

ASSESSMENT OF DIABETES MELLITUS AS A *MADHUMEHA* AND CANCER RISK – A REVIEW

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ABSTRACT

Background: Diabetes is a chronic metabolic disease. All over the world there has been substantial rise in number of diabetic patients and may experience an increased risk of cancer. **Objectives:** Primary - Associate the compiled data from systematic reviews. Secondary - Collect data from databases, journals, modern texts, websites & *ayurvedic* classics. **Material and method:** The systemic literature search includes databases, journals, periodicals, *Ayurvedic* classics, web sites like pub med, DHARA, AYUSH portal with the term ‘Diabetes mellitus’, ‘risk of cancer’, ‘*madhumeha*’ & ‘*prameha*’. **Result:** All Meta analyses reporting a significant increased risk among diabetes patients for liver, pancreatic, oesophageal, colorectal, endometrial, breast, kidney and bladder cancer with the risk ratio and confidence interval. In *madhumeha vyadhikshamatva* [immunity] is a major casualty. *Oja* plays an active part as *dushya* in the pathogenesis of *madhumeha* and its deficiency characterizes *vikar avighata abhava*. *Dosha, dushya, shatkriyakala, dhatukshayata, vyadhikshamatva abhava* these all possible factors in pathogenesis of *madhumeha* are responsible for increase a risk of cancer in patient. **Conclusion:** The systematic review of Meta analytical studies associated with all possible determinants in *madhumeha* pathogenesis confirms the result of increased cancer risk in diabetes mellitus patients.

Key words: *Madhumeha*, Diabetes mellitus, Cancer risk.

INTRODUCTION

Diabetes is the 8th leading cause of mortality in high-income countries, but now its prevalence has been rising more rapidly in middle and low-income countries as well. Association between diabetes mellitus (Type I & II) and cancer have been established by several Meta analyses including only studies of observational design. Clinical condition of diabetes mellitus is similar to *madhumeha* described in *Ayurveda* under *prameha roga*. It is a long-term disease with variable clinical manifestation and progression.

MATERIAL AND METHOD

Systematic reviews from databases, journals, periodicals, *ayurvedic* classical texts, modern texts were accessed with focus to study cancer risk in diabetes mellitus. The included studies compared the risk of cancer in diabetic patients versus non-diabetic patients. All types of observational study designs were included. Literature searches of *ayurvedic* classics consists data for *prameha* and *madhumeha*. Causes, pathogenesis, process of *madhumeha* and cancer were assessed to establish association between them.

RESULT AND DISCUSSION

All Meta analyses report a significant increased risk among diabetic patients for pancreatic cancer. ^[1,2,3] Several observational studies have examined the relationship between diabetes and gastro intestinal cancer ^[4,5] esophageal cancer also reported ^[6]. Diabetes has been associated with an increased risk of colorectal cancer ^[7-13]. Both endometrial cancer and breast cancer ^[14-18] were reported to be increased in diabetes. Also, it is associated with increased risk of kidney cancer ^[19] and bladder cancer ^[20].

Possible determinants for cancer risk in *madhumeha* are as follows:

Role of *oja* in *madhumeha* and cancer- *Madhumeha* is considered as *mahagada*. This is because; in *madhumeha vyadhikshamatva* (immunity) which depends on *bala* is a major casualty. This *bala* derived from *oja* characterizes *vikara vighata bhava* and its deficiency characterizes *vikar avighata abhava*. *Sushruta* has mentioned that *oja* is a supreme extract of all the *dhatu* and strength of the body ^[21]. But, in *madhumeha*, *oja* is

excreted through urine leading to *oja kshaya*. This *oja kshaya* affects the immune system i.e. *vyadhikshamatva*. *Charaka* mentions that life depends on *oja* and therefore without *oja* one cannot live^[22].

In modern aspect, the immune system can be divided into innate and adaptive responses. The 'immune surveillance' hypothesis proposes that, both the innate and adaptive immune system constantly survey for and eliminate newly formed cancer cells. Onset and progression of cancer are kept under control by immune system.^[23,24] Diminished immunity is an important and common factor in disease of *madhumeha* and progression of cancer.

Role of Food, Nutrition & Physical activity- In *madhumeha*, causes related to food and daily/seasonal regimen are, excessive food intake without digestion of previously taken food, excessive intake of new grains, high calorie diet, *guru, snighdha, sheeta, manda, shlakshna, sandra, sthira* and *pichchila guna ahara, anup oudak, gramya mamsa* (meat), jaggery based food items, *dadhi*, day sleep, laziness, not undergoing detoxification process^[21,22]. This *ahara* and *vihara* are dominant factors, considered as *madhumeha nidana*.

About 5-10 percent of cancer results directly from inheriting gene associated with cancer, but the majority involve alteration or damage accumulated overtime to the genetic material within cells. The causes of damage are both endogenous (internal) and exogenous (environmental). Food, nutrition and physical activity are important exogenous factors in the development of cancer. When a person is not suitably nourished, either through under or over nutrition this affects tissue micro-environment, compromising both structure and function^[23,24].

Role of Samprapti ghataka and Shat-kriyakal - In pathogenesis of *madhumeha, tridosha dusthi, dushya* as a *rasa, rakta, mamsa, meda, majja, vasa, shukra, oja, lasika, sweda, strotas* as *aannavaha, mutravaha, udakvaha, medovaha, amashayaudbhavasthana*, all these are *samprapti ghataka* involved in pathogenesis of *madhumeha*. *Vyaktasthan* is *sarva shareer*^[21,22] thus it affects the vital organs related of that *dhatu* and *strotasa*. These *samprapti ghataka* with *chirkari vyadhi swabhav* and *agni vaishmyata* maybe responsible to stop inhibition of several events that lead to cancer or contribute to cancer development.

In 6th *kriyakal (bhedavastha)*, *madhumeha* would have attained sub-acute or chronic stage. This disease proceeds into more severe forms in the events of increasing *dhatu kshya*. Immunity worsens and disease essentially attains *asadhyatha*. Hence forth *upadrava* and *aristha lakshana* starts to appear^[21,22]. In this stage immunity surveillance process declines, which is essential to recognize difference between cancer cell and normal cell. Progression of cancer may take place as an *upadrava*.

Pittaja prameha and cancer- *Pittaja prameha* caused by excessive intake of *ushna guna ahara, katu-amlalavana rasa. Ajeernashana, visham ahara sevana*, excessive sun bath, excess irritability, excess labour and anger these all *hetus* vitiate the *pitta dosha*. Inflammation occurs in *pittaj prameha* which is one of the characteristic of *prakupit pitta*. Chronic inflammation can result in DNA damage and cancer promotion^[23,24].

CONCLUSION

Food, Nutrition, Physical activity, make immunity stronger against various diseases. But improper food pattern and daily/seasonal physical activity in *madhumeha* affects the immunity severely with involvement of *samprapti ghataka*. Thus all the above determinants help to increase the risk of cancer promotion. Furthermore, studies are required to assure the involvement of these possible determinants as mentioned. Physicians in contact with diabetes patients should be aware that patients are at an increased risk of cancer.

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