Prevalence of Positive Faecal Occult Blood Test in University of Benin Teaching Hospital, Benin City, Nigeria

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Abstract

Background*: Faecal occult blood test is a laboratory test used to access stool samples for hidden (occult) blood. It is an important screening tool for colorectal cancer.*

Subject and Methods*: The faecal specimens were mainly requests sent to the department of chemical pathology from the accident and emergency words, consultant out-patients clinic and various in-patient wards at the University of Benin Teaching Hospital, between January and December 2014 (12 months). The stools samples were analyzed using the guaiac-impregnated paper slides.*

Results*: Of the 122 faecal occult blood tests done in the department of Chemical pathology, UBTH, during the period, only 2 were positive corresponding to just 1.6%, with one FOBT positive for the males (1.35%) and females (2.08%) respectively.*

Conclusion: *This study demonstrates the low incidence of colorectal cancer using FOBT among Nigerians living in the Niger-Delta region. Although with more people embracing western lifestyle and minimal exposure to sunlight, we advise that more awareness has to be created for people to routinely screen for occult blood in faeces and those positive or negative with high index of clinical suspicion should further be evaluated with sigmoidoscopy and colonoscopy.*

Keywords: Faecal occult blood test (FOBT), prevalence, guaiac, colorectal cancer

Introduction

The faecal occult blood test (FOBT) is a laboratory test used to assess stool samples for hidden (occult) blood[1]. The concept of occult-blood detection has existed since 1864, there was little interest in its application to the early detection of large-bowel cancer until 1967, when Greegor proposed a test for home use that involved guaiac-impregnated paper slides[2]. Two French studies have shown that screening for colorectal cancer with feacal occult blood tests (FOBT) can be very effective. In one, FOBT screening increases the rate of diagnosis of high-risk precancerous adenomas (polyps) by 89%, and in the other, using FOBT to guide colonoscopy decision could increase positive predictive value of colonoscopy in those high risk patients based on history with 3.9% for

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cancer, 12.9% for advanced adenoma, and 25% for any adenoma[3]. By comparison, in the average risk population selected by a positive FOBT, the positive predictive value of colonoscopy ranges from 7.5% to 10% for cancer, from 15% to 27% for advanced adenoma, and from 32% to 37% for any adenoma[3].

The American cancer society estimated that early diagnosis and prompt treatment could save two-thirds of 53,000 Americans who die annually from cancer of the colon and rectum[4]. Greegor further stated that if guaiac screening, plus digital rectal examination and sigmoidoscopy where included in all annual physical examinations many more cases of colorectal cancer could be detected at a stage amendable to cure[5].

Van Deen is generally credited with the discovering that gum guaiac, a natural resin extracted from the wood; Guaiacum Officinale is a method of choice for detecting occult blood in faeces[6.] . The basis of the test is that haemoglobin exerts a peroxidase-like action and causes the oxidation of a phenolic compound (alpha guaiaconic acid) by hydrogen peroxidase to a quinone structure[6]. Since the structure of haematin is similar to peroxidase, it is probably this fraction of the haemoglobin which catalyzes the oxidation of guaiac. Comparing the reactions obtained with guaiac paper slides and other chemical methods such as benzidine and orthotolidine[7], for detecting feacal blood, the guaiac slide method was found to be about one-quarter as sensitive as the chemical tests but overcomes both the instability of guaiac solutions and the hypersensitiveiy of benzidine and orthotolidine[7].

Globally, colorectal cancer is the third commonest malignant neoplasm after cancer of the lung and stomach in the male and after cancer of the breast and cervix in the female[8]. It accounts for 8.8% of cancer in males and 9.2% in females. Though it is more common in Western communities like United States of America, England and Wales, the incidence is known to be gradually increasing in Black Africa from about 10 to 20 in major urban centre tertiary institutions to 50 cases annually[9]. The relative low frequency in Black Africa may be attributed to the poor diagnostic tools, transit time of faeces, fibre diet and rarity of pre cancerous conditions[10]. In this present study we looked at the prevalence of positive faecal occult blood test in patients attending university of Benin teaching hospital, Benin City, Edo state, Nigeria.

Subjects and Methods

This study was done at the department of Chemical Pathology, University of Benin Teaching Hospital, Benin City, Edo state, Nigeria, between January, and December, 2014 (12 months).

