

Association between Infections and Diabetes Mellitus

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Diabetes mellitus poses the risk of many secondary infections. At the same time, many infections can also help in developing Diabetes mellitus by a plethora of mechanisms. These aspects have been reviewed and presented in this chapter.

Kew Words: infection; diabetes mellitus; periodontitis

Introduction

Diabetes mellitus affects millions of people worldwide. India can be called the 'Diabetes capital' of the world. Having Diabetes predisposes one to many infections like superficial infections and Rhinocerebral mucormycosis. However, one should also explore the possibility of infections being the trigger factor behind the development of Diabetes mellitus. Diabetes mellitus can be Type 1 or Type 2. Type 1 Diabetes mellitus occurs due to autoreactive CD4 and CD8 T cells. Any type of Diabetes mellitus occurs due to reduction or less production of Insulin. Insulin is produced in the islets of Langerhans of the pancreas. A study done long ago had shown that the Encephalomyocarditis virus could induce Diabetes in mice. Scientists had also postulated the association between Congenital Rubella syndrome and Diabetes mellitus in the newborn. Mechanisms underlying the development of Diabetes is now being unravelled slowly. However, this area still remains a mystery mostly.

Periodontitis and Diabetes: - It has been shown that periodontitis can induce Diabetes mellitus in man by various proposed methods. One is via the AGE or advanced glycation end products which incite a brisk cytokine response and thereby can destroy beta cells of the islets of Langerhans of the Pancreas [1]. Periodontitis is also one of the most common complications occurring after Diabetes.

Mumps and Diabetes: -The mumps virus has been proposed to be strongly associated with development of Diabetes mellitus. The mumps virus can multiply in the beta cells of islets of Langerhans of pancreas. Many cases of insulinopenic DM (Diabetes mellitus) have been reported way back in 1970s. Such DM cases have spiked just after cases of Mumps. Also, anti- mumps antibody has been detected in such newly diagnosed Diabetic patients [2]. The mumps virus is also known to cause pancreatitis. Cases of DM have been documented even after Mumps vaccination. Such vaccination may end the latency of Diabetes mellitus in man. Statistical studies in Italy using data registry have also shown a significant association (p value less than 0.05) between Mumps and DM and Rubella and DM. However there has been no documented statistical association between Measles virus infection and DM [3].

Diabetes after Rotavirus infection: -DM has also been documented after Enterovirus and Rotavirus infection. It has been postulated that rotaviruses share homologous amino acid sequences with two major diabetes-associated autoantigens, the 65 kDa isoform of glutamic acid decarboxylase (GAD65) and also the protein tyrosine phosphatase related IA-2 molecule [4]. Thus data suggests that autoimmune diabetes mellitus may be induced by molecular mimicry. Also, Rotavirus also alters the permeability and cytokine balance in intestinal mucosa. This may enhance autoimmunity. It has been seen that diabetes-associated autoantibodies appear in children along with a rise in anti-Rotavirus IgG antibody titre.

Enterovirus and DM: -

Enterovirus has also been associated with DM and has been isolated from pancreas of many persons who had DM. Particularly Type 1 Diabetes mellitus is linked with Enterovirus infections. Enteroviruses have tropism towards pancreatic islets and can also produce beta-cell damage in experimental models [5]. Viral persistence has been thought to be an important factor for pathogenesis. A large proportion of type 1 diabetic patients have prolonged enterovirus infections associated with an ongoing inflammation process in gut mucosa. Also, Enterovirus infections of pancreas can cause decreased beta cell functioning, disintegrated islets and diminished glucose-stimulated insulin secretion. It has been found that the Enterovirus can persist in the body as ds-RNA. In experimental model's dsRNA can disrupt the functions of the beta cells [6]. Diabetes mellitus is also induced by periodontitis. It induces insulin resistance in DM.

Discussion

By various mechanisms infective agents can try modulate pancreatic function and hence affect Diabetes mellitus. This is an interesting area of future research and is also of much public health importance.

Conclusion

Thus, it can be concluded that many infections can trigger the development of Diabetes mellitus, predominantly Type I DM.

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