MALIGNANT DISEASE IN NIGERIA: AN ANALYSIS OF A THOUSAND TUMOURS

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(*Received for publication August 6th*, 1947)

An analysis of malignant tumours in natives of Nigeria was published by Smith and Elmes in 1934. The present paper is a continuation of that work, and the tumours here analysed represent specimens received from all parts of Nigeria during the 10 years 1935–44. All were from Africans.

Accurate statistics are still difficult to obtain, and the general remarks by Smith and Elmes (1934) concerning the difficulty in obtaining accurate data apply equally to this analysis.

In the light of more recent knowledge, some of the tumours have been reclassified, with consequent alteration in the percentage incidence.

The classification is according to the varieties of tumour, the age and sex incidence, and the type and site incidence of the two main groups, carcinoma and sarcoma.

The difficulty in obtaining photographic materials during and after the recent war, and the high cost of reproduction, preclude photomicrographs, except for two tumours of special interest—a pigmented acanthoma and the chronic leg ulcer type of carcinoma.

TABLE I

Varieties of tumours

Variety	No.	Percentage
Carcinoma	568	56·8
Sarcoma	204	20·4
Melanoma	62	6·2
Mixed salivary-gland tumour ...	49	4·9
Neuroblastoma	45	4·5
Osteoclastoma	23	2·3
Adamantinoma	18	1·8
Haemangio-endothelioma	10	1·0
Ewing's tumour of bone	8	0·8
Granulosa-cell tumour of ovary ...	4	0·4
Brenner's tumour of ovary	3	0·3
Teratoma	3	0·3
Carotid body tumour	2	0·2
Lympho-epithelioma of nasopharynx	1	0·1
Total	1,000	100

NOTES ON TABLE I

Haemangio-Endothelioma. It is interesting to record that one of these tumours, in the lip of a boy of 11 years, gave rise to fatal haemorrhage.

Neuroblastoma. These growths were included under 'round-cell sarcoma' by Smith and Elmes (1934). We have here separated them by virtue of their histology, their site of origin, and, to a less extent, their age incidence. They include the undifferentiated sympathicoblastoma, the retinoblastoma and the medulloblastoma.

Of the 45 cases in the present analysis, 29 were in males, 11 were in females, and in five the sex was not stated. The youngest case was a boy of $1\frac{1}{2}$ years, with a retinoblastoma; the oldest was a man of 50, with an abdominal sympathicoblastoma.

Thirty-one of the patients were under 10 years of age, six were between 10 and 20 years, and only one was above the age of 20. The age was not stated in three instances.

Twenty-one of the specimens were retinoblastomas, 16 were abdominal sympathicoblastomas, three were medulloblastomas, three were from the maxilla, one from the temporal bone, and one from the scrotum.

Melanoma. These number 62 in the present analysis. The percentage of 6·2 agrees fairly closely with the 8·0 per cent. obtained by Smith and Elmes (1934), and with the 10·8 per cent. obtained by Vint (1935) in East Africa.

Ewing (1940) quotes Bauer on the rarity of melanotic tumours in the negro, but their frequent occurrence in the natives of the Anglo-Egyptian Sudan is recorded by Hewer (1935), who stresses the different conditions under which American negroes live.

That trauma plays a significant part in the aetiology is borne out by the site incidence of our cases. Forty-five (72·0 per cent.) occurred on the foot, four of them with metastases in the inguinal lymph-nodes. Of the remainder, four were in the mouth—one of which had widespread metastases—four were in the eye, and there was one each in wrist, buttock, scalp and femoral triangle. Two were described briefly as 'ulcers' and were probably of the lower limb, and three were metastatic growths with undetermined primary sites.

Thirty-one of the melanomas were in males, 17 were in females, and in 14 the sex was not stated. In only 32 cases was the age given. There were two tumours in boys of eight years, both situated in the eye. The remainder occurred between the ages of 25 and 65. Of the 32 cases in which the age was not recorded, 18 were stated to be adults.

Histologically, the tumours were, for the most part, of the spindle-cell (sarcomatous) or polyhedral (carcinomatous) type, the amount of pigment usually being abundant but varying from microscopic amounts to coal-black masses. One specimen deserves special comment: it occurred in the eye of a man of 30 years and was structurally a pigmented acanthoma with well-marked 'cell nests' (see Plate XII). No previous record of such a tumour could be found in the available literature.

