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Colon and rectal cancer in Ibadan, Nigeria: an update

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Abstract

Introduction Colorectal cancer was hitherto a rarity in the rural African in general and in Nigerians inclusive. Ibadan is a sprawling city in Western Nigeria with a population of about 2.5 million inhabitants. Lately, several publications from surgeons in this city have alluded to an increase in the number of colorectal cancer cases managed in the teaching hospital.

Objectives To examine the incidence of this disease over 10 years in order to confirm or exclude the apparent significant increase in colorectal cancer cases in Ibadan, Nigeria.

Method This is a retrospective study highlighting the age, sex, clinical features, operations performed and histopathological subtypes of patients who had surgery for colorectal cancer in the University College Hospital Ibadan between July 1995 and August 2004.

Results Two and sixty-eight patients were seen over 10 years. The male:female ratio was 1.16:1. The mean age was 41 years and the peak age was the 51- to 60-years group. Fourteen per cent of the patients were 30 years and below. Sixty-two per cent of the patients had rectal carcinoma while 33.2% had colonic carcinoma. Around 60.7% of colonic lesions were right-sided. The most common histopathological subtype was adenocarcinoma (78.8%), mucinous adenocarcinoma was 10.8% and signet ring type was 2.6%.

Conclusion Colorectal cancer is a disease on the increase in Ibadan. The mean age of 41 years is much lower than in the Western world. The male:female ratio still favours male patients slightly. About one in seven patients are 30 years and below. Adenomatous polyps were absent in the resected specimens.

Keywords colon, rectal, cancer, Ibadan

Introduction

Colorectal carcinoma (CRC) hitherto was thought to be uncommon in the developing countries especially the tropics [1,2]; however, this disease is showing up in these parts sufficiently enough to elicit concern. Several workers in the University College Hospital Ibadan have studied this disease and have mentioned the increasing rates thus highlighting the growing importance of this disease [3–5]. In the last 10 years (1995–2004), 268 patients presented to the University College Hospital Ibadan with colorectal cancer, making an average of about 27 patients per year. Thirty-five years previously, an average of 18 patients were seen per year [3] and this rose to about 25 patients per year about 18 years ago [4,5]. However, the incidence still seems to be rising as over 50 patients presented in the year 2004 alone.

This paper aims to study the clinical and pathological presentation of this disease over the last 10 years in Ibadan in order to serve as an update on the study of this disease in this environment.

Method

This is a retrospective, descriptive study utilizing the case files, ward admission records, operation room registers, histopathological reports, pathology day-book entries and cancer registry records of all patients who had surgery for colon and rectal surgery in the University College Hospital Ibadan between July 1995 and August 2004.

Data obtained from the case files were arranged as follows:

- demography (age, sex, occupation);

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- presenting complaint (bleeding per rectum, tenesmus, anal pain);
- abdominal findings (hepatomegaly, ascites, palpable mass);
- rectal examination findings.

Operation room registers supplied the anatomical sites of the lesions and operations performed.

The histopathology reports, day-book entries and the cancer registry provided the histological subtypes of the colon and rectal malignancies.

Results

A total of 268 patients' records were studied over the time period of 10 years. There were 144 male patients and 124 female patients, giving a male:female (M:F) ratio of about 1.16:1.

The age range was 14–86 years. The mean age was 41 years. The peak age incidence in this study was 51–60 years, though it was only marginally higher than the 41–50 age group (Table 1). There were 38 patients aged 30 years and below (14%): 22 male patients and 16 female patients, giving a M:F ratio of roughly 1.4:1.

The types of occupation the patients were engaged in were varied. Among the male patients, 44 were 'business men' or traders, 35 patients were farmers, 20 patients were unemployed. Others were 15 artisans, 10 secondary school teachers, 8 students, 5 evangelists (or pastors), 2 catholic priests, 3 patients worked in banks, and there was 1 engineer and 1 professor of basic sciences. Among the female patients, 40 were housewives, 30 were professionals, e.g. hairdressers, fashion designers (seamstresses), 29 had their own businesses mainly selling goods at a market or roadside, 11 were retirees or grandmothers who were just 'staying at home', the rest were made up of 9 students, 3 petty traders and 2 staff nurses.

The most common presentation was bleeding per rectum. Physical findings showed a palpable rectal mass (i.e. within reach of the examining digit) as most common in those with rectal carcinoma and palpable abdominal mass in those with colon cancer, 70% and 80% respectively. There were 166 (62%) patients with carcinoma of the rectum: 91 male patients and 75 female patients giving a M:F ratio of approximately 1.2:1.

