

**PREVALENCE OF DIABETES MELLITUS IN PATIENTS WITH CANCER AND  
COMPARE WITH THE GENERAL PREVALENCE OF THE DIABETES MELLITUS IN  
TURKISH SOCIETY: RESEARCH ARTICLE****Serdar Olt\*<sup>1</sup>, Meltem Baykara<sup>2</sup>, Hasan Ergenç<sup>3</sup>, Selçuk Yaylacı<sup>4</sup> and Ali Tamer<sup>3</sup>**<sup>1</sup>Adıyaman University Medical Faculty, Department of Internal Medicine.<sup>2</sup>Sakarya University Medical Faculty, Department of Oncology.<sup>3</sup>Sinop Ayançık State Hospital Department of Internal Medicine.<sup>4</sup>Rize Fındıklı State Hospital, Department of Internal Medicine.**Corresponding Author: Dr. Serdar Olt**

Department of Internal Medicine, Adıyaman University, Medical Faculty, Turkey.

Article Received on 30/05/2016

Article Revised on 20/06/2016

Article Accepted on 11/07/2016

**ABSTRACT**

Herein our aim was to investigate prevalence of diabetes Mellitus (DM) in patients with cancer and compare with the general prevalence of the DM in Turkish society based on the TURDEP 2 study. Records of 1252 patients were analyzed retrospectively between the years 2010 and 2012. Patients' cancer type, age, gender and presence of diabetes were recorded. Mean age of the patients was 63. 680 (54.3%) of the patients were female and 572 (45.7%) were male. The DM prevalence was 13.3% in all patients with cancer. According to the types of cancer the prevalence of the DM was: 14.8% in Breast cancer, 13.1% in Lung cancer, 9.7% in Colon cancer, 7.4% Rectum cancer, 11.7% Gastric cancer, 23.6% Ovary cancer, %30 Endometrium cancer, 12.5% Prostate cancer and 10.5% Pancreas cancer respectively. Prevalence of DM was detected 16.5% in TURDEP 2 study in general Turkish society recently. Considering the general prevalence of DM in Turkey, we found that the DM rates in our patients with cancer are lower than this rate. Although there is a relationship between some types of cancer and DM in the literature, this issue is subject to debate, and further studies are needed in this area.

**KEYWORDS:** Cancer, Diabetes mellitus, TURDEP 2 study.**INTRODUCTION**

Cancer and Diabetes Mellitus are diseases with very high morbidity and mortality. Many scientific studies have been conducted on these two diseases. Another intriguing point of interest in this area is whether there is any relationship between these two diseases. According to the literature, there was a correlation between certain cancer types and Diabetes Mellitus (DM).<sup>[1-2]</sup> Although cancer development in DM is not fully understood, hyperinsulinemia developed secondary to insulin resistance, increased oxidative stress caused by hyperglycemia and inflammation are suspected factors.<sup>[3-4]</sup> In a study on DM and cancer, it was found that DM increases the risk of breast, endometrial, bladder, liver, colorectal and pancreatic cancer, whereas reduces the risk of prostate cancer.<sup>[4]</sup> DM prevalence varies in different parts of the world, as the prevalence of cancer varies in different geographies. In the TURDEP 2 study the prevalence and risk factors of diabetes and pre-diabetes were investigated in Turkish adults. Prevalence of DM was detected 16.5% in TURDEP 2 study in general Turkish society recently. Herein, we aimed to investigate the prevalence of DM in patients with cancer

and compare with the prevalence of DM in the general Turkish society based on TURDEP 2 study.

**MATERIALS AND METHODS**

Files of 1252 patients followed in our Oncology Clinic were analyzed retrospectively between the years 2010 and 2012. Patients' cancer type, age, gender and presence of DM were recorded.

IBM SPSS (Statistical Package for Social Sciences) Version 21 statistical software package program was used to analyze the data obtained from the retrospective review of patient records, and the descriptive statistics were utilized.

