# PYOMYOSITIS AND HIV INFECTION AT THE UNIVERSITY TEACHING HOSPITAL.



*BY*

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF MEDICINE ( SURGERY ) DEGREE OF THE UNIVERSITY OF ZAMBIA.**

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**HEAD OF DEPARTMENT. 1997.**

## TABLE OF CONTENTS

**DECLARATION**

I, Chomba C. Sikasote, hereby declare that this dissertation has never been submitted, in part or in full, for a diploma or a degree in any other university.

Date: 6/02/98 Candidates Signature: .....

I have read this dissertation and approved it for examination..

Date: 9/2/98 Signature: .....

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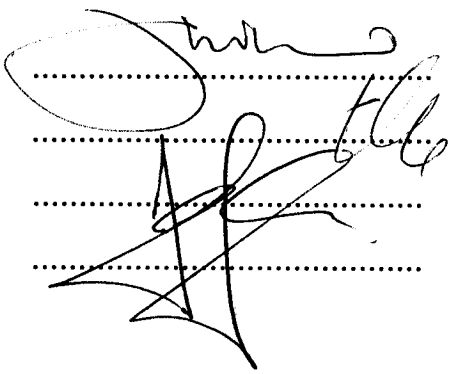
## DEDICATION

This piece of work is dedicated to my wife, Janet and my sons Nataizya and Khondwani .

## APPROVAL

This dissertation of **Dr. Chomba C. Sikasote** is approved as fulfilling part of the requirements for the award of the degree of Master of Medicine in Surgery by the University of Zambia.

Signature:



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**SUMMARY :**

A prospective study of pyomyositis and HIV infection was conducted at the emergency admission ward of the University Teaching Hospital.

One hundred and three(103) patients were included in the study. The age range was between 15 and 51 years (Mean=29). The objectives of the study were :

- To determine the percentage of pyomyositis patients who are HIV positive.
- To determine the infective organisms and their sensitivity patterns.
- To determine the complications of pyomyositis in HIV positive and negative patients.

Out of this study group , 71(69%) patients tested HIV positive. Culture of pus yielded several organisms 88% of which were *Staphylococcus aureus.* The duration of wound healing in HIV negative and HIV positive patients was not significantly different. Most patients in this st udy (91%) lived in high density areas. All patients presented with history of fever, pain and swelling and most patients presented to hospital within 15 days from the commencement of symptoms. Limbs were the most affected parts of the body. Antibiotics and analgesics had been taken by 52% and 50% of patients respectively before presenting to hospital . Sexually transmitted diseases (STD) were found to be a significant predisposing factor to HIV infection. Limbs were the most affected parts of the body. Blood culture was positive in only 5% of patients. There was no significant relationship between the type of infecting organism and HIV status.

**ACKNOWLEDGEMENTS:**

I would like to acknowledge the following for their invaluable help and support :

My supervisor Prof. Krikor Erzingatzian who guided me through the preparation , implementation and writing up of this dissertation .Dr.N.Ng'andu for unveiling some of the mysteries of statistics for me.Mr. C . Tembo for lending me his computer and Dr.L Ndhlovu for lending me his printer. I also acknowledge Dr. J . Mulwanda and Mr. S.Banda for helping me through the write up and my sponsor ZCCM for the financial support.

**DEFINITIONS AND ABBREVIATIONS:**

(a) RESIDENTIAL AREAS:

(i) LOW DENSITY: Urban areas ,for example Woodlands Kabulonga , Longacres .

(ii) MEDIUM DENSITY: Periurban , for example Libala , Chilenje ,Matero .

(iii) HIGH DENSITY: Shanty compounds such as Chawama , Kanyama , Chibolya.

(b) HIV = Human Immunodeficiency Virus.

(c) BACTERIOLOGY :

(i) Strep. = *Streptococcus*

(ii) Staph.aureus=*Staphylococcus aureus.*

(iii) Esch. coli = *Escherichia coli*

(iv) *B.H Strep.* = *Beta haemolytic streptococcus*

(v) *B.H Streptococcus* = *Beta haemolytic streptococcus*

(vi) *Strep. pneumonia* = *Streptococcus pneumonia*

(vii) *Strep. Pyogenes* = *Streptococcus pyogenes*

(d) AIDS = Acquired Immuno Deficiency Syndrome

(e) ELISA = Enzyme - linked immunosorbent assay.

(f) STD = Sexually transmitted disease.

(g) UTH = University Teaching Hospital - a National referral centre. It has a surgical department with five General surgical units. Each unit admits an average of two patients with pyomyositis every week.

(h) CD4 = Receptors on the T4 cells.

(i ) Pyomyositis = Painful muscle swelling , pain elicited by movement of muscle, pus aspiration from lesion and history of fever.

(j) CDC = Center for Disease Control ( Atlanta , Georgia - USA)

(k) Complication = A new illness that arises during the course of another illness thus making treatment more difficult.

**LIST OF TABLES AND GRAPHS:**

## INTRODUCTION:

Pyomyositis is a suppurative affection of skeletal muscles of unknown aetiology seen commonly in some parts of the tropics especially East Africa. The disease has rarely been reported in temperate climates. However with the advent of HIV, more and more cases of pyomyositis associated with HIV are being reported in temperate areas (Windrow and others ,1991). There has been a trend of increase of pyomyositis in Uganda from 1984 to 1991 (I Alidria,1991).Operation records at the University Teaching Hospital show a similar trend .The fact that the trend of pyomyositis admission appears to be rising and that the majority of those being affected are young adults means that this condition may have important socio-economic implications.

