

Geopathological Study on Endemic Kaposi's Sarcoma in Western Kenya

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Abstract: A geopathological study on endemic Kaposi's sarcoma (KS) in western Kenya was performed. During the eight year period between 1979 and 1986, 124 cases out of 25,343 surgical specimens were histologically diagnosed as KS in western Kenya (Western, Nyanza and Rift Valley Provinces). The epidemiological results were as follows: 1) KS accounted for 124 cases (2.92%) out of 4,243 malignant tumors. 2) A large number of KS was found among and over the 50 - 59 year old age group. 3) The male to female ratio was 8.4:1. 4) In adults, the most common site of primary lesion was the foot, followed by the leg, hand and arm. 5) In children, KS was predominantly of lymph node origin. 6) The ratio of multiple lesions to solitary lesions was 53:66. 7) Ethnically high incidences of KS per 100,000 population were found among the Luo and Luhya, inhabitants of Nyanza and Western Province, respectively. 8) All patients were from the relatively moist tropical savannah and tropical highlands. None of the patients were from desert or semi-desert areas. These findings suggest that some environmental factors are more important in influencing the causation of KS in western Kenya.

Key words: Kaposi's Sarcoma, Geopathological Study, Western Kenya

INTRODUCTION

Kaposi's sarcoma (KS; initially called Idiopathisches multiples pigment Sarkom der Haut) was first described in Austria (Kaposi, 1872). Up to the present day many cases of KS have been reported from European and North American countries with a high incidence of KS appearing among the inhabitants of eastern Europe and Mediterranean countries and Jewish peoples in central Europe (Aegerter and Peale, 1942; McCarthy and Pack, 1950; Bluefarb, 1957; Ecklund and Valaitis, 1962; Rothman, 1962; Siegel *et al.*, 1969; Gambardella, 1974). The first reported African case was from French Cameroon (Jojot

and Laigret, 1922). Subsequent to this report, many cases of KS have been reported from the African continent (Oettle, 1962; Davies and Lothe, 1962; Cook, 1962; Maclean, 1963; Slavin *et al.*, 1969, 1970; D'Oliveira and Torres, 1972; Schmid, 1973; Kungu and Gatei, 1981). And nowadays, it is recognized that KS is more prevalent in the African continent than in any other parts of the world. A large number of case reports of KS were gathered together and then summarized and analysed so as to evaluate the incidence of KS amongst malignant tumors from various African countries (Oettle, 1962; Maclean, 1963). In this continent, the incidence of KS varied from country to country. The highest incidence was seen in eastern Zaire with the level decreasing with distance away from this area. It is the aim of this study to throw light on the geographical and ethnical distribution of endemic KS throughout western Kenya and also to discuss what plays the most important role in the causation of KS.

MATERIALS AND METHODS

This study was based on the histological examinations of the surgical pathological specimens, almost all of which were performed in the Histology Departments of the two hospitals, the Rift Valley Provincial General Hospital in Nakuru and the Nyanza Provincial General Hospital in Kisumu, Kenya. During the eight year period between 1979 and 1986, a total of 25,343 surgical specimens were examined histologically with 124 being diagnosed as KS. Clinical data and relevant information were recorded as accurately as possible, with attention being paid to age, sex, ethnic group and residence of the patients, primary site of lesion, and whether the lesion was a solitary or multiple.

Histological examinations were performed using HE, periodic acid Schiff (PAS), reticulum, elastic van Gieson and Azan Mallory stains.

Population composition figures were obtained from the Kenya Population Census 1979 (a temporary report).

