

# Incidence and Pattern of Infections in Diabetes Mellitus A Retrospective Study

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## SUMMARY

The case records of 792 patients with diabetes mellitus admitted in last 5 years were reviewed for incidence and pattern of infections. All patients had been treated at Institute of Medical Sciences, Srinagar, Kashmir. Analysis of data revealed presence of infection in 154 (19.4%) diabetics. There was no effect of age, sex or type of diabetes on presence or severity of infection. Five most common infections encountered were urinary tract infection (28.6%), tuberculosis (20.1%), skin and soft tissue infections (14.3%), bacterial pneumonia (10.4%), and foot infections (10.4%). Among the major chronic diabetic complications peripheral neuropathy was seen in 78(50.6%), retinopathy in 18(11.7%), and nephropathy in 22(14.3%) patients with infections. We conclude that infections continue to be an important cause of concern in diabetics in developing countries, and measures should be taken for prompt recognition and treatment of infections in diabetics in order to reduce the associated mortality and morbidity.

## INTRODUCTION

Infections are believed to occur with increased frequency in patients with diabetes mellitus, whether or not this is true, remains controversial [1]. Nolan et al in 1978 reported that granulocytes from ambulatory hospitalized diabetics with fasting blood glucose values of > 200mg/dl had an impaired ability to engulf and kill opsonized staphylococci. The granulocyte function improved after more intensive management of diabetes mellitus[2]. Infection is associated with impaired carbohydrate tolerance[3-5] and contributes to approximately 25 percent of the deaths associated with diabetic ketoacidosis[6-8].

Prior to the advent of modern anti-microbial therapy, infections accounted for much of mortality in diabetes. With the advent of anti-microbial agents fewer deaths occur due to infections in developed countries. However, in developing countries infections in diabetics continue to be a major problem. In this retrospective study we attempted to find out the incidence and pattern of infections in

patients with diabetes mellitus who were admitted in the Department of Endocrinology, Institute of Medical Sciences, (IMS) Srinagar, Kashmir from January 1987 to March 1992. This hospital is a 500 bed referral centre, with patients coming from all over the Valley of Kashmir.

## MATERIAL AND METHODS

Hospital records of all patients of diabetes mellitus who were admitted in the Department of Endocrinology, IMS, Srinagar, Kashmir from January 1987 to March 1992 were reviewed. All available data for each patient was studied in detail to determine the incidence and clinical profile of infections in these patients. These patients were mainly studied for age and sex distribution, type and duration of diabetes, presence of complications; and the presence and nature of infections.

## RESULTS

We could retrieve the records of 729 patients with diabetes mellitus who were admitted in the Department of Endocrinology, IMS, Srinagar from January 1987 to March 1992. Out of these 792 patients 154 (19.4%) had evidence of concomitant infections constituting about one fifth of all diabetic population (Table-1).

**Table 1**  
**Age and Sex Distribution of Diabetics with Infections**

	No. of patients with diabetes	No. of diabetics with infections
Total No. of patients	792	154(19.4%)
Males	410	76
Females	382	78
Mean age (years)	46.4	47.2
± S.D.	± 14.2	± 12.1

There was no significant difference in the age and sex distribution of total diabetics and diabetics with infection. Out of 792 patients 122 had IDDM, 642

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had NIDDM, 8 had fibrocalculous pancreatic diabetics and in 20 patients records were not clear about the type of diabetes. There was no significant difference in the frequency of infection in patients with IDDM or NIDDM (Table 2). The median duration of diabetes in patients with infections was 2 years in IDDM and 5 years in NIDDM. Five most common infections encountered in patients with diabetes mellitus were urinary tract infection (28.6%), tuberculosis (20.1%) skin and soft tissue infections (14.3%) bacterial pneumonias (10.4%) and foot infections (10.4%); all these constituting about 80% of all infections (Table 3). Among the major chronic diabetic complications in patients with infection, peripheral neuropathy was seen in 78(50.6%), retinopathy in 18(11.7%) and nephropathy in 22 (14.3%) patients. Among the miscellaneous infections recorded were periodontitis, vulvulitis, chronic suppurative otitis media, mucormycosis, balanitis, amoebic hepatitis, septic arthritis and osteomyelitis.