In 90% of cases, *Staphylococcus aureus* can be cultured from the abscess but is by no means the only pathogen isolated from the lesion. It has generally been assumed that *Staphylococcus aureus* is an opportunistic organism and causes secondary infection in a previously damaged muscle. This postulate was supported by the work of Miyake [ 1968 ] in which intravenous injection of *Staphylococcus aureus* in rabbits, following traumatic damage to skeletal muscle, resulted in abscess formation. *Staphylococcus aureus* is generally sensitive to erythromycin , cloxacillin , gentamicin and co-trimoxazole. It is however resistant to penicillin , ampicillin and tetracycline (Buttner , 1973). Latha Subramanian (1979) in her study of 109 patients with pyomyositis in UTH , Lusaka encountered septicaemia, gram-negative endotoxic shock, disseminated intravascular coagulation and haemorrhage, massive local bleeding and pneumonia with a lung abscess as complications of pyomyositis in Zambia.

## OBJECTIVES:

1. To determine the percentage of pyomyositis patients who are HIV positive.

2. To determine infective organisms and their sensitivity pattern.

3. To determine the complications of pyomyositis in HIV positive and negative patients.

## RATIONALE:

Recent studies in Uganda show that there is an association between pyomyositis and HIV infection. Statistics also show that the risk of getting pyomyositis is greater in HIV infected persons and that they are nine times more likely to develop pyomyositis than HIV sero-negative persons (I Alidria , 1991). No such studies have been reported from the University Teaching Hospital or elsewhere in Zambia on this subject. Knowledge of the magnitude of the problem, aetiology and patient response to treatment will help formulate recommendations for effective and affordable treatment.

**LITERATURE REVIEW:**

Pyomyositis is a common disease in the tropics,but rare in the temperate climates (Ajao,1982, Watts , 1987 ). In East Africa it was found to be almost entirely confined to the indigenous population (Horn and Master, 1968).

Although many cases of pyomyositis in individuals seropositive for HIV infection in temperate climate countries have been reported in the literature since 1987 (Widrow and others, 1991) , the HIV serological status rarely has been documented in African patients with pyomyositis (Be'lec and others , 1991) .

At New Mulago Hospital the association between HIV infection and pyomyositis was studied in eighty of the hundred and twenty five patients seen. The seropositivity rate was 71%. Kisali and others (1992) in Dar es Salaam , Tanzania had a seropositivity rate of 62%. In his study, Kisali (1992) found that pyomyositis was the bacterial infection most significantly associated with HIV infection. A high proportion (72%)of the HIV positive subjects in Kisali's study fulfilled the WHO classification of HIV disease, indicating that pyomyositis may be an HIV related complication, especially in the late stages of the disease .

Pyomyositis has been reported in association with immunosuppression in HIV (Kaye, 1988) , in aplastic anaemia and agammaglobulinaemia (Glassudin,1986) and in a patient with systemic sclerosis on chlorambucil (Minor and others , 1988).

In 90% of cases , *Staphylococcus aureus* can be cultured from the abscess (Chaudry ,1972) . I Alidria (1991) isolated *Staphylococcus aureus* from seventy (70%)percent of pus cultures. The following organisms were also isolated :*Escherichia coli* (4%),pseudomonas (3%),Klebsiella(3%) and Proteus(1%).

It is generally believed that *Staphylococcus aureus* is opportunistic and causes secondary infection in a previously damaged muscle . This postulate was supported by the work of Miyake (1904). There are many theories to explain how the muscle becomes diseased prior to *Staphylococcus aureus* superinfection. One of these theories suggests that muscle trauma is a cause of pyomyositis (Ransford ,1946,Burkitt , 1947,Marcus and Foster, 1968). O'Brien (1963) suggested that migrant helminth larvae may be responsible for the initial muscle damage because of histological evidence of eosinophilic infiltration in some lesions. Annad and Evans (1964) have classified tropical pyomyositis into intramuscular and intermuscular types. They believe that the intermuscular variety is caused by guinea-worm (*Dracunculus medinensis*). O' Brien (1974) has also demonstrated nematode larvae in the pus drawn from intramuscular abscesses.

Many tropical conditions have been suggested as playing a role in the genesis of pyomyositis. Nevertheless ,It is known that previously incriminated conditions like filariasis , toxoplasmosis , leptospirosis and toxocariasis play no direct part in the genesis of pyomyositis (Ransford , 1946 , Burkitt ,1947 ).

Another theory suggests that nutrition could be a factor in the development of pyomyositis. Vitamin C deficiency was first suggested by Young and Clark (1940), however, this idea was opposed by Ryan (1962).

I Alidria (1991) showed that *Staphylococcus aureus* was always sensitive to cloxacillin , gentamicin , chloramphenicol (95%), co-trimoxazole (93%) , erythromycin (93%) and to tetracycline (87%). The same study showed total resistance to ampicillin and penicillin. Buttner (1973) showed that sensitivity of *Staphylococcus aureus* to chloramphenicol , tetracycline and streptomycin, differed from one place to another depending on the strains of *Staphylococcus aureus* and the use or missuse of the drug. He however noted that all the strains were sensitive to cloxacillin.

It was difficult to find literature on complications of pyomyositis , however Latha Subramanian at the University Teaching Hospital , Lusaka (1978) in her study of 109 patients encountered septicaemia (14%),gram negative endotoxic shock (1%), disseminated intravascular coagulation and haemorrhage (1%), massive local bleeding (2%) and pneumonia with a lung abscess (1%) as complications of pyomyositis out of one hundred and nine patients.It should however be noted that his work is not comparable because of most of Subramanian patients were children and the present study restricted itself to adults over the age of 15 years.

