Indian Journal of Basic and Applied Medical Research; December 2021: Vol.-11, Issue- 1, P. 46 - 52
DOI: 10.36848/IJBAMR/2020/30215.55590

Original research article

Diabetic foot disease in covid 19 patients-a prospective study

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ABSTRACT:

INTRODUCTION: These are unprecedented times, where a global pandemic disrupts all aspects of local clinical practice. Yet, providing care for people with diabetic foot disease remains crucial: as clinicians caring for these patients, during peak of covid 19 many branches of medicine have adapted to telemedicine, this is difficult and challenging for the diabetic foot which often requires “hands on” treatment.

METHODOLOGY: All the diabetic foot disease cases treated in various tertiary care medical colleges during covid period 1March2020 to 31 August 2021 admitted with RTPCR covid positive are taken for study.

RESULTS : Total number of covid positive patients admitted and treated are 29,170 of them 9421 are DIABETIC , 143 had diabetic foot disease 7 patients undergone Below Knee AMPUTATION 19-PATIENTS NEED AMPUTAION OF DIGITS, 117 NEED DEEP DEBRIDEMENT , no mortality due to covid19, diabetic foot patients, but delayed wound healing, infections, AND INTENSIVE CARE ADMISSIONS ARE MORE COMPARED TO OTHER PATIENTS.

CONCLUSION: There is no doubt that the covid-19 experience when handling diabetic foot problems will likely transform our approach to the management of diabetic foot disease especially in the areas of digital health and smart technology.double care, vaccination, mask, social distancing frequent soapand water hand wash all are necessary with adquate diabetic control. patient education plays a major role, daily mirror examination of feet and any ulcer, blister even painless should be attended immediately in order to prevent the vicious cycle of sepsis-uncontrolled DIABETES.

1. Introduction

Older patients with other comorbidities, including diabetes, were at greater risk of poor outcomes and death studies focused on the relationship between diabetes and COVID-19 and reported that the risk of Intensive Care Unit admission and fatality was much higher in patients with pre-existing diabetes and COVID-19 . Recognizing the frequency of diabetes in patients with COVID-19, the International Diabetes Federation has been at the forefront of increasing the importance of good diabetes care to those people living with diabetes across the world

. At the height of the pandemic, this resulted in lesser attention being payed to non-communicable diseases such as heart disease, cancer, and diabetes, which remain the major cause of mortality across the world Thus, for many reasons, the COVID-19 pandemic has raised major challenges to the entire diabetes community

Foot ulceration is the most common and costly late complication of diabetes, with high morbidity and mortality. Data suggest that up to one in three of all people with diabetes will develop a diabetic foot ulcer (DFU) sometime during their lifetime. Non-healing DFUs are a leading cause of hospitalisation, amputation, disability, and death among the diabetic population

Pathways to DFUs are well defined, and those at greater risk of developing such lesions are mainly bare foot walkers in agriculture fields of India, pilgrimage persons walk 20-200kilometers without any shoe or chapels ,smokers ,male, old age, foot deformity, peripheral vascular disease, neuropathy and nephropathy all are more prone for diabetic foot disease a part from poor glycaemic control Two of the most important risk factors for DFU development are neuropathy and peripheral vascular disease. Due to loss of sensation in diabetic neuropathy, patients have poor appreciation of their DFU risk resulting in the lack of preventative foot self-care

Risk factors for mortality in those with diabetes who are admitted with COVID-19 include being elderly, being male with poor glycaemic control, hypertension, and cardiovascular disease

The global pandemic has presented many challenges in the management of people with diabetes particularly with late complications such as risk factors for foot ulceration. New modes of patient consultation have widely been used during the pandemic including the use of telephone consultations and telemedicine sometimes with video consultation. Thus, the outpatient management of people with diabetes and its complications has faced a huge challenge during the last two years and in many countries, the classical “face-to-face” clinics have been cancelled and replaced by telephone consultations as noted above

As reported by Caruso et al. its widespread lockdown significantly affected patients with chronic diseases including diabetes and particularly those with DFUs. This group from Naples reported that patients with diabetes admitted to a Tertiary Care Centre for DFU management had a 3-fold increased risk of amputation compared with figures from 2019. A further report from Rome described the development of a new triage pathway to manage patients with DFUs such that those with severely complicated lesions were urgently seen at the hospital outpatient service and admitted if necessary, whereas those with less complicated DFUs were managed by telemedicine after a brief outpatient evaluation. This study group included 151 patients seen since February 2020 and of these, only three required a major amputation. The authors concluded that this triage pathway provided adequate management of DFUs during the pandemic and there were no cases of hospital-acquired COVID-19 infections In Eastern Europe, Urbancic-Rovan reported on the experience of diabetic foot ulcers during the pandemic in the small country of Slovenia Severe logistical problems were encountered in caring for patients with DFUs such as lack of public transport and, again, fear of infection with COVID-19, keeping patients away from the outpatient services. It was possible partially to compensate for this non-attendance by using telephone and email consultations.

