



## A PROSPECTIVE STUDY OF HAND ULCERS IN DIABETIC PATIENTS- AN UNDER-RECOGNISED SPECTRUM OF DISEASE IN INDIAN POPULATION

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**ABSTRACT** Diabetes is the most common, non-communicable disease which is a major accused of morbidity and mortality of humane at present. Of many complications of Diabetes, Diabetic hand ulcer is comparatively under addressed complication paralyzing the patient's daily activities. Though diabetic foot ulcers have been recognized as one of the major burdens on the society, diabetic hand ulcers are still under-recognized by the society and also by the health sector. Our country being, an Agricultural country, our patients are more prone for agriculture based injuries to hand. Considering the hidden burden of hand ulcers in Diabetes mellitus on health system, this study is undertaken to emphasize on early identification, sequential debridement and efficient wound care along with proper control of underlying Diabetes.

**KEYWORDS :** Diabetic Hand Ulcer

### INTRODUCTION :

Diabetes is the most common, non-communicable disease which is a major accused of morbidity and mortality of humane at present. Of many complications of Diabetes, Diabetic hand ulcer is comparatively under addressed complication paralyzing the patient's daily activities. Though diabetic foot ulcers have been recognized as one of the major burdens on the society, diabetic hand ulcers are still under-recognized by the society and also by the health sector. Our country being, an Agricultural country, our patients are more prone for agriculture based injuries to hand. Search for Diabetic Hand ulcers usually show no perfect definition in the literature. Papanas and Maltezos<sup>1</sup> defined diabetic hand as a syndrome of musculoskeletal manifestations of the hand in diabetic patients. Limited joint mobility, Dupuytren's contraction and trigger fingers are the most commonly recognized and studied pathologies of the diabetic hand. Hand ulcer with superadded infection can lead to more morbidities such as gangrene, which require amputation or even mortality.<sup>3,4</sup> Sangeetha Tiwari et al<sup>2</sup> in their study termed tropical diabetic hand syndrome (TDHS), a terminology used to describe a specific complication affecting patients with diabetes mellitus in the tropics and they documented that Diabetic hand is more common in tropics. The syndrome encompasses a localized cellulitis with variable swelling and ulceration of the hands to progressive, fulminant hand sepsis, potentially fatal. Considering the hidden burden of hand ulcers in Diabetes mellitus on health system, this study is undertaken to study the clinical spectrum of this disease in our Indian population.

### PATIENTS AND METHODS :

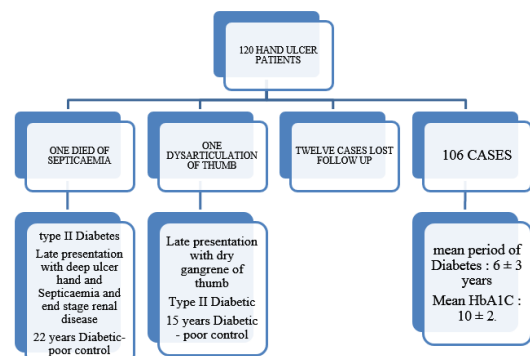
- Design of the study :- Prospective study
- Material / Selection of Subjects:- The study population consists of 120 consecutive patients admitted in the surgical ward and medical wards who presented with Hand ulcers with Diabetes mellitus.
- Inclusion criteria : Patients admitted in the surgical ward who presented with Hand ulcers with Diabetes mellitus.
- Exclusion Criteria : Patients who are , Not willing for the study. excluded
- Study Procedure :. Sequential debridement of ulcers, Incision and drainage of abscesses, fasciotomy for cellulitis with impending gangrene, end stage renal disease. Glycaemic management, Antibiotics according to culture and sensitivity, Correction of anaemia and hypo-proteinaemia, Plastic surgeons

expert follow up of ulcers were systematically done in all the patients.

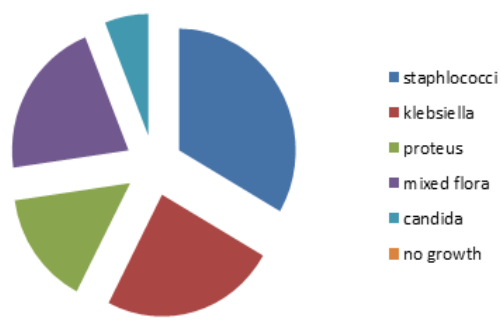
- Microbiological analysis was also done Prognosis assessment was done and documented.
- The endpoint of study was complete primary closure of ulcer or secondary closure of ulcer using Split skin graft after nil growth in microbiological cultures.

