Smoking as a Risk Factor for Type 2 Diabetes Mellitus: a Literature Review

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ABSTRACT

Introduction: According to the WHO, tobacco, the only legal product, is the second major cause of death in the world leading to death of one-half of its regular users. More than 3,900 compounds have been identified in the tobacco plant, both in its natural form and after it is burnt for smoking. The number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. The future increase will mainly be in type 2 diabetics due to changes in lifestyle.

Aim: Smoking is associated with a risk of type 2 diabetes mellitus (T2DM) and the aim of the present study was to explore potential pathogenetic mechanisms linking smoking and T2DM, using a systematic literature review approach.

Methods: PubMed database was searched by using smoking AND Type 2 diabetes keywords in various combinations. A total of 1,136 articles were retrieved out of which 965 articles were in English language and involved studies performed in humans. All 965 abstracts were reviewed with application of inclusion criteria of availability of full-text articles, original articles, prospective studies, those that discussed smoking effects and the risk of T2DM and differentiated between T2DM and T1DM (type 1 diabetes mellitus). Ten articles fulfilled the inclusion criteria and were included in this study. Then an additional search was made in PubMed by using smoking AND pancreatic beta cells keywords for articles discussing smoking and its effects on beta cells. From these searches ten prospective studies and five cross-sectional studies were found.

Results: Based on the 10 prospective studies we concluded that cigarette smoking is an independent risk factor for T2DM and impaired fasting glucose. The risk of diabetes in those who switched from cigarette smoking to pipe or cigars remained equal to the risk in current cigarette smokers. There was a dose-response relationship between them. In cross-sectional studies it was observed that the association between smoking and T2DM is stronger in men than in women and the smokers develop T2DM earlier than non-smokers. The cross-sectional studies that examined the association between smoking and beta cell function found an inverse relation in men while no association was found in women. Smoking affects pancreatic tissue, increases insulin resistance and decreases beta cells function leading increased risk of T2DM.
Conclusion: Smoking is an independent and modifiable risk factor for T2DM due to increased insulin resistance. Beta cell function may be impaired by smoking in men, however, this needs confirmation in prospective studies.


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