

Complications Associated with Diabetes: A Case Study

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ABSTRACT: Background: The current study has focused on the complications arising in a patient due to diabetes mellitus and how the patient's quality of life has been affected. The most feared complication of the disease is loss of lower limb due to infection and major cardiovascular complications.

Objectives: Management of a patient with diabetes and cardiovascular complication with history of tuberculosis is studied along with antimicrobial interventions for curing the ulcer and reducing risk of amputation. Cardiovascular complication, one of the co-morbidity of diabetes, was also managed.

Methods: After selection of the patient, consent from patient and approval from relevant authority were obtained, patient was kept under observation for a week.

Case Presentation: Patient was admitted with complaints of: shortness of breath, palpitation, exertional dyspnea and a spreading right shin discharging foot ulcer.

Conclusion: Patient was treated with antibiotics and ionotropic agent and indicated better rate of prognosis.

Keywords: Atrial fibrillation, congestive heart failure, diabetes mellitus, infection.

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INTRODUCTION

Diabetes mellitus (DM) is a lifelong metabolic disorder which affects the biochemical pathways and cycles that help the body to utilize energy. Diabetic neuropathy is a crucial complication that not only affects the quality of life but also increases the morbidity rate. Serious secondary complications like diabetic foot ulcer and heart failure can develop as a result of unrecognized symptoms of autonomic neuropathy. The most awful complication of diabetes mellitus is diabetic foot which results in loss of lower limb and a challenge to surgeons due to an association with sudden cardio-respiratory deaths during and after the surgery in DM patients, [1-3].

Another complication of acute metabolism associated with mortality includes diabetic ketoacidosis due to remarkable hyperglycemia and coma as the result of marked hypoglycemia.

In DM, the subsequent complications come together with "microvascular disease" and "macrovascular disease". Microvascular complications consist of retinopathy, nephropathy and neuropathy. The major macrovascular complications include aggravated cardiovascular disorder resulting in myocardial infarction and strokes. Patients with hypertension and diabetes mellitus have amplified possibility of evolving atrial fibrillation (AF). AF increases the risk of cardiovascular disorders, [4-6]. Knowing all these complications, self-care management could play a vital role in the prevention and prevalence of diabetic foot ulcer but these programs are needed to be more vigilant and versatile to have comprehensive approach on associated comorbidities [7, 8].

Diabetic ulcer foot usually leads to the amputation of the major part of limbs. Some new therapies could be an ideal approach for such patients; stem cell gives us a way to save patients limbs from major amputations. There are obvious advantages and disadvantages with every kind of treatment, but the best actual solution to the problem would be to control the microvascular and macrovascular complication that

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are associated with type 2 DM and there is the need to standardize the medical therapy for the patients with such complications [9, 10].

South Asian migrants and their offspring who migrated to affluent western nations have higher prevalence rates of DM than the native population: Bangladesh–4.7-8.5% (2004–2005; Rural), India–4.6-12.5% (2007; Rural); Maldives–3.0-3.7% (2004), Nepal–19.5-9.5% (2007), Pakistan–3.0-7.2% (2002), Sri Lanka–11.5-10.3% [11].

CASE PRESENTATION

A debilitated male patient 50 years previously diagnosed with type II DM along with the history of tuberculosis was admitted with the complaints of shortness of breath, palpitation and exertional dyspnea. Patient also had painful discharging ulcer on right shin which was spreading day by day. There is also a family history of cardiovascular complications. Physical examinations revealed clubbing of nail and edema of lower extremity. Initially patient was unaware of the fact that there was any prevailing cardiovascular complication. However, physician indicated that patient was showing signs of actual symptom. Tuberculosis was ruled out after carrying out the diagnostic tests.

On examination, the overall general condition was poor with Pulse rate of 98/minute, body temperature 100°F and B.P 110/70 mm of Hg. Patient's ECG revealed atrial fibrillation while X-ray examination showed an increase in cardiothoracic ratio (CTR).

Initially patient's leg ulcer was examined and physician prescribed ceftriaxone (3rd generation cephalosporin) after wound debridement and dressing. Blood Sugar level was measured to be 143 mg/dl. After monitoring the patient for one day with various tests being performed, confirmed findings for congestive heart failure (CHF) with atrial fibrillation. For management of atrial fibrillation /CHF, the patient was given digoxin with warfarin. Patient was monitored at regular intervals as digoxin showed to increase the rate of mortality rate when given for complaints like CHF [12, 13].

