



## Full Length Research Article

### SURGICAL MALIGNANCIES IN A MINING TOWN ON THE COPPER BELT IN ZAMBIA

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#### ABSTRACT

Surgical Malignancies are not a common cause of admission to the mine hospital in Chingola – Zambia, however they do occur; they formed 0.4% of the admissions during the study. These were due to malignant disease affecting people of all ages. In this study, the youngest was two years old and the oldest was 75. The mean age was 40.8 years. The affected population was relatively young. Nearly all the patients were from the Bantu ethnic grouping (97.6%). Both females and males were equally affected (M:F 1:1). The Most prevalent malignancies were of the Reticulo-endothelial system (44.5%) followed by tumours of the GIT(18.8%). Kaposi's sarcoma was the most common, it formed 71.9% of the Reticulo-endothelial system tumours and 32% of all the tumours. This endothelial tumour was first described by Kaposi in 1872. It is histologically described as a vasoformative tumor. It is a multifocal metastasizing malignant reticulosis with features resembling those of Angiosarcoma<sup>5</sup>. Clinical diagnosis is straightforward.

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#### INTRODUCTION

Chingola is an urban area on the Copper Belt region of Zambia, which is a "melting pot" with a mixture of people from all parts of the country who came looking for jobs and a better standard of living in. This was known as the so called rural urban migration. There were also people from other parts of the world who provided services or worked as expatriates in the mining industries. The main occupation in this area was mining and the mines in this town were owned by Konkola Copper mines PLC which also run Nchanga south hospital. In the study, Chingola had a population of about 200 000 people who accessed medical services from the mine run hospital and the general hospital run by the government of the republic of Zambia (GRZ). The people in this study were a similar representation of the entire region called the Copper Belt of Zambia. The Nchanga South Hospital had the Catchment population of 60,000 people, these comprised mainly of miners, miners' dependants and non miners who paid to access the service. This service was also available to everyone who could afford it from the rest of the copper Belt.

Here we present surgical malignancies seen in people who were admitted to Nchanga South mine hospital a facility serving a mining community in Chingola –Zambia.

#### MATERIALS AND METHODS

A prospective study of all the patients who presented to the Nchanga South hospital with surgical malignancy was conducted from January 2000 to January 2006, a period of six years. The following records were kept: The age, sex and ethnic group of the patient. The system affected by the tumour, the location of the tumour on the body, how the tumour was diagnosed and whether the malignancy was localized, disseminated or metastatic at presentation. Pre-test counseling was done and where the patient gave consent; the HIV status of the patient was determined. The author throughout the study period kept these records. The number of all the admission to this hospital was also obtained from the records office.

#### RESULTS

##### Age and Sex distribution

There were 128 patients who presented with one form of surgical malignancy during the study period. There were 60 females and 68 were males (M: F ratio of 1:1).

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**Table 1. Tumour Classification**

System affected	No. Of Patients	(%)
Reticulo-Endothelial System	57	44.5
Gastro- Intestinal Tract.	24	18.8
Genito- Urinary Tract.	20	15.6
Musculo-Skeletal System.	10	7.8
Endocrine	10	7.8
Hepato-biliary	5	3.9
Ear, Nose and Throat	2	1.6
Total	128	100

The youngest patient was 2 years old and the oldest was 75 years. The mean age was 40.8 years.(See Table I)

### Ethnic grouping of the patients

There were 125 patient of the Bantu ethnic group, two patients were Caucasians and one patient was Asian.

### Tumour distribution

Tables III to VIII show the Description and setting of the various tumours among the patients. The cervical tumours composed of six squamous cell carcinomas, three Epidermoid carcinomas and one adenocarcinoma. Both Urinary bladder cases were Transitional cell carcinomas. The breast malignances were ductal carcinomas except for one that was a malignant Phalloides tumour. Both Thyroid tumours were follicular Carcinomas.

### Other tumours

There were five patients who presented with Hepato-cellular carcinomas and two patients had laryngeal tumours.