Turkey—a group of authors from Istanbul reported on their development of an algorithm to manage diabetic foot problems during the COVID-19 One important recommendation that they made was to request a CT thorax for a pre-operative screening in any DFU patients requiring surgery for the detection of possible undiagnosed COVID-19.

United Kingdom and United States—an early report on the effect of the pandemic on diabetic foot care from Manchester, United Kingdom and Los Angeles, USA compared and contrasted the approach and outcomes during the first lockdown period of March/April 2020. It was during this first six-week lockdown that virtually all routine tests for outpatient services were suspended, emphasising the importance of good clinical medicine with careful history taking and, especially, examination of the feet. The inability to perform X-rays made clinical signs such as the "sausage toe and the positive "probe-to-bone test" very important as clinical markers for the presence of underlying osteomyelitis. The inability to do routine X-rays during this period of time led to the clinical decision alone being made to diagnose and treat osteomyelitis

Global—the International Diabetic Foot Care Group and Diabetic-Foot International have published a fast-track pathway for diabetic foot ulceration during the COVID-19 pandemic This pathway has been advocated as an easy tool for clinicians working in primary care and treating DFUs. It suggests that patients should be fast-tracked into three potential levels of severity and need for care: (a) uncomplicated diabetic foot ulcers; (b) complicated, defined as potentially ischaemic or infected with osteomyelitis; and (c) severely complicated DFUs, defined as gangrene, abscess, etc. This fast-track pathway and other proposals in this article provide a useful algorithm that can be adapted appropriately and used across the world. Naturally they propose early screening and investigation to ensure that patients do not in addition have COVID-19 infection.

COVID-19 results in a hypercoagulable state and thrombotic events can occur during the acute illness or convalescence. The most common haemostatic abnormalities in COVID-19 include mild thrombocytopaenia, increased D-dimer levels, prolongation of the prothrombin time (PT), international normalised ratio (INR), thrombin time (TT) and shortened activated partial thromboplastin time

Hormonal and metabolic disturbances due to the involvement of the thyroid, pancreas and adrenal glands by the coronavirus have been reported. Direct viral damage to pancreatic islets due to coronavirus can lead to transient diabetes mellitus. Thyroid follicular damage, subacute thyroiditis leading to primary hypothyroidism, transient pituitary lesions and damage to hypothalamo-pituitary-adrenal axis leading to hypocortisolism and secondary hypothyroidism have been reported in patients recovering from SARS-CoV-2.

The farmers worships their agricultural land and never enters the land with shoes or chapels. Hence , the chance of getting injury, inter trigo athelet foot , fungal infection, allergic or chemical induced ulcers (minor injury to major injuries) are common –

- They are barefoot walkers , especially to temples, they walk for many miles (nearly 20 to 30 miles) per day and upto 40 – 48 days in a year during religious festivals - They are more prone for foot injuries , thorn or nail prick injuries - IEC activities (information , education & communication) , arranging medical camp along the way , stress on use of MCR / MCP chappals, advice use silicone in-soles in shoes are the few remedies to prevent the above complications developing .
- Constuction workers do not wear safety shoes (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 , they do not wear footwear, because, they are having God and Deity pictures for worshiping in their house Even, if they prefer wearing foot-wear, they prefer using hard based footwear – this practice must be condemned and appropriate type of footwear to be adviced .
- Manual workers, Tree Climbers ,Building Workers , porters , Agricultural Labores etc., do not wear footwear - 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 gears 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.
- In many villages ,over the injured part - they apply mud, cow dung, cow urine, green leaves, turmeric, sugar, coffee powder or anything available in the vicinity, to stop bleeding - all should be discouraged,
- Old age diabetic patient's inability to attend hospitals due to ,frequent fall, due to orthostatic hypotension, due to diabetic autonomic neuropathy
- Self Neglect due to poverty and depression
- carelessness due to un education ,un employment,
- Poor socioeconomic status ,results in infrequent blood sugar checkups and never done Hba1c
- Increased prevalence of two-wheeler injuries, associated with or without alcohol
- Increased prevalence of neuropathy due to poor diabetic management.
- No logistics during covid lockdowns, no beds for non corona patients in
- hospitals, no elective surgeries.