**RESULTS AND DISCUSSIONS**

Mean age of the patients was 63, 680 (54.3%) of the patients were female and 572 (45.7%) were male. The DM prevalence was found to be 13.3% in all patients with cancer. According to the types of cancer the prevalence of DM was: 14.8% in Breast cancer, 13.1% in Lung cancer, 9.7% in Colon cancer, 7.4% Rectum cancer, 11.7% Gastric cancer, 23.6% Ovary cancer, %30

Endometrium cancer, 12.5% Prostate cancer and 10.5% Pancreas cancer. Prevalence of the DM according to the type of DM was documented in **Table 1**.

**Table 1: Prevalence of Diabetes Mellitus in Patients with Cancer**

	<i>DM prevalence</i>
<i>Patients with Breast Cancer</i>	14.8%
<i>Patients with Lung Cancer</i>	13.1%
<i>Patients with Colon Cancer</i>	9.7%
<i>Patients with Rectum Cancer</i>	7.4%
<i>Patients with Gastric Cancer</i>	11.7%
<i>Patients with Ovary Cancer</i>	23.6%
<i>Patients with Endometrium Cancer</i>	30%
<i>Patients with Prostate Cancer</i>	12.5%
<i>Patients with Pancreas Cancer</i>	10.5%
<i>Total (In all patients)</i>	13.3%

In many studies in the literature, the risk of cancer was found to be increased in diabetic patients. In a meta-analysis study by Noto H et al., it was found that DM increases the risk of breast, endometrial, bladder, liver, colorectal and pancreatic cancer, whereas reduces the risk of prostate cancer.<sup>[4]</sup> In a study by Qi X et al., no correlation was found between Lung cancer and DM<sup>[5]</sup>. In their study, Larsson SC et al. have found that DM increases the risk of Breast cancer.<sup>[6]</sup> And, Larsson SC et al. have also found in another study that DM increases the risk of Colon cancer.<sup>[7]</sup> In a study, Friberg E et al. have found that DM increases the risk of Endometrium cancer.<sup>[8]</sup>

In recent years, the issue that whether there is a relationship between Diabetes Mellitus, drugs used in DM and cancer has gained popularity. Although Insulin Glargine was reported to increase the risk of cancer in a study, no significant relationship was found in other studies<sup>[9-10]</sup>. Studies on Metformin have determined that use of Metformin reduces the cancer risk.<sup>[11]</sup> In another study on drug-cancer relationship, Pioglitazone was found to increase the risk of Bladder cancer.<sup>[12]</sup> Similarly, it was found that use of Exenatide, which is a drug used in DM, increases the risk of Pancreatic and Thyroid cancer.<sup>[13]</sup> In another study, the use of DPP-4 inhibitor Sitagliptin reported to increase the risk of pancreatic cancer.<sup>[13]</sup> Although some studies conclude that Sulfonylurea and Glinides induce hyperinsulinemia, hence increasing the risk of cancer, no increased risk has been identified in other studies.<sup>[14-15]</sup>

In TURDEP 2 study conducted in Turkey recently, the prevalence of Diabetes Mellitus was found to be 16.5%.<sup>[16]</sup> In this present study, DM prevalence was found 13.3% in all patients with cancer. According to the types of cancer the prevalence of DM was: 14.8% in Breast cancer, 13.1% in Lung cancer, 9.7% in Colon cancer, 7.4% Rectum cancer, 11.7% Gastric cancer, 23.6% Ovary cancer, %30 Endometrium cancer, 12.5%

Prostate cancer and 10.5% Pancreas cancer. Considering the general prevalence of Diabetes Mellitus in Turkey based on the TURDEP 2 study we found that the DM rates in our patients with cancer are lower than this rate. According to the results of our study, we can not talk about any increased risk of cancer in diabetic patients in Turkey.