## PATIENTS AND METHODS:

### PATIENTS :

The study was performed in the emergency surgical admission ward of the University Teaching Hospital ( U.T.H). Patients were admitted to the study between September 1995 and May 1996 ( eight months). They were seen and admitted on a daily basis. Pyomyositis was defined as a painful muscle swelling, pain elicited by movement of that particular muscle, history of fever and pus aspirated from the intramuscular swelling. All patients who satisfied this definition were enrolled in the study. History and physical examination were done for each patient as shown in annex 1. Those suffering from chronic osteomyelitis, a history of trauma and were below the age of 15 years were excluded from the study. All patients were evaluated according to the World Health Organisation (WHO) clinical case definition for AIDS ( 1986) (See Annex 2). For each patient a Questionaire was filled in (see Annex.1). After informed consent , venous blood was drawn and pus aspirated from the lesion. The patient and his samples were identified by a serial number.

### LABORATORY PROCEDURE :

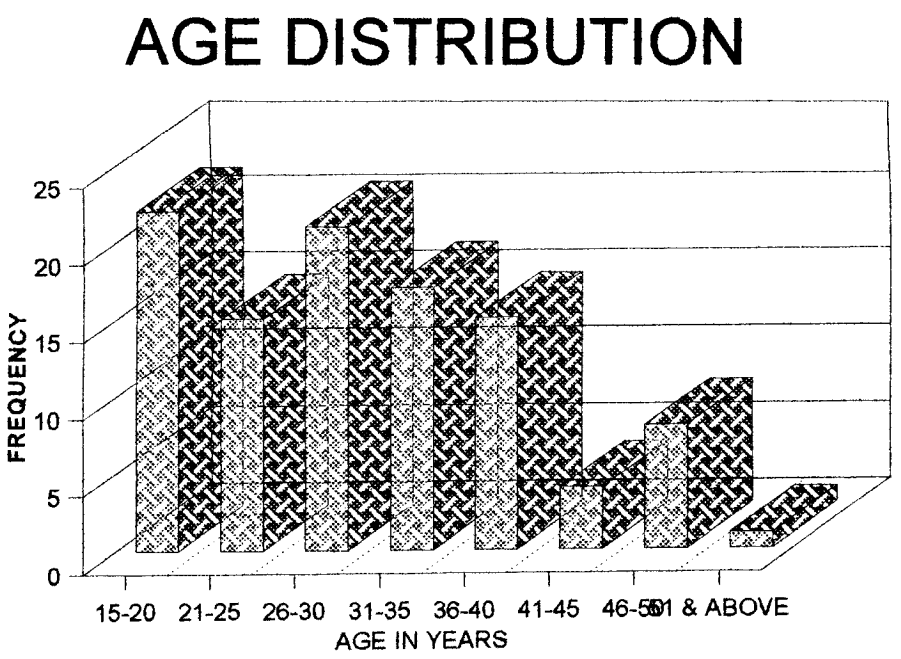
All blood samples were sent to the laboratory for analysis. Sera were analysed for the presence of HIV 1 and 2 by using a rapid (Capillus)test and ELISA. Other blood examination carried out were White Cell Count (WBC), Erythrocyte Sedimentation Rate (ESR), Random blood sugar (RBS), Haemoglobin (Hb) and blood culture using thioglycolate broth as blood culture media. The pus was cultured on blood agar. Blood and pus samples were collected under aseptic conditions. Routine incision and drainage of the lesion

was done in theatre. Microscopy and culture was done on all pus samples and sensitivities performed on organisms isolated by standard microbiology techniques.

STATISTICS :The statistical analysis was carried out using the Epi Info, Version 6.02 software package. Chi square test was used to test the significance of the results. P value less than 0.05 was taken to be significant. Chi square was used because only two constants ( HIV positive and HIV negative) were being considered in this study.

## RESULTS

Graph : 1




One hundred and three(103) patients with pyomyositis were seen in the outpatients department of the University Teaching Hospital and admitted to the study between September 1995 and May 1996.

Twenty nine (28%) patients were female and 74 (72%) patients were male. The age ranged from 15 years to 51 years with a mean of 29 (SD = 9.6)

**TABLE 1**: Occupation .

| OCCUPATION | FREQUENCY (%) |
|---|---|
| Student | 17 (16.5) |
| Nil (No occupation) | 13 (12.6) |
| Businessman | 11 (10.7) |
| Driver | 11 (10.7) |
| Housewife | 10 (9.7) |
| Peasant Farmer | 9 (8.7) |
| General worker | 3 (2.9) |
| Guard | 3 (2.9) |
| Prisoner | 3 (2.9) |
| Technician | 3 (2.9) |
| Servant | 2 (1.9) |
| Other | 18 (17.5) |
| TOTAL | 103(100) |

The majority were Students, drivers , farmers , housewives and businessmen. See table 1 above.

Other occupations were: Surveyor, Storekeeper, Receptionist, Purchasing officer, Plumber, Painter, Nurse, Mechanic, Lecturer, Lorryboy, Fisherman , Clerk , Bus conductor , Bricklayer , Barber and a Baker.

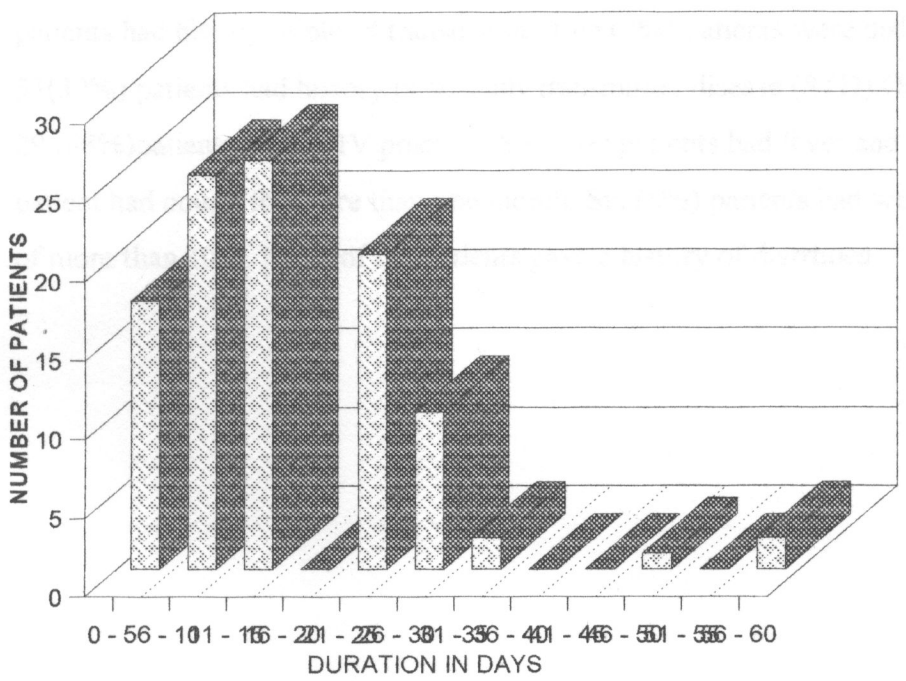
**TABLE 2** :Residential area frequency.