Patients with colonic lesions totalled 89 (33.2%), comprising 48 male and 41 female patients. The M:F ratio for colonic lesions was 1.17:1. Fifty-four of these patients had their lesions located within the right side of the colon (60.7%). The overall rectum to colon ratio was 1.86:1. There were 13 patients (4.8%) who had their lesions located in the rectosigmoid junction: five male patients and eight female patients, giving a M:F ratio of 1:1.6.

In the 38 patients who were 30 years and below, 32 had rectal carcinoma while only 4 had colon carcinoma, a rectum to colon ratio of 8:1.The remaining two patients had tumours located in the rectosigmoid junction. Among the 32 patients with rectal cancer, 20 were male while 12 were female (M:F ratio of 1.67:1). Two male and two female patients had the colon as their site (M:F ratio of 1:1), and there were two female patients having the rectosigmoid junction as their site.

Table 1 Comparisons between present study and previous studies.

	Author(s) Adekunle and Abioye [3]	Akute [5]	Naeder and Archampong [12]	Irabor *et al.* [present study]	*P*-value
City/country	Ibadan/Nigeria	Ibadan/Nigeria	Accra/Ghana	Ibadan/Nigeria	
No. patients	320	504	134	268	
Period of study	1960–1978 (18 years)	1971–1990 (20 years)	1987–1991 (5 years)	1995–2004 (10 years)	
Patients per year	17.8	25	26.8	26.8	0.032
Male:female ratio	1.5:1	1.5:1	1:1	1.16:1	
Mean age	44 years	46 years	Not stated	41 years	
Peak age range	51–60 years	40–50 years	60–69 years	51–60 years	
Colonic tumours	39.1%	35.5%	48.5%	33.2%	0.016
Rectal tumours	60.9%	61.5%	51.5%	62%	0.170
Right sided colon tumours	66.7%	73.2%	71%	60.7%	0.003
Patients under 30 years	18.1%	Not stated	5.2%	14%	

P is significant at < 0.05.

The anatomical sites favoured were as follows:

- caecum (7.5%),
- ascending colon (13.4%),
- hepatic flexure (1.1%),
- transverse colon (1.1%),
- splenic flexure (1.1%),
- descending colon (4%),
- sigmoid colon (4.9%),
- rectosigmoid junction (4.9%),
- rectum (62%).

The surgical operations performed are as follows: for rectal carcinoma, 105 patients had Miles' abdomino-perineal resection, 19 patients had sigmoid loop colostomy fashioned because of inoperability (extension of the tumour to the pelvic side walls) and there were 42 patients who refused surgery. From the pathology report of the gross examination of the abdomino-perineal resection specimens, the location of the tumours within the rectum were as follows: thirty-two patients (31%) had tumours in the proximal third of the rectum, middle third of the rectum harboured tumour in 49% of patients (52) and the distal third showed tumour in 20% (21 patients).

The patients with colonic cancer had 59 right hemicolectomies, 16 left hemicolectomies and 14 sigmoid resections documented. All the patients with rectosigmoid tumours had anterior resections performed (13 in number).

The histopathological subtypes were as follows:

- adenocarcinoma (not otherwise stated) (78.8%),
- mucinous adenocarcinoma (10.8%),
- papillary adenocarcinoma (4.8%),
- signet-ring cell carcinoma (2.6%),
- squamous cell carcinoma (3%),
- carcinoid tumour (3%),
- malignant lymphoma (3%),
- small cell carcinoma (3%).

There were 29 patients overall with mucinous adenocarcinoma: 14 rectal and 15 colonic. The overall M:F ratio was about 5:1. For those with rectal mucinous adenocarcinoma, the age range was 14–58 years, with a median of 35 years and a mean of 36.6 years; the M:F ratio was 2.5:1. The age range for patients with colonic mucinous tumours was 28–68 years, with a median of 47 years and a mean of 42.3 years. The M:F ratio was 6.5:1. No evidence of colonic polyps was recorded in the pathology specimens.

