DOI: 10.14260/jemds/2014/3047

ORIGINAL ARTICLE

A RETROSPECTIVE ANALYSIS OF EFFICACY OF NON-SURGICAL TREATMENT FOR DIABETIC CHRONIC OSTEOMYELITIS

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HOW TO CITE THIS ARTICLE:
H. D. Veeranna, Mohammed Arif, Abdul Azeem. "A Retrospective Analysis of Efficacy of Non-Surgical Treatment for Diabetic Chronic Osteomyelitis". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 30, July 28; Page: 8313-8316, DOI: 10.14260/jemds/2014/3047

ABSTRACT: AIM & OBJECTIVE: The primary aim was to evaluate the efficacy and response rate of non-surgical treatment in diabetic Chronic Osteomyelitis. **RESEARCH DESIGN & METHODS:** All patients with Diabetic Chronic Osteomyelitis seen in outpatient & inpatient Orthopedic and Surgical department of tertiary care medical college hospital from January 2012 to January 2013 were evaluated. Response rate to non-surgical treatment was measured in terms of absence of infection at site of initial injury or contiguous site for a follow up period of 6 months. Patients were evaluated in terms of demographic, clinical and therapeutic variables, which included probe testing, swab culture and sensitivity and empiric antibiotic sensitivity testing. **RESULTS:** 100 consecutive patients aged between 30years to 70 years (mean age 60.2±4 yrs (mean ± SD)) with co-existing diabetes since last 15-20 years were included in study. **CONCLUSION:** Pus culture based and bone culture based antibiotic therapy was proved as primary variable leading to remission with avoidance to surgical debridement and curettage or amputation. Secondly Staphylococcus aureus followed by Pseudomonas aeruginosa along with MRSA and ESBL were major source of infection.

KEYWORDS: Diabetes, Osteomyelitis, Antibiotics, culture sensitivity.

INTRODUCTION: Chronic Osteomyelitis is relapsing and persisting inflammation of the affected bone with or without involvement of marrow, cortex, periosteum and surrounding soft tissue infection usually associated with polymicrobial bacteria as the root cause.[1] It commonly involves the long bones especially the tibia and femur.[2] Microorganisms gain access to the metaphysis through blood stream and multiplication at this level causes congestion, edema, exudates, leukocytosis, necrosis and abscess.[3] The commonest risk factors documented in literature are trauma (primarily open fractures with crush or contaminated soft tissue injury), vascular insufficiency, diabetes, obesity, mismanaged cases of acute osteomyelitis, etc.[2,4]

Diagnosis of this condition mainly depends on strong clinical suspicion in non-healing ulcer especially in diabetic patient, radiological findings of translucency of bone with patchy sclerosis and adjacent periosteal bone reaction. MRI and blood culture along with deeper bone biopsy or culture and pus culture are mainstay in management protocol of these patients.[2]

Although the definitive treatment described in literature is surgical decompression and removal of sequestra, we have made an attempt to analyze the effectiveness of a non-surgical, conservative, scientific approach in this study.

MATERIALS AND METHODS: One hundred clinically diagnosed cases of Diabetic Chronic Osteomyelitis attending the Orthopaedic and General Surgery wards and outpatient departments of McGann Teaching District Hospital, attached to Shimoga Institute of Medical Sciences, Shimoga for a two year period from January 2011 to January 2013 were included in present study.

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A detailed proforma documenting the age, sex, address, clinical information focusing on probable etiology and duration of symptoms and past history of treatment was carried out.

Specimen for culture was preferably taken from deeper wounds or after squeezing the sinus tracts and the most active sinus in cases of multiple sinuses and swabs sent for both Gram staining and direct microscopy and second swab for aerobic bacteria isolation.