| RESIDENTIAL AREA | FREQUENCY (%) |
|---|---|
| High | 94 (91) |
| Low | 4 (4) |
| Medium | 5 (5) |
| TOTAL | 103 (100) |

Most of the patients with pyomyositis (91%) came from high density residential areas. See table 2

All patients presented with three cardinal symptoms - Fever, Pain and Swelling.

DURATION OF SYMPTOMS BEFORE PRESENTING TO HOSPITAL:




Graph : 2

The duration of symptoms before presenting to hospital ranged between two and sixty days (Mean= 15). However, seventy (67%) presented between seven and twenty one days. See graph 2 .

Fifty three (52%) patients and 51(50%)patients had taken antibiotics and analgesics respectively before presentation to hospital. Seven (7%) of the patients had history of blood transfusion , two (2%) patients were diabetic and 33(32%) patients had history of sexually transmitted disease (STD).Out of them 29 (88%)patients were HIV positive. Six (6%) patients had fever and one (1%) patient had cough for more than one month. Six (6%) patients had weight loss of more than 10%. None of the patients gave a history of diarrhoea.

**TABLE 3** : Site of pyomyositis.

| S I T E | FREQUENCY (%) |
|---|---|
| Thigh | 53 (52%) |
| Gluteal region | 11 (11%) |
| Arm | 10 (10%) |
| Calf | 7 (7%) |
| Forearm | 6 (6%) |
| Other | 16 (16%) |

Fifty three (52%) patients presented with pyomyositis of the thigh. See table 3 .

Other sites were: right deltoid , right pectoralis major , right erector spinae , left trapezius, left sternocleidomastoid, left deltoid, left pectoralis major, left erector spinae and rectus abdominis muscle.

SIGNS OF HIV INFECTION:

**TABLE 4** : Features of HIV infection.

| PHYSICAL FINDING | FREQUENCY (%) |
|---|---|
| Healthy perineum | 100 (97.1) |
| Skin rash | 14 (13.6) |
| Lymphadenopathy | 11 (10.7) |
| Molluscum contagiosum | 2 (1.9) |
| Oral thrush | 1 (1) |

Seventy one (69%) patients tested HIV positive ( ELISA). Only five (5%) patients had blood culture positive for *Staphylococcus aureus*. The White cell count ranged from 3.9 to 42x10 to the power 9 per litre with a mean of 14.5 (SD= 7.2 ). Haemoglobin levels ranged from 4.2g/dl to 16g/dl with a mean of 10.4 (SD= 2.5). Erythrocyte sedimentation rate values were between 4mm and 160mm/hr. The mean value was 73.2 ( SD= 38.3). Random blood sugar values ranged from 1.2 to 9.6mmols with a mean of 5.1 (SD= 1.6)

**TABLE 5**: Bacteria isolated.

| BACTERIA | FREQUENCY (%) |
|---|---|
| *Staphylococcus aureus* | 91 (88) |
| *Streptococcus pyogenese* | 3 (3) |
| *Staph.aureus* + Salmonella | 2 (2) |
| *Beta haemolytic strep. +Staph. aureus* | 1 (1) |
| *Beta haemolytic streptococcus* | 1 (1) |
| *Esch. coli* + Pseudomonas | 1 (1) |
| *Proteus mirabilis* | 1 (1) |
| Salmonella species | 1 (1) |
| *Staph. aureus* + Klebsiella | 1 (1) |
| *Streptococcus pneumonia* | 1 (1) |

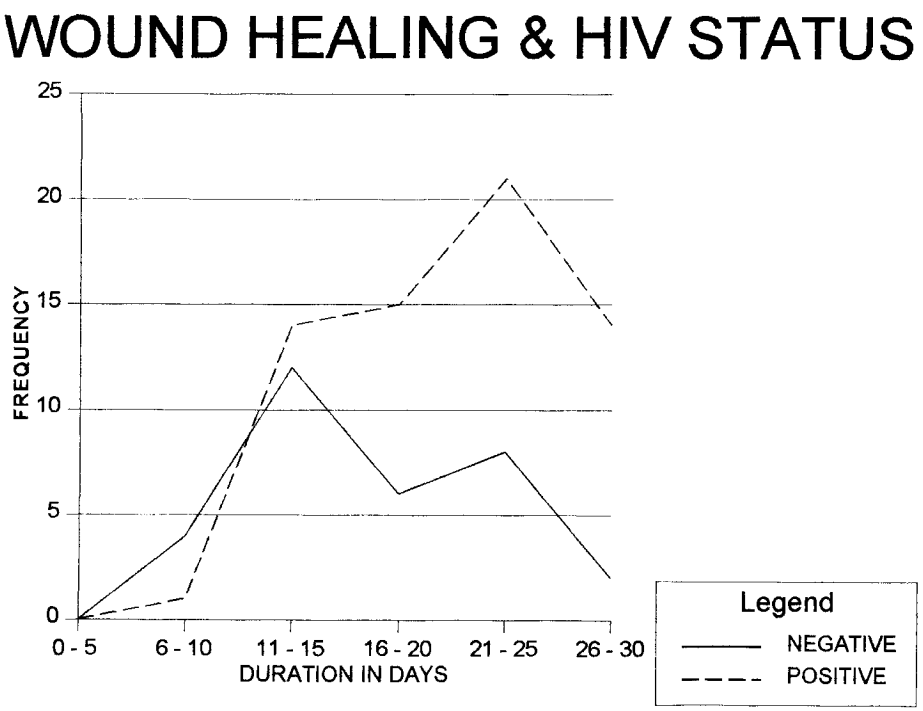
Ninety one(88%) pus samples collected yielded *Staphylococcus aureus*. Five samples yielded more than one organism. Table 5 above shows type of bacteria isolated.