Methodology:

All the diabetic foot disease cases treated in various tertiary care medical colleges during covid period 1March2020 to 31 August 2021 admitted with RTPCR covid positive are taken for study.

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Observations and results:

Table 1) TOTAL NUMBER OF COVID 19 WITH DIABETIC FOOT DISEASE N=143

AGE DISTIBUTION

SL NO	AGE	MALE	FEMALE	TOTAL
1	<30YRS	07	0	07
2	30-40YRS	19	06	25
3	40-50YRS	47	18	65
4	>50YRS	35	11	46
5	-Total	108	35	143

Table 2) DURATION OF DIABTES

Sl no	Duration of DM	MALE	FEMALE	ASSOCIATED SHT	RENAL/NEURO PVD/OTHERS
1	5-10YRS	03	01	01	-
2	10-15YRS	32	13	12	1
3	15-20YRS	30	18	16	4
4	>20 YEARS	34	12	13	3
TOTAL		99	54	32	3

Table 3) PROCEDURE DONE

SL NO	NUMBER	PROCEDURE	OUTCOME
1	7	B.K AMPUTATION	I DEATH
2	19	RAY AMPUTATION	GOOD
3	117	WOUNDDEBRIDEMENT	GOOD

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Table 4) AVERAGE IN PATIENT HOSPITAL STAY

SL.NO	PROCEDURE	AVERAGE PRE OPERATIVE	AVERAGE POSTOPERATIVE	TOTAL
1	BK AMPUTATION	3	7	10
2	RAY AMPUTATION	4	4	8
3	DEBRIDEMENT	3	12	15

Discussion:

TOTAL NUMBER OF CASES ; (N=143) many of them (N=64) diabetic for more than 15 years well controlled with drugs, except who are having own glucometer (n=18) all have no access to lab services , because of covid lockdown, fear, no transportation ,and other personal reasons, many of them(n=118) never tested blood sugar for 6-8 months, and consulted the physician over phone (n=16) however 89% of them continued same dose of anti diabetic drugs.15 of them are on insulin and OHA drugs once diagnosed as covid 19, then get admitted in covid tertiary care hospitals , in majority of them the stress itself made their average blood sugar around 300mg/dl on admission, adding fuel to fire the use of steroids, made blood sugar more than 400mg/dl and difficult to titrate as super added wound infection,/ uti, lower respiratory tract infection , sepsis over and above covid19 ,

As covid-19 is a pro thrombotic disease in patients with diabetic peripheral vascular disease, its complications are more. use of anti coagulants complicates the issues ,increases the stasis, easy bruising, purpura, hematoma, and bleeding during debridement and difficult for haemostasis but with the use of fractional heparin analogs and using of right procedures bleeding is well controlled.

Associated Renal failure causes frequent hypoglycemic episodes difficult to manage and titrate the dose of insulin in these patients, use of dye also difficult in patients with C.R.F. with peripheral vascular contrast study ,Doppler was helpful, but the social distancing, PPE for patients and doctors ,fumigating the rooms, all are needed

PROCEDURES ;of the 143 patients in 7 patients need below knee amputation, three already undergone treatment for osteomyelitis,not completely cured , 2 had injury with non healing ulcer with vascular insufficiency ,one patient 78 years male smoker, obese, had peripheral vascular disease, peripheral neuropathy, CAHD undergone CABG, non healing ulcer, super added infection, died on 4th post operative day due to covid ,respiratory failure

19patients need amputation of digits, gangrene, required ray amputation of single or multiple toes . 117 needed deep wound debridement many of them required two are more sittings complications : other than DKA, we expected various other complications due to inflammatory cytokine strom,anticoagulants, steroids, un controlled dm, in spite of insulin titration, renal failure , associated hypertension, copd, peripheral vascular disease complicating surgery, but because of diet, medications, and supportive team not much complications in this study group.

Conclusions:

The message, not to neglect the diabetic foot and its potential complications during the pandemic. The art of clinical observation has never been more important in the management of diabetic foot disease. As the famous Irish physician, Dominic Corrigan, whose observations of aortic incompetence are now known as "Corrigan's sign" wrote, "the trouble with most doctors is not that they do not know enough but they do not see enough." A careful examination of the feet in people with diabetes is absolutely essential, and it always has been and always will be. COVID-19 experience will likely transform our approach to the management of diabetic foot disease. There will undoubtedly be a new wave of innovations in the areas of digital health, smart technology including pressure or temperature sensing insoles, tele health technologies, and more. Most important in the management of diabetic foot disease is to provide the appropriate treatment to patients if possible while they are safely at home, but if not possible, to do so, where indicated, in outpatient facilities and hospital services for the most severely affected.

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