With regard to the aggressive character of the melanomas, there is some doubt whether this is as great in the dark-skinned African as it is in the light-skinned races, but the difficulty of following up operation-cases rules out accurate statistical evidence. Eight out of the 62 cases were metastatic tumours or had given rise to metastases, all with abundant pigment. Hewer (1935) in the Sudan found metastases in the lymph-nodes in 10 of his 47 cases.

Adamantinoma. All the tumours, except one, occurred in the jaw. The exception was in the tibia and has been recorded by Bell (1942).

Teratoma. Only those with definite histological evidence of malignancy are included in this analysis. Two occurred in the ovary and one in the sacro-coccygeal region. Since the analysis was completed one specimen of testicular teratoma has been received.

Osteoclastoma. These tumours were classified by Smith and Elmes (1934) as myeloid sarcoma. The present analysis includes the bone tumours, the giant-cell epulis and the giant-cell tumour of tendon sheaths. Nine occurred in bones (radius, tibia, rib), nine in tendon sheaths, and five were of the epulis type. One of the epulis tumours, in a man aged 35 years, was remarkable in that it reached the size of an infant's head.

Ewing's Tumour of Bone. Only one of the eight cases came to autopsy and thus allowed confirmation of the diagnosis, but in the others the clinical examination failed to reveal a primary carcinoma or neuroblastoma, both of which may, in their metastases, closely simulate Ewing's tumour. The sites involved were the ilium, clavicle, leg bones, forearm bones, scapula and os calcis. The tumour of the os calcis had secondary deposits in the regional lymph-nodes.

Five of the tumours were in males, two were in females, and in one the sex was not stated. Five occurred in persons under the age of 30 and none above the age of 45.

TABLE II

Age and sex incidence

Age-group	0–10 years	11–30 years	Over 30 years	Not stated	Totals
Males	35	114	308	22	479
Females	24	60	217	59	360
Not stated	8	7	19	127	161
Totals ...	67	181	544	208	1,000

NOTES ON TABLE II

Malignant tumours occurring under the age of 10 years show almost the same percentage in the two analyses—5·8 per cent. in the earlier one of Smith and Elmes (1934), and 6·7 in the present one. The difference between the sexes increases sharply after the age of 10, and is mainly accounted for by the greater frequency with which males attend hospitals. (In the 10-year period up to 1943 the African in-patients in Government hospitals numbered 600,685, of whom 71·5 per cent. were male and 28·5 per cent. female.)

NOTES ON TABLES III AND IV

The term ' glandular carcinoma ' includes all carcinomas arising in glandular organs and tissues, and all in which the histology is of a definite glandular type. ' Undifferentiated carcinoma ' is one in which the histological type shows no differentiation into glandular structure and where there is no definite indication of origin. The embryonic carcinomas comprise nine choriocarcinomas, seven seminomas, two dysgerminomas and four nephroblastomas (Wilms' tumour).

Kidney. No attempt has been made to distinguish between hypernephroma and adenocarcinoma, as such distinction is felt to be no longer valid.

Female Genitalia. Seven carcinomas occurred in the vulva, five in the vagina, 68 in the uterus, and 20 in the ovary. Owing to meagre clinical data it was not possible to subdivide the uterine cancers into cervix and corpus. The great majority occurred in parous women and they include the nine choriocarcinomas.

The ovarian carcinomas include the dysgerminomas, both of which occurred in children.

Male Genitalia. There were five squamous carcinomas of the scrotum and 10 of the penis. The seven testicular tumours were all seminomas. The prostatic carcinomas numbered eight.

TABLE III

Carcinoma : type incidence

Type	No.	Percentage of carcinomas
Glandular	243	42·8
Squamous	231	40·7
Basal-cell	16	2·8
Undifferentiated	56	9·8
Embryonic	22	3·9
Total	568	100·0

TABLE IV

Carcinoma : site incidence

Site	No.	Percentage of carcinomas
Female breast	77	13·5
Male breast	7	1·2
Kidney	10	1·8
Female genitalia	100	17·6
Male genitalia	30	5·3
Liver, primary	81	14·3
Liver, metastatic	3	0·5
Skin	122	21·5
Thyroid	14	2·5
Stomach	22	3·9
Lip, mouth, palate, tongue, larynx ...	13	2·3
Nasal cavities	6	1·1
Bladder	18	3·1
Pancreas	7	1·2
Lung	5	0·9
Large intestine	14	2·5
Lymph-nodes, metastatic	16	2·8
Salivary glands	11	1·8
Bone, metastatic	6	1·1
Small intestine	1	0·2
Unspecified	5	0·9
Total	568	100·0