Ninety (87%) of the bacterial cultures were sensitive to chloramphenicol , erythromycin , co-trimoxazole and cloxacillin. Ninety one(88%) were resistant to tetracycline, ampicillin and penicillin.

**TABLE 6 :** Bacteria isolated and HIV status.

| | HIV STATUS | |
|---|---|---|
| TYPE OF BACTERIA | NEGATIVE ( n= 32) | POSITIVE ( n = 71) |
| *Staphylococcus aureus* | 28 | 63 |
| *Streptococcus pyogenese* | 1 | 2 |
| *treptococcus pneumonia* | 0 | 1 |
| *B.haem.strep.* + *Staph aureus* | 0 | 1 |
| *Esch.coli* + Pseudomonas | 0 | 1 |
| *Proteus mirabilis* | 0 | 1 |
| Salmonella species | 0 | 1 |
| *Staph. aureus* + Klebsiella | 1 | 0 |
| *Beta haem. streptococcus* | 1 | 0 |
| *Staph. aureus* + Salmonella | 1 | 1 |

Twenty eight of the 32 (88%) HIV negative patients had *Staphylococcus aureus* cultured from the pus and so did the 63 of the 71 (89%) patients who tested HIV positive. There was no significant association between type of infecting organism and HIV status ($p = 0.5$), although most of the other infecting organisms were isolated mostly in HIV positive patients as shown in table 6.




Graph 3 : Duration of wound healing and HIV status

The mean duration of wound healing was 19 days (SD= 5.5) and ranged from eight days to 29 days. Comparing the duration of wound healing in HIV negative and HIV positive patients, it was found that there was no significant association between duration of wound healing and HIV status ($p = 0.12$ ) See graph 3..

**TABLE** 7 : Complications (%)

| COMPLICATIONS | FREQUENCY (%) |
|---|---|
| Multiple Abscesses | 19 (18) |
| Pneumonia | 3 (3) |
| Pneumonia, Septicaemia, Abscess | 1 (1) |
| Death | 1 (1) |

Twenty four patients had complications of pyomyositis and were HIV positive (34%) . The association between complications of pyomyositis and HIV status is significant (p=0.007).

See table 7 .

All patients who had complications were HIV positive.

**TABLE 8** :Marital status and HIV.

| | H I V | STATUS |
|---|---|---|
| MARITAL STATUS | NEGATIVE (n=32) | POSITIVE(n=71) |
| Married | 8 (14%) | 50 (83%) |
| Single | 24 (57%) | 18 (43%) |
| Widowed | 0 | 3 (100%) |
| TOTAL | 32 | 71 |

There is a significant association between marital status and HIV infection ($p = 0.00001137$).

**TABLE 9:** Occupation and HIV status.

| | H I V | S T A T U S |
|---|---|---|
| OCCUPATION | NEGATIVE | POSITIVE |
| Student | 13 | 4 |
| Nil (No occupation) | 7 | 6 |
| Businessman | 4 | 7 |
| Driver | 1 | 10 |
| Housewife | 1 | 9 |
| Farmer | 0 | 9 |
| General worker | 1 | 2 |
| Guard | 0 | 3 |
| Prisoner | 0 | 3 |
| Technician | 0 | 3 |
| Servant | 0 | 2 |
| Other | 5 | 13 |
| TOTAL | 32 | 71 |

There was a significant association between occupation and HIV ($p = 0.00000001$ ). Most affected were drivers , farmers , housewives and businessmen. See Table 9 above.

Other occupations were: Baker, Barber, Bricklayer., Butcher man, Bus conductor, Clerk, Fisherman, Lecturer., Lorry boy, Mechanic, Nurse, Painter, Plumber, Purchasing officer, Receptionist, Salesman, Storekeeper and a Surveyor.

**TABLE 10** : Residential area and HIV status .

| | H I V | S T A T U S |
|---|---|---|
| RESIDENTIAL AREA | NEGATIVE | POSITIVE |
| High | 28 | 66 |
| Low | 3 | 1 |
| Medium | 1 | 4 |
| TOTAL | 32 | 71 |

There was no significant association found between residential area and HIV status,($p = 0.14$ ).See table 10.

**TABLE 11** : Site of pyomyositis and HIV status.

| | H I V | S T A T U S |
|---|---|---|
| SITE OF PYOMYOSITIS | NEGATIVE | POSITIVE |
| Thigh | 13 | 40 |
| Gluteal region | 2 | 9 |
| Arm | 5 | 5 |
| Calf | 4 | 0 |
| Forearm | 2 | 4 |
| Other | 6 | 13 |

The HIV status of the patient did not appear to influence the site of pyomyositis ($p = 0.12$), although a larger proportion of patients with pyomyositis of the thigh were HIV positive. The table above shows a frequency tabulation of the site of pyomyositis according to HIV status.

