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Malignant Tumours of the Control Nervous System in Migrant Population of East Africa

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Summary. The three immigrant races in East Africa—Asians, Arabs and Europeans—are mainly urban communities, in contrast to the predominantly rural life of the vast majority of the indigenous African population. Variation has been observed in the relative frequency of cancer in certain sites in these races.

The incidence of CNS cancer in Asians is found to be relatively higher than in Africans. This reflects the sophistication of the population and the facilities available rather than the true difference in the incidence. For example, the relative frequency of malignant CNS tumours in the male Asian in Kenya is as high as 11%, while the frequency in the Kenyan male Africans is only 0.6% as shown by Kenya Cancer Registry. In contrast, the frequency in Asians in Bombay, Karachi or Gujrat (province of India from which the majority of East African Indians have originated) is quite low (0.5–1%). Thus, the relative incidence of CNS tumours in an indigenous community is directly proportional to the extent of availability of neuro-surgical diagnostic facilities.

The study of thirty CNS malignant tumours in Asians of East Africa reveals the following findings: (a) higher incidence in the male, ratio being 21:9 (b) higher rates in the ages 1–20 and 51–60 (c) astrocytomas being the commonest type.

Résumé. Les trois races immigrantes d'Afrique Orientale (Asiens, Arabes et Européens) forment surtout des communautés urbaines, alors que la plus grande partie de la population africaine indigène est rurale. Une variation a été observée dans la fréquence relative du cancer de certains lieux chez les trois races.

On a observé que le cancer du S.N.C. était plus fréquent chez les Asiens que chez les Africains, ce qui reflète une différence du niveau de vie plutôt qu'une différence "vraie". Ainsi, la fréquence relative des tumeurs malignes du S.N.C. chez l'Asien mâle au Kenya atteint 11%, tandis que le taux correspondant chez le Kenyan africain mâle n'est que de 0,6% (selon le Kenya Cancer Registry). Par contre, la fréquence chez les Asiens de Bombay, Karachi ou Gujrat (provinces d'origine de la majorité des Indiens d'Afrique Orientale) est relativement basse (de 0,5 à 1%). Il apparait donc que l'incidence relative des tumeurs du S.N.C. dans une com-

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munauté indigène est directement proportionnelle à la disponibilité des moyens de diagnostic neuro-chirurgical.

L'étude de 30 tumeurs malignes du S.N.C. chez des Asiens d'Afrique Orientale révèle les faits suivants: 1) incidence plus élevée chez les hommes (rapport 21 à 9); 2) plus élevée entre 1 et 20 ans et 51-60 ans; 3) les astrocytomes sont le type le plus commun.

INTRODUCTION

The tumours of the central nervous system (CNS), because of their relatively inaccessible site, are generally under-diagnosed. In a country with limited medical facilities their incidence is therefore under-estimated.

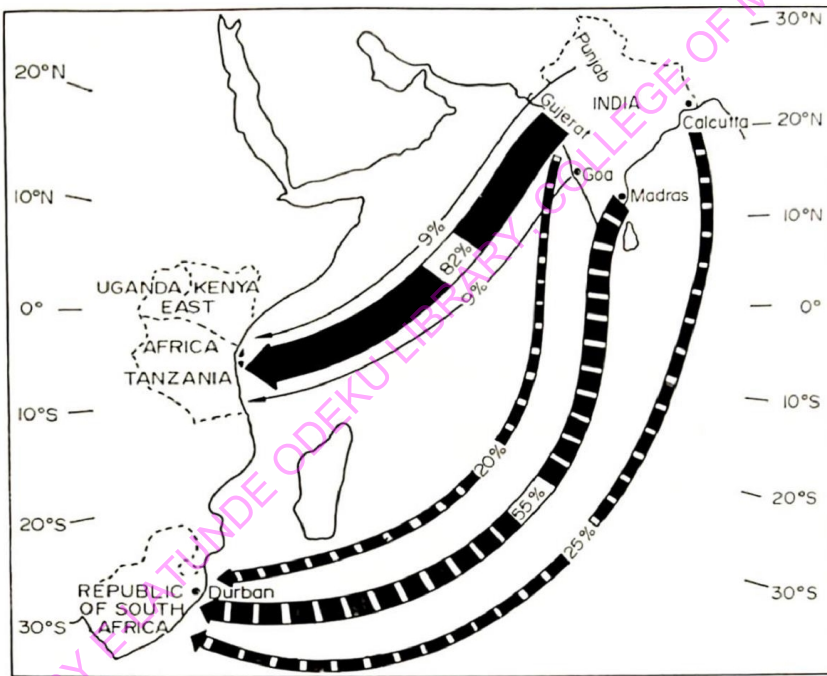


FIG. 1. Origin of the Asian populations of East Africa and the Republic of South Africa.

