

THE RELATIONSHIP BETWEEN TYPE 2 DIABETES AND CANCER: AN INTEGRATIVE REVIEW

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Abstract

Background: There is evidence to suggest that type 2 diabetes may increase the risk of incidence of cancer. Type 2 diabetes is characterized by insulin resistance and hyperinsulinemia. Hyperinsulinemia may lead to cancer through insulin's effect on its cognate receptor and the insulin-like growth factor system.

Methods: An integrative review of the literature focused on 9 articles 2009-2013, and was completed to determine the Relationship between Type 2 Diabetes and Cancer.

Conclusions: Substantial evidence suggests that people with type 2 diabetes have an increased risk of developing several types of cancers.

Key words: diabetes mellitus, cancer, diabetes type 2, epidemiology, incidence, relationship, diagnosis, risk factor

Introduction

Diabetes mellitus (DM) is a serious growing health problem worldwide and is associated with severe acute and chronic complications that negatively influence both the quality of life and survival of affected individuals (Vigneri P, Frasca F, Sciacca L, Pandini G, vigneri R, 2011). Globally, as of 2010, an estimated 285 million people had diabetes with type 2 making up about 90% of the cases. Its incidence is increasing rapidly and by 2030, this number is estimated to almost double (Wild S, Roglic G, Green A, Sicree R, King H, 2004). Therefore, if diabetes is associated with a small increase in the risk of cancer, this may have important consequence at the population level (Vigneri et al., 2011). So Diabetes and cancer are common diseases that have a tremendous impact on health worldwide. The epidemiological evidence suggests that people with diabetes are at a significantly higher risk of many forms of cancer as type 2 diabetes and cancer shares many risk factors (Giovannucci et al., 2010). However, the links between diabetes and cancer are still not well understood. Moreover, evidence from observational studies suggests that some medications used to treat hyperglycemia are associated with either an increased or reduced risk of cancer (Giovannucci et al., 2010). Moreover, some but not all epidemiologic studies have suggested that diabetes significantly increases mortality in patients with cancer (Chustekka, 2010).

In this review, we will assess the available evidence about the association between type 2 diabetes mellitus and cancer, the different aspect of diabetes type 2 which may influence this association and the possible mechanisms involved.

Methodological Characteristics

The 9 studies composing this integrative research review were quantitative studies. Four studies were review studies, two studies were meta analysis studies, two studies were cohort studies and one was a case control study. Although only 9 studies were included in this research review, a wide variety of instruments were used to measure concepts related to the relationship between Type 2 Diabetes and Cancer. Most instruments were used in these studies to collect information to measure the effect of type 2 diabetes mellitus on development of cancer by review, review and analysis or comparing populations. The samples in articles are composed of males and females with type 2 diabetes mellitus and the age of samples varied. Many types of cancer were included in this review such as colorectal cancer, prostate cancer, and primary liver cancer.

Design

An integrative review method was used which encompasses a diverse form of research studies, including experiment and non-experimental ones to understand the phenomenon of interest (Whittemore & Knafl, 2005). Integrative review may also

combine data from theoretical as well as empirical literature. In addition, integrative review incorporates a wide range of purposes: to define concepts, to review theories, to review evidence, and to analyse methodological issues of a particular topic (Broome, 1993). Cooper (1998) delineates five stages of research review: problem identification, data collection, data evaluation, analysis and interpretation, and presentation of findings.

Search strategy

A literature search was conducted through the major electronic database MEDLINE. Articles reviewed were limited to primary research reports and published in English from 2009 to 2013. One hundred and forty one articles were identified through the database search and review of reference lists, of which some articles were duplicated. Also some articles were excluded because they were not related to diabetes and cancer or they were not empirical studies but were discussions, opinions or editorial articles. Eventually, only 9 articles were included in this review.