DISCUSSION

DM causes greater degree of damage to nerves and vasculature. Patients with DM have nerve damage hence unable to feel any kind of trauma [14] and diabetic cardiomyopathy [15].

In present study the patient had spreading infectious ulcer on the shin of right leg. On day one of admission the major concern for physician was to deal with the patient's cardiovascular complication. As the patient was diabetic, physician continued the metformin to regulate blood sugar level as it has been reported to be the safest drug to control sugar level in CVS disorder, [16]. For the infection, physician prescribed

ceftriaxone along with diclofenac sodium and cleared the infected wound from pus and applied duoderm dressing: a standard diabetic foot ulcers (DFU) dressing [17, 18]. Modern approach for treating the DFU includes the use of topical anhydrous silicon base containing pracaxi oil; this medication can be compounded and can be tailored according to the need of the patient [19].

On the second day the physician prescribed digoxin for CHF and atrial fibrillation and warfarin to prevent incidence of Thromboembolism as per recommendation [20].

On the third day of admission patient complained of three loose stools (might be beginning of toxicity of digoxin) without blood which would be the possible side effect of the antibiotic used. Patient was prescribed metronidazole I/V to control diarrhea but patient only needed supportive treatment as metronidazole is not for drug induced diarrhea. In drug induced diarrhea most appropriate supportive therapy is the use of probiotics [21].

On fourth day of admission the patients International Normalized Ratio (INR) raised to 6 therefore Warfarin was stopped. Patient was administered Vitamin B complex and salt free albumin for hypoalbuminemia to cover the toxicity of digoxin. As digoxin is highly protein bound drug and albumin was given to prevent toxicity [22].

Patient remained under observation for 6 days and vitals were normal but pulse rate was 92/min showing tachycardia. On the sixth day, patient complained of dizziness and abdominal pain. Therefore patient was prescribed potassium chloride I/V to cover up digoxin toxicity. On the seventh day patient was feeling much better and laboratory findings indicated better prognosis. Patient was discharged with regular medication: captopril and carvedilol for cardiac problems and instructed to change wound dressing after 1 week.

Table 1. Laboratory Findings of the Patient.

Blood Count		
	Normal Range	Result
WBC	4-11.6x10 ³ cells/ μ l	14.2x10 ³ cells/ μ l*
Hb	11.5-16.4 g/dl	13.7 g/dl
MCV	76-96 fl	85 fl
Platelet	150-400x10 ³ /l	183x10 ³ cells/l
Renal Profile		
Na ⁺	136-146 mmol/l	141 mmol/l
K ⁺	3.5-5 mmol/l	4.4 mmol/l
Urea	2.8-7.2 mmol/l	4.1 mmol/l

LFT (Recommended 3rd day Test)		
T.Protein	66-83g/l	35 g/l*
Albumin	35-52 g/l	21 g/l*
T.Bilirubin	5-21 µmol/l	25 µmol/l*
ALP	40-150 U/l	117 U/l
ALT	0-55 U/l	41 U/l
CRP(C reactive Protein)	0.10 mg/l	46 ml/L*
PT	10-13.5 Sec	35sec*
APTT	26-42 sec	25 sec
INR	<1.5	1.1
Sugar Test		
Blood Sugar	<100 mg/dl	143 mg/dl*
MISC Test		
LDH	140 U/L	589 U/l*
Folic Acid	2.7 to 17.0 ng/mL	1.84 ng/ml*
X-ray		CTR increased*
ECG		Atrial Fibrillation rapid Ventricular response*

*Values are not in physiological range.

Table 2. Medication profile of patient during hospitalization.

1 st Day Medication			
Drug	Strength	Duration	Frequency
Ceftriaxone	2mg(I/V)	1st-7th day	OD
Diclofenac	75mg/3ml(I/V)	1st day only	BD
Metformin	500mg	1st day-onwards	OD
Duoderum Dressing			
2 nd Day Medication			
Digoxin	25mg	2nd-7th day	OD
Warfarin	5mg	2nd-3rd day	OD
3 rd Day Medication			
Metronidazole	500mg(I/V)	3rd day	OD
4 th Day Medication			
Salt Free Albumin	50g(I/V)	4th day	Once
Vitamin B Complex		4th-7th day	OD

6 th Day Medication			
Potassium Salt	4mEq(I/V)	6th day	Once
Discharged Medication			
Captopril	25 mg	2weeks	OD
Carvedilol	12.5mg	2 weeks	OD
Metformin	500mg		OD

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CONFLICT OF INTEREST

Declared none.

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