East Africa, has a large immigrant population of Asian, European, and Arab races. In contrast to the predominantly rural life of the indigenous African, the immigrant people are mostly urbanized. The Asian community is largest and mostly originates from Western part of India. The socio-economic conditions of the immigrant races is generally better than that of the indigenous African population, and also generally better than that of the people in the countries of their origin. The complete change of the physical environment, with little variation in the social customs of the migrant community, makes East Africa a unique place for the study of disease patterns and their possible aetiological roles in the migrant race. In the case of Asians and Europeans, there has been no dilution, genetically speaking.

The retrospective study of malignant CNS tumours in this paper is confined to the Asian community, because the data on the European and Arab people are both scanty and scattered. The Asian population consists of different communities which have their own social and cultural traditions, without any exchange of customs with other races.

The purpose of this paper is also to compare the relative frequency of CNS malignant tumours in East African Asians with that in Kenya Africans and in the people of Indo-Pakistan origin in South Africa (Durban), Western India and Pakistan. Figure 1 illustrates the origin of Asian migrant population.

MATERIALS AND METHODS

The data for this paper were obtained from the records of all Asian patients admitted to H.H. Aga Khan Platinum Jubilee Hospital, Nairobi, from 1961 to 1970 inclusive. This hospital is the largest private institute in East Africa, and being well-equipped, it offers all facilities for diagnosis and surgery of neurological conditions. It attracts patients of all races from all over East Africa, so that its records seem significant for the purpose of estimation and analysis of CNS cancers, especially in the Indians of East Africa. The Indian population is about 1% of the African population in East Africa. The cancer figures of the former are therefore correspondingly low.

The definition of malignancy has been confined to all tumours of neuroepithelial tissue (except one case of cerebellar cystic astrocytoma in a child, which clinically behaved benign) and malignant variants of mesodermal tissue tumours. Two pituitary adenomas are listed separately.

RESULTS AND DISCUSSION

A total of thirty malignant CNS tumours is reviewed. Table 1 shows the total number of cancers in Asians diagnosed annually. Their average rate is 1.1% of numbers admitted. The uniformity of the population dealt with by the hospital is emphasized by the constant cancer rates.

In Table 2 it is noticed that 80% of the malignant CNS tumours diagnosed were resident in Kenya. Neurosurgical facilities until recently existed only in Kenya. The remaining 20% of the cases were referred from Uganda and Tanzania. It is also interesting to note that in Uganda, in the period 1955-69, not a single case in the Asian was recorded in Kampala Cancer Registry; on the other hand, the relative frequency of malignant CNS tumours in our series was 11.4% of all cancers in the male and 4% in the female (Table 3). This is higher than in people of the Indo-Pakistan origin in South Africa, India or Pakistan (Table 4). It is evident from these figures that the relative incidence is directly proportional to the degree of sophistication in the medical facilities. In India and Pakistan, hospitals catering for general populations obviously show higher rates of cancer of all accessible sites, thus relatively diminishing the incidence of CNS tumours. In South Africa, where hospital facilities are adequate and sophisticated, the rates are higher.

The incidence in the African population of East Africa is found to be apparently low (Table 5). The Kenya Cancer Registry which records all African Cancers referred from various hospitals in the country showed only 0.7% rate in the male and 0.5% in the female (Linsell, 1967), but in H. H. Aga Khan Hospital of Nairobi, which is a private institute and

TABLE 1. H.H. The Aga Khan Platinum Jubilee Hospital, Nairobi—admission rates and cancer rates; Asian patients 1961–70

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
No. of admission	Fig. not available	3420	3631	3478	Fig. not available	3951	4085	4077	3869	3844
Cancer no.	—	37	40	42	39	44	43	39	33	43
Cancer %	—	1.1	1.1	1.2	—	1.1	1.1	1.0	0.8	1.1

TABLE 2. H.H. Aga Khan Platinum Jubilee Hospital, Nairobi—CNS malignant tumours in Asians 1961–70

	Males	Females	Total
Kenya	19	5	24 (80%)
Tanzania	1	1	2 (6.5%)
Uganda	1	3	4 (13.5%)
Total	21	9	30 (100%)