Discussion

Colorectal carcinoma in Nigeria now seems to be an established disease; however, it is difficult to determine whether the incidence which appeared to be escalating has levelled off and is now at a plateau. One of the earlier reports from Ibadan revealed an annual rate of about 18 patients from the 1960s to the late 1970s [3], later this increased to a little over 25 patients per year in the late 1980s [4,5]. These higher figures are not sustained by other tertiary institutions in Nigeria probably because of the status of the University College Hospital (UCH), Ibadan, as the premier teaching hospital in the country leading to more referrals from all over the country. Nevertheless, the Eastern part of the country saw about six patients a year [6], a little over 14 patients a year from Jos which is in the middle belt of the country [7] and about 13 patients per year in Kano, a city in the core North of Nigeria [8]. The Obafemi Awolowo teaching hospital in Ife, which is about 45 km from Ibadan saw 127 patients with CRC over 10 years in the mid-1980s to the mid-1990s [9] similar to the incidence in Kano. In effect a range of 6–25 CRC patients have been reported to present to teaching hospitals in Nigeria before this study, which recorded about 27 patients per year from 1995 to 2004. However, the true yearly incidence shows that from the year 2000, there was a big jump in attendance at the UCH, Ibadan, by patients with CRC (Fig. 1). Indeed, in the 1960s, there were only four teaching hospitals in Nigeria (Universities of Ibadan, Lagos, Nsukka and Ife), which led to many referrals coming to Ibadan. Lately, there are about 30 teaching hospitals in the country, yet the teaching hospital in Ibadan still records a patient load higher than most. The past 4 years have seen over 40 patients per year. This may be attributed to increased awareness and accessibility to hospital than hitherto, but may also indicate an increase in new cases. Indeed, when Nigeria re-embraced democracy in May 1999 after about 30 years of military rule, the

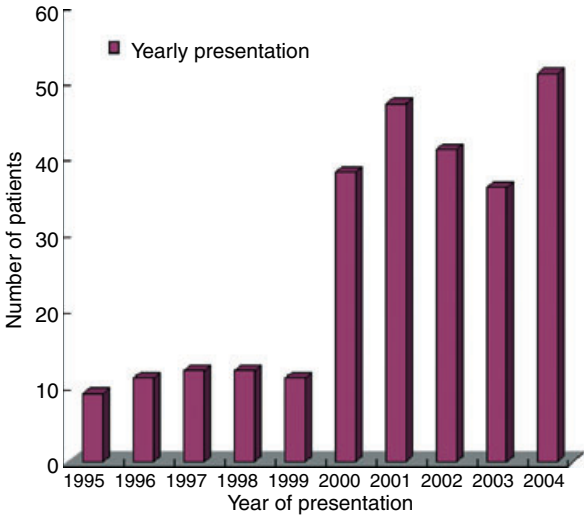

Figure 1 Yearly presentation of CRC patients in Ibadan.

first preference given by the democratically elected leaders was to refurbish the teaching hospitals and improve the salaries of health workers to stem the brain drain to other countries, thereby reinstating the confidence of the populace about the hospitals that had been described as 'mere consulting clinics' during the military era.

The average of 26.8 patients per year in this study has been shown to be statistically significant as a true increase in colorectal cancer patients presenting to the UCH, Ibadan ($P = 0.032$, Table 1). The M:F ratio of CRC in this study was 1.16:1 in favour of male patients, this compares favourably with previous studies in Ibadan [3–5], though other studies from the Eastern and the Northern parts of the country had above 2:1 in favour of male patients [6,7].

The mean age of 41 years in this study was in accordance with all the studies reported in Nigeria where the peak age incidence has constantly been within 41–50 years, thus underscoring the earlier age incidence in Nigerian Africans since the 1960s (Fig. 2) [3–11]. Only in Ghana, a neighbouring West African country was the 7th and 8th decades reported as ages of peak incidence [12]. The lower peak age incidence seen in Nigerian Africans could be attributed to the life expectancy of Nigerians that is estimated at 47 years, buttressing the younger age structure of the Nigerian population [13]. This may then allow Nigerians to develop such life-threatening diseases at a younger age; conversely one may also argue that it might be because these diseases are developed at a younger age that the life expectancy of Nigerians is that low. An interesting observation of age-related incidence was the significant proportion of patients under the age of 30 years; 14% of patients in this study were in that category (Fig. 2).

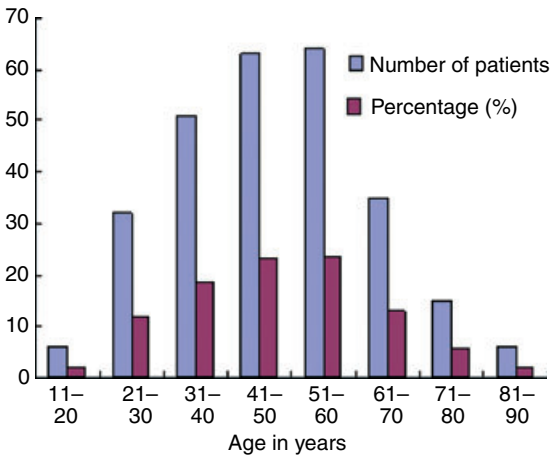

Figure 2 Age incidence of CRC in Ibadan.