RESULTS AND OBSERVATIONS: 100 patients seen over a period of 2 years, in Orthopaedic and General Surgery wards with clinical diagnosis of Chronic Osteomyelitis were studied. The following results were obtained:

a) 30 – 70 yrs was the common age group affected.
b) Majority of our patients were males 68% (68 males) and 32% (32 females) with male: female ratio of 2.1:1.
c) Trauma was the primary predisposing factor seen in 46% patients.
d) The commonest bones affected were the Metatarsals, Calcaneum and Tibia in decreasing grades of severity
e) Out of total swabs collected, 84% were culture positive and 16% culture negative.
f) Gram negative organisms 61% were identified compared to Gram positive in 39% patients.
g) Staphylococcus aureus was the commonest isolate in 38% cases, followed by Pseudomonas aeruginosa in 18% cases. S. epidermidis and K. pneumonia each 13% cases. Escherichia coli and Enterobacter Species in 9% cases and P. mirabilis in 2% cases.
h) Majority of Gram positive isolates were sensitive to Linezolid (96%), Vancomycin (89%) and Amikacin (92%).

DISCUSSION: Review of literature has not been able to exactly reveal the optimal duration and type of antibiotics therapy in Diabetic Chronic Osteomyelitis.[5] Infection in these cases may not be easily eradicated because of the site and extent of spread, the host factors that limit treatment option or presence of a highly resistant pathogen.[6] Beta lactams are used often along with lincosamide and gyrase inhibitors.[7] Empiric Gram negative coverage is also warranted in adults, especially with quinolones group.[8]

Non-surgical adjunctive modalities are still in infant stage. These include hyperbaric oxygen therapy, growth factor such as the bone morphogenic proteins and advancement in biofilm research. Other hypothetical adjuncts proposed are platelet rich plasma (PRP), Pulsed Electromagnetic field (PEMFs) and ultrasound.[9]

Empiric antibiotic should include an anti-Staphylococcal antibiotic like oxacillin or nafcillin and vancomycin if MRSA is suspected.[8] Combination treatment with linezolid plus rifampicin or vancomycin is found effective in an animal model of MRSA foreign body osteomyelitis.[10] Complex phytochemical extracts such as Tea Tree oil and Eucalyptus derived formulations have been shown to be bactericidal against MRSA in-vitro.[11]

Recent advances in treatment of these chronic cases, have thrown light on role of autovaccination with the isolated inactivated strain, local antibiotic perfusion systems, intra-arterial antibiotic therapy implants of antibiotic beads, etc. Local antibiotic delivery involves the use of mechanical pumps, non-biodegradable implants such as methyl methacrylate etc. The main advantages of above methods are high antibiotic delivery to the site with avoidance of systemic side

effects and also help obliterate the dead space that occurs after bone debridement.[12] It is possible that in future the use of bone morphogenic proteins (BMPs) will facilitate bone reconstruction. More recently Embil et al did not find any difference in patients treated with bone versus non bone debridement, nor in those treated with oral versus oral plus intravenous therapy.

In 1987, Bambergeret al reported in a review of 51 cases of Diabetic foot osteomyelitis that most of the patients responded to antimicrobial therapy without need for ablative surgery.[13] They found 27(53%) of their cases showing clinical resolution on a mean follow up of 19 months.

Hughes et al[14] found clinical success rates for therapy with parenteral third generation cephalosporins ranging from 79% to 87% at 1 year of follow up. In 1987, Nix et al[15] reported the first series of patients treated entirely with oral antibiotic therapy alone claiming 19(79%) of 24 diabetic patients responding favorably. Peterson et al reported that among 29 patients with osteomyelitis who received ciprofloxacin 19(66%) has successful long term outcome without need of amputation.[16]

CONCLUSIONS:

1. Decision to select a proper antibiotic should always rely on both aerobic and anaerobic culture, preferably taken from depth of sinus/wound or bone culture.
2. Susceptibility of all isolated species should be considered in cases of polymicrobial flora isolations.
3. All foot ulcer in a diabetic patient need lifelong observation and preventive foot care by specialized team.

