

## **Pyomyositis and its risk factors in patients of Gulu Regional Referral Hospital, Uganda. A Descriptive Cross-sectional Study Design.**

**D.L. Kitara<sup>1</sup>, P.O. Bwangamoi<sup>2</sup>, H. Wabinga<sup>3</sup>**

<sup>1</sup>Department of Surgery, Faculty of Medicine, Gulu University, Gulu, Uganda. <sup>2</sup>Institute of Research, Graduate studies and staff development, Gulu University, Gulu.

<sup>3</sup>Pathology Department, College of Health sciences, Makerere University, Kampala, Uganda

**Correspondence to:** D.L. Kitara, Email: [klagoro@yahoo.co.uk](mailto:klagoro@yahoo.co.uk)

**Background:** Pyomyositis is a suppurative infection of the skeletal muscles and is characterized by localized muscle pains, swelling and tenderness. Pyomyositis accounts for 10-15% of hospital admissions in some units in northern Uganda. We described the demographic characteristics and risk factors of Pyomyositis patients treated at Gulu Hospital between January to September 2009.

**Methods:** A descriptive cross-sectional study was conducted on Pyomyositis patients admitted in Gulu Regional hospital surgical ward over a period of 9 months (January 2009 to September 2009). One hundred patients who met the inclusion criteria were consecutively recruited in to the study after obtaining an informed consent. The patients' information was recorded on a special questionnaire. The information recorded included the demographic characteristic, the BMI, sites of infection and the laboratory tests findings. Each patient underwent incision and drainage (I&D) operation and was followed up in the outpatient department for postoperative surgical review. Ethical consideration and approval was obtained from the ethical review committee and administration of Gulu Regional Hospital.

**Results:** The population study consisted of 100 patients. The patients' ages ranged from 12 to 60 with a mean of 30.3 years. The peak age range was 30-34 years. The male to female (M: F) ratio of 1:1.1. Of the risk factors studied trauma was reported in 7 patients (7%). Malnutrition (53%) and HIV/AIDS (40%) were the commonest risk factors. None of the patients suffered from Diabetes mellitus or hypertension. HIV/AIDS was present in 88% of the malnourished pyomyositis patients.

**Conclusion:** Malnutrition is the commonest risk factor to pyomyositis, followed by HIV/AIDS and trauma. Most malnourished patients were HIV positive.

### **Introduction**

Originally Pyomyositis was restricted to certain well-defined areas<sup>1</sup>. Large series were reported from Nigeria, Cameroon, Uganda and Solomon Islands and occasional occurrences from countries in Africa, Asia and South America<sup>5,19</sup>. Between 1960 and 1973, the incidence of up to 10 cases per 10,000 populations was observed in Uganda. In East Africa, the disease concentrated in regions of high altitude, warm and humid climate. In Rwanda and Burundi, Pyomyositis used to be extremely rare, but Rwandan immigrants to Uganda were affected just as often as the local population. In contrast, no cases have been registered among members of the European community in endemic regions<sup>5</sup>. With the spread of HIV/AIDS, the pattern of distribution has changed in a dramatic way. In a recent African studies, 63– 80% of patients with Pyomyositis were HIV-positive. The regional incidence of pyomyositis in tropical countries is now closely linked to HIV sero-prevalence, which implicates an extension of disease to previously unaffected areas<sup>5,19</sup>. The close link between the advanced HIV infection and Pyomyositis suggests that the occurrence of muscle abscesses may be an indicator of stage III HIV disease, according to WHO clinical classification<sup>5</sup>. Hospital based data show that pyomyositis is relatively rarer in the southern part of Uganda accounting for 4-4.5% of all surgical admissions<sup>1,22</sup> compared to the prevalence of 10-15% found in Gulu and the neighboring districts of northern Uganda<sup>1,2,3,4,21</sup>.