RESULTS

1. Total incidence of KS amongst malignant tumors.

During the eight year between 1979 and 1986, out of 25,343 surgical pathological specimens, 124 cases were histologically diagnosed as KS. Table 1 shows the yearly and total incidence of KS during this time. The incidence of KS amongst malignant tumors was 1.08 per cent in 1979, 2.23 in 1980, 3.95 in 1981, 4.88 in 1982, 1.39 in 1983, 1.93 in 1984, 2.65 in 1985 and 3.64 in 1986. The total incidence of KS in western Kenya for this eight year period was 2.92 per cent in all malignant tumors. The incidence of KS in malignant tumors in the male and female was (1.96 per cent, 0.00 per cent) in 1979, (4.58, 0.31) in 1980, (6.55, 1.36) in 1981, (11.27, 0.63) in 1982, (2.64, 0.00) in 1983, (4.04, 0.00) in 1984, (5.57, 0.70) in 1985, (8.33, 0.74) in 1986 and the total incidence of KS in malignant tumors in the male and female for this period was 5.69 and 0.58 per cent, respectively.

Table 1. Incidence of KS in western Kenya (1979-1986)

| Year | No. of surg. specimen | No. of malig. tumor | No. of KS | KS (%) | |
|-------|--------------------------|------------------------|--------------|--------------|-------|
| | | | | Malig. tumor | |
| 1979 | 1,179 | Male | 102 | 2 | 1.96 |
| | | Female | 76 | 0 | 0.00 |
| | | Unknown | 7 | 0 | 0.00 |
| | | Total | 185 | 2 | 1.08 |
| 1980 | 3,359 | Male | 262 | 12 | 4.58 |
| | | Female | 318 | 1 | 0.31 |
| | | Unknown | 3 | 0 | 0.00 |
| | | Total | 583 | 13 | 2.23 |
| 1981 | 3,652 | Male | 336 | 22 | 6.55 |
| | | Female | 368 | 5 | 1.36 |
| | | Unknown | 5 | 1 | 20.00 |
| | | Total | 709 | 28 | 3.95 |
| 1982 | 4,401 | Male | 213 | 24 | 11.27 |
| | | Female | 315 | 2 | 0.63 |
| | | Unknown | 25 | 1 | 4.00 |
| | | Total | 553 | 27 | 4.88 |
| 1983 | 3,905 | Male | 303 | 8 | 2.64 |
| | | Female | 253 | 0 | 0.00 |
| | | Unknown | 19 | 0 | 0.00 |
| | | Total | 575 | 8 | 1.39 |
| 1984 | 2,493 | Male | 198 | 8 | 4.04 |
| | | Female | 216 | 0 | 0.00 |
| | | Unknown | 1 | 0 | 0.00 |
| | | Total | 415 | 8 | 1.93 |
| 1985 | 3,914 | Male | 323 | 18 | 5.57 |
| | | Female | 424 | 3 | 0.70 |
| | | Unknown | 9 | 0 | 0.00 |
| | | Total | 756 | 21 | 2.65 |
| 1986 | 2,440 | Male | 180 | 15 | 8.33 |
| | | Female | 271 | 2 | 0.74 |
| | | Unknown | 16 | 0 | 0.00 |
| | | Total | 467 | 17 | 3.64 |
| Total | 25,343 | Male | 1,917 | 109 | 5.69 |
| | | Female | 2,241 | 13 | 0.58 |
| | | Unknown | 85 | 2 | 2.35 |
| | | Total | 4,243 | 124 | 2.92 |

2. Age and sex distribution.

Table 2 indicates the age and sex distribution. A large number of KS cases was found among and over the 50 - 59 year old age group. The male to female ratio was 8.4:1.

3. Anatomical distribution of the primary lesion.

The anatomical distribution of KS is described in Table 3. In adults, the most common site of the primary lesion was the foot, followed by the leg, hand and arm. In children, the primary lesion was predominantly of lymph node origin. The ratio of multiple to solitary lesions was 53:66.