A study by Ajao [14] in Ibadan in 1998 over a 2-year period found 11 patients out of 23 belonging to the under-30 age group, 23.6% of under-30s was reported by Sule *et al.* in Jos [7], while a study in the Sudan showed 33% of histopathologically confirmed patients under 30 years of age [15]. A European study observed that hereditary tumours are found more in younger patients [16]; however, all of the under-30s with CRC in this study denied a family history of a similar illness (as recorded in their case files). Only two patients of familial adenomatous polyposis have been reported in Ibadan in the last 35 years [4], two patients of hereditary nonpolyposis colon cancer have been reported within the last 15 years [17] and one patient with a rectal polyp [18]. Colonic polyps are estimated to develop usually in the late 1940s and malignant change may then occur 15–20 years later [19,20]. This pathogenetic mechanism buttresses the belief that the adenoma-carcinoma sequence is unlikely to be the main route of carcinogenesis in Nigerian patients [5,14], given the mean age of 41 years here. Table 1 shows briefly how this study compares with previous studies on this disease in Ibadan and in Ghana, a neighbouring West African country, and one can see that, consistently, in all the studies, there have been more rectal cancer cases than colonic and for those colonic lesions, right-sided lesions predominate. Bleeding per rectum and a rectal mass was seen in those with rectal carcinoma while an abdominal mass was seen in those presenting with colon cancer. Weight loss was common to both. These clinical features were reported in most of the studies perused [3–11]. Rectal lesions were also more common and were overall roughly twice more than colonic lesions in this study compared with about 1.3–1 in most [4,5,8]. However, in the under-30's the rectum to colon ratio was 8:1 in this study. The significance of this as regards pathogenesis is yet to be elucidated.

Indeed, some authors have also pondered at this higher incidence of rectal as opposed to colon cancer in young patients, especially male patients and they have suggested that a different pathogenesis, yet to be elucidated, which is neither inherited nor diet-related could be at play [21,22]. The male predominance has been explained by some authors to be due to the protective effect of exogenous female hormones, through the use of oral contraceptives and hormone replacement therapy, making the women less susceptible to the development of colorectal cancer [23,24]. With the increased focus and attention on healthy-motherhood through family planning in Nigeria, many more women in the child-bearing age are using oral contraceptives.

The favoured anatomical sites in the colon have been reported to be shifting towards the right colon [4–

6,11,12,18] and this is borne out in this study where tumours in the caecum and ascending colon alone took up 21% of the total of 33% colonic involvement. Microsatellite instability (MSI) should be considered as a possible route in these patients because the clinicopathologic features that are associated with MSI include location of the tumour proximal to the splenic flexure, poorly differentiated cancers and predominance of mucin-producing cells in such lesions [25]. This right-sided shift may now have reached a plateau, and is probably reducing slightly ($P < 0.05$, Table 1) in favour of rectal tumours. Thus the most frequent operations performed were Miles abdominoperineal excision of the rectum and right hemicolectomy for right-sided colon cancers. The use of staplers in bowel surgery, sadly, is lacking in the UCH, Ibadan, thus hand-sewn anastomosis is performed in two layers (usually 3–0 Vicryl for both layers). Anterior resections are performed for rectosigmoid lesions; however, once the lesion is estimated to be about 8 cm from the anal verge, an abdominoperineal resection is indicated. This is predicated on the difficulty of hand-sewn anastomosis for a low (or deep) anterior resection in the confines of the narrow male pelvis and also the contracted pelvis of many Nigerian women [26,27] and, as seen above in the results, 69% of the patients with rectal carcinoma had their lesions located in the middle and distal thirds of the rectum. The only surgical option in this centre for such patients is Miles' abdominoperineal resection. Low anterior resections were not considered for the 31% who had proximal third lesions probably due to the above reason (difficulty of hand-sewn anastomosis for deep pelvic locations).