Liver. All but one of the 85 tumours of the liver were carcinomas. Of these, 81 were primary, which is 8·1 per cent. of the total tumours in this analysis and corresponds fairly closely to Smith and Elmes's (1934) figure of 6·4 per cent. of all tumours. The 81 primary carcinomas represent 14·3 per cent. of the total carcinomas, which is close to Vint's (1935) figure of 13·0 per cent. in East African natives. Much higher percentages have been recorded by some writers, and Kennaway (1944), quoting Berman, gives liver

cancer as 37·4 per cent. of all cancers in the Bantu races and 18·7 per cent. in West Africans, and draws attention to the much lower incidence in American negroes. In the present analysis 70 of the primary growths originated from hepatic cells and 11 from the intrahepatic bile-ducts. All showed cirrhosis of the Laënnec type to a greater or less degree, a process which Ewing (1940) considers is contributory to and coincident with the tumour growth. When the high incidence of liver damage and consequent cirrhosis in Africans and other tropical races is explained, we shall also have an explanation for the high percentage of primary liver cancer. It is unlikely that alcohol, syphilis, schistosomiasis, virus disease or race *per se* will be specially incriminated, though they may be contributory to damage caused by a common initial factor. Des Ligneris (1936), discussing the incidence of liver cancer in young mine natives in South Africa, considers that the factor responsible for cirrhosis must be one affecting them in their early youth.

Smith (1942) draws attention to the abnormal histological appearance of the liver in Nigerian natives, and notes the frequency with which subacute necrosis is encountered. A dietetic factor seems the most likely initiator of liver damage, and is suggested by the work of Gillman (1944) and of Himsworth and Glynn (1944).

In the present analysis 19 of the cases were under the age of 40, the youngest being a man of 20. Twenty-eight were between 40 and 60 years and five were between 60 and 70. Sixteen were stated in the clinical reports to be adults, and in 17 cases no age was given.

Clinical data are frequently meagre, but of the 60 cases in which the sex was given 57 were males. One must bear in mind the much greater proportion of males attending hospitals, but there does seem to be a true preponderance of liver cancer in the male sex.

Primary carcinoma of the liver in natives of Nigeria is a disease seen, as a rule, only in its final stage, and it is remarkable how, with the organ grossly diseased, the individual manages to perform his vocation. A recent case seen by one of us (B.G.T.E.) was a soldier in whom disease was unsuspected until his admission to hospital a week before death. At autopsy the liver weighed 11 pounds and was almost entirely composed of tumour tissue.

Skin. Squamous carcinoma of the leg merits special mention in this paper. Vint (1935) has drawn attention to the prevalence of malignant change in chronic tropical ulcers of the leg, and stresses the difficulty in determining whether precancerous changes exist in cases with aberrant overgrowth of the marginal epithelium. Cooray (1944), in Ceylon, found that 61 per cent. of the skin cancers arose in connection with chronic ulcers of the leg. We have seen several cases of chronic leg ulcer with a distinctive clinical appearance. The base is composed of granulation-tissue and the edge is nodular, indurated, raised and rolled, and very suggestive of squamous carcinoma. Histologically, there is marked papillary hyperplasia of the epithelium and the formation of ' cell nests.' Mitoses, hyperchromatism and abnormal cell-bodies or nuclei are rare, and the down-growth appears to be limited, as Vint (1935) notes, by the fibrous tissue of the ulcer bed. To these tumours we have given the name ' squamous carcinoma of the chronic leg ulcer type,' in the hope that it will connote a definite entity to the clinician.

Twelve of the squamous carcinomas of the series were of this type, and the majority were of several years' duration, without evidence of metastases. Seven were in males, four were in females, and in one the sex was not stated. The youngest patient was 28 years of age and the oldest 63. In the few cases which we have been able to examine

clinically, no evidence of a fuso-spirochaetal infection was found, though there remains the possibility that they were primarily true examples of tropical ulcer. Enlarged regional lymph-nodes showed, on section, only chronic inflammatory changes. Excision and skin grafts were the normal methods employed in treatment.