**Table 2**  
**Incidence of Infections in Patients with Different Types of Diabetes**

	No. of pat Patients with IDDM	No. of pat Patients with NIDDM	Miscellaneous*
Patients with Infections (n=154)	20	134	0
Patients without Infections (n=638)	102	518	28

P > .25 (Not significant)

\* Miscellaneous = Patients with pancreatic diabetes and others where type of diabetes was not clear

**Table 3**  
**Incidence of Infections**

S. No.	Type of infection	* No. of patients	Percent (n=154)
1.	Urinary tract infection	44	28.6
2.	Tuberculosis	31	20.1
3.	Skin and soft tissue infections	22	28.6
4.	Bacterial pneumonia	16	10.4
5.	Foot infections	16	10.4
6.	Upper respiratory tract infections	13	8.4
7.	Pyrexia-unknown origin	09	5.8
8.	Cholecystitis	05	3.2
9.	Chronic suppurative otitis media	02	1.3
10.	Others	14	9.1

\* Out of 154 diabetics with infection, some had more than one infection present concomitantly, making total number of infections 172.

## DISCUSSION

Infections in diabetic patients continue to be a major cause of morbidity and mortality. Even though the incidence of infections in diabetics in the developed countries has steeply gone down [9], the same does not seem to be true for developing countries like ours as is shown in this study.

Out of 154 diabetics with infection in this study, 44(28.6%) had urinary tract infection (UTI), majority (68.2%) of whom were asymptomatic. E. coli was the commonest causative organism. Urinary tract is probably the most common site of infection in diabetics. Diabetics have been found at autopsy to have five-fold greater frequency of acute pyelonephritis than non-diabetics[10]. Although most urinary tract infections in diabetics are asymptomatic, [11-13] the presence of diabetes predisposes to more severe infection[14]. In one study E. coli was the commonest cause of emphysematous pyelonephritis (50%) while the remainder being caused by other gram negative bacilli[15]. None of our patients with UTI had evidence of emphysematous pyelonephritis.

Tuberculosis was once a common and serious problem in diabetic patients. In 1930's tuberculosis was 3-16 times more frequent in diabetics than non-diabetics. [16-18] In our study 31 out of 154 (20.1%) patients had tuberculosis. In these patients diagnosis of tuberculosis was done on radiological grounds, acid fast bacillus (AFB) positivity in sputum and on culture studies. Currently, tuberculosis is less of a problem in diabetic patients, however diabetes may still predispose to reactivation of tuberculosis [19]. All these patients of tuberculosis were treated with conventional antitubercular regimens as tuberculous chemotherapy is reported to be equally effective in diabetic and non-diabetic population [20].

Skin and soft tissue infections were found in 22 out of 154 patients of diabetes mellitus with infections, and in half of these cases culture had grown staphylococcus. There is a general belief that diabetic patients are predisposed to staphylococcal skin infection and the results of a study in recent years indicated that staphylococcal colonization correlated with poor glycaemic control [21]. However diabetes predisposes to staphylococcal skin infection has not been conclusively proven. Gram negative wound infections are said to be three times more frequent in diabetics than in non diabetic individuals [22].

Bacterial pneumonia remains important infection in diabetic patients and is frequently caused by Gram-negative organisms or staphylococci [23]. However, diabetes does not appear to predispose to pneumococcal pneumonia [24]. In our study 10.4% of diabetic patients with infection were diagnosed to have bacterial pneumonia. Most of the times diagnosis was made on clinical and/or radiological grounds. Why diabetic patients should be predisposed to Gram-negative or staphylococcal pneumonia is not clear.

Foot infections are common and serious problems in diabetic patients. Infection may develop in the toe nail bed, beneath planter calluses or in ischaemic or neuropathic ulcers. Once established these infections may extend to involve deeper soft tissues, joints or bones [25]. In this study sixteen out of 154 diabetics with infections had primarily to be admitted for foot infection, half of which needed amputation. Most of these patients had a prolonged hospital stay. Other infections recorded were upper respiratory infections, pyrexia of unknown origin periodontitis vulvulitis, chronic suppurative otitis media, mucormycosis, fungal infection, balanitis, amoebic hepatitis, septic arthritis and osteomyelitis.

Although morbidity and mortality in diabetics due to infection is becoming less important in developed countries, in developing countries these still constitute an important cause of concern. Measures should be taken in diabetics including care of feet, prompt recognition and treatment of an early infection, giving specific antimicrobial agent for a sufficient time and maintenance of an euglycaemic state, usually with insulin therapy till the infection is eradicated.

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