Table 2. Age and sex distribution of 124 cases of KS

| Age group | Sex | | | Total |
|-------------|------|--------|---------|-------|
| | Male | Female | Unknown | |
| 0 – 4 | 6 | 0 | 0 | 6 |
| 5 – 9 | 4 | 2 | 0 | 6 |
| 10 – 14 | 3 | 1 | 0 | 4 |
| 15 – 19 | 1 | 1 | 0 | 2 |
| 20 – 24 | 4 | 0 | 0 | 4 |
| 25 – 29 | 7 | 1 | 0 | 8 |
| 30 – 34 | 4 | 0 | 0 | 4 |
| 35 – 39 | 5 | 0 | 0 | 5 |
| 40 – 44 | 8 | 1 | 0 | 9 |
| 45 – 49 | 7 | 2 | 0 | 9 |
| 50 – 54 | 15 | 1 | 0 | 16 |
| 55 – 59 | 7 | 0 | 0 | 7 |
| 60 and over | 17 | 0 | 0 | 17 |
| Child | 1 | 0 | 0 | 1 |
| Adult | 14 | 3 | 0 | 17 |
| Unknown | 6 | 1 | 2 | 9 |
| Total | 109 | 13 | 2 | 124 |

Table 3. Anatomical distribution of 124 cases of KS
Sites of clinical lesions

| Localization | Number of cases |
|--------------|-----------------|
| Foot | 41 |
| Leg | 25 |
| Lymph node | 19 |
| Hand | 18 |
| Arm | 11 |
| Thigh | 8 |
| Knee | 4 |
| Trunk | 4 |
| Ankle | 3 |
| Orbit | 1 |
| Upper lid | 1 |
| Axilla | 1 |
| Mandibula | 1 |
| Pharynx | 1 |
| Neck | 1 |
| Wrist | 1 |
| Unknown | 3 |
| Total | 143* |

*including multiple lesions

4. Geographical distribution.

Table 4 shows the geographical distribution of KS. The largest number, 54 cases in all, were from Nyanza Province, with 36 cases being from Rift Valley Province and 33 from Western Province. Table 5 describes the incidence of KS per 100,000 population in districts and provinces in western Kenya for the eight year period. Nyanza Province exhibited the highest incidence of 2.12, followed by 1.80 in Western Province and 1.11 in Rift Valley Province. Kisumu District of Nyanza Province showed the highest incidence of 4.98, followed by 3.06 in Nakuru District of Rift Valley Province and 2.11 in Siaya District of Nyanza Province. The incidence of KS per 100,000 population in districts is illustrated in Map 1. The high incidence of KS appeared in the tropical savannah around Lake Victoria and in the tropical highlands of Rift Valley Province.

5. Ethnical distribution.

Table 6 shows the ethnical incidence of KS per 100,000 population for the eight year period. The Luo, main inhabitants of Nyanza Province, exhibited the highest

Table 4. Geographical and sex distribution of 124 cases of KS in western Kenya (1979-1986)

| Province | District | Number of cases | | | |
|-------------|-----------------|-----------------|--------|---------|-------|
| | | Male | Female | Unknown | Total |
| Western | Bungoma | 9 | 1 | 0 | 10 |
| | Busia | 5 | 0 | 0 | 5 |
| | Kakamega | 14 | 3 | 1 | 18 |
| | Subtotal | 28 | 4 | 1 | 33 |
| Nyanza | Siaya | 8 | 2 | 0 | 10 |
| | Kisumu | 24 | 0 | 0 | 24 |
| | South Nyanza | 11 | 1 | 0 | 12 |
| | Kisii | 7 | 1 | 0 | 8 |
| | Subtotal | 50 | 4 | 0 | 54 |
| Rift Valley | West Pokot | 3 | 0 | 0 | 3 |
| | Trans Nzoia | 2 | 0 | 0 | 2 |
| | Uasin Gishu | 4 | 0 | 0 | 4 |
| | Elgeyo Marakwet | 1 | 0 | 0 | 1 |
| | Baringo | 1 | 0 | 0 | 1 |
| | Nandi | 3 | 0 | 0 | 3 |
| | Kericho | 3 | 1 | 0 | 4 |
| | Nakuru | 13 | 2 | 1 | 16 |
| | Narok | 1 | 1 | 0 | 2 |
| | Others | 0 | 0 | 0 | 0 |
| | Subtotal | 31 | 4 | 1 | 36 |
| Unknown | | 0 | 1 | 0 | 1 |
| Total | | 109 | 13 | 2 | 124 |

