ORIGINAL ARTICLE

Osteomyelitis of the Foot among Patients Presenting with Diabetic Foot Ulcers: A Retrospective Analysis

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ABSTRACT

Objective: To assess the prevalence of osteomyelitis of the foot, diagnostic accuracy of investigations and outcome of conservative treatment in patients presenting with non-healing diabetic foot ulcers at the outpatient department of Liaquat University Hospital.

Methods: Retrospective data of two hundred diabetic patients (chosen via consecutive sampling) presenting with non-healing diabetic foot ulcers at the outpatient department of the Liaquat University Hospital from July 2015 to June 2016 was evaluated. All patients (as per standard routine protocol) have went under physical examination, plain x-ray and complete blood count after taking written informed consent. The results were analyzed using SPSS v. 19.0.

Results: Among the 200 patients, presenting with non-healing diabetic foot ulcers, evaluated and managed in the outpatient department, 120 (60%) patients were evaluated positive for osteomyelitis on the basis of positive clinical presentation i.e., laboratory data and radiographic imaging. 30 (15%) of the diagnosed patients later met with grim fate of amputation while the rest (i.e., 50, 25%) yielded positive outcomes. Among the measure employed to assess the patients, all worked in tandem. However the accuracy rates varied.

Conclusions: We conclude that conservative therapy more often than not, yielded positive results. It is recommend that patients at risk should be evaluated for osteomyelitis in the outpatient setting so that the disease may be diagnosed at early stage and thus helping to bring down the amputation rates.

Keywords: Diabetic foot ulcers, Osteomyelitis

INTRODUCTION

The incidence of diabetes around the globe is so high that it is only a matter of time that it reaches and eventually surpasses epidemic levels. With such heightened levels of incidence and prevalence, a substantial hike in the comorbidities most often found occurring in tandem with diabetes is only natural to assume. In individuals suffering from diabetes, vascular insufficiency and sensory neuropathy are to blame for foot ulcers development owing to the chief pathological role they play in the development of ulcers and their progression towards infection and osteomyelitis, along with other mal-outcomes [1-3]. Current evidence based statistics reveals that osteomyelitis is far more common than previously believed and more often than not sets patients on the grim track that eventually results in the greatest number of non-traumatic lower extremity amputation [4].

Researchers have also figured that almost a quarter of all individuals diagnosed with diabetes have a hundred person risk of developing a diabetic foot ulcer during any stage in their life [5,6]. Furthermore half of those who develop are destined to be troubled with consequent infections including osteomyelitis. This amount is almost one-fifth of the entire admission at hospitals in the United States owing to diabetes and thus led to a substantial economic burden on the healthcare system amounting to approximately eleven billion during the year 2001 [7-13].

On another instance, research suggest that underlying osteomyelitis is found in almost sixty-five percent of all individuals visiting healthcare facilities with the complaint of non-healing diabetic foot ulcers and it is noteworthy that not only are these infected

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ulcers a worrisome co-morbidity, but they lead to more non-traumatic lower extremity amputations than any other pathology [14]. To top it off, it is now proven that the consequences of non-traumatic lower extremity amputation are grim and, after amputation less than half of the individuals make live longer than five years, which is worse than the 5 year survival rates of most neoplastic conditions [15]

Not long ago, the traditional approach towards such cases was treatment of osteomyelitis via removal of infected bone but some reports now suggest that a more conservative approach with appropriate local measures along with an extended course of antimicrobial therapy can cure bone infection without need of a surgical procedure [9]. However, to expect such results, it is vital that the diagnosis to be made early at the outpatient department using clinical presentation, laboratory data, radiographic imaging.

This research provides support to all the above mentioned stances as, firstly, it assesses the prevalence of osteomyelitis of the foot in patients presenting with non-healing diabetic foot ulcers at the outpatient department of Liaquat University Hospital, a tertiary care hospital catering to the needs of a broad patient base stemming from diverse sociodemographic backgrounds. Secondly, because it tests whether conservative treatment is as promising as recent reports suggest and finally since it ascertains whether clinical examination alone suffices or radiological & pathological reports are needed for more accurate diagnosis.

METHODS

This retrospective analysis was based upon the hospital records. Two hundred diabetic patients (chosen via consecutive sampling) presenting with non-healing diabetic foot ulcers at the outpatient department of the Liaquat University Hospital from July 2015 to June 2016 was evaluated. All patients (as per standard routine protocol) were undergone in physical examination, plain x-ray and complete blood count after taking written informed consent. Data was also derived using survey based structured questionnaire administered in the patients local language. The results were analyzed using SPSS v. 19.0.

In addition to the site, size and character, the patients' ulcers were evaluated by health professionals for the presence of any vasculopathy, neuropathy, and extent of underlying infection. The plain x-rays were also carefully examined and attention paid to signs of periosteal thickening or elevation, as well as cortical thickening, sclerosis, and irregularity. It was assured that loss of trabecular architecture, osteolysis, and new bone formation were noted thoroughly. Emphasis was paid on the leukocyte levels, erythrocyte sedimentation rates and C-reactive protein levels among other pathological and hematological studies.

