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General Medicine

A CLINICAL STUDY OF PREVALENCE OF INFECTIONS IN DIABETES MELLITUS PATIENTS

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KEYWORDS :

BACKGROUND

Diabetes mellitus (DM) is a clinical syndrome associated with insufficiency of insulin secretion and action. It is considered as one of the largest arising pitfalls to human health in this century. It is estimated that there will be roughly 380 million persons with DM in 2025. Besides the classical complications of the disease, DM has been related to reduced response of T cells, neutrophil function, and diseases of humoral immunity. Consequently, DM increases thevulnerability to infections, both the most common ones as well as those that nearly always affect only people with DM. Such infections, in addition to the complications associated with its infectivity, may also spark DM related complications such as hypoglycaemia and keto acidosis.

Infection is quietly the most common cause of morbidity and mortality in cases with diabetes in India with a reported prevalence ranging from 33-46%.

Unbridled diabetes affects most factors of immunity:

[1] innate immunity including imperfect neutrophil and macrophage function.
[2] Abnormal complement function, which may be related in part to defects in neutrophil function and cytokine responses.
[3] Flaws in T-cell responses.
[4] Imperfect humoral (antibody-mediated) immunity

Besides generalized impairments of immunity, other non-immunologic, anatomically distinct factors may contribute to anincreased infection threat.

Macrovascular and microvascular complications may result incompromised vascular state leading to delayed response to infectionsand imperfect wound healing.Incognizance of lower extremity trauma due to sensory neuropathyresults in insufficient attention to minor injuries and subsequentincreased threat of infections.Partial bladder evacuation which isdue to autonomic neuropathy can result in urinary colonization bymicroorganisms.High glucose concentration in the urine al so promotes the growth of microorganisms.

Major Infections Associated with Diabetes Mellitus:-

Respiratory infections: -

[1] CAP, Influenza H1N1, Tuberculosis, COVID-19, HAP, VAP,Pharyngitis, Sinusitis, Lung abscess
[2] Urinary tract infections
[3] Asymptomatic bacteriuria, Fungal cystitis, Emphysematous cystitis,Bacterial pyelonephritis, Emphysematous cystitis, Perinephricabscess, vulvovaginal candidiasis, urethritis Gastrointestinal and liver infections: -
[4] H. pylori infection Oral and oesophageal candidiasis, Emphysematous cholecystitis, Hepatitis C, Hepatitis B, Enteroviruses, Gastroenteritis Skin and soft tissue infections: -
[5] Skin infections, Foot infection, Necrotizing fasciitis, Fournier'sgangrene, cellulitis, furuncles, carbuncles,
[6] Tinea infections, Decubitus(pressure) ulcers, Peri anal abscess Head and neck infections (Including Brain):
[7] Invasive external otitis, Rhino orbital cerebral Mucor mycosis, Meningitis

Other infections: Human immunodeficiency virus

MATERIAL & METHODS

Place of study:Index Medical College Hospital And Research Center Indore

Case Selection: Patients admitted in Index Medical College And Hospital, from January 2020 to June 2022 suffering from infections and diabetes. All patients were included after satisfying inclusion and exclusion criteria for the study. METHODOLOGY A clinical study on patients suffering from diabetes and infections attending the inpatient at Index Medical College And Research Center

Indore to study the prevalence of infection in each group in relation toglycemic control. A detailed andthourough clinical history and physical examination is taken andrelevant investigations are done

Inclusion Criteria

1) Patients in age group of 18 to 80 from both male and female sex.
2) History of dibetes mellites confirmed with fbsppbs hba1c.
3) History of infections following detection of diabetic status.
4) Patients not immunocompromised due to other reason.

Exclusion Criteria

1) Patients less than 18 years of age and greater than 80 years of age.
2) Patients who are immunocomprmised like HIV, SLE etc.
3) Patients on steroid therapy for any reasons for more than 2 weeks.
4) Patients with structural abnormalities in urinary tract or any otheranatomical abnormalities predisposing them for infection.

Investigations To See Glycemic Control

1) HbA1c

Relevant Investigations Depending Upon Type Of Infection

1) BLOOD: Complete Blood Count, ESR, Culture And Sensitivity.
2) SKIN: Skin Scrapping In Case Of Suspected Fungal Infections , Culture And Sensitivity In Case Of Bacterial Infections AndCellulitis With Pus.
3) URINE: Urine Routine Microscopy And Culture And Sensitivity.
4) RESPIRATORY SYSTEM: Chest Xray P/A View ,X Ray P/N/S,HRCT Chest, Throat and Nasal Swab RT-PCR for Covid-19 AndSputum For AFB And Culture Sensitivity.
5) OTHER: Relevant Investigations Depending Upon The InfectionInvolved. Like in selected cases Stool R/M and C/S in

case ofgastroenteritis.

