



“A STUDY OF ETIOLOGICAL PREVALENCE OF INFECTIONS IN DIABETES MELLITUS PATIENTS IN A TERTIARY CARE HOSPITAL”

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ABSTRACT **BACKGROUND:** Infection is still the most common cause of morbidity and mortality in patients with Diabetes in our country.

Many common infections are polymicrobial in Diabetic patients, So heightened sense of awareness about these infections will lead to early diagnosis and subsequent treatment of these potential life threatening infections, for better prognosis and also to avoid high degree of Drug resistance in them.

AIM: To study the etiological agent and its responsible for the prevalence of infections in Diabetes mellitus patients.

MATERIALS AND METHODS: A Hospital based observational prospective study was conducted in the department of general medicine in santhiram medical college and general hospital for 6 months, 50 Diabetic patients attending patient in the department of general medicine and relevant investigations done and assessed the etiological agent responsible for prevalence of infections in diabetes mellitus patients.

RESULTS: Out of 50 Patients studied, the majority of the group belonged to the 3rd and 4th decade which shows that Diabetes with infections are more prevalent in the middle aged people in this study.

Soft tissue infections, being the commonest of the infections contributed, 37% of the total patients in the study, followed by respiratory infections 30%, genitourinary infections 20% and a very small group of GI infections 7%. Nervous system infections and infections of blood infections constituted a minority of 3% and 4% respectively.

CONCLUSION : Infections in diabetes are more in the 3rd and 4th decades.

Soft tissue infections, respiratory tract infections, and genitourinary infections are more prevalent in diabetics in that order.

KEYWORDS :

INTRODUCTION :

Patients of diabetes mellitus with uncontrolled blood glucose are predisposed to various infections.¹ Infection is still the most common cause of morbidity and mortality in patients with diabetes in our country with a reported prevalence ranging from 33-46%.² Infection and pneumonia accounted for 22% of all deaths in diabetic patients in a study conducted in Japan.³ Clinicians often express the belief that diabetic patients are at higher risk for infections than non diabetic patients. Studies on this subject have concluded that data supporting a higher risk for many infections in diabetes are inadequate.^{4,5} Immunologic research has, however, demonstrated several defects in host immune defense mechanisms in diabetic subjects.

Phagocytic capabilities of polymorphonuclear leukocytes (PMN) are adversely affected by hyperglycemia in rat models.⁶ Several PMN defects occur in diabetic subjects, including impaired migration, phagocytosis intracellular killing, and chemotaxis⁷, which may be due to decreased PMN membrane fluidity.⁸ Generalized immunologic defects such as these raise the suspicion that diabetic patients may be at an overall increased risk for infection.

generalized impairments of immunity, other nonimmunologic, anatomically specific factors may contribute to an increased infection risk. Macrovascular disease and microvascular dysfunction may result in compromised local circulation leading to delayed response to infections and impaired wound healing.¹⁰ Unawareness of lower extremity trauma Besides due to sensory neuropathy may result in inadequate attention to minor wounds and subsequent increased infection risk.¹¹ Incomplete bladder emptying due to autonomic neuropathy permits urinary colonization by microorganisms.^{12, 13} High glucose concentration in the urine promotes the growth of some microorganisms.¹⁴

AIMS AND OBJECTIVES:

- To study the prevalence of infections in diabetic patients of different age group and sex.
- To study the etiological agents responsible for the Infections in diabetes individuals.

MATERIALS AND METHODS:

A Hospital based observational prospective study was conducted in the

department of general medicine in santhiram medical college and general hospital for 6 months, 50 Diabetic patients attending the in patient and out patient department of general medicine and followed up them with relevant investigations and assessed the etiological agent responsible for prevalence of infections in diabetes mellitus patients.

Sampling Technique And Sample Size:

All the selected patients fulfilling the inclusion criteria, 50 diabetic patients attending the inpatient and out patient at department of medicine, Santhiram medical college Nandyal to study the prevalence of infections in each group in relation to age, sex, etiological agent and glycaemic control. A detailed and thorough clinical history and physical examination is taken and relevant investigations will be done.

Inclusion Criteria:

- Patients in age group of 18 to 80 from both male and female sex
- History of Diabetes mellitus confirmed with FBS, PPBS Patients.
- History of infections following detection of diabetic status.
- Patients not immunocompromised due to other reasons.
- Those who are given written and informed consent.

