East African Medical Journal Vol. 90 No. 12 (Supplement) December 2013
PYOMYOSITIS IN HIV: A SERIES OF 12 CASES
A. E. O. Otedo, MBChB, MMed (Int. Med)., Cert. Gastroenterology, DDMS/ Consultant Physician/ Gastroenterologist, Kisumu District Hospital, P.O. Box, 4685-40103, Kisumu, G. O. Oyoo, MD., MMed, FACR, Consultant Physician/Senior Lecturer, Department of Clinical Medicine and Therapeutics, College of Health Sciences, University of Nairobi, P.O. Box, 19676-00202, Nairobi, J. O. Otieno, MBChB, MMed (Surgery), (FEACS), Consultant Surgeon/DDMS Kisumu District Hospital, P.O Box, 4685-40103, Kisumu, C. F. Otieno, MBChB, MMed (Int. Med), Associate Professor, Consultant Physician and E. O. Omonge, MBChB, MMed (Int.Med), Consultant Physician, Lecturer, Department of Clinical Medicine and Therapeutics, College of Health Sciences, University of Nairobi, P.O. Box, 19676-00202, Nairobi, Kenya

Request for reprints to: Dr. A. E. O. Otedo, Consultant Physician/ Gastroenterologist/ DDMS, Kisumu District Hospital, P.O. Box, 4685-40103, Kisumu, Kenya, email: otedoamos@yahoo.com

PYOMYOSITIS IN HIV: A SERIES OF 12 CASES

A. E. O. OTEDO, G.O. OYOO, J. O. OTIENO, C. F. OTIENO and E. O. OMONGE

ABSTRACT

***Background*: Pyomyositis is a bacterial infection of the large skeletal muscles presenting with muscle pain and swelling. It is commonly seen in the tropics but is being recognised more in end-stage HIV/AIDS. In HIV-associated pyomyositis, leukocytosis and bacteraemia is rare due to deranged immune response. Surgical drainage, antibiotic treatment and HAART are the mainstay of treatment.**

***Objective*: To describe pyomyositis in HIV positive patients, their CD4+ cell counts, clinical stages of pyomyositis and anatomical sites affected.**

***Design*: Cross sectional, prospective, descriptive, consecutive entry study.**

***Setting*: Kisumu District Hospital and Nairobi Rheumatology Clinic between January 2002 to December 2007.**

***Subjects*: Twelve patients with HIV infection and pyomyositis.**

***Main Outcome Measures*: CD4+ cell counts, clinical stage and site of pyomyositis.**

***Results*: Twelve patients (six males and six females) were enrolled with mean age of 39.3 years (24-52). Pyomyositis was localised in the following regions:two each in gluteal and calf, six in the thigh and one each in the right arm and abdominal wall. CD4+ cell counts were low with a mean of 166.8 cells/μl (1.0-433) (normal range is 355-1600 cells/μl), indicating severe immunosuppression. They also had leucocytopaenia with a mean white blood cell count of 3.67 × 103/μl (1.5-7.1 × 103/μl) with a mean neutrophil count of 62.7% (43-78). Random blood sugar and creatine kinase levels were all normal. The co-morbidities comprised one case of deep venous thrombosis (DVT) and five of oral candidiasis. Pus swab grew Staphylococcous aureus in eight instances and Streptococcous pyogenes in four.**

***Conclusion*: Pyomyositis in HIV positive patients tends to occur at low CD4+ cell counts. Staphylococcus aureus was the most common causative organism.**

INTRODUCTION

Pyomyositis is a purulent bacterial infection of the large skeletal muscle groups. It is characterised by muscle pain and swelling. It was originally described in the tropics, Uganda. The illness is more commonly seen in the tropics but is increasingly being recognised worldwide especially in association with HIV Infection (1-3).

Bacterial pyomyositis among HIV infected persons typically occurred in those with end stage acquired immunodeficiency syndrome (AIDS) (4).

Leukocytosis and bacteraemia tend to occur less frequently in those with HIV infection and pyomyositis. Antibiotic therapy with surgical drainage/aspiration is usually sufficient (5). It is divided into three clinical stages (3):

Stage (i) Invasive stage: -crumpy, local muscle pain and swelling, low grade fever ~ 37.8ºC, mild leukocytosis and may be an induration of the affected muscle due to bacterial seeding. The muscle has a "woody" texture on palpation, no fluctuation, and muscle aspiration will not yield purulent material. Only 2% of patients present at this stage.