### Spread of Tumour disease at presentation

The patients were classified as those presenting with non-metastatic or localized disease and those presenting with

**Table 2. Tumour distribution according to age and sex**

	Male	Female	Age Range	Mean Age
Reticulo-endothelial	39	18	2-64	34.9
Gastro-intestinal	11	13	33-75	49.1
Genito-urinary	06	14	4-72	44.1
Endocrine	00	10	15-60	39.1
Musculo-skeletal	07	03	2-56	41.0
Hepato-biliary	03	02	36-58	46.0
ENT	02	00	50-55	52.5

**Table 3. Reticulo-endothelial system tumours**

Tumour	No. of Patients	%
Kaposi's Sarcoma(KS)	41	71.9
Non-Hodgkin's Lymphoma (NHL)	14	24.5
Burkitt's Lymphoma	01	1.8
Fibrohystiocytoma	01	1.8
Total	57	100

**Table 4. Body distribution of KS and NHL**

	Head	Neck	Axillae	U/limbs	Trunk	L/limbs	GIT	GUS	Total
KS	02	05	00	04	10	15	02	03	41
NHL	02	05	01	00	01	00	03	02	14

KS- Kaposi Sarcoma

NHL- Non Hodgkin's Lymphoma

### Prevalence of the Surgical tumours

During the course of the study there were 31,248 patients admitted to this hospital for various causes. Only 0.4% of the patients were admitted with surgical malignancies.

### Tumour classification

The tumours were classified as: Reticulo-endothelial, Gastro-intestinal tract and Genital- urinary tract tumours. There were also Musculo-skeletal, Endocrine, Hepato-Biliary and Ear Nose and Throat tumours.(See Table II)

### Mode of diagnosis

The cases that were confirmed by histological means were 94(73.4%), and those diagnosed by clinical means only were 34(26.6%).

metastatic or disseminated disease when they were first seen.

62(48.4%) patients presented with Tumours that had not metastasized or were localized to the presenting area. 66(51.6%) patients presented with metastatic or disseminated disease.

**Table 5. Gastro intestinal Tract tumours**

Tumour Site	Number of Patients	%
Stomach	09	37.5
Pancreas	06	25.0
Rectum	04	16.7
Oesophagus	02	8.2
Colon	02	8.2
Ceacum	01	4.2
Total	24	100

### HIV Status of the patients

The HIV test was requested in all the patients who presented with malignancy to the hospital.

**Table 6. Genito-Urinary Tumours**

Tumour site	No. of Patients	%
Cervix	11	55
Prostate	03	15
Ovary	02	10
Urinary Bladder	02	10
Renal	01	05
Uterus	01	05
Total	20	100

**Table 7. Musculo-skeletal system tumours**

Tumour	No. of Patients	%
Dermatofibrosarcoma	03	30
Squamous cell carcinoma	03	30
Verucous carcinoma	01	10
Giant cell tumour	01	10
Rhabdomyosarcoma	01	10
Basal cell carcinoma	01	10
Total	10	10

**Table 8. Endocrine Tumours**

Tumour site	No. of Patients	%
Breast	06	60
Thyroid gland	02	20
Parotid gland	01	10
Adrenal Cortex	01	10
Total	10	100

**Table 9. HIV Status of the patients**

HIV Status	No. of Patients	%
HIV Positive	45	35.2
HIV Negative	36	28.1
Declined Test	47	36.7
Total	128	100.0

Table VIII shows the outcome of the test. The distribution of HIV disease among the patients of the Reticuloendothelial system was as follows: There were 41 patients who presented with Kaposi's sarcoma of whom one was HIV negative, eight declined to take the test and 32(78%) tested positive. There were 14 patients who presented with Non Hodgkin's Lymphoma: One patient tested negative for HIV, four refused to take the test and 9(64.3%) tested positive.

**Table 10. Distribution of the HIV disease in the classes of Tumours**

	No. HIV Positive(%)	No. HIV Negative(%)	No. Declined test(%)	Total
Reticuloendothelial	41(71.9)	3(5.3)	13(22.8)	57
Gastro-Intestinal	1(4.2)	13(54.2)	10(41.6)	24
Genito-urinary	1(5)	9(45)	10(50)	20
Musculo-skeletal	1(10)	3(30)	6(60)	10
Endocrine	1(10)	5(50)	4(40)	10
Hepato- Billiary	0	2(40)	3(60)	5
ENT	0	1(50)	1(50)	2

## DISCUSSION

Malignancies are not a common cause of admission to the mine hospital in Chingola – Zambia or indeed in any of the Mines hospitals, in fact only 0.4% of the admissions were due to malignant disease affecting people of all ages. The youngest in this study being 2 years old and the oldest being 75. The mean age of 40.8 years means the affected population is relatively young.