The factors leading to its increased occurrence in this region remains unknown. Pyomyositis has been associated with various conditions such as HIV/AIDS<sup>5,6</sup>, Malnutrition<sup>5</sup>, Diabetes mellitus<sup>7</sup>, Alcohol abuse<sup>8</sup>, and Felty's syndrome<sup>9</sup>. There is now considerable epidemiological evidence showing the role of malnutrition

and HIV/AIDS in the development of Pyomyositis in Uganda<sup>5</sup>. It therefore follows that if malnutrition and HIV/AIDS play a major role in the development of Pyomyositis and that the prevalence and incidence of malnutrition and HIV/AIDS is higher in northern Uganda compared to the rest of the country (8.2% and 6.4% respectively)<sup>10,11,12</sup>. The current upsurge of Pyomyositis in the region follows this defined trend.

## Patients and Method

We conducted a descriptive cross-sectional study from January to September 2009 with pyomyositis patients in Gulu Regional Hospital. This hospital is situated in Laroo division, one of the sub-counties in Gulu Municipality of northern Uganda. This hospital is situated in a region which is just recovering from the 20 year-old civil war. Gulu is strategically located and endowed with its transport terminals and pivotal role in the vast and profitable distribution of goods in the region. It is the regional center for northern Uganda and draws a largely rural population, many people were displaced into camps famously known as the internally displaced peoples camps (IDPS) near the hospital for safety from the insurgency. Patients were selected consecutively from the outpatients department and the casualty unit of the hospital. Informed consent was obtained from each individual patient for the research and each person was free to dissent treatment at any stage of their management without any effect to their follow up treatment. Ethical approval was obtained from ethical review committee and management of the hospital. Overall 100 patients who met the inclusion criteria were included in the study. Non consenting patients and those with secondary pyomyositis were excluded from the study.

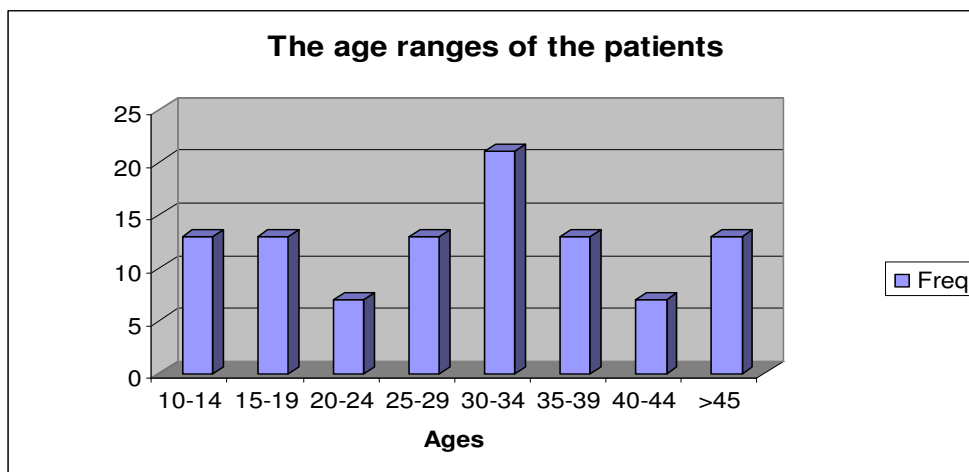
## Data collection

The patients were assessed preoperatively, operatively and postoperatively. The demographic characteristics, the physiological status and risk factors investigated. The findings were recorded in a prepared data sheet (questionnaire) designed earlier-on to assess the risk factors and physiological status of the patients. All patients underwent emergency incision & drainage (I & D) procedure. The operative procedures were conducted in the same manner by making a wide incision to ensure that the pus was well drained. The abscess cavity was washed with normal saline and packed with sterile gauze. The patients followed up postoperative until discharge and in the outpatient department in the weekly postoperative surgical review. Data was cleaned and presented in graphs, charts and figures.