Dr. E. C. Braithwaite, Senior Specialist, Nigeria, in a personal communication on the subject of these tumours states: 'In these cases of malignant disease (epithelioma) arising in ulcers of long standing, particularly burn cases, the malignancy is of a low grade, with late secondary involvement of the lymphatic glands in the drainage area. Death is usually due to some intercurrent disease.'

Plate XIII shows a typical squamous carcinoma of this type in a man aged 30 years with a history of an ulcer of the leg of 10 years' duration.

Stomach. Twenty-two cases of carcinoma of the stomach occur in the present analysis, compared with only four cases in the first analysis by Smith and Elmes (1934). Vint (1935) recorded an incidence of 1·8 per cent. in his malignant tumours in Kenya, which is close to our figure of 2·2 per cent. Cooray (1944), in Ceylon, found only seven primary carcinomas of the stomach in 2,295 malignant tumours. These figures cannot strictly be compared with the high percentages quoted by Ewing (1940) for Europe and the United States of America, but there may be, as Ewing notes, a slight relative immunity from this form of cancer in negroes and in the tropics. No reliable statistical evidence is likely to be obtained from Nigeria for many years.

Thirteen of our cases were in males, five were in females, and in four the sex was not stated. The 16 cases in which the age was given were between 30 and 60 years.

Histologically, all were adenocarcinomas, except two, one which was carcinoma simplex of diffuse type and the other a sclerosing fibrocarcinoma.

Bladder. The only point of interest is that, out of 18 carcinomas, four were associated with *Schistosoma haematobium* infection.

Notes on Tables V and VI

In the analysis by Smith and Elmes (1934) the sarcomas were 44·0 per cent. of the total, compared with 20·4 per cent. in the present series. This difference is largely made up by the neuroblastomas, melanomas, osteoclastomas and Ewing's tumours, which have been separated from the sarcomas in this paper.

Kaposi Sarcoma (*Multiple Idiopathic Haemorrhagic Sarcoma*). This interesting condition is by no means rare in the natives of Nigeria, and 24 (2·4 per cent.) of the present analysis were of this type. The earlier analysis by Smith and Elmes (1934) showed a corresponding figure—2·0 per cent.

With two exceptions, in which the sex was not stated, all the cases occurred in males, the youngest being 23 years of age and the oldest 50. The tumours were confined to the leg below the knee, except for two cases in which the external genitals, perineum and thighs were involved, and one case in which the left upper arm, as well as the leg, was affected. No metastatic deposits are recorded in the clinical data, nor were any detected in the few cases observed personally. If the disease is a granuloma of peculiar type we have not been fortunate to see a case in which the histological picture was otherwise than predominantly neoplastic. The earliest nodule was probably not more than six weeks old, but the structure was that of angiosarcoma. Only in cases with ulcerated nodules were inflammatory cells at all numerous.

An unsuccessful attempt to transmit the disease to experimental animals by one of us (B.G.T.E.) in conjunction with Dr. G. M. Findlay has been recorded by Findlay (1946). In addition to the chimpanzee, baboons, *Cercopithecus* and Patas monkeys, rabbits, guinea-pigs and mice, two Syrian hamsters were also inoculated without success. The nodules used for the inoculations were of only six weeks' duration.

TABLE V

Sarcoma : type incidence

Type	No.	Percentage of sarcomas
Spindle-cell	53	25·9
Kaposi	24	11·8
Round-cell	21	10·3
Lymphosarcoma	53	25·9
Mixed cell	11	5·4
Osteogenic sarcoma	16	7·8
Rhabdomyosarcoma	13	6·4
Leiomyosarcoma	5	2·5
Angiosarcoma	3	1·5
Gliosarcoma, spongioblastoma ...	2	1·0
Gliosarcoma, ependymoma	1	0·5
Neurofibrosarcoma	1	0·5
Liposarcoma	1	0·5
Total	204	100·0

TABLE VI

Sarcoma : site incidence

Site	No.	Percentage of sarcomas
Upper limbs	24	11·8
Lower limbs	57	27·9
Face, head, mouth	22	10·8
Eye	7	3·4
Chest-wall, trunk	8	3·9
Lymph-nodes	43	21·0
Uterus	6	2·9
Male breast	2	1·0
Bone	15	7·4
Bladder	1	0·5
Heart	1	0·5
Liver	1	0·5
Ovary	2	1·0
Abdominal	10	4·9
Stomach	2	1·0
Brain	3	1·5
Total	204	100·0

Endothelioma of Spleen. One tumour of the type described by Ewing (1940) as endothelial sarcoma is included in Table V under 'Lymphosarcoma,' and in Table VI under 'Abdominal.'