Exclusion Criteria:

- Patients <18 years of age and >80 years of age.
- Patients who are immunocompromised like HIV, SLE Etc.
- Patients on steroid therapy for any reasons.
- Patients with abnormalities, Structural abnormalities in urinary tract or any other anatomical predisposing them for infection.
- Those who didn't give written and informed consent.

Data Analysis:

A etiological prevalence of infections in diabetes mellitus patients are detected by history and examination and subsequently with relevant investigations.

RESULTS:

1. Age wise distribution

Age Group	%
20-39	36%
40-59	42%
60-80	22%

2. Sex Distribution:

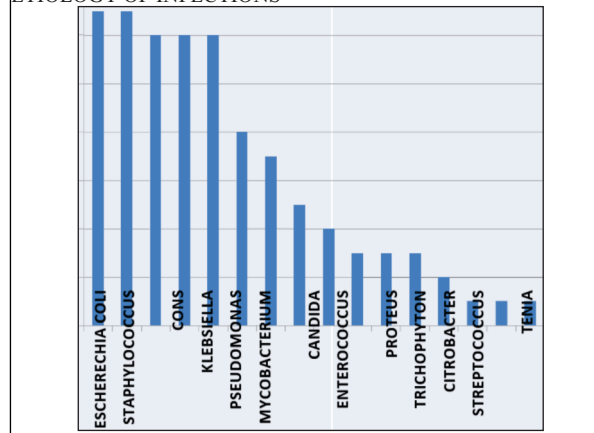
Out of 50 Patients, 38 patients are males and 12 patients are females.

Number of patients	Males	Females
50	38	12

3. Prevalence of infections distribution in diabetes patients

INFECTION	DISTRIBUTION
Soft tissue infections	37%
Respiratory tract infections	29%
Genito-urinary tract infections	20%
Gastro-intestinal infections	7%
Central nervous system infections	3%
Blood infection	4%

ETIOLOGY OF INFECTIONS



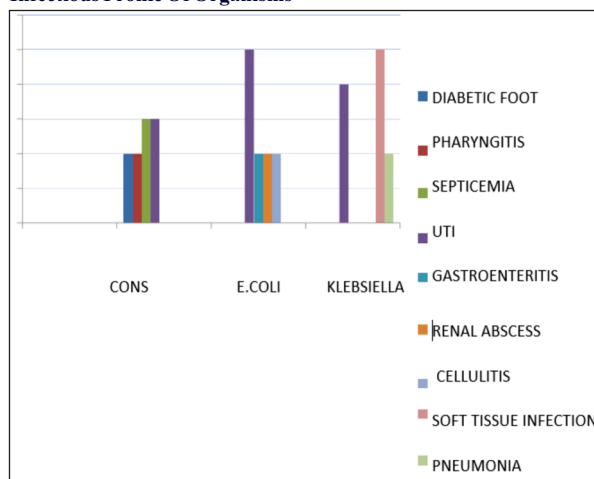
E. coli, staphylococcus, klebsiella, and pseudomonas and mycobacterium tuberculosis constituted the majority of infections in the present study group. Staphylococci constituted the major cause of infections with a significant 24% of them being coagulase negative.

PREVELANCE OF SOFT TISSUE INFECTIONS:

SOFT TISSUE INFECTIONS	% OF PREVALENCE
Diabetic foot	40%
Cellulitis	14%
Carbuncle	12.5%
Gluteal abscess	9.3%
Malignant otitis externa	9.3%
Peri anal abscess	6.25%
Burns	3.12%

Diabetic foot constituted the major soft tissue infection in diabetics. Cellulitis, carbuncles and gluteal abscess were also other frequent soft tissue infections prevalent in this study.

Infectious Profile Of Organisms



Although the infections in diabetic patient are polymicrobial, and can involve a whole range of organisms, few bacteria are found causing

infection at different sites more commonly. In this study CONS ,E.COLI, KLEBSIELLA were found in more than three systems to cause infection.

In this study CONS caused infections more in the urinary tract and in blood causing septicemia.

E.COLI had more prevalence in urinary tract infections. Klebsiella is seen to cause more soft tissue infections like diabetic foot and cellulitis.