Keywords used in literature search were: diabetes mellitus, cancer, diabetes type 2, epidemiology, incidence, relationship, diagnosis, risk factor

Data extraction and synthesis

Each of the 9 studies was analysed and categorized according to the types of methodology used. The following characteristics (Table pages 33-34) were recorded: purpose of the study, study design, population and outcomes of the findings.

Authors	Purpose	Population	Findings	Method
Neale ,Doedke , Pandeya, Sadeghi, Green Webb , Whiteman.	Does type 2 diabetes influence the risk of oesophageal adenocarcinoma?	Compared type 2 diabetes prevalence among oesophageal adenocarcinoma patients and population controls.	Diabetes increased the risk of OAC	Case control study
Berster, Göke.	Colorectal cancer occurs more frequently in patients with type 2 diabetes mellitus	Colorectal cancer in patients with type 2 diabetes mellitus	Increased risk for colorectal cancer	Review
Krämer, Schöttker Raum, Brenner.	T2DM is associated with a moderate increase in CRC risk in both men and women.	Total of 29 eligible studies	Higher risk for colorectal cancer (CRC) amongst patients with type 2 diabetes mellitus (T2DM).	Meta-analysis
Ogunleye,Ogston Morris, Evans.	Study of the risk of cancer associated with type 2 diabetes	Record-linkage health-care datasets for Tayside, Scotland in 1993-2004	Significantly increased risks were observed for pancreatic, liver and colon cancer.	Cohort study
Cannata ,Fierz Vijayakumar,LeRoith.	Type 2 diabetes and cancer: what is the connection?	Patients with DM 2 and cancer.	Type 2 diabetes has been positively associated with cancers.	Review

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Authors	Purpose	Population	Findings	Method
Müssig Staiger Kantartzis Fritsche Kanz Häring	To give an overview on the relationship between diabetes mellitus and increased cancer risk.	Between diabetes mellitus, its treatment with insulin and insulin analogues and malignancies.	The relationship between elevated cancer risk and Type 2 diabetes mellitus has been shown by numerous epidemiological studies.	Review
Yang WS ,Shu XO Gao J, Li HL;Cai H, Yang G, Ji BT, Rothman N; Gao YT; Zheng W ; Xiang YB.	Prospective study has investigated the relationship between type 2 diabetes mellitus and the risk of primary liver cancer.	Two population based cohorts.	Increased risk of subsequent liver cancer.	Cohort
Bansal D, Bhansali A, Kapil G, Undela K, Tiwari P.	Examined the association between Type 2 diabetes and risk of prostate cancer	Conducting a detailed meta-analysis of all studies published regarding this subject	This meta-analysis provides strongest evidence supporting that Type 2 diabetes is significantly inversely associated with risk of developing prostate cancer.	Meta-analysis
Johnson JA; Carstensen B; Witte D; Bowker SL; Lipscombe L; Renehan AG.	Review factors related to cancer incidence in the diabetic population and cancer mortality.	Diabetic population	Substantial evidence suggests that people with type 2 diabetes have an increased risk of developing several types of cancers.	Review

Sample Characteristics

The sample in the 9 studies in this review contains people who with diabetes type 2 and diagnosed with cancer or risk for cancer. The sample contains male and female from different age. Cancer sites in sample were mainly liver, prostate, esophageal, and colorectal.

Results

The studies have shown a link between type 2 diabetes and cancer. Positive correlation between type 2 diabetes and cancers of the colon, breast, liver, and pancreas. In other hand the type 2 diabetes is significantly inversely associated with risk of developing prostate cancer, and this may be due to lower testosterone levels in men with type 2 diabetes.

Conclusion

Substantial evidence suggests that people with type 2 diabetes have an increased risk of developing several types of cancers. These associations may be due to a number of direct and indirect mechanisms. Recommendations to do more researches to decrease the risk of cancer for patients Suffer from diabetes and to increase the awareness among patients to do screening from time to time that reduce the risk of cancer.

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