Table 5. KS per 100,000 population in each district (1979–1986)

| Province | District | Population in '000s (1979) | No. of KS | KS per 100,000 population |
|-------------|-----------------|----------------------------|-----------|---------------------------|
| Western | Bungoma | 503.9 | 10 | 1.98 |
| | Busia | 297.8 | 5 | 1.68 |
| | Kakamega | 1,030.9 | 18 | 1.75 |
| | Subtotal | 1,832.7 | 33 | 1.80 |
| Nyanza | Siaya | 474.5 | 10 | 2.11 |
| | Kisumu | 482.3 | 24 | 4.98 |
| | South Nyanza | 817.6 | 12 | 1.47 |
| | Kisii | 869.5 | 8 | 0.92 |
| | Subtotal | 2,544.0 | 54 | 2.12 |
| Rift Valley | West Pokot | 158.7 | 3 | 1.89 |
| | Trans Nzoia | 259.5 | 2 | 0.77 |
| | Uasin Gishu | 300.8 | 4 | 1.33 |
| | Elgeyo Marakwet | 148.9 | 1 | 0.67 |
| | Baringo | 203.8 | 1 | 0.49 |
| | Nandi | 299.3 | 3 | 1.00 |
| | Kericho | 633.3 | 4 | 0.63 |
| | Nakuru | 522.7 | 16 | 3.06 |
| | Narok | 210.3 | 2 | 0.96 |
| | Others | 503.1 | 0 | 0.00 |
| | Subtotal | 3,240.4 | 36 | 1.11 |
| Unknown | | | 1 | — |
| Total | | 7,617.0 | 124 | 1.63 |

Table 6. Ethnic incidence of KS per 100,000 population (1979–1986)

| Ethnic group | Population in '000s (1979) | No. of KS | KS per 100,000 population |
|--------------|----------------------------|-----------|---------------------------|
| Luo | 1,955.9 | 50 | 2.56 |
| Luhya | 2,119.7 | 35 | 1.65 |
| Kalenjin | 1,652.2 | 17 | 1.03 |
| Kisii | 944.1 | 9 | 0.95 |
| Teso | 132.7 | 1 | 0.75 |
| Kikuyu | 3,202.8* | 11 | 0.34 |
| Unknown | — | 1 | — |

*Exact number of their population in western Kenya is unclear

Table 7. Ethnical incidence of KS amongst malignant tumor (1979–1986)

| Ethnic group | | No. of malig. tumor | No. of KS | KS |
|--------------|---------|------------------------|-----------|------------------|
| | | | | Malig. tumor (%) |
| Luo | Male | 625 | 46 | 7.36 |
| | Female | 765 | 4 | 0.52 |
| | Unknown | 6 | 0 | 0.00 |
| | Total | 1,396 | 50 | 3.58 |
| Luhya | Male | 347 | 30 | 8.65 |
| | Female | 391 | 1 | 0.26 |
| | Unknown | 9 | 4 | 44.44 |
| | Total | 747 | 35 | 4.69 |
| Kalenjin | Male | 402 | 15 | 3.73 |
| | Female | 472 | 2 | 0.42 |
| | Unknown | 22 | 0 | 0.00 |
| | Total | 896 | 17 | 1.90 |
| Kisii | Male | 165 | 8 | 4.85 |
| | Female | 153 | 1 | 0.65 |
| | Unknown | 1 | 0 | 0.00 |
| | Total | 319 | 9 | 2.82 |
| Teso | Male | 8 | 1 | 12.50 |
| | Female | 9 | 0 | 0.00 |
| | Unknown | 1 | 0 | 0.00 |
| | Total | 18 | 1 | 5.56 |
| Kikuyu | Male | 181 | 9 | 4.97 |
| | Female | 303 | 2 | 0.66 |
| | Unknown | 18 | 0 | 0.00 |
| | Total | 502 | 11 | 2.19 |
| Unknown | Total | 365 | 1 | 0.27 |