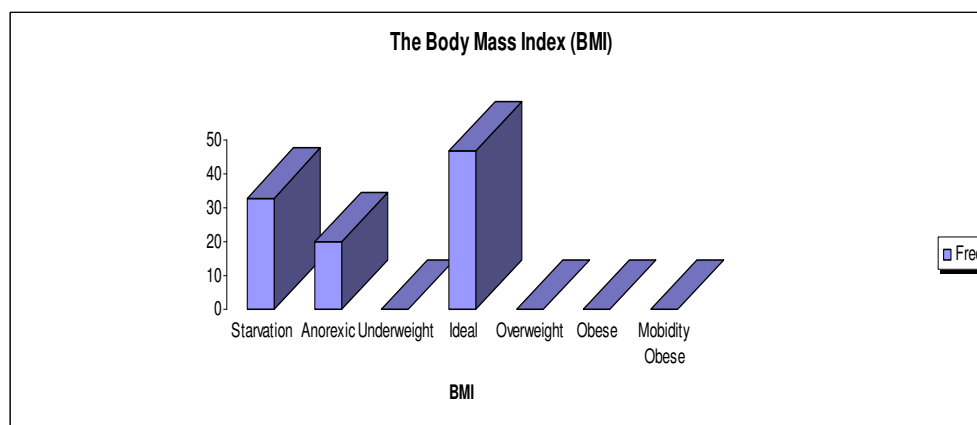
## Results

The patients' ages ranged from 12 to 60 with a mean of 30.3 years. The peak age range was 30-34 years. Fifty three patients (53%) were females and forty seven (47%) males. The male to female (M: F) ratio of 1:1.1. (Figure 1). Figure 2 shows the BMI of the patients. Most (53%) of the patients were malnourished with a BMI less than 17.5; 47 (47%) patients had ideal BMI of greater than 18.5, and none of the patients had a BMI greater than 25. Figure 3 shows the risk factors of Pyomyositis in these patients (Figure 3). Apart from malnutrition, the Other risk factors found were HIV/AIDS (40%) and trauma in 7 (7%) of the patients. All the patients investigated had no other co-morbid condition of Diabetes mellitus and/or hypertension.

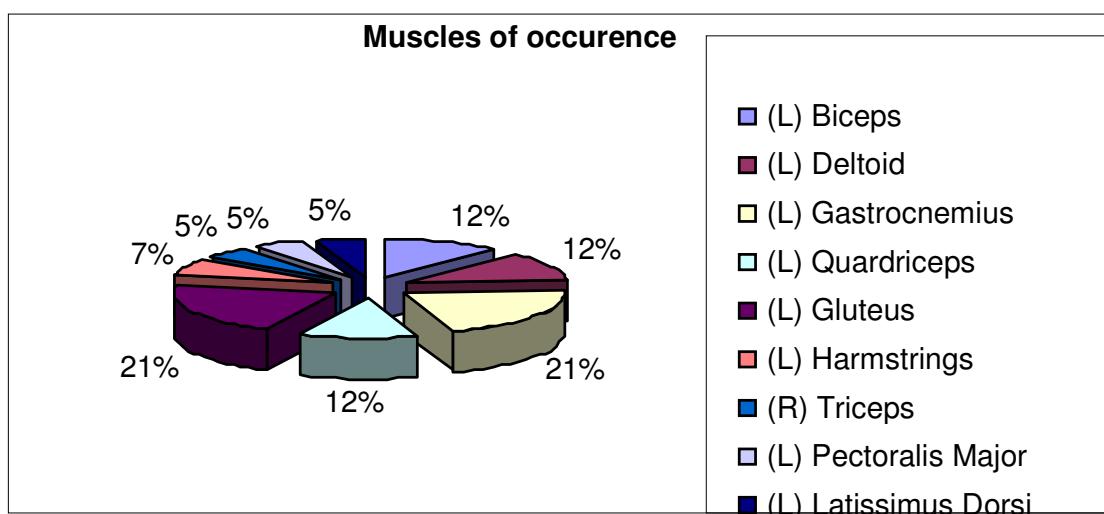
Figure 3 shows the muscles groups involved. The gluteal, gastrocnemius and quadriceps were most commonly involved muscles in pyomyositis. Figure 4 shows the distribution of the patients by occupation. The majority (66%) of patients were peasant farmers, 34% were pupils or students. History of previous occurrence of pyomyositis was recorded in a third (33%) of the patients while 67% had first experience. Regarding the Length of symptoms and signs in the patients, all the patients presented late at diagnosis of the disease. The majority (53%) spent weeks before getting correct diagnosis while (47%) took months to have the case diagnosed. Eighty four of the patients who had delayed diagnosis for months were HIV positive. Serology for HIV was positive in 40% of the pyomyositis patients and was negative in 60%. There were no hospital deaths.