Other sites were: Rectus abdominis muscles, Erector spinae ,Pectoral muscles, Sternocleidomastoid.

**DISCUSSION:**

During the eight months period of observation , 103 patients with a diagnosis of pyomyositis who met the inclusion criteria were admitted to the emergency surgical ward of the University Teaching Hospital. The age range was between 15 years and 51 years, the mean being 29 years. The mean is almost equal to what was found by Latha Subramanian (1979) in her study (mean = 28 years ). Although this is so, the two studies are cannot be compaired because Subramanian had children as a majority in her study. This study excludes those under 15 years ( 15 years and above - sexually active and therefore predisposed to HIV infection . It is important to note that in our Zambian society, sexual activity is considered to commence at puberty. This is usually around the age of 15 years.) , patients with osteomyelitis and those with history of trauma as these would have introduced confounding factors in the study.

Pyomyositis is said to affect all age groups . There is a preponderance in the 20 to 40 years group ( Horn, 1968 , Watts and others , 1987). Latha Subramanian (1979) also suggested that pyomyositis is a disease of children . In this study, ninety (87%) patients were between 15 years and 40 years and thirteen (13%) were between 41 years and 51 years. This preponderance of pyomyositis in this age group could be explained by the fact that this is the age group that is actively involved in activities such as manual labour that predispose them to infection. This is also the same age group that is sexually active and hence predisposed to HIV infection. This does not imply that sexual activity ceases at fourty. The small number of patients observed above the age of fourty could mean that they do not indulge in sex as much as the young ones do. If they do then they do with their husbands or wives as the case may be.

The Male:Female ratio in this study was 2.6:1.Sex differences regarding pyomyositis have been commented upon by many authors (Taylor,1970,Trangui, 1947),particularly the genuine bias towards male.It has been suggested by the same authors that this bias may be due to the fact that males are the ones that are mostly involved in activities that predipose to muscle trauma leading to the development of pyomyositis.

Young and Clark (1940) suggested that Vitamin C deficiency was the cause of pyomyositis , however , this idea was opposed by Ryan (1962) when he studied 12 Papua children with pyomyositis and found no evidence of Vitamin C deficiency. In this study, 91% of the patients lived in high density residential areas. These are areas where most people who belong to the lower social class live. Four (4%) percent of the patients came from low density areas. The low turn out of patients from low density areas could be due to the fact that these patients attend private hospitals and are therefore missed. It was not possible to investigate this aspect because the study was confined to the capital's central hospital.

Trauma has been suggested as an aetiological factor in the genesis of pyomyositis (Oluwole,1967, Ransford, 1946, Burkit,1947, Marcus and Foster ,1968) . Marcus and Foster claim that trauma made the muscles susceptible to bacterial invasion , therefore giving rise to pyomyositis . This claim is supported by the work of Miyake (1904) in which intravenous injection of *Staphylococcus aureus* in rabbits , following traumatic damage to skeletal muscle , resulted in abscess formation. In this study, none of the patients had a history of trauma and was not considered. Eleven (11%) of the patients were drivers, 11% were businessmen , 10% housewives, 9% farmers and 9% schoolchildren. Infact , this study shows that pyomyositis cuts across

occupation. This is considered to be because of its association with HIV infection. In this study, 69% of patients with pyomyositis were HIV positive. This concurs with the findings of I Alidria-Ezati (1991), Kisali (1992) whose seropositivity rates were 71% and 62% respectively.

Primary virus infection causing muscle damage has been suggested as the predisposing factor to secondary *Staphylococcus aureus* invasion. Patel (1969) postulated an association between pyomyositis and an acute suppurative parotitis in two cases where *Staphylococcus aureus* of the same antibiotic sensitivity was cultured from both sites. He suggested Coxsackie virus as the commonest aetiological agent. This was confirmed by the works of Harris , Henderson and Manubi (1969). They cultured a Coxsackie B virus from cases of epidemic parotitis. Taylor (1970) described necropsy findings in 19 patients who died from pyomyositis in Mulago Hospital between 1964 and 1968. He showed that pyomyositis is a widespread disorder of skeletal and cardiac muscle, with localised abscess formation. The non suppurative lesions showed histological features compatible with viral necrosis. The histological findings by Taylor, Horsfalland Tamm(1965) suggested that the findings were compatible with virus infection in general and Coxsackie virus in particular. To this day no further histological evidence suggesting virus infection has been reported. One therefore has to consider whether the incidence described from one locality could be due to a coincidental correlation between an epidemic of virus infection and pyomyositis.

Kaye (1988) has reported myopathies induced by HIV infection presenting as muscle weakness, myalgia and muscle wasting. Histological examination of the affected muscle showed inflammatory infiltrates with phagocytes and tissue

fibre necrosis. It is possible that foci of muscle necrosis in the face of existing bacteraemia can be colonised and predispose to pyomyositis. However, it may be a direct consquence of immunodeficiency (Kaye , 1988) making the patients susceptible to infection with virulent organisms (Bernstein ,1985).