Prevalence Of Various Infections In Study Infections
TOTAL NUMBER OF CASES:-100% (250)
RESPIRATORY TRACT INFECTIONS:- 45.2% (113)
SKIN AND SOFT TISSUE INFECTIONS:-24% (60)
GENITO-URINARY INFECTIONS:-16.8% (42)
BLOOD INFECTIONS:-8% (20)
GASTROINTESTINAL INFECTIONS:-4.4% (11)
HEAD AND NECK INFECTIONS:-1.6% (4)

Skin And Soft Tissue Infections:-
TOTAL NO. OF CASES:-60 (100%)
SKIN SCRAPPING:- 6 (10%)
PRESSURE SORE:- 12 (20%)
DIABETIC FOOT:- 19 (31.7%)
CELLULITIS:- 12 (20%)
CARBUNCLE:- 5 (8.3%)
MALIGNANT OTITIS EXTERNA:- 4 (6.7%)
PERI ANAL ABSCESS:- 2 (3.3%)

Respiratory Tract Infections
TOTAL NUMBER OF CASES:- 113 (100%)
PHARYNGITIS:— 2 (1.7%)
SINUSITIS:-2 (1.7%)
TB:-11 (9.8%)
PNEUMONIA:-21 (18.6%)
COVID 19:- 74 (65.5%)
LUNG ABSCESS 3 (2.7%)

Genito-urinary Infections:-
TOTAL NUMBER OF CASES:- 42 (100%)
UTI:- 33 (78.6%)
VULVOVAGINITIS:- 9(21.4%)

DISCUSSION

In this observational study of diabetic patients with infection, studied during a period of 18 months from Jan 2020 to July 2022 in INDEX MEDICAL COLLEGE AND RESEARCH CENTER Indore, 250 patients hospitalized with Diabetes and Infections were analysed for prevalence of infections with severity of disease. The study done showed that a high number of Diabetic Patients were in their 5th and 6th decade of life and accounted for 34.4% of the total study. This group was followed by patients in their 6thto 7th and 4th to5th decade of life with prevalence of 23.6% and 22.4% respectively and a small group accounting for 12.4% of patients in their 7th to 8th decade of life. There were 146 males and 104 females in the study forming a MALE: FEMALE ratio of 1.4:1. This trend of more prevalence at older age could be attributed to the long duration of diabetes and derangement of immune system associate with that leading to increased susceptibility for acquiring infections. Theprevalence of infection was highest in the group with HbA1c values >12 accounting to 32%, followed by groups with 8.1-10 and10.1-12 accounting for 24.5% and 25% each. This trend shows a directcorrelation of higher prevalence of infections with high HbA1c values.

The prevalence of respiratory infections was highest in our studyaccounting to 45.2% followed by skin and soft tissue infections whichformed 24% of infections and genitourinary infections forming 17%.Other infections were blood infections which made up 8%,gastrointestinal infections which accounted for 4.4% and head andneck infections which accounted for 1.6% of all the infections.This distribution was due to the fact that since during Jan 2020 andJuly 2021 i.e. the time period of this thesis the world and India wasaffected by a new pandemic COVID-19 caused by SARS CoV-2.COVID-19 formed the major portion of patients with diabetes infectedwith respiratory infections because of which in this study respiratoryinfections accounted for the greatest number of cases with 45.2%prevalence.

High prevalence of Skin and soft tissue infections could be due to thepoor knowledge and lesser awareness of the study population in whicha majority were illiterate towards proper foot care. Other chronicmicrovascular complication such as Diabetic neuropathy predisposingthem to foot infections can also be the reason for increased prevalenceof soft tissue infections such as Diabetic foot and Ulcers.Most of the patients suffering from lower respiratory infections had amedianduration of 4 years of diabetes. This shows that for somereasons not well known, patients had respiratory tract infections earlyin course of diabetes. The patients with tuberculosis in diabetes hadeither a very short duration of diabetes or had a very long duration ofdiabetes.Skin and soft tissue infections were the second most common cause ofinfections after respiratory tract infections. It included fungal skininfections, diabetic foot, cellulitis, otitis externa, pressure ulcers andperianal abscess. They contributed 24%(60) to infections in this studywith 19 cases of diabetic foot and 12 cases each of cellulitis andpressure ulcers. Males showed 58% (35) prevalence as compared to42% (25) in females. All the patients in the group had very poor footcare predisposing them for foot infections progressing to ulceration andcellulitis. Many patients had cracks in the sole of foot acting as portalof entry for organisms leading to infections. Patients of pressure ulcersand perianal abscess were either bed ridden or were obese. MalignantOtitis externa was also encountered as a frequent infection in diabetes.They were mostly seen in patients with long standing diabetes and in population in their 4th to 5th decade.Contrary to belief that urinary tract infections are the most common indiabetics, in our study it was the third most common infection afterrespiratory tract infections and Skin soft tissue infections.Patients with urinary tract infections had a mean duration of 5years with diabetes.There were 9 cases of vulvovaginitis, candida species was theetiological factor responsible for all of them.There were 20 cases of septicaemia contributing a prevalence of 8%.Males showed 35% prevalence as compared to 65% females.

CONCLUSION

(1) Diabetics patients have a high prevalence of infections.
(2) Infections in diabetes are more in the 5th and 6th decade of life.
(3) There was no significant difference regarding prevalence in either sex.
(4) There was a clear correlation between prevalence of various infections and glycaemic levels.
(5) Respiratory infections, soft tissue infections and genitourinary infections are more prevalent in that order.
(6) Gastrointestinal infections and Head and neck infections are also common in diabetes.
(7) Bacterial infections were common with significant fungal infections and viral infections.
(8) Infections due to uncommon organisms was also observed in this study which led to variable antibiotic sensitivity.
(9) There was high degree of antibiotic resistance. Resistance to antibiotics varied depending on the site of infection for the same etiological agent.

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