Adequate foot care by patient's themselves, optimal diabetic control, avoidance of smoking and podiatric help, can go a long way in cutting down mortality and long term morbidity rates.

REFERENCES:

1. Canale S T, James H B, Campbell's operative orthopaedics, 11th ed. St Louis Missouri Mosby 2008; 1; 695 – 709.
2. Abid A S, Ethan A H, Yonis AR, Epidemiological and Bacteriological Study of Chronic Osteomyelitis, Tikrit Medical Journal 2008, 14 (1); 59 – 62.
3. Reza M, Shahab F, Jalal K, Farshid A. Epidemic Assessment of Bacterial Agents in Osteomyelitis and their antibiotic resistance pattern determination. Journal of Biological Sciences 2008; 8(2); 478 – 481.
4. A. K. Ako-Nai, I. C, Jkem, A. Aziba et al. Bacteriological Examination of Chronic Osteomyelitis cases in ILE-IFE. South Western Nigeria, African Journal of Clinical and Experimental Microbiology 2003; 4(2); 45 – 51.
5. Conterno Lo, da Silva, Filho CR. Antibiotic for Treating Chronic Osteomyelitis in Adults (Review) John Wiley & Sons Ltd 2009; 1 – 9.
6. Henry. S. Fraimow, Systemic Antimicrobial Therapy in Osteomyelitis, Semin Plastic Surgery 2009; 23(2); 90 – 99.
7. Gerhard W, Mathias K, Clemens K, Reinhard H. Treatment algorithms for Chronic Osteomyelitis, Dtsh Arztebl Int. 2012, 109(14); 257 – 264.
8. Joseph M.F, Jay R, McDonald. Osteomyelitis: Approach to Diagnosis and Treatment. Phys, Sportsmed 2008; 36(1); 1 – 9.

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9. Mark SR, Kerryl EP, Melissa J, David J J, James MS, Robin P, Daptomycin treatment of Staph aureus Experimental Chronic Osteomyelitis. Journal of antimicrobial chemotherapy; 2006; 57; 301 – 305.
10. Paschalis V, Mark SR, Gorane E, Melissa JK et al. Treatment with Linezolid or Vancomycin in combination with Rifampicin is effective in an Animal model of Methicillin Resistant Staph. Aureus Foreign body Osteomyelitis. Antimicrobial agents and Chemotherapy 2011; 55(3); 1182 – 86
11. Eugene S. Harry B. Patrick HW, Percutaneous Treatment of Chronic MRSA Osteomyelitis with a novel plant derived antiseptic. BMC surgery 2001; 1:1.
12. Tevin G, Gregory TB. The Treatment of Chronic Osteomyelitis with a biodegradable antibiotic impregnated implant. Journal of Orthopaedic Surgery 2002; 10(1); 53 – 60.
13. Bamberger DM, DuasGP, Gerding DN. Osteomyelitis in the Feet of Diabetic Patients. Am J Med 1987; 83; 653 – 9.
14. Hughes CE, Johnson CC, Bamberger DM, et al. Treatment and Long Term follow up of Foot infection in patients with Diabetes or Ischemia, a randomized, prospective, double blind Comparison of cefoxitin and ceftizoxime. Clin Ther 1987; 10 (Suppl A) : 36-49.
15. Nix DE, Cumbo TJ, Kuritzslay P, Devito JM. Oral Ciprofloxacin in Treatment of Serious Soft tissue and Bone infection, Efficacy, Safety and Pharmacokinetics. Am J Med. 1987; 82(supplement); 176 – 215.
16. Peterson LR, Lissack LM, Canter K, Faschiyez Clabot SC, Gerding DN. Therapy of Lower Extremity infection with Ciprofloxacin in Patients with Diabetic Peripheral Vascular Disease or both. Am J Med 1989; 86; 801 – 7.

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Date of Submission: 16/07/2014.
Date of Peer Review: 17/07/2014.
Date of Acceptance: 19/07/2014.
Date of Publishing: 22/07/2014.