Sarcoma of Stomach. The two tumours recorded were of the reticulum-cell type of lymphosarcoma.

SUMMARY AND CONCLUSIONS

One thousand malignant tumours from all parts of Nigeria are analysed as accurately as possible from the available data.

The results are tabulated and commented upon.

The melanomas, liver carcinomas, chronic leg ulcer carcinomas and the Kaposi tumours receive special attention.

An analysis of this type from biopsy and autopsy material cannot give a really accurate picture of the incidence of malignant tumours in Nigeria, but it is felt that it provides information of considerable value at this stage of the country's development.

ACKNOWLEDGEMENTS.—We are indebted to the Director of Medical Services, Nigeria, for permission to publish this paper; to Lieutenant-Colonel W. F. Harvey, of the Royal College of Physicians Laboratory, Edinburgh, for his valued opinion in the diagnosis of obscure types; and to all the medical officers who have forwarded specimens.

We are especially indebted to the late Dr. E. C. Smith, whose collaboration we should have had but for his untimely death by enemy action in July, 1943. To his enthusiasm and unfailing interest we wish to pay this tribute.

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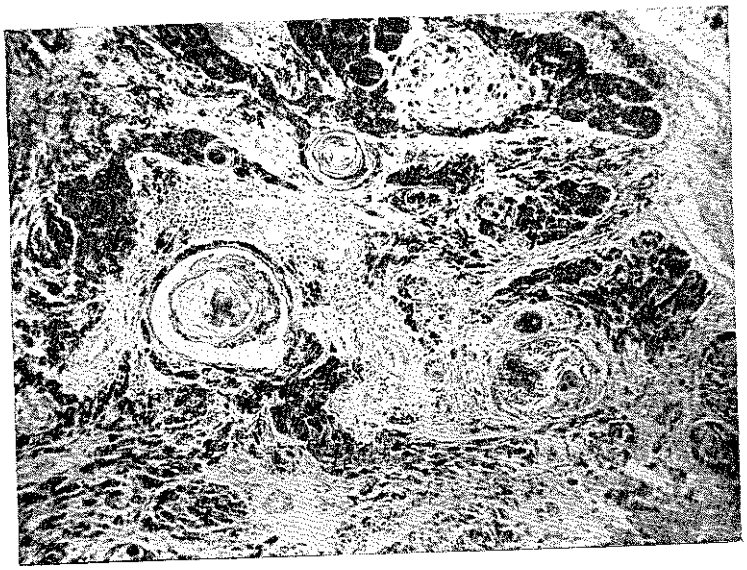

FIG. 1. Pigmented acanthoma (melanoma). (× 60.)

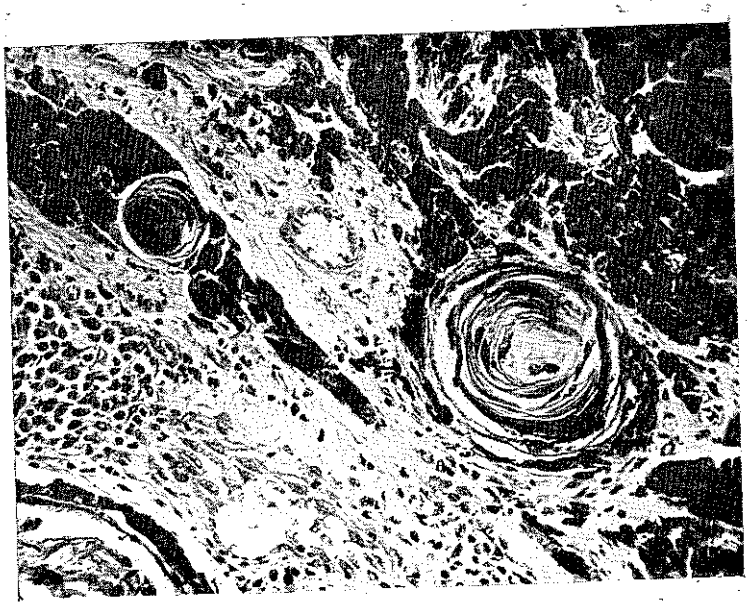

FIG. 2. Pigmented acanthoma (melanoma). (× 200.)

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