The specimens were mainly requests sent to the department of chemical pathology from the accident and emergency wards, consultant out-patient clinic and in-patient wards at the University of Benin Teaching Hospital. The clinical information ranges from unexplained anaemia to routine medical test. Most of the patients were in the middle age group (45 – 65 years).

Patient Preparation

Patients were asked to avoid red meats, high dose ascorbic acids (Vitamin C) and iron containing drugs for 72 hours prior to sample collection because these factors may interfere with the result of the test to give either false positive (iron containing drugs) or false negative results- (Vitamin C)[7] . Patients with bleeding from other conditions such as hemorrhoids, dental bleeding, constipation and menstrual bleeding were not tested. Also patients using rectal preparations or who had rectal examination (digital or sigmoidoscopy) 72 hours prior to sample collection were not tested.

Sample Collection and Biochemical Analysis
The stool specimens were collected into properly labeled universal bottles. Each specimen was applied to the guaiac paper of the haema-screen slide as a thin smear using the applicator stick provided by the kit manufacturers (Immunostics-inc). The perforated sections on the back of each slide labeled 1-2 were opened; two or more drops of haemascreen developing solution were applied to expose test paper. The results were read between 30 and 60 seconds. Any trace of blue is positive for occult blood and it is negative when there is no trace of blue. Positive and negative standards were also analyzed along with the test samples.

Statistical Analysis
The data were entered into and analyzed using SPSS version 16.0 (Chicago, IL, USA). Continuous variables were presented as mean ± standard deviations.

Results
The mean age of the subjects was 50.25 ± 7.60 years, with 60.7% of the subjects being males with a mean age of 50.03 ± 5.12 years and 39.3% being females with a mean age of 50.17 ± 4.83 years. Of the 122 faecal occult blood tests done in the department during the period, only 2 were positive corresponding to just 1.6%, with one FOBT positive for the males (1.35%) and females (2.08%) as shown in the table below.

Discussion
The mean age of the patients recruited for faecal occult blood test was 50.25 years with age range of 40-68years. This is similar to the observations from other parts of Africa[11].

The low prevalence of positive faecal occult blood test observed in this study could be attributed to the low incidence of colorectal cancer in Nigeria which is estimated to be 3.4 cases per 100,000 per year in Nigeria[12], compared with 35.8 cases per 100,000 each year in Connecticut, USA[9]. The crude incidence of bowel cancer in the South African blacks living in the Witwatersrand was assessed as less than one-tenth of the whites living in the same location (3.5/100,000/ year in blacks to 41/ 100,000/year for whites) despite 3 to 4 generations of "Westernization" of the blacks, the authors were unable to find a reportable reason for the difference[11].

Various researchers have adduced different reasons for the huge disparity in the prevalence of bowel cancers between Caucasians and negroid. One of the reasons put forward is the effect of diet and environment on prevalence of bowel cancers, this was noticed from migration studies, as American blacks have incidence comparable to Caucasians and native Africans who migrated to America[13]. Colonic adenocarcinoma is the 3rd commonest maligiant neoplasm in societies with western lifestyle as diet rich in red meat and fat, lacking vegetables, fruits and fibres is implicated in colonic carcinogensis[9,13,14]. It is without doubt

	Number of FOBT	Age (Years) Mean ± SD	Percentage of Postive FOBT	Percentage of Negative FOBT
Male	74	50.03±5.12	1.35%	98.65%
Female	48	50.17±4.83	2.08%	97.92%
Total	122	50.25±7.60	1.64%	98.36%

Legend: FOBT- Faecal Occult Blood Test, SD- Standard Deviation

the countries that consume a lot of meat and animal fat have the highest rates of colon cancer, and this inversely correlates with the consumption of dietary fibres[15,16,17]. The protection that fibre offers has been shown to be dependent on the type of fibre consumed as many studies have found no protective effect of cereals type fibre and have consistently found a protective effect of vegetable and fruit fibre[18,19,20,21]

Finally, West Africa is blessed with sunlight all year round. Sunlight is important in the peripheral manufacture of vitamin D in the human body. Vitamin D and Calcium have been shown to be protective against colorectal cancer[22,23]. Other countries in the world like North Africa, the Middle east and Pakistan that receive large amount of sunshine annually have very low incidences of colorectal cancer[3,24].