Table 8. Child type KS in western Kenya (1979–1986)

| Case | Age | Sex | Site of lesion | Ethnic group | District | Province |
|------|-------|-----|-------------------------|--------------|--------------|----------|
| 1 | 1 | M | Inguinal lymph node | Luhya | Busia | Western |
| 2 | 1y6m | M | Generalized lymph nodes | Luo | South Nyanza | Nyanza |
| 3 | 1y8m | M | Generalized lymph nodes | Luo | Kisumu | Nyanza |
| 4 | 1y9m | M | Generalized lymph nodes | Luhya | Kakamega | Western |
| 5 | 1y9m | M | Generalized lymph nodes | Luo | Siaya | Nyanza |
| 6 | 2y6m | M | Unknown lymph node | Luhya | Kisumu | Nyanza |
| 7 | 5 | F | Generalized lymph nodes | Luo | South Nyaza | Nyanza |
| 8 | 6 | M | Unknown lymph node | Luo | Kisumu | Nyanza |
| 9 | 7 | M | Generalized lymph nodes | Luo | Kakamega | Western |
| 10 | 7 | F | Mandibula | Luo | Siaya | Nyanza |
| 11 | 8 | M | Elbow lymph node | Kisii | Kisii | Nyanza |
| 12 | 9 | M | Foot | Luo | South Nyanza | Nyanza |
| 13 | 10 | F | Unknown lymph node | Luhya | Kakamega | Western |
| 14 | 11 | M | Leg | Luo | Kisumu | Nyanza |
| 15 | 12 | M | Upper lid | Luo | Busia | Western |
| 16 | 12 | M | Cervical lymph node | Luo | Kisumu | Nyanza |
| 17 | Child | M | Generalized lymph nodes | Luo | Kisumu | Nyanza |

incidence of 2.56, followed by the Luhya, main inhabitants of Western Province, with 1.56 and the Kalenjin, inhabitants of the tropical highland of Rift Valley Province with 1.03. Table 7 describes the ethnical incidence of KS in malignant tumors. The Teso exhibited the highest incidence of 5.56 per cent, followed by the Luhya with 4.69 and the Luo with 3.58. Although the Kikuyu showed the relatively high incidence of KS in malignant tumors, we could not confirm the exact number of their population in western Kenya.