### RESULTS :

The prevalence of diabetic hand ulcer was found to be spectatively lower than that of diabetic foot ulcers .Of `120 hand ulcer patients studied, 6 presented with dry gangrene of thumb, 12 had deep ulcers with Osteomyelitis, 36 presented with abscess, 18 had cellulitis of hand, 30 had deep ulcers, and 18 had superficial ulcers. Deep ulcers included ulcers exposing joints and tendons. 12 had Type 1 diabetes and 108 had Type 2 diabetes. Of 120 patients, 96 were from rural areas. 72 were men and 48 were females. Sensory deficit was present in 24 patients (20 %). Peripheral neuropathy was seen in 85 % patients. Colour Doppler ultrasound revealed associated atherosclerotic plaques of lower limb arteries in 80 % patients. History of Agricultural occupational injury like thorn prick was seen in 18 patients, 6 patients had history of scalds and other patients had no demonstrable history of Injury. Anyway, possibility of trivial injuries couldn't be ruled out. 55 % patients had right hand involvement, commonest site being fingers. Of 120 patients, we lost follow up of 12 patients. And 1 patient died during treatment.



## MICROBIOLOGICAL ANALYSIS



Staphylococci was found to be the most common pathogen associated with hand infections followed by klebsiella.

The mean healing time was  $25 \pm 5-7$  days. The mean hospital stay was 22 days. The mean period of Diabetes was 10-12 years. **Etiology**

The ulcers in the diabetics are due to the critical triad of peripheral neuropathy (sensory), deformity, and trauma. (which is most commonly seen in these patients - McNeely et al.) All three of these risk factors are present in 65% of diabetic foot ulcer patients. Calluses, edema, and peripheral vascular disease have also been identified as etiological factors in the development of diabetic foot ulcers.

Although the pathogenesis of peripheral neuropathy (sensory) is still poorly understood, there seem to be multiple mechanisms involved, including the formation of advanced glycosylated end products and diacylglycerol, oxidative stress, and activation of protein kinase C $\beta$ . Added to this hyperglycemia plays a major role in the onset and progression of neuropathy. It is important for clinicians to know the basics of evaluation and treatment of foot ulcers seen in diabetic patients.

### Evaluation

Diabetic ulcer evaluation should include assessment of neurological status, vascular status, and evaluation of the wound itself. Neurological status can be checked by using the Semmes-Weinstein monofilaments to determine whether the patient has "**protective sensation**," which means determining whether the patient is sensate to the 10-g monofilament

Another useful instrument is the 128 C tuning fork, which can be used to determine whether a patient's **vibratory sensation** is intact by checking at the wrist and first metacarpophalangeal joints. The notion is that metabolic neuropathies have a gradient in intensity and are most severe distally. Thus, a patient who cannot sense vibration at the thumb but can detect vibration at the wrist when the tuning fork is immediately transferred demonstrates a gradient in sensation suggestive of a metabolic neuropathy. In general, you should not be able to sense vibration of the tuning fork in your fingers for more than 10 seconds after the time when the patient can no longer sense vibration at the thumb.

**Vascular assessment** is important in the management ulcer management and is essential in the evaluation of diabetic ulcers. Vascular assessment includes checking pulses and capillary filling time. If pulses are non palpable then arterial Doppler and recording pulse volume waveforms should be done. **Ulcer evaluation** should include documentation of the wound's location, size, shape, depth, base, and border. A *sterile stainless steel probe* is useful in assessing the presence of sinus tracts and determining whether a wound probes to a tendon, joint, or bone. *X-rays* should be ordered on all deep or infected wounds, but *magnetic resonance imaging* often is more useful because it is more sensitive in detecting osteomyelitis and deep abscesses. **Signs** of infection, such as the presence of cellulites, odor, or purulent discharge should be documented, and aerobic and anaerobic cultures should be obtained of any purulent exudates. *Culturing* a dry or clean wound base has proven to be useless because most wounds are colonized, and this practice leads to overprescribing of antibiotics.