Nearly all the patients were from the Bantu ethnic grouping (97.6%). Both females and males were equally affected (M:F 1:1). However the Copper Belt area is an Urbanisation and Modernization region. The Lifestyle has also changed and so has the diet. It is believed that the most prevalent cancers in developing countries and urbanized areas are associated with infections with viruses particularly HIV, the human papillomavirus and hepatitis B virus (6). In addition, tobacco use is on the rise in these areas where protective legislation is non-existent and the populations less informed about the dangers they expose themselves. Most cancer patients in our developing Copperbelt areas have advanced or incurable cancers at the time they present to the Hospital for diagnosis; Usually our patient don't survive.

The Most prevalent malignancies were of the Reticulo-endothelial system (44.5%) followed by tumours of the GIT (18.8%) (see Table I). Of the Reticulo-endothelial tumours Kaposi's sarcoma was the most common, it formed 71.9% of the Reticulo-endothelial system tumours and 32% of all the tumours. (see Table II and III). This endothelial tumour was first described by Kaposi in 1872. It is histologically described as a vasoformative tumor. It is a multifocal metastasizing malignant reticulosis with features resembling those of Angiosarcoma (Breimer, 1994). Kaposi's sarcoma is now known to be transmitted by a viral particle-the Human Herpes Virus type 8(HHV 8). This virus has been isolated from all biopsies of affected tissue in all the types of KS. It is a sexually transmitted virus (Martin and Ganem, 1998).

Kaposi's sarcoma in its epidemic form is an AIDS defining disease; its incidence increases a hundred fold among patients who are HIV positive. Indeed an estimated 20% of these patients go on to develop KS (Mocroft A, Youle J et al., 1997). In this case, 71.9% of the Reticuloendothelial tumour patients were positive for HIV and of the KS patients 78% were positive. These patients can now expect to live longer with the advent of the availability of HAART (Ledbege *et al.*, 1999), ( Egger *et al.*, 1997). Generally Kaposi's sarcoma (KS) is associated epidemiologically with HIV infection and a number of countries have reported a dramatic increase in the incidence of KS with the advent of AIDS (Onyango, 2004).

Onyango of Kenya has reported that the fall in the male: female ratio is a strong indication of a rise in KS among female patients (Onyango, 2004). Our study showed a very similar picture with regard to all the malignancies, however when it comes to Reticuloendothelial tumours, there is a high prevalence of KS affecting more males than females. A further study will need to be carried out. We have come to know that

Kaposi's sarcoma (KS) is the most common AIDS associated malignancy and a number of countries have reported a dramatic increase in the incidence of KS as a consequence of the increased incidence of AIDS. The tumours of the GIT seem to present much later with a mean age of almost 50 years as compared to the Reticuloendothelial tumours which present early with a mean age of about 40 years. The most prevalent tumour of the GIT in our area is adenocarcinoma of the stomach (5) followed closely by pancreatic tumours. Gastric cancer poses a significant global health burden. It is the second most common cause of cancer death worldwide and the ninth leading cause of cancer mortality in Zambia, at a rate of 3.8/100,000 comparable to USA (2/100,000) and UK (3.4/100,000) (Asombang *et al.*, 2014). It is known that survival data on gastric malignancy in Zambia is not known. In our study we had Stomach in 09 and Pancreas in 06 over a period six years. Obviously it is not that common on the Copper Belt region because primarily Prognosis of newly diagnosed gastric cancer in Zambia is poor with significant mortality within 1 year of diagnosis. It is not easy to get the real features we are looking for.

The Genito-urinary tumors were mostly cervical cancers. Among the patients who presented with endocrine tumours the breast took the larger share of the group. We had a larger number of the patients being mainly women 14 females compared to just 06 males the M: F was over 1: 2 and the most significant pathology in women was Carcinoma of the Cervix primarily due to the human papillomavirus. We are hoping that this will be highly reduced in Zambia as the male circumcision will reduce this problem in our women. Most of the patients (51.6%) presented late with disease that was already metastatic or disseminated. This remains a problem because the outcome of management is poor in patients who present late. As Asombang *et al.*, 2014 comments that "Prognosis of newly diagnosed gastric cancer in Zambia is poor with significant mortality within 1 year of diagnosis, particularly among patients with weight loss and dysphagia" is not only true to Gastric malignancy but true for all malignancies. The HIV testing issue remains a difficult one to deal with as large proportion of our patient (36.7%) still decline the test even after counseling.

This was true particularly in those who had malignancies other than Reticuloendothelial tumours. It can however be said confidently that the bulk of the tumours seen in this study were HIV related.

## Conclusion

Most papers on Malignancies representing the large population Zambia or the Africa cancer are here shown the true picture of malignancies in a particular section of our population. HIV and the Reticuloendothelial tumours are a major problem in our town representing the Copper Belt region.

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