6. KS in children.

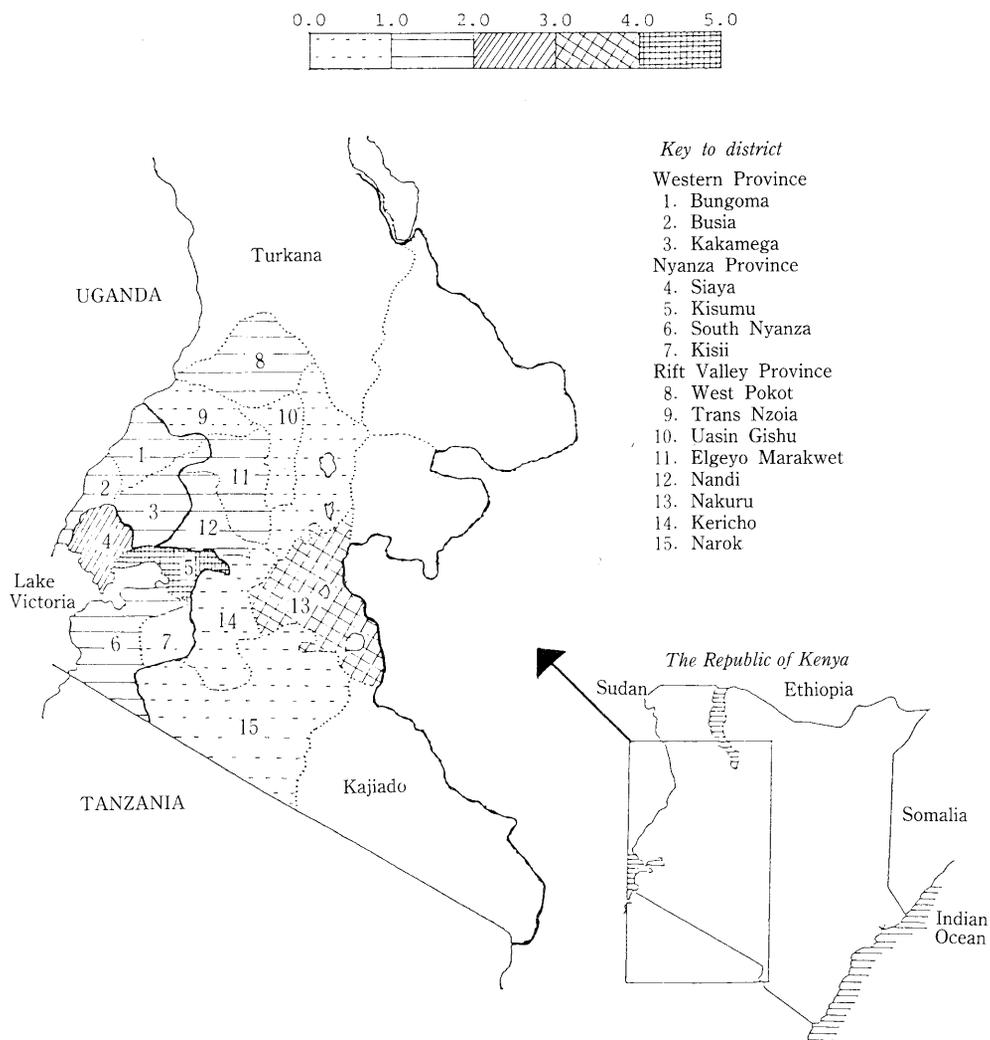
Table 8 summarizes the incidence of KS in children. The highest incidence of KS in children appeared geographically in Kisumu District of Nyanza Province and ethnically in the Luo, inhabitants of Nyanza Province. Anatomically, 13 out of 17 cases of KS in children had primary lesions of lymph node(s) origin.

DISCUSSION

Since the first case of KS was described (Kaposi, 1872), the most number of cases have been reported from European and North American countries (Aegerter and Peal, 1942; McCarthy and Pack, 1950; Bluefarb, 1957; Cox and Helwig, 1959; Oettle, 1962). Subsequent to the first African case, which was reported from French Cameroon (Jojob and Laigret, 1922), many more have been reported from the African continent (Elmes, 1954; Dutz and Stout, 1960; Oettle, 1962; Davies and Lothe, 1962; Keen, 1962; Cook, 1962; Jelliffe *et al.*, 1962; Maclean, 1963; Slavin *et al.*, 1969, 1970; Taylor *et al.*, 1971a; Taylor *et al.*, 1971b; D'Oliveira and Torres, 1972; Templeton, 1972; Schmid, 1973; Olweny *et al.*, 1976; Kyalwazi, 1976; Kungu and Gatei, 1981; Bayley, 1984; Bayley *et al.*, 1985; Leu and Odermatt, 1985; Otu, 1986; Serwadda *et al.*, 1986). Although nowadays it is generally recognized that KS is much more prevalent in the African continent, there is a great variation in its incidence in different parts of Africa. The worst affected area is around Lake Kivu, eastern Zaire, where KS accounts for up to 12.8 per cent of all malignant tumors. The incidence of KS decreases with distance away from this area (Oettle, 1962; Maclean, 1963).