In conclusion, this study demonstrates the low incidence of colorectal cancer using FOBT among Nigerians in the Niger-Delta region, although with more people embracing western lifestyle and minimal exposure to sunlight, we advice that more awareness has to be created for people to routinely screen for occult blood in faeces and those positive or negative with high index of clinical suspicion should be further evaluated with sigmoidoscopy and colonoscopy.

References

1. Greegor DH. Diagnosis of large bowel cancer in the asymptomatic patient, JAMA, 1967; 201: 943 – 945.
2. Greegor DH. A progress report. Detection of colorectal cancer using Guaiac slides. Cancer 1972; 22 (6): 360 – 364.
3. Parkin DM, Bray F, Ferlay J, and Pisani P. Global cancer statistics, 2002. Ca-A cancer Journal for clinicians 2005; 55(2): 74 – 108
4. American cancer society, 1982 facts and figures.
5. Greegor DH. Detection of silent colon cancer in routine examination. Cancer 1969; 19: 330 – 336.
6. Kratochvil JF, Burns RH, Soikel MK, and Haskin JM. Isolation and characterization of alpha guaiaconic acid and the nature of guaiacum blue. Phytochem 1971; 10: 2529 – 2531.
7. Ostrow JD, Mulvanoy CA, Hansell JR and Rhodes RS. Sensitivity and reproducibility of chemical tests for faecal occult blood with an emphasis on false positive reactions. Amer. J. Digest Dis. 1973; 18: 930 – 940.
8. Burkilt DP. Epidemiology of cancer of the colon and rectum. Cancer 1971; 28(1): 3 – 13.
9. Irabor DO, Arowolo A and Afolabi AA. Colon and rectal cancer in Ibadan, Nigeria: an update. Colorectal disease. 2010; 12: 43 – 49.
10. Iliyasu Y, Ladipo JK, Akang EEU, Adebamowo CA, Ajao OG, and Aghadiuno PU. A twenty year review of malignant colorectal neoplasm at University College Hospital, Ibadan, Nigeria. Disease of the colon and Rectum. 1996; 39(5): 536 – 540.
11. Segal I. Rarity of colorectal adenomas in the African black population. Eur J. of cancer Pre. 1998; 7(5): 387 -391.
12. Sack J and Rothman HM. Colorectal carcinoma: natural history and Management. Hospital physician 2000; 36: 64 – 73
13. Hill MJ. Cancer of the large bowel: human carcinogenesis. Bri J surg. 1985; 72: 537 – 539.
14. Adekunle OO and Lawani JA. Clinical aspects and management of carcinoma of the rectum in Nigeia. East afr. Med. J. 1982; 59(3): 206-213.
15. Barbatis C. The histopathology of colorectal cancer. Archives of Hellenic pathology 1995; 4: 218 -221.
16. Willett WC, Stampfer MJ, Colditz GA, Rosner BA and Speizer FE. Relation of meat, fat and fiber intake to the risk of

colon cancer in a prospective study among women. N Engl J Med. 1990, 323 (24): 1664 – 1672.
17. Kampman E, Slattery ML, and Bigler J. Meat consumption, genetic susceptibility, and colon cancer risk: a united states, multicenter case-control study. Cancer Epidemiology Biomarkers and prevention 1999; 8(1): 15 – 24.
18. Weisburger JH. Colon carcinogens: their metabolism and mode of action. Cancer. 1971; 28(1): 60 – 70.
19. Ponz de Leon M. Prevention and chemoprevention of colorectal neoplasm. Digestive and liver disease 2001; 34(1): 59-69.
20. Schatzkin A, Lanza E, and Corle D. Lack of effects of a low-fat, high-fibre diet on the recurrence of colorectal adenomas. N Engl. J. Med. 2000; 342 (16): 1149-1155.
21. Alberts DS, Martinez ME, and Roe DJ. Lack of effects of a high-fibre cereal supplement on the recurrence of colorectal adenoma. N Engl J. Med.; 2000; 342(16): 1156-1162.
22. Garland CF and Garland FC. Do sunlight and vitamin D reduce the likelihood of colon cancer. Int J. Epidem. 2006; 35(2):217-220.
23. Heaney RP. Research and public health implications of the intricate relationship between calcium and vitamin D in the prevention of colorectal neoplasm. J Nat. cancer Inst. 2004; 96 (10): 805 – 807.
24. Moshkowitz M and Arber N. Differences in incidence and distribution of colorectal cancer among races and ethnic societies: lifestyle, genes or both. Digestion. 2005; 72(4): 219-222.