The histopathological types were most commonly adenocarcinoma; however, a significant proportion of these tumours were mucinous adenocarcinoma (10.7%) and signet ring types (2.6%). Other studies from Ibadan, Enugu and Ife have shown 15.5%, 5.9% and 7.3% respectively of the mucinous type [4,6,11], and the highest was from Kano where 30% of the specimens showed mucinous adenocarcinoma [8]. An interesting observation from the mucinous tumours in this study showed that rectal locations occurred more in younger patients while the colonic sites occurred in patients on average a decade older. In both locations, the male predominance was significant but overwhelmingly so in the colonic locations. Mucinous carcinomas, which are said to occur in 10–15% of cases, may have a worse prognosis and are common in younger patients [19,20]. The colloid type produces ample extracellular mucin and the signet ring type is characterized by intracytoplasmic accumulation of mucin. The signet ring type occurs in about 1% of cases and its prognosis is even worse than the colloid type [19].

Epidemiologic studies have revealed a direct correlation between the incidence of colorectal cancer and per capita consumption of calories, dietary fat and meat protein [20,28]. Yet the incidence per population in Africa is still very much lower than a the country like the USA where beef intake is very high. The world-wide incidence of colorectal cancer varies dramatically, from 3.4 cases per 100 000 population in Nigeria to 35.8 cases per 100 000 population in Connecticut [20]. In the past, meat intake for Nigerians was a luxury confined to tiny cubes of beef or the hide (called Ponmo locally), which are taken with meals once or twice a week. Meat is still expensive though but increasing affluence and the adoption/preference for Western-type menus has led to increase in the consumption of meat. Whether this may be a factor in the pathogenesis of colon and rectal cancer in Nigeria is something to be considered. Another factor for consideration is the widespread practice of smoking, barbecuing or deep frying meat in Nigeria. Because of poor refrigeration subsequent on very poor electricity supply, many Nigerians resort to preserving meat through those means. Unfortunately, it has been shown that the application of high heat to meat results in the production of heterocyclic amines, which are carcinogenic to the colon [29,30].

Some authors have suggested the possibility of *de novo* colorectal cancer in African black populations. They suggest that MSI may play a greater role in the development of CRC in native African population based on the relatively young age, mucinous histopathology and high proliferative activity [31,32]. Indeed, in a small pilot study conducted in Ibadan, Nigeria in 2000, it was suggested that mismatch repair genes play an important part in the aetiology of CRC in Nigerian blacks [17,32]. Added to this is the observation that many MSI positive colon cancers had significantly higher exposure to dietary heterocyclic amines [30]. It is instructive to note that long-term alcohol use has also been linked to an increase in the probability of MSI-associated CRC [33,34]. Coupling this with the report that alcohol consumption in Nigeria has been rising steadily over the last 35 years with a significant steep rise in the last 15 years [35], one may assume that part of the increase in CRC cases may be ascribed to this. However, before one is quick to ascribe cause and effect, it should be stated that the astronomical rise in total alcohol consumption in Nigeria from 1994 onwards was due mainly to the increase in wine consumption. Beer consumption only showed a slight increase while consumption of spirits remained the same [35]. Indeed moderate wine intake (< 9 glasses per week) has been shown to have a protective effect against CRC [34] while an increased risk has been reported in those who consume up to 21 glasses of wine per week [36].

Obesity, which has been linked to CRC [37,38], has been reported to be the silent global epidemic of the last 30 years with almost every country recording an increase [39]. Apparently, Nigeria has recorded a modest increase in the incidence of obesity over the last 7 years, yet the numbers are still much less than those from the USA or the Caribbean [40–42]. The concept of occupation having a bearing on the development of colon cancer should also be examined. The influence of shift duty increasing the risk of colorectal cancer has been reported in nurses [43,44]; however, only two nurses (1.6% of the female patients) were reported in this study, which may make that aetiological pathway tenuous at best in these patients. It is likely that multiple factors acting singly or in concert may be responsible for the perceived increase in CRC patients; however, other considerations should include better patient awareness, improved data records from computerized cancer registries [45], emergence of and access to diagnostic methods to identify nonpolyposis coli cancer syndromes [17,32] and acknowledgement of the possibility of environmental factors, such as dietary influences and dietary carcinogens [29,30].

In conclusion, CRC in Nigeria is increasing in incidence, it affects adults in their most economically productive age group (mean age of 41 years with a significant percentage of patients who are 30 years and below), male patients are slightly more affected than female patients and it affects the rectum more than the colon. Its pathogenesis is still unclear due to the rarity of adenomatous polyps, yet could well lie in the path of MSI in combination with other environmental factors.

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