### What are the challenges in Indian diabetic patients especially in south Indian diabetics

- The agriculture workers manually plant the paddy, remove the weeds, and uses hand and small sickles for work Hence, the chance of getting injury, inter trigo, fungal infection, allergic or chemical induced ulcers ( minor injury to major injuries) are common – **using mechanical devices for agriculture is the one remedy.**
- during religious festivals - They are more prone for burns and injuries because they carry hot pots with fire as a ritual , - **IEC activities** (information, education & communication) , are the few remedies to prevent the above complications developing .
- Construction workers do not wear gloves (rubberized) and are more prone for work spot injuries (due to contact with Cement and other building materials) the **Contractor must provide safety measures to prevent these occupational hazards** at the work spot for all and especially to Diabetics .
- Inside the house, while cooking and when cutting the vegetables, injuries, scald, burns are common
- While wash cloths and utensils Manually, they are using different types of detergents which causes allergy, dermatitis, with superadded infection and ignorance leading to complications
- Tree Climbers ,Building Workers, porters , Agricultural workers etc., do not wear safety gloves- it is challenging task in this part of world to manage these people, who are mostly uneducated or ill-educated and are unaware of the probable complication that they may develop in future, if proper protective are not used at appropriate situations or places.
- Both educated and uneducated people prefer self-management, Native treatment, treatment by Quacks, cheap Alternate management etc., before attending a qualified physician or hospital for his / her medical needs. By this time, complications might have developed, thus, increasing the morbidity & mortality of the condition. This practice must be discouraged and proper awareness must be created to improve this condition.

### Treatment Myths :

- Over the injured part - they apply mud, cow dung, urine, green leaves, turmeric, sugar, coffee powder or any thing available in the vicinity, to stop bleeding - all should be discouraged,
- For paronychia they apply lemon ,boiled cook hot rice, lime, or green leaves which will
- Old age diabetic patient's inability to attend hospitals regularly due to, frequent fall, due to orthostatic hypotension, due to diabetic autonomic neuropathy
- Self Neglect due to poverty and depression and alcoholic dependence
- carelessness due to un education ,un employment,
- Lack of insurance in many families and they not bothered about medical insurance,
- Lack of awareness/ignorance of govt free insurance by chief minister of Tamilnadu comprehensive health insurance which covers more than 1100 procedures
- Poor socioeconomic status, results in infrequent blood sugar checkups and never done HbA1c
- Increased prevalence of road traffic accidents ,associated with or without alcohol
- Increased prevalence of neuropathy due to poor diabetic management.

### Patient-instructions for the care of the diabetic ulcers

- Do not smoke.
- Inspect the hand and feet daily for blisters, cuts and scratches. The use of a mirror can aid in seeing the bottom of the feet. Always check between the toes. And fingers
- Wash hands feet daily, dry carefully, especially between the toes.
- Avoid extremes of temperatures. Test water with hand, elbow or thermometer before bathing.
- Do not use chemical agents for removal of corns and calluses, corn plasters or strong antiseptics

### Discussion

Though diabetic hand ulcers are comparatively less prevalent than Diabetic foot ulcers, Diabetic hand ulcers need to be highly recognized because of morbidity it causes in socioeconomic status of the patients and also for the morbidity it causes in quality of life of the affected patients. Also, from our study, it is clearly seen that most of the affected patients are from Agricultural background from rural areas. So, possibility of thorn prick injuries and other occupational trivial injuries

and house hold injuries in females have to be noted on. Occupational injuries along with long period of uncontrolled Diabetes in a poor uneducated rural background, with delayed seek of clinical help are found to be the major risk factors of this spectrum of disease. Also, the main accused was found to be Staphylococci. Our study shows the preponderance of peripheral neuropathy in Diabetic hand, consistent with study by Abbas and Archibald<sup>5</sup>. Though other pathologies of hand such as limited joint mobility, Dupuytren's contraction and trigger fingers are highly recognized, Diabetic hand is under recognized both by health sector and patient sector and so our study has been done to shed insight into the increasing incidence of a spectrum of disease in rural agricultural areas who are more prone for unrecognized trivial injuries.

Long period of Diabetes, poor metabolic control, associated Peripheral Neuropathy, Delayed presentation to treatment, insecure trivial injuries and of all, unawareness lead to the clinical burden of this spectrum of disease to society and individual patient. Proper health education, avoidance of trivial traumas in long term diabetics, early treatment of hand abscesses and ulcers, perfect glycaemic management and clinical insight into the disease by the primary health care physicians are highly recommended to fight the clinical spectrum of Diabetic Hand.

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