The Republic of Kenya stands almost exactly astride the equator: its area is 569,137 square kilometers and its population is 15,327,000 (Bhushan, 1979). Western Kenya (Western, Nyanza and Rift Valley Provinces) accounts for one third, 189,578 square kilometers, of the whole country in area and about one half, 7,617,000 in population (Bhushan, 1979). It is bounded by Sudan and Ethiopia in the north, Uganda in the west and Tanzania in the south (Map 1), and consists of three provinces, namely, Western, Nyanza and Rift Valley Provinces. These three provinces are made up of three, four and thirteen districts, respectively. This area experiences a wide variation of climatic conditions (Vogel *et al.*, 1974), namely the most northern part, Turkana District, and the most southern part, Kajiado District, are the dry desert or dry tropical savannah and have mean annual rainfalls of 100 to 200 mm and 300 to 700 mm, respectively and mean annual temperatures of 33 to 36°C and 22 to 33°C, respectively. The altitude in these

Map 1. KS per 100,000 population in western Kenya (1979–1986)



areas in 650 m and 650 to 1,000 m, respectively. Contrarily, the central part of Rift Valley Province is a tropical highland and has a mean annual rainfall of 1,200 to 2,000 mm, a mean annual temperature of 18 to 22°C and an altitude of 1,500 to 2,000 m. Western Province is a tropical savannah and has a mean annual rainfall of 1,250 to 1,750 mm, a mean annual temperature of 26 to 30°C and an altitude is 1,200 to 2,000 m. Nyanza Province is situated around Lake Victoria and is a tropical savannah and has a mean annual rainfall of 1,000 to 1,750 mm, a mean annual temperature of 26 to 34°C and altitude of 1,100 to 1,800 m.

According to many reports from the African continent, the incidence of KS amongst all malignant tumors is 5.0 per cent in Central Africa, 4.0 to 5.0 per cent in

Uganda, 2.0 per cent in Nigeria, 1.3 per cent in Ghana, 1.0 per cent in Senegal, 0.04 per cent in Tunisia, 4.2 per cent in Malawi, 4.0 per cent in Tanzania, 1.89 per cent in Mozambique (Oettle, 1962; Maclean, 1963; Slavin *et al.*, 1969; Schmid, 1972; D'Oliveira and Torres, 1972; Rampen, 1972; Owor, 1980). The closer to the equator, the higher the incidence of KS becomes (Quenum, 1957), and it is said that KS is comparatively rare in the dry sandy areas and commoner in the more moist tropical areas and also in the upland plateau (Devies, 1959). In western Kenya, the high incidence of KS were observed in Kisumu and Siaya Districts around Lake Victoria in Nyanza Province, which consists of relatively moist tropical savannah, and Nakuru District in Rift Valley Province, which is a tropical highland. There was no cases of KS reported from dry areas, such as Turkana or Kajiado Districts. These findings support Davies' report and suggest that some environmental factors, such as high temperature and humidity, influence the causation of KS. The total incidence of KS amongst all malignant tumors for the eight year period between 1979 and 1986 was 2.92 per cent. Although this figure is lower than those of central African countries, it can be recognized that KS is not such a rare disease in western Kenya.