Stage (ii) Suppurative stage: occurs 10-21 days after onset of symptoms; characterised by fever, oedema, exquisite muscle tenderness; Marked leucocytosis is usually present with lymphocyte muscle infiltration.

Eosinophilia is common in tropical pyomyositis. Aspiration of muscle yields pus. More than 90% of patients are seen at this stage

Stage (iii): Late stage: characterised by bacteraemia and toxaemia (septicaemia) and affected muscle is fluctuant. Complications of Staphylococcous aureus bacteraemia like septic shock, endocarditis, pneumonia, pericarditis, brain abscess, septic arthritis and acute renal failure (multi-organ dysfunction) may be present and is associated with high mortality.

The epidemiology of pyomyositis in HIV positive patients is poorly described hence the rationale of this case series.

Intervention: The patients were managed as out or in patients. Five had huge abscesses and incision and drainage was done in theatre. Pus swab for microscopy, culture and sensitivity was taken, antibiotics, analgesics and HAART was initiated, and the wound dressed daily thereafter in out patient department. One patient with deep venous thrombosis (DVT) was started on heparin and wafarin. HAART was self-purchased or offered at the Nairobi Rheumatology Clinic. Fluconazole was administered for oral candidiasis.

MATERIALS AND METHODS

This was a prospective, descriptive, consecutive entry of on-going study of adult patients with clinical symptoms and signs of pyomyositis. The study was approved by the ethics and standards committee Kisumu District Hospital. They were more than 18 years old, gave informed signed consent and underwent physical examination by one of the authors. Diagnostic testing and counselling (DTC) was done and sustained thereafter. From each patient, biodata were taken and under aseptic condition, 10mls of blood was drawn from the cubital vein. The blood was used for complete blood count, CD4+ cell count and random blood sugar and HIV-test by ELISA method and creatine kinase assay. Pus was taken for microscopy, culture, sensitivity and Ziehl-Nielsen staining for tuberculosis. One patient had a doppler ultrasound done to diagnose right lower limb deep vein thrombosis (DVT) at the Aga Khan Hospital, Kisumu. The HIV test was done by ELISA test (organon teknika or enzygnost, Germany) with a sensitivity and specificity of 99.87 and 99.99% respectively. Complete blood count was analysed using the coulter counter machine.

CD4+ cell count was done using the FACS (fluorescent activated cell sorter) flow cytometry method with a sensitivity of 1-2000 cells/μl.

RESULTS

This ongoing cross sectional, prospective, descriptive study had enlisted 19 cases. Seven patients (five declined HIV test and two were HIV negative) were excluded from the study but successfully managed for pyomyositis. The 12 cases included (six males and six females), were all HIV positive and had pyomyositis stage 2 (11) and stage 3(1). The patient in stage 3 had a CD4+ cell count of 1.0 cells/μl and acute renal failure.

Mean age was 39.3 years (range 24-52). Mean CD4+ cell count was 166.8 cells/μl (1.0-433). Eight patients had fever. The anatomical location of pyomyositis was thus: six in the thigh, two each in the calf and the gluteal region and one each in the abdominal wall and right upper arm, Table1. Microbiological results showed eight had staphylococcus aureus and four streptococcus pyogenes bacteria. One patient with CD4 + cell count of 1.0 cells/μl presented in septic shock with reduced urine output and had to be resuscitated. AAFB(acid alcohol fast bacilli) test by Ziehl-Nielsen (Z-N) staining for tuberculosis was negative in all cases.

Mean white blood cell count was $3.67 \times 10^3/\mu L$ ($1.5\text{-}7.1 \times 10^3$/ml) normal range is $4.8\text{-}10.8 \times 10^3$/L. The mean neutrophil count was 62.78% (43-78%) and normal range (40-75%), ESR mean was 99.7 mm/hr.

The co-morbidities were DVT (1 patient) and oral candidiasis (five patients). Random blood sugar was normal in all cases, 3.4-5.0 mmol/L. Creatine kinase levels were also normal in all.

Table 1

Biodata, site of pyomyositis, laboratory features and clinical signs of patients with HIV associated pyomyositis.

