hepatitis B core antigen (anti-HBc) as well as to HBsAg (33). The possible role of hepatitis C virus in the etiology of hepatocellular carcinoma seems to be similar to that of HBV (38).

In the high-incidence areas in Africa, 60–80% of hepatomas arise in cirrhotic livers — a much higher proportion than in countries in temperate zones (7, 38).

Cirrhosis of the liver is usually macronodular, suggesting that liver cell injury, followed by regenerative hyperplasia, is of etiological importance in the pathogenesis of hepatocellular carcinoma. Theoretically, alcoholic cirrhosis also predisposes to hepatocellular carcinoma, but alcohol consumption seems to be unimportant because hepatoma is common even in predominantly Moslem areas (e.g. Nigeria or Saudi Arabia), where little or no alcohol is consumed (7, 33).

Aflatoxins are a group of compounds produced by the moulds *Aspergillus flavus* and *A. fumigatus*, which readily grow on grains under warm and humid conditions. A single dose of aflatoxin is sufficient to induce hepatitis and/or liver cancer in experimental animals (34). In Africa attempts have been made to account for the distribution of hepatocellular carcinoma in terms of that of aflatoxins (40, 41). In Swaziland, the incidence of hepatocellular carcinoma is highest in the hot, low-lying areas among immigrants from Mozambique who eat groundnuts heavily contaminated with aflatoxin. In Kenya, a statistically significant association between ingested aflatoxin and hepatocellular carcinoma has been observed and similar observations have been made also in Nigeria. In Uganda, the incidence of the condition is highest among poor immigrants from Rwanda and Burundi who consume poor quality, aflatoxin-contaminated grains.

The tumours arise from hepatocytes and may be monocentric or multicentric in origin; the rate of

growth is very rapid and they may reach an enormous size. Metastases occur mainly by lymphatic spread. Spread to hepatic veins with pulmonary metastases is very common. Death, which is usually a result of cachexia, occurs within a few weeks of diagnosis, with longer survival being rare and never more than a few months. The average age at presentation is 30–40 years, with males being four to five times more frequently affected than females.

Most patients have a persistent pain in the right hypochondrium, with anorexia and weight loss at presentation. Approximately 95% of patients exhibit hepatomegaly and about 25% are jaundiced. About half of the patients with hepatoma exhibit an audible bruit, which leaves no reasonable doubt about the diagnosis (35). The diagnosis is nearly always clear and only rarely presents difficulties in differentiating it from others (42). The most common problem is to differentiate the tumour from an amoebic liver abscess or in certain countries (e.g., in Ethiopia) from hydatid cysts.

The clinical condition is usually so obvious that little if any investigation is required. An adult African who presents with upper abdominal pain and an enlarged, hard liver should be considered a case of hepatocellular carcinoma.

The treatment of hepatocellular carcinoma is uniformly disappointing. Liver cancer is a fatal tumour and death is rapid. Methods of treatment include symptomatic care, surgery and drug therapy (7, 33, 34, 38). Even in developed countries, where diagnostic facilities are better and the choice of therapeutic remedies greater, the prognosis remains poor.

Résumé

Quelques pathologies digestives en Afrique subsaharienne tropicale

Jusqu'à une époque relativement récente, les médecins exerçant en Afrique ou ailleurs devaient tirer leurs informations de publications écrites pour des environnements très différents de ceux que l'on rencontre sous les tropiques.

Aujourd'hui, les médecins doivent être conscients des différences entre la pratique médicale en climat tropical et en climat tempéré. Dans cet article, nous passons en revue les caractéristiques de certaines pathologies digestives en Afrique subsaharienne tropicale.

Ulcère gastro-duodéal. Les maladies gastriques, y compris l'ulcère gastrique, sont rares en Afrique. En

revanche, l'ulcère duodéal, contrairement à ce qu'on observait il y a une vingtaine d'années, est répandu dans toute la zone tropicale. Il semblerait que l'ulcère duodéal soit plus fréquent dans les régions urbaines et que son incidence soit en augmentation. Il est cependant extrêmement difficile, dans les pays en développement, d'obtenir des données exactes sur l'incidence de maladies non directement mortelles.

Cancer de l'estomac et cancer colorectal. En Afrique subsaharienne, le cancer de l'estomac est rare et le cancer colorectal rarissime.

Comme les symptômes précoces de ces deux maladies sont pratiquement inexistantes à un stade encore curable, les malades consultent en général trop tard, et la survie à 5 ans est inférieure à 10%.

La recherche du sang occulte, le dépistage par endoscopie et autres mesures préventives sont exclus dans la plupart des pays en développement car le budget de la santé ne permet pas de couvrir ce type de dépenses.

Carcinome hépatocellulaire. Le cancer primitif des cellules parenchymateuses du foie, ou carcinome hépatocellulaire, est beaucoup plus fréquent en Afrique qu'en Europe et en Amérique du Nord. La très forte incidence de cette tumeur est l'un des principaux problèmes de santé publique dans les pays tropicaux et il ne fait pas de doute que ce type de cancer était déjà répandu sur ce continent avant l'urbanisation et l'industrialisation.

Il est intéressant de noter que dans les régions d'Afrique à forte incidence — Mozambique et Sénégal — 60 à 80% des hépatomes surviennent sur un foie cirrhotique, alors que dans les pays tempérés les chiffres correspondants sont de 2,5 à 15%. Au Kenya, une association statistiquement significative a été rapportée entre l'ingestion d'aflatoxines et le cancer hépatocellulaire. Des observations similaires ont été faites au Nigéria et dans certains autres pays.

Les manifestations cliniques sont si évidentes qu'il n'est habituellement pas nécessaire d'approfondir les investigations. En pratique, tout Africain adulte qui présente des douleurs abdominales hautes et un foie induré et hypertrophié doit être considéré comme atteint de cette tumeur.

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