**Figure 1.** Ages Distribution of the patients with Pyomyositis



**Figure 2.** The BMI Distribution of the Patients



**Figure 3.** The Muscles Involvement of Pyomyositis

## Discussion

The Predisposing factors for Pyomyositis include immunodeficiency, trauma, injection drug use, concurrent infection, and malnutrition. Immunodeficiency has been implicated in the development of Pyomyositis in both temperate and tropical climates<sup>13</sup>. The common causes of immune deficiency in our environment include; Malnutrition, HIV/AIDS, Diabetes mellitus, malignancy, Liver cirrhosis, renal insufficiency, organ transplantation and administration of immunosuppressive agents<sup>13</sup>. The age pattern of the study population was specifically consistent with the pattern of the general population of Uganda and particularly northern Uganda which has a young population<sup>14</sup>. More so previous findings show that Pyomyositis occurs in the young and healthy population<sup>13</sup>. The sex distribution of the study population was more or less the reflection of the demographic characteristics of the Uganda in which women constitutes over 51% of the total population of Uganda. But more importantly, most studies show the distribution of 1:1 between males and females<sup>13,14,15</sup>. The BMI of the patients: Majority (53%) of the patients were malnourished. Recent surveys by UNICEF (2007, 2008, & 2009) indicated that there was a high prevalence of malnutrition in northern Uganda. The most probable reason advanced was inadequate intake of food due to food insufficiency. World Food Program report showed that the populations in the IDP camps were receiving only 60% of the required calories per person per day. This population did not have options of other sources of food since they were in the camps. This could be the reason for the high levels of malnutrition in the region. The HIV status was positive in 40% of the patients and all HIV positive patients were malnourished. The reason for the malnutrition of the HIV patient can be explained in the same way for the general population where there was inadequate food provided by the world food program<sup>16</sup>. Otherwise, HIV/AIDS also makes the patient lose weight, vomit, diarrhea and other opportunistic infections<sup>17</sup>.

The majority (66%) of the patients were peasant farmers. This is a reflection of a normal demographic characteristic of population in northern Uganda<sup>14</sup>. Pupils constituted and students constituted a third of the study population. This again is consistent with the fact that Pyomyositis occurs in healthy young individuals<sup>5,13</sup>. Of all the patients who were malnourished 50% were peasant farmers and 50% pupils. Of all the patients who were HIV positive, 71% were peasant farmers and 29% were pupils and none was a student. HIV infection overloads surgical staff in sub-Saharan Africa as mentioned by many reports on surgical infections/ inflammations: appendicitis in HIV-positive patients<sup>23</sup>.

Forty seven (47%) of the patients were diagnosed after months with the symptoms and signs while fifty three were diagnosed after weeks. The length of symptoms clearly showed how our community responds to their medical problems. But it could also show that patients report early but only delayed to have a proper diagnosis. Most (86%) of the patients who spent months before getting diagnosis were HIV/AIDS positive patients. This is unusual because HIV patients frequent medical institution more often than the rest of the population because of the recurrent opportunistic infections. Early diagnosis is critical for saving the tissue and life of patient but is often missed because of unfamiliarity with the disease, atypical presentations, a wide range of differential diagnoses, and lack of early specific signs<sup>18</sup>. We noted a high rate of re-interventions, long periods of hospital-stay and high occurrence of surgical site infection in HIV-positive patients in comparison with those HIV negative<sup>24</sup>. A third (33%) of the patients patients gave a history of previous occurrence of pyomyositis. Out of this only 20% was HIV positive whereas 60% of the patients that had previous history of Pyomyositis were malnourished with a BMI of less than 17.5. In this case therefore the presence of malnutrition was more associated with recurrence<sup>5</sup>.

The muscles involved: The muscles involved in this study were mainly those of the upper and lower limbs. This is consistent with the previous studies conducted elsewhere on Pyomyositis<sup>5,19</sup>. The lower limb was involved in 60% of the Pyomyositis and the upper limb in 40%. The majority of the muscle involved was Gluteus maximus, followed by gastrocnemius, Pectoralis major, Deltoid and the rest within other muscles. Muscles frequently involved are quadriceps, glutei, pectoralis major, serratus anterior, biceps, iliopsoas, gastrocnemius, abdominal and spinal muscles<sup>5,19,20</sup>. This is consistent with previous studies conducted

elsewhere in which they reported that Pyomyositis occurred in larger trunk and lower limb muscles<sup>5,19</sup>. Of special interest to note is that most of the muscles involved were on the left limbs of the patients as opposed to previous studies.