TABLE 3. Malignant tumours of CNS in Asians; proportional rates

	H.H. Aga Khan Hospital, Nairobi 1961–70	Kampala Cancer Registry, Kampala 1955–69
Male:		
Total no. of cancers	184	121
CNS	21 (11.4%)	Nil
Female:		
Total no. of cancers	203	121
CNS	9 (4.4%)	Nil

TABLE 4. Malignant CNS tumours in Asians; proportional rates

	Nairobi 1961–70	Durban 1964–66	Bombay 1964	Ahmedabad 1966–69	Karachi 1960–64
Male:					
Total cancers	184	220	1921	4313	0.7% of all
CNS	21 (11.4%)	9 (4.5%)	19 (1%)	20 (0.5%)	Male and female
Female:					
Total cancers	203	276	1269	1818	Cancers
CNS	9 (4.4%)	2 (0.8%)	12 (0.9%)	10 (0.6%)	

where the African patients admitted belong to a higher socio-economic group, the relative frequency of malignant CNS tumours in Africans was 7.8% in the male and 8.4% in the female. This obviously reflects the bias based on the selection of the patients.

The age and sex incidence in our series of thirty CNS cancers are presented in Table 6. The relative incidence is much higher in the male than in the female (ratio 7:3), although the overall incidence of total cancers of all sites has been shown to be higher in the East African female (Chopra & Templeton, 1971).

TABLE 5. Malignant CNS tumours—Kenya; proportional rates

	Asians 1961-70	Africans 1957-61 (Linsell, 1967)
Male:		
Total	184	2305
CNS	21 (11.4%)	15 (0.7%)
Female:		
Total	203	1901
CNS	9 (4.4%)	9 (0.5%)

TABLE 6. H.H. The Aga Khan Platinum Jubilee Hospital, Nairobi—malignant CNS tumours in Asian patients 1961-70

Age	Male	Female	Total
1-10	3	2	5
11-20	4	2	6
21-30	2	1	3
31-40	2	1	3
41-50	3	1	4
51-60	6	2	8
61-70	1	—	1
Total	21	9	30

Two pituitary adenomas in adult females not included.

The preponderance in the males is also observed in the African series (Linsell, 1967) as well as in the Indians of South Africa (Schonland & Bradshaw, 1969) and India (Jussawalla, 1964; Toprani & Shah, 1966). Histopathological details have not been available in the latter series. Astrocytomas are amongst the commonest glial tumours, and their increased incidence in the male, as evident from the experience of many workers (Russell & Rubinstein, 1963), has influenced the overall high rates of all CNS cancers in the male.

The age incidence in our series reflects two main susceptible age groups, namely 1-20 years and 51-60 years. The latter group chiefly consists of glioblastomas and astrocytomas.

HISTOPATHOLOGICAL PATTERNS

Table 7 shows the histological origin of all thirty cases. Gliomas constitute two-thirds of the total. Astrocytomas in the male are found to be twice as common as in the female. Two cases of metastasis were clinically diagnosed, the primary sites being lung in one and adrenal gland in another. One case of malignant angioblastomas of the spinal cord in a boy aged 17, presenting as paraplegia was rare and unusual. Another case of liposarcoma in a man aged 30 was also interesting. The patient is still alive and originally presented as a case of multiple growths—probably multicentric in origin—over the thigh, gluteal area and the spine.

TABLE 7. Histological types of malignant CNS tumours H.H. Aga Khan Platinum Jubilee Hospital, Nairobi 1961-70

	Male	Female	Total
Neuro-epithelial			
(a) Gliomas			
astrocytoma	8	4	12
glioblastoma	4	3	7
oligodendrog.	1	—	1
(b) Medullo-blastomas	3	1	4
Mesodermal			
(a) Haemangio-blastomas	1	—	1
(b) Meningeo-sarcoma	—	1	1
(c) Spinal cord-liposarcoma	1	—	1
(d) Spinal cord malignant angioblastoma	1	—	1
Metastasis	2	—	2
Total	21	9	30

Two pituitary adenomas in adult female not included.

CONCLUSION

The relative frequency of malignant CNS tumours in East African Asians is found to be much higher than in the Africans. The variation reflects the degree of sophistication of medical facilities utilized by the different races rather than the true difference in the incidence. The age, and sex incidence as well as the histological types of the tumours in the Asians are described and discussed.

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