## CONCLUSIONS

Herein there were not any significant relationship between the diabetes frequency and cancer. Although there is a relationship between some types of cancer and DM in the literature, this issue is controversial and further studies will illuminate this subject. Despite of observational study we hope that our study will contribute to the literature

**Acknowledgement:** None

## REFERENCES

- Gariani K, Tran C, Philippe J. [Diabetes and cancer: an injurious association]. *Rev Med Suisse*, 2010; 6: 1193-4, 1196-8.
- Xu CX, Zhu HH, Zhu YM. Diabetes and cancer: Associations, mechanisms, and implications for medical practice. *World J Diabetes*, 2014; 5: 372-80.
- Shikata K, Ninomiya T, Kiyohara Y. Diabetes mellitus and cancer risk: review of the epidemiological evidence. *cancer Sci.*, 2013; 104: 9-14.
- Noto H, Goto A, Tsujimoto T, Osame K, Noda M. Latest insights into the risk of cancer in diabetes. *J Diabetes Investig*, 2013; 4: 225-32.
- Wang Z, Bao C, Su C, Xu W, Luo H, Chen L, Qi X. Association between diabetes or antidiabetic therapy and lung cancer: A meta-analysis. *J Diabetes Investig*, 2013; 4: 659-66.
- Larsson SC, Mantzoros CS, Wolk A. Diabetes mellitus and risk of breast cancer: a meta-analysis. *Int J cancer*, 2007; 121: 856-62.
- Larsson SC, Orsini N, Wolk A. Diabetes mellitus and risk of colorectal cancer: a meta-analysis. *J Natl cancer Inst*, 2005; 97: 1679-87.
- Friberg E, Orsini N, Mantzoros CS, Wolk A. Diabetes mellitus and risk of endometrial cancer: a meta-analysis. *Diabetologia*, 2007; 50: 1365-74.
- Rosenstock J, Fonseca V, McGill JB, Riddle M, Hallé JP, Hramiak I, Johnston P, Davis M. Similar risk of malignancy with insulin glargine and neutral protamine Hagedorn (NPH) insulin in patients with diabetes: findings from a 5 year randomised, open-label study. *Diabetologia*, 2009; 52: 1971-3.
- Home PD, Lagarenne P. Combined randomised controlled trial experience of malignancies in studies using insulin glargine. *Diabetologia*, 2009; 52: 2499-506.
- Noto H, Goto A, Tsujimoto T, Noda M. cancer risk in diabetic patients treated with metformin: a

- systematic review and meta-analysis. *PLoS One*, 2012; 7: e33411.
12. Mamtani R, Haynes K, Bilker WB, Vaughn DJ, Strom BL, Glanz K, Lewis JD. Association between longer therapy with thiazolidinediones and risk of bladder cancer: a cohort study. *J Natl cancer Inst*, 2012; 104: 1411-21.
  13. Elashoff M, Matveyenko AV, Gier B, Elashoff R, Butler PC. Pancreatitis, pancreatic, and thyroid cancer with glucagon-like peptide-1-based therapies. *Gastroenterology*, 2011; 141: 150-6.
  14. Thakkar B, Aronis KN, Vamvini MT, Shields K, Mantzoros CS. Metformin and sulfonylureas in relation to cancer risk in type II diabetes patients: a meta-analysis using primary data of published studies. *Metabolism*, 2013; 62: 922-34.
  15. Yang X, So WY, Ma RC, Yu LW, Ko GT, Kong AP, Ng VW, Luk AO, Ozaki R, Tong PC, Chow CC, Chan JC. Use of sulphonylurea and cancer in diabetes-The Hong Kong Diabetes Registry. *Diabetes Res Clin Pract*, 2010; 90: 343-51.
  16. Satman I, Omer B, Tutuncu Y, Kalaca S, Gedik S, Dincag N, Karsidag K, Genc S, Telci A, Canbaz B, Turker F, Yilmaz T, Cakir B, Tuomilehto J; TURDEP-II Study Group. Twelve-year trends in the prevalence and risk factors of diabetes and prediabetes in Turkish adults. *Eur J Epidemiol*, 2013; 28: 169-80.