Case	Age (Yrs)	Sex	Site of pyomyositis	Co-Morbidity/Clinical findings	CD4 cells/mm^3
1	50	F	Right Thigh	DVT-Left lower limb, fever	375
2	24	M	Right Thigh	Oral candidiasis Fever Shock, acute renal failure	1
3	32	F	Left calf	Oral candidiasis Fever	45
4	27	F	Left Gluteal Region	Fever	126
5	27	M	Left Gluteal Region	Oral candidiasis	1
6	43	F	Abdominal wall	Fever	433
7	37	M	Right Thigh	Fever/Bronchopneumonia	101
8	48	F	Right Calf	Oral Candidiasis	180
9	47	M	Thigh(Hamstring)	-	44
10	52	M	Left thigh	Fever	162
11	41	M	Left Thigh	Oral candidiasis	166
12	43	F	Right Thigh	-	368

Table 2

Demographic and laboratory features of the 12 patients with pyomyositis and HIV.

Parameter	Mean/Range
Age (Years)	39.3 (24-52)
M:F	1:1
CD4+ cell counts (350-1600 cells/μl)	166.8 (1-433)
White cell count (4.8-10.8 X103/μl)	3.67 (1.5-7.1)
Neutrophils (45-70%)	62.78 (43-78)
Random blood sugar (2.5-7.1 mmol/L)	3.9 (3.4-5.0)
Bacteria grown	8-Staphylococous aureus 4-Streptococcous pyogenes
Z-N staining	Negative
Creatine Kinase (upto 290 IU/L)	90 (65-170)
ESR (mm/Hr)	99.7

DISCUSSION

Pyomyositis was first described by Scriba in 1885 (6). In 1800s, both Virchow and Osler reported cases of "diffuse purulent infiltration of the muscles" (4). Though common in the tropics, pyomyositis is being increasingly recognised in patients infected with HIV/AIDS with the first case described in 1987 (7).

The 12 cases represent pyomyositis associated with HIV infection. The majority, eight patients had fever and co-morbidities, one deep vein thrombosis (DVT) and five oral candidiasis and one septic shock. They had low mean CD4+ cell counts of 166.8 (range 1-433) cells/μl. This compares with a study done in US where the CD4+ cell count mean were 82 cells/mm^3 (4). The low CD4+ cell count manifests severe immunosuppression and explains the severity of one patient who had toxaemia and presented in acute renal failure in this series.

The white blood cell counts were low, but one patient had a neutrophilia of 78 % (range 43-78%),

normal range is 40-75%. Other studies have also reported a reduced occurrence of leucocytosis and bacteraemia in HIV associated pyomyositis (5,7). Thus HIV infection is frequently associated with low or normal leukocyte count related to the concurrent neutropaenia, opportunistic infections or a poor immune response to the infection (5,7-9). The low white blood cell counts could be due to the late stage of the HIV / AIDS as evidenced by the low mean CD4+ cell counts. The high mean ESR of 99.7 mm / hr (males 0-10 and females 0-20) is non-specific marker of inflammation and similarly reported in other studies in patients with pyomyositis (1,8). The levels of creatine kinase were also normal despite the patients presenting in stage (ii) pyomyositis. This could be due to localised nature of the disease as has been observed too in other studies (9). Staphylococcus aureus and streptococcus pyogenes were isolated in eight (66.7%) and four (33.3%) patients respectively. Most cases, >90% of bacterial pyomyositis (in HIV positive or negative patients) are due to staphylococcus aureus (4). Several other causative organisms found in other few cases include gram positive organisms (streptococcus), gram negative organisms, anaerobes, mycobacterium (M. Tuberculosis and M. Avium intracellularae complex) and fungi (Cryptococcus neoformans, aspergillus, Candida fusarium, Pneumocystis jiroveci pneumonia) (2,8,10-15).

In this series, the Ziehl-Nielsen (Z-N) staining for acid alcohol fast bacilli was negative for tuberculosis, which is a common opportunistic infection in HIV infected patients in the tropics. The increased incidence of pyomyositis in HIV-infected patients is due to various pertinent immune changes and risk factors, which include (16-20):

- Suppression of T-cell mediated immunity,
- B-lymphocyte and neutrophil dysfunction
- Defective polymorphonuclear cell chemotaxis and impairment of polymorphonuclear (PMN) bactericidal capacity,
- Increased colonisation of Staphylococcus aureus,
- HIV or drug related (Zidovudine) myopathies,
- Marked elevation in serum immunoglobulin G concentrations in advanced HIV disease, and
- Mycobacterial myositis. Z-N Staining was negative in all the cases.