DISCUSSION

The study done showed that a higher number of Diabetic patients were in their 3rd to 4th decade of life and accounted for 28% of the total study. This group was followed by patients in their 5th to 6th decade accounting for 34% and a very small group accounting for 6% of patients in 2nd decade . There were, 38 males and 12 females in the study forming a male: female ratio of 1.03:1. This trend of more prevalence at younger age groups could be attributed to the changing behavioural, environmental and food habits of the younger generation which increases the risk of developing diabetes at younger age.

The prevalence of soft tissue infections was highest in our study accounting to 37% followed by respiratory infections which formed 29% of infections and genitourinary infections forming 20%.. Other infections were gastrointestinal which made up 7% , blood infections which accounted for 4% and central nervous system infections which made a 3% of all the infections . This distribution could be due to the poor knowledge and lesser awareness of the study population in which a majority were illiterate. Unawareness of the importance of skin and foot care could be a reason for the higher prevalence of diabetic foot infections. This could also be attributed to the increased prevalence of diabetic foot at an average age of 50 years by which time they would have had developed neuropathy predisposing them to foot infections.

Soft tissue infections were the most common diseases encountered in diabetic patients in this study. It included diabetic foot, cellulitis, otitis externa, gluteal and perianal abscess and fungal skin infections. Soft tissue Infection accounting for 37% of the patients in the study with 8 cases of diabetic foot ulcerations and 3 cases of cellulitis. All the patients in the group had very poor foot care predisposing them for foot infection progressing to ulceration and cellulitis . Many patients had cracks in the sole of the foot acting as portal of entry for infections. Other common sites of infections were gluteal abscess and preanal abscess. These patients were either bed ridden or were obese .Malignant otitis externa was also encountered as a frequent infection in diabetics.

Staphylococcus Aureus and Pseudomonas were the most common organism responsible for Diabetic foot .23% out of the patient with diabetic foot had Staphylococcus Infection and 23% had pseudomonas infection.

CONCLUSION :

- Diabetic patients have a high prevalence of infections.
- Infections in diabetes are more in the 3rd and 4th decade.
- There was no difference regarding prevalence in either sex.
- There was no correlation between prevalence of various infections and glycemic levels.
- Soft tissue infections, respiratory tract infections, and genitourinary infections are more prevalent in diabetics in that order.
- Gastrointestinal system ,central nervous system infections are also common in diabetics
- Bacterial infections were common, with significant fungal infections and few viral infections.

REFERENCES:

1. Edwards JE, Tillman DB, Miller ME, Pitchon HE: Infection and diabetes mellitus. *West J Med* 130:515-21,
2. Drachman RH, Root RK Jr, WB Wood: Studies on the effect of experimental nonketotic diabetes on antibacterial defense— I. Demonstration of a defect in phagocytosis. *J Exp Med* 124:227-40, 1966
3. Valerius NH, Eff C, Hansen NE, Karle H, Nerup J, Soeberg B, Sorenson SF: Neutrophil and lymphocyte function in patients with diabetes mellitus. *Acta Med Scand* 211:463-67, 1982
4. Masuda M, Markami T, Egawa H, Murata K: Decreased fluidity of polymorphonuclear leukocyte membrane in streptozocin- induced diabetic rats. *Diabetes* 39:466-70, 1990
5. Goodson III WH, Hunt TK: Wound healing and the diabetic patient. *Surg Gynecol Obstet* 149:600-08, 1979
6. Pecoraro RE, Ahroni JH, Boyko EJ, Stensel VL: Chronology and determinants of tissue repair in diabetic lower-extremity ulcers. *Diabetes* 40:1305-13, 1991 Infection in elderly diabetics. *Clin Geriatr Med* 6:747-69, 90
7. Ellenberg M, Weber H: The incipient asymptomatic diabetic bladder. *Diabetes* 16:331-35, 1967
8. Hosking DJ, Bennett T, Hampton JR: Diabetic autonomic neuropathy. *Diabetologia* 27:1043-54, 1978
9. Murphy DP, Tan JS, File TM: Infectious complications in diabetic patients. *Primary Care* 8:695-714, 1981
10. Harrison's Principles of Internal Medicine, 16th edn 2006, ch 323 ;2169. Kumar and Clark ,6th Edn ,2006, ch 19 ;1130-31.