### Conclusion and Recommendations

- Malnutrition and HIV/AIDS are the commonest risk factors to Pyomyositis in Gulu regional referral Hospital.
- Large trunk and lower limb muscles were the most commonly affected.
- Recurrence occurs more in malnourished patients than HIV/AIDS patients.
- A more extensive study needs to be conducted in the region to clearly define the risk factors and the association that exists between Pyomyositis, malnutrition and HIV/AIDS.

### Acknowledgement

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### References

1. Rodgers WB, Yodlowski ML, Mintzer CM. Pyomyositis in patients who have human immunodeficiency virus: case report and review of literature. *J Bone Joint Surg Am* 1993; 75:588–92.
2. Ansaloni L. Tropical Pyomyositis. *World J Surg* 1996; 20:613–7.
3. Lacor Report. The Annual Hospital Report (2008 & 2009); St. Mary's Hospital -Lacor.
4. Gulu Report. The Annual Hospital Report (2008 & 2009); Gulu Regional Referral Hospital.
5. Ezati I. The association between Pyomyositis and HIV infection at New Mulago. The proceedings of association of Surgeons of East Africa 1991.
6. Victor A, Branley J, Opal SM and Meyer KH. Pyomyositis in patients with acquired immunodeficiency syndrome *Arch Int Med* 149: 705-709.
7. Belsky, DS, Teates, CD, Hartman, ML. Case Report. Diabetes mellitus as a predisposing factor in the development of pyomyositis. *Am J Med Sci* 1994; 308: 251.
8. Christin, L, Sarosi, GA. Pyomyositis in North America: Case reports and review. *Clin Infect Dis* 1992; 15:668.
9. Lachiewicz PF and Halder NM. Spontaneous pyomyositis in patients with felty's syndrome: Diagnosis using Computerized Tomography; *south Med J*; 79 (8T:1047-1048).
10. UNAIDS. Uganda HIV mode of transmission and response analysis, 2009.
11. UAIS. Uganda HIV/AIDS sero-behavioural survey (UAIS), 2005.
12. LQAS. The NUMAT Lot Quality Assurance survey (LQAS 2008), 2008.
13. Crum NF. Bacterial pyomyositis in the United States. *Am J Med* 2004; 117:420–8
14. UDHS. Uganda National Demographic and Health surveys (UDHS) 1989, 1995; 2000/1, 2006
15. Chiedozi LC. Pyomyositis a review of 205 cases in 112 patients *Am J Surg* 137: 255-259.
16. UNICEF. The Nutritional status report of Northern Uganda. 2008.
17. WHO. Health Nutrition and HIV/AIDS cluster. 2008
18. Sherperd JJ. Tropical Myositis is it an entity and what is the cause? *Lancet* 26: 1240-1242.
19. Phillipp L, John J. Pyomyositis: *Surgery International* Vol. 56 (2002)
20. Ashken MH, Cotton RE. Tropical skeletal muscle abscesses (pyomyositis tropicans). *Br J Surg* 1963; 50: 846–52.
21. Ansaloni, L, Acaye, GL, Re, MC. High HIV sero-prevalence among patients with pyomyositis in northern Uganda. *Trop Med Int Health* 1996; 1:210.
22. Mulago Report. The Annual Hospital Report (2008 & 2009); Mulago National Referral Hospital.
23. Meagher B.R. Appendicitis in HIV-positive patients. *Aust NZ J Surg.* 1998; 68:337–9.



24. Odimba BFK. The Impact of HIV infection on the Surgical Disease Burden in Africa. East Central Afr J Surg 2010; 15(1): 3-8
25. Smith MC, Pike MC, Taylor E and Taylor JR (1978) the Epidemiology of Tropical Myositis in Mengo District of Uganda. Trans R Soc Trop Med Hyg 72: 46-52.