The role of immuno suppression in the pathogenesis of pyomyositis was recognised in 1947 by Burkitt although others disagreed with him (Ajao,1982, Annad, 1964). Others supported the role of immunosuppression and reported its occurrence in association with aplastic anaemia and agammaglobulinaemia. Glassudin (1986) found low antibody titre in patients with pyomyositis and proposed that antibody deficiency , primary or acquired, might be the cause of pyomyositis. Minor and others (1988) reported pyomyositis in a patient with systemic sclerosis on chlorambucil. It is well known that HIV infection affects cell mediated and humoral immunity. It mainly destroys T4 (CD4) lymphocytes which themselves play a role in humoral immunity. The decrease in these lymphocytes, monocytes and macrophages , leads to an increased frequency of bacterial infections ( Fauci, 1984, Murata, 1984) . Although HIV infection is associated with increased levels of IgG ,IgA , IgM, the B cells are refractory to further stimulation by bacterial and neo-antigens only IgG and IgG3 are ellevated. IgG2 and IgG4 are depressed and this is associated with susceptibility to infection by encapsulated bacteria including *Staphylococcus aureus* , pneumococcus species and *Haemophilus influenzae* (Lane, 1985). Pyomyositis may be the first clinical manifestation of HIV infection or may be part of the full blown picture of AIDS( I Alidria,1991)

Pyomyositis usually involves the large muscles of the trunk and

proximal parts of the limbs (I Alidria , 1991). Taylor (1973) in his study found that limbs were predominantly affected. Latha Subramanian (1979) found that the site of pyomyositis was usually the lower limb (73%) especially the thigh (65%).The site of pyomyositis in this study was usually the lower limb (69%) especially the thigh (51%). Other common sites were the upper limb , the back and abdominal muscles.

The pathogenesis of pyomyositis is uncertain , but it is notable that HIV infected patients are commonly colonised by *Staphylococcus aureus* and that neutrophils from HIV infected patients frequently manifest phagocytic , chemotactic and oxidative defects and impaired bactericidal activity against *Staphylococcus aureus* (Schwartzman and others , 1991) . I Alidria(1991) cultured 70% *Staphylococcus aureus* from pus. The following organisms were also isolated : *Escherichia coli* (4%) , pseudomonas (3%) , Klebsiella(3%) and proteus(1%). In this study, eighty- eight per cent grew *Staphylococcus aureus* , sixty- nine (69%) per cent of these patients were HIV positive and 25% were HIV negative. This demonstrates the relationship between HIV status and pyomyositis ( Chi Sq. 9.4) . *Streptococcus pyogenese* was isolated in three of patients. Other pus samples grew a combination of organism which include: *Beta haemolytic streptococcus , Esch.coli, Pseudomonas, Proteus mirabilis,* Salmonella Species, Klebsiella, and *Salmonella para typhi*. Only 5% of blood cultures grew *Staphylococcus aureus*. Fifty- three (52%) patients had been on antibiotic therapy before presentation . This may explain the low yield from blood culture.

Ninety one per cent of *Staphylococcus aureus* organisms were resistant to tetracycline, ampicillin and penicillin. This echoes the findings of Subramanian (1979). Ninenty per cent of the *Staphylococcus aureus* was however sensitive

to chloramphenicol , cloxacillin , erythromycin and co-trimoxazole. This is in tune with the study conducted by Buttler (1971).

Latha Subramanian (1979) encountered septicaemia (14%) , gram negative endotoxic shock (1%) , disseminated intravascular coagulation and haemorrhage(1%), massive local bleeding (2%)and pneumonia with a lung abscess (1%) as complications of pyomyositis. In this study the following complications were encountered : multiple abscesses in 18% ,pneumonia in 3% and death 1%. The study showed that there appears to be a relationship between those with HIV positive status and the development of complications (Yates corrected value 0.00046 ). It is, however difficult to say whether these were due to pyomyositis or part of the pathology of HIV infection. This is not surprising since HIV reduces the body's immunity and predisposes to the development of complications in any condition.

Previous reports have given little account of the presenting symptoms of pyomyositis. It is true that the majority of patients have a uniform history of pain in a muscle group followed within a few days by swelling . The length of history is variable, the peak for surgical presentation being six to nine days irrespective of site or stage of lesion (Horn , 1968). Staphylococcal pyomyositis in HIV infected patients presents in an indolent fashion ,which may delay appropiate diagnosis and treatment ( Schwartzman, 1991). Results in this study show that duration of symptoms before surgical admission has significantly increased (mean 14.9, S.D= 10.9) compared to the study by Horn (1968).The increase in the number of days before admission can be attributed to the delay in the evolution of symptoms from fever to pain. Most patients in this study who took long to present for admission were HIV positive although the relationship between duration of symptoms before admission to hospital and HIV status is

not significant (p=0.84). The delay could also be explained on the basis of such patients having a dysfunction in B lymphocyte, neutrophil and phagocytic activity (Ansaloni , 1996). Another reason could be that these patients spent time treating themselves as can be seen from a higher number of patients who took medication before presenting to hospital . This study shows normal response to infection ( WBC mean 14.5, S.D= 7.2). Cook (1963) showed similar findings. Findings in this study also agree with Oluwole (1967) in that the observed anaemia seen in association with some cases of tropical pyomyositis are due to the effects of the disease rather than the cause.

Mugala (1991) demonstrated that wound healing in HIV positive patients was delayed , especially those who had abdominal surgery. However, he showed no significant difference in the duration of wound healing with those who had limb surgery. This study also demonstrates that there was no significant difference in duration of wound healing considering that most surgery was done on limbs (P. Value = 1).

The presence of sexually transmitted diseases facilitates the acquisition and transmission of HIV by over 50% ( Kamanga , 1992). The disrupted mucosa in the genital ulcer diseases or sexually transmitted diseases and imflammation in genital discharge create an easy entry point for the HIV (Kamanga , 1992). A significant proportion of patients had been exposed to risk factors of HIV infection. Thirty- three patients had history of sexually transmitted diseases. Twelve patients had syphilis out of which 11 were HIV positive . Kidan (1995) in his study found that women who were seropositive for syphilis were more than twice as likely to be positive for HIV.

There seems to be a significant association between marital status and HIV infection (p = 0.00001137). From this study, fifty three (87%)patients out of

those that were married were HIV positive and eight (13%) were HIV negative. Eighteen (43%) single patients were HIV positive and twenty four(57%)were HIV negative. The average age in this study group was 29 years(SD= 9.6). This is the age group that is mostly affected by HIV. The most probable explanation for the marital status to appear to be a risk factor is that these people may be infected with HIV before they are married. It is rather difficult to give a plausible explanation unless a control group was included in the study.