All the patients had incision and drainage of abscess combined with antibiotic therapy. Stage 1 disease responds adequately well to broad-spectrum antibiotics alone with good staphylococcal aureus coverage. Stage ii disease as in this series requires both surgical drainage and broad-spectrum antibiotics (for 3-4 weeks). Empirical coverage of gram-negative organisms is the rule especially in HIV / immunocompromised patients and gentamicin / clindamycin must be included. HIV infection is not a reason to avoid surgical procedures (4,20). All patients were discharged home on oral antibiotics and follow up in the clinic.

REFERENCES

1. Horn C.V., Master S. Pyomyositis tropicans in Uganda. *East. Afr. Med. J.* 1968; **45**: 463 – 471
2. Widrow C.A., Kellie S.M; Saltzman B.R., Mathur – wagh U. Pyomyositis in patients with the human immunodeficiency virus: an un–usual form of disseminated bacterial infection. *Am. J. Med* 1991; **91**: 129 – 136.
3. Rodgers W.B., Yodlowski M.L, Mintzer C.M. Pyomyositis in patients who have the human immunodeficiency virus. Case report and review of the literature. *J. Bone joint. Surg. Am*. 1993; 75A: 588 –592.
4. Crum N.F. Bacterial pyomyositis in the United States. *Am. J Med*, 2004; **117**: 420 – 428.
5. Al –Tawfiq J.A., Jaffer A.A., Sarosi G.A., Cushing H.E. and Herbert E.C. Pyomyositis in the acquired immunodeficiency syndrome. *South. Med J*. 2000; **93**: 330 – 334.
6. Scriba J. Bietrag Zur aetiologic der myositis acuta. Dtsch. Ztschr. Chir.1885: **22**: 497 – 502.
7. Watts R.A., Hoffbrand B.I., Paton D.F., Davies J.C. Pyomyositis associated with human immunodeficiency virus infection. *Brit. Med. J* 1987; **294**; 1524 – 1525.
8. Chiedozi L.C. Pyomyositis. Review of 112 cases in 205 patients. *Am J Surg* 1979; **137**: 255 – 259.
9. Thomas R., French M.A. Pyomyositis complicating the acquired immunodeficiency syndrome. A report of two cases with coexistent Neutropenia. *Med. J. Aust.* 1991; **154**: 481- 483.
10. Gomez – Reino J.J, Aznar J.J., Pablos J.L. et al. Non-tropical pyomyositis in adults Semin. *Arthritis. Rheum*. 1994; **23**: 396 – 405.
11. Walling D.M., Kaelin W.G. Jr. Pyomyositis in patients with diabetes mellitus. *Rev. Infect. Dis*. 1991; **13**: 797-802.
12. Schlech W.F, Moulten P., and Kaiser A.B. Pyomyositis: Tropical disease in a temperate climate. *Am. J. Med*. 1981; **71**: 900- 902.
13. Tumeh S.S., Butler G.J., Maguire J.H., Nagel J.S. Pyogenic myositis: C-T Evaluation. *J. Comput. Assist. Tomogr.* 1988: **12**: 1002 – 1005.
14. Alidria – Ezati I. The association between pyomyositis and HIV infection at New Mulago Hospital. *Proc. Assoc. Surg. East. Afri*. 1991; **14**: 91-94.
15. Pearl G.S., Sieger B. Granulomatous pneumocystis carini myositis presenting as an intramuscular mass. *Clin. Infect. Dis*. 1996; **22**: 577- 578.
16. Vandembos F, Roger P.M., Mondail- Milton V. et al. Aspergillus fumigutus muscle abscess revealing invasive aspergillus in a patient expectant of AIDS. *Presse Med*.1998: **30**: 316 – 317.

17. O' Neill K.M, Ormsby A.H., Prayson R.A. Cryptococcal myositis: a case report and review of the literature. *Pathology*. 1998: **30**: 316 – 317.
18. Wrozolek M.A., Sher J.H., Kozlowski P.B., Rao C. Skeletal muscle pathology in AIDS: An autopsy study. Muscle. nerve .1990; **13**: 508-515.
19. Murphy P.M, Lane HC, Fauci A.S, Gallin J.L. Impairment of Neutrophil bactericidal capacity in patients with AIDS. *J. Infect. Dis*. 1988; **158**: 627-630.
20. Patel S.R, Oleginski T.P., Perruquet J.L., Harrington T.M. Pyomyositis: Clinical features and predisposing conditions. *J. Rheumetol*. 1997; **24**: 1734- 1738.