When the ethnical incidence of KS per 100,000 population in western Kenya is considered, the Luo, main inhabitants of Nyanza Province exhibited the highest levels, followed by the Luhya, main inhabitants of Western Province, and the Kalenjin, inhabitants of the tropical highland in Rift Valley Province. The Luo is now considered to have descended from the Nilotic who migrated from southern Sudan to the shores of Lake Victoria in the 16th or 17th century. The Luhya descended from the Bantu who migrated from central Africa to a tropical savannah in western Kenya in the 14th century. The Kalenjin also descended from the Nilotic who moved from southern Sudan to the highlands in Rift Valley Province in the 10th century (Murdock, 1959; Kipkorir, 1978; Muriuki, 1978; Sharman, 1979; Ochieng, 1979; Fedders and Salvadori, 1979). Although nowadays, to a small extent, they enter into cultural and marriage exchanges with each other, they still retain their own identities, cultures and life styles, especially in rural areas (Fedders and Salvadori, 1979). So it is recognized that there is little chance for their own genetic and congenital factors to integrate. We could not detect any cases of KS from the dry areas in the most northern and southern parts of Rift Valley Province where the Nilotic or Nilohamitic groups, who come from the same line as the Luo and Kalenjin are living. In western Kenya, the highest incidence of KS appears to be among the ethnically different groups who are living in the tropical savannah and highlands where the climatic conditions are relatively humid and hot. Although there are reports which claim that genetic factors influence the causation of KS (Oettle, 1962; Schmid, 1973), our findings suggest that environmental factors play a main role.

The most common site of the primary lesion in adults is in the extremities, such as the foot, leg, hand, arm and thigh. These sites are much more frequently exposed to the environment and transmissible agents than other sites of the body. Thirteen out of 17 cases (76 per cent) of KS in children were of lymph node(s) origin. In addition, KS

of lymph node(s) in children sometimes mimicked a malignant lymphoma without any skin lesions. These findings suggest that there might be some differences in the oncogenicity of KS between adults and children. It may be postulated that some infection with a transmissible agent in a young non-immune child leads to an overwhelming proliferation of KS in the lymph nodes(s) (Slavin *et al.*, 1969). Some viral agents may initiate KS if it allowed to infect long and Persistently enough in a susceptible child whose immunological response has been altered by malaria, especially *P. falciparum* (Safai *et al.*, 1980). It is recognized that continuous stimulation with foreign antigens might cause a relative immunodeficiency in Africa (Oettle, 1962; Master *et al.*, 1970; Tayler *et al.*, 1971b). Five explants of eight cases of African KS contained viral inclusions. European and American patients with KS were found to possess increased serum levels of antibody to Cytomegalovirus (CMV) when compared with normal controls and patients with other malignancies (Giraldo *et al.*, 1972a, 1972b, 1975).

The male to female ratio of KS in number in western Kenya was 8.4:1. Although some reports describe that hormonal factors may play a role in the marked male preponderance of KS (Hurlbert and Lincoln, 1949; Slavin *et al.*, 1969), other report claims that sex hormones are unlikely to influence the pathogenesis of KS (Tayer *et al.*, 1971b). We could not determine any environmental factors which would cause a difference among the sexes, and so we are unable to explain the marked male preponderance of KS. Our findings suggest that: 1) environmental factors play a greater role than genetic factors in influencing the causation of KS, 2) some transmissible agents may be involved, and 3) there might be some differences in the oncogenicity of KS between adult type and child type.

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ケニア西部における地方病型カポシ肉腫の地理病理学

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1979年から1986年の8年間にわたり, ウガンダ共和国に隣接したケニア共和国西部, ウェスタン, ニャンザ, リフトバレーの3州においてカポシ肉腫の地理病理学的調査をおこない次のような結果を得た. 1. カポシ肉腫は全悪性腫瘍, 4,243例中124例でその比率は2.92%であった. 2. 50才台に高い発生頻度が見られた. 3. 男女比は8.4:1であった. 4. 成人では原発部位は足, 下肢, 手, 腕などの外界に暴露されやすい部位に多く認められた. 5. 小児例では多くがリンパ節原発であった. 6. 多発および単発病変の比は53:66であった. 7. 部族的にはナイロート系のルオー族, パンツー系のルイア族に高い発生頻度が見られた. 8. 地理的には比較的高温で湿潤な熱帯サバンナと熱帯高地に多く, 乾燥した砂漠地帯, およびそこに居住する, ルオー族などと起源の類似した部族にはカポシ肉腫は全く見られなかった. これらの結果よりカポシ肉腫の発生要因としてなんらかの病原体の他に自然環境, 生活様式などが強く関わっている事が推察された.

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