**CONCLUSION:**

From this study , the following conclusions can be drawn.

(i) Seventy one (69%) patients tested HIV positive.

(ii) *Staphylococcus aureus* is the main aetiological organism.

(iii) *Staphylococcus aureus* is sensitive to erythromycin , cloxacillin , co-trimoxazole and gentamicin. The organism is resistant to penicillin , ampicillin and tetracycline.

(iv) Multiple abscesses are a complication of pyomyositis in HIV positive patients.

Other conclusions which have emerged in this study are ;

(i) Pyomyositis is a disease of the young , from this study being most common between 15 and 40 years.

(ii) Pyomyositis has a sex bias towards males.

(iii) The thigh is the most affected part of the body.

(iv) Pain, swelling and fever are the cardinal symptoms.

(v) There is no significant relationship between duration of wound healing and HIV infection.

(vi) Sexually transmitted diseases are a risk factor of HIV infection.

(vii) There is no significant relationship between occupation and pyomyositis.

**CONSTRAINTS:**

Most patients in this study who were HIV positive were in the clinical stage (WHO) 1 . CD4 lymphocyte counts would have helped to determine the stage of the immune competence of the patients. HIV kits ran out towards the end of this study and twenty patients did not have their HIV status determined.Moreover delayed release of funds did not allow me to do the CD4 counts .These difficulties reduced the sample size to 103. Weight for height would have helped in determining the nutritional status of the patients. Measurement of the weight and height was abandoned because the scale that was being used was lost and a new one could not be bought because of the non-availability of funds.

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FILE NO..... SEX..... AGE.....SURVEY NO.....

WEIGHT.....HEIGHT.....OCCUPATION.....

MARITAL STATUS: SINGLE/MARRIED/WIDOWED.....DATE.....

RESIDENTIAL ADDRESS:.....CAUSE OF DEATH.....

SYMPTOMS: FEVER.....PAIN.....SWELLING.....(DURATION BEFORE PRESENTING TO HOSPITAL)

HISTORY OF TREATMENT:

a) ANTIBIOTICS YES/NO

b) OTHERS.....SPECIFY.....

HISTORY OF a) BLOOD TRANSFUSION YES/NO DATE:.....

b) DIABETES MELLITUS YES/NO

c) SEXUALLY TRANSMITTED DISEASE YES/NO SPECIFY

d) FEVER > 1 MONTH YES/NO

e) CHRONIC COUGH 1 MONTH YES/NO

f) DIARRHOEA > 1 MONTH YES/NO

g) WEIGHT LOSS > 10%

PHYSICAL EXAMINATION: SITE OF PYOMYOSITIS:

a) SKIN RASH YES/NO

b) ORAL THRUSH YES/NO

c) LYMPHADNOPATHY YES/NO

d) MOLLUSCUM CONTANGIOSUM YES/NO

e) PERINEUM - HEALTHY YES/NO

**LAB RESULTS**

HIV STATUS: NEGATIVE/POSITIVE
BLOOD CULTURE

FBC/ESR, BLOOD SUGAR

PUS - BACTERIOLOGY, SENSITIVITY AND RESISTANCE

**CLINICAL RESULTS**

DURATION OF WOUND HEALING

COMPLICATIONS OF THE DISEASE

## ANNEX 2

INTERIM PROPOSAL FOR WHO STAGING SYSTEM FOR HIV INFECTION AND DISEASE.

**CLINIAL STAGE 1:**

1. Asymptomatic
2. Persistant generalised lymphadnopathy (PGL)

   Performance Scale 1: asymptomatic , normal activity

**CLINICAL STAGE 2**:

3. Weight loss < 10% of body weight
4. Minor mucocutaneous manifestations ( seborrhoeic dermatitis , prurigo , fungal nail infections , recurrent oral ulcerations , angular cheilitis ).
5. Herpes Zoster within the last five years
6. Recurrent upper respiratory tract infections (i.e bacterial sinusitis and or performance scale 2: symptomatic , normal activity )

**CLINICAL STAGE 3:**

7. Weight loss> 10% of body weight
8. Unexplained chronic diarrhoea > 1 month
9. Unexplained prolonged fever ( intermittent or constant ) > 1 month
10. Oral candidiasis ( thrush )
11. Oral hairy leukoplakia
12. Pulmonary tuberculosis , within the past year
13. Severe bacterial infections ( i.e pneumonia , pyomyositis ) and or performance scale 3 : bed ridden < 50% of the day during last month.

**CLINICAL STAGE 4**:

14. HIV wasting syndrome , as defined by CDC
15. Pneumocystis carinii pneumonia
16. Toxoplasmosis of the brain
17. Cryptosporiodosis with diarrhoea > 1 month
18. Cryptococcos , extrapulmonary
19. Cryptomegalovirus (CVM) disease of an organ other than liver , spleen or lymphnodes.
20. Herpes simplex virus (HSV) infection , mucocutaneous > 1 month , or visceral any duration.
21. Progressive multifocal leucoencephalopathy (PML)
22. Candidiasis of the oesophagus , trachea , bronchi or lung.
23. Any disseminated endemic mycosis (i.e histoplasmosis , coccidiomycosis)
24. Atypical mycobacteriosis , disseminated
25. Non - typhoid Salmonella septicaemia
26. Extra pulmonary tuberculosis
27. Lymphoma
28. Kaposi's Sarcoma ( KS )
29. HIV encephalopathy , as defined by CDC and or performance scale 4 : bed-ridden > 50% of the day during last 1 month. NOTE: Both definitive and presumptive diagnosis are acceptable.

ANNEX 3

**HIV TEST CONSENT**

I.....agree/ not agree to have the above test done. I wish / do not wish to know the results.

Sign.....

Witness:

Sign..... DATE:.....