RESULTS

Among the 200 patients, presenting with non-healing diabetic foot ulcers, evaluated and managed in the outpatient department, 120 (60%) patients were

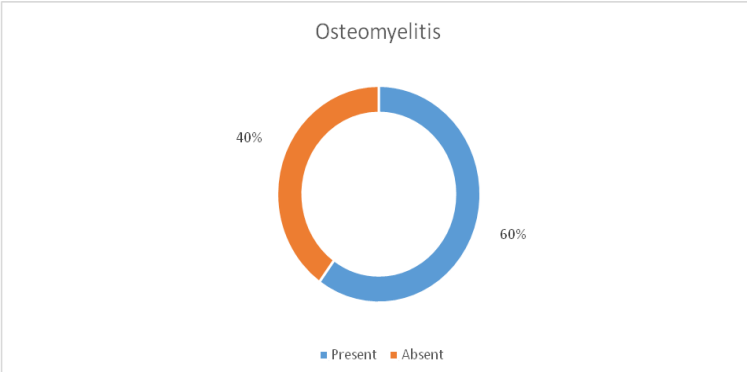

Figure 1: The prevalence of osteomyelitis are substantially higher in our sample when compared to the latest evidence based research in the world.

evaluated positive for osteomyelitis on the basis of positive clinical presentation, laboratory data, radiographic imaging.
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All 120 patients evaluated positive for osteomyelitis were given conservative treatment initially. 30 patients (15%) later met with grim fate of amputation after conservative treatment failed to pre-empt it while the rest yielded positive outcomes and did not require amputation.

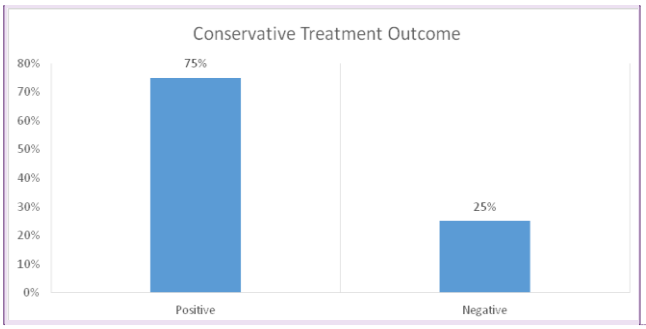

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Figure 2: It is hypothesized that the outcome yielded by conservative treatment could me made better if patients are identified earlier. However, detailed insight into the stages of ulcer and the extent of osteomyelitis is needed to validate the claim.

Among the measure employed to assess the patients, all worked in tandem. However the accuracy rates varied slightly. The graph below shows the individual accuracy rates.

DISCUSSION

Almost five to eighteen percent of Pakistanis are currently victim to diabetes and among them sixty four percent aren't even aware of the disease they suffer from. A ninety seven percent of them are not well versed with rules of good diabetes control and as the disease prevalence increases in the coming years, the situation is likely to get even worse statistically [16'17]. Adverse outcomes stemming from diabetic foot boast of being the number one cause of hospital admissions worldwide and nearly a quarter of all hospital admissions due to diabetes in the developed world are due to these adverse outcomes stemming from diabetic foot [18]. In simple terms, nearly 24,000,000 people suffering diabetes are likely to develop lesions of the foot per annum and 1/3 of all these shall develop osteomyelitis of the foot at any point in time [19].

Likewise, if the diagnosis is not made early, outcomes can be grim and this is shown by a prospective study of a consecutive four hundred and sixty eight patients admitted to the hospital due to diabetic foot ulcers in which the rate of amputation was sixty two percent within three years and almost all amputations were precipitated by a foot ulcer induced osteomyelitis of the foot [20]. Another casual-comparative analysis suggested that osteomyelitis if caught early and treated conservatively has a mortality rate of 17%. But if identified late, a mortality rate of 31% was noted. Boyko and colleagues have reported similar findings in a population of veterans in the United States [21]. In addition to the morbidity and mortality associated with these diabetic foot problems, Apelqvist and colleagues also determined the financial cost. The average total direct cost is substantially lower if the problem is identified early and treatment started (either conservative or surgical) [22].

Given the severe consequences of foot infections, especially if the infection is ignored or left un-identified at the early phase, it is apparent that early identification and prevention is a key to the care of such patients. Numerous other also provide proof that a methodological, multi-disciplinary method of foot care can substantially lower the rate at which mal-outcomes are encountered, especially if greater care and keener evaluation is employed since the beginning for those at highest risk [23,24].

Our results are in harmony with the above quoted international literature and show that conservative therapy yields encouraging outcomes. Further research involving a greater sample size could give more validity to the already produced results. It also highlights the importance of the full range of basic investigations needed to evaluate the diabetic foot ulcers because although quite accurate, clinical examination alone does not yield the best diagnostic accuracy.

CONCLUSION

The results show that patients presenting with non-healing diabetic foot ulcers are more often than not evaluated positive for osteomyelitis and a quarter of whom meet a grim fate. To our delight, conservative therapy, more often than not, yielded positive results. We recommend that it should be made sure that patients at risk are evaluated for osteomyelitis in the outpatient setting so that the disease is diagnosed early thus helping to bring down the amputation rates. Pathological tests too should be hailed as more accurate than mere physical examination.

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