

Recent Developments in Cancer

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Received date: April 06, 2015; Accepted date: April 07, 2015; Published date: April 14, 2015

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Abstract

Cancer is one among the leading cause of deaths worldwide. In the present review I have mentioned recent statistics of cancer and mentioned few recent developments in cancer research especially on the most common cancers like lung cancer, breast cancer, prostate cancer, skin cancer and endometrial cancer which would give a brief idea on the ongoing research in cancer for the students, Research Scholars.

Keywords: Metastasis; Skin cancer; Prostate cancer; Lung cancer; Endometrial cancer; Rectal cancer; Melanoma; Energy metabolism; Metronomic therapy

Introduction

Cancer is a set of diseases in which the abnormal cells divide without any control and invade to other tissues through blood and lymph systems. More than 100 different types of cancer are existing, which are named according to the organ or type of cell at which they origin [1]. It is characterized by uncontrolled growth and spread of abnormal cells which is called Metastasis; if the spread is not controlled then it might lead to death. Cancer is caused by both external factors (tobacco, chemicals, radiation, and infectious organisms) and internal factors (mutations, hormones, immune conditions), which might act together or sequentially to initiate or promote carcinogenesis. Most cancers require multiple steps that occur for over many years for their development [2].

Statistics

According to the International Agency for Research on Cancer, World Health Organization, Global cancer burden rose to 14.1 million new cases in 2012 which is expected to be 22 million within next two decades and they addressed a marked increase in breast cancers in their recent report on 12 December 2013 [3]. Among the 14.1 million cases diagnosed in 2012, 8.2 million deaths have occurred. Most of the cancer deaths are due to Lung, liver, stomach, colorectal and Breast cancers. Lung cancer ranks one among the Top 10 leading causes of death worldwide. The most common cancer is breast cancer followed by lung cancer [4]. Five leading behavioral and dietary risks like high body mass index, intake of less fruits and vegetables, lack of physical activity, tobacco and alcohol use results about 30% of cancer deaths, of which 20% is due to tobacco use. Viral infections which cause cancer such as HBV/HCV and HPV are responsible for 20% of cancer deaths in low and middle income countries. Africa, Asia, Central America and South America accounts for 60% of world's annual new cases and 70% of the world's cancer deaths [5]

Few Recent Facts/ Developments Related to Cancer

- Fruits reduces risk of skin cancers: Wang et al. performed a meta-analysis of cohort studies, by including a total of 17 articles (24 studies), and estimated that consumption of fruits but not vegetables might reduce the risk of gastric cancer. They mentioned that the quantification of association between consumption of fruit and vegetables and risk of gastric cancer (GC) was controversial [6].
- Vitamin D might reduce skin cancers: Exposure to sun is known to be a risk factor for skin cancer development, but Caini et al. mentioned that Vitamin D which is formed mainly in the skin upon exposure to sunlight exerts anti-proliferative and pro-apoptotic effects on melanocytes and keratinocytes in vitro. To justify this they performed a meta-analysis to evaluate the association of vitamin D serum levels and dietary intake with cutaneous melanoma (CM) and non-melanoma skin cancer (NMSC) risk and melanoma prognostic factors [7].
- Metformin decrease risk of lung cancer in diabetics: Ming-Ju Tsai et al. reported that there is high risk of cancer occurrence in patients with Type 2 diabetes mellitus. They observed that metformin would reduce the risk of cancer in Type 2 diabetes mellitus patient in dose dependent manner in a study on Chinese population. They mentioned that the chemo-preventive effect of metformin deserves further study [8].
- Metformin significantly reduces prostate cancer incidence in Taiwanese: Chin-Hsiao Tseng conducted sensitivity analyses in various subgroups using time dependent and non time dependent approaches and concluded that Metformin use is associated with a decreased risk of incident prostate cancer in Taiwanese male patients with type 2 diabetes mellitus (T2DM) but that in Asian patients with T2DM has been not investigated [9].
- Loss of progesterone receptor in endometrial cancer is associated with increased proliferation: Tangen and his colleagues examined that, loss of progesterone receptor in endometrial cancer is associated with aggressive disease and altered response to hormonal treatment. They concluded that loss of PR in endometrial cancer is associated with increased proliferation, poor survival, and increases from primary to metastatic lesions in an investigation for PR expression in relation to clinical and histopathological data [10].
- Cancer treatment by using cancer energy metabolism: Jozef Oleksyszyn et al. proposed a general method for cancer treatment, involving the use of cancer energy metabolism and the activation of the immune system by the simple modulation of blood glucose concentrations. They explained the phenomenon of spontaneous regression of cancer, together with its implications of new

approaches to cancer treatment like manipulation of the energy metabolism and/or redox status of cancer cells [11].

- Rectal cancer in pregnancy is a diagnostic and therapeutic challenge: Monireh Toosi et al. mentioned that during pregnancy rectal cancer could not be diagnosed because colorectal cancer could mimic the signs and the symptoms of pregnancy and tends to present at an advanced stage in pregnant women wherein they has cited a case report of a 31-year-old multiparous, pregnant woman whose pregnancy was terminated at 20th week of gestation due rectal cancer which was identified at that late stage [12].
- Beta blockers all-causes mortality in prostate cancer diagnosed patients: In a recent study of Jonathan Assayag et al., observed that usage of beta blockers, including those of non-selective, in prostate cancer patients resulted in mortality. They used time dependent Cox proportional hazards models to estimate adjusted hazards ratio (HR) and secondary analyses to examine the independent effects of non-selective beta-blockers, as well as cumulative duration of use [13].
- Advanced melanoma could be targeted with immunotherapy and targeted therapy: David McDermott et al. have mentioned that melanoma can be targeted with immunotherapy and targeted agents. They observed that few patients have achieved durable benefits and long term survival with immunotherapy. They suggested that novel combination strategies, improved clinical trial endpoints, predictive biomarkers might improve the clinical outcomes in melanoma [14].
- Metronomic therapy could be a treatment option for breast cancer: A Repetitive, low dose of chemotherapy drugs is called metronomic therapy (MT). Emilia Montagna and his colleagues mentioned that MT exerts effect not only on tumor cells but also on its microenvironment, like anti-angiogenic effect by compromising the repair process of endothelial cells, immunological action through the restoration of the anticancer effect of the immune system and induction of tumor dormancy. They concluded by suggesting that MT is a treatment option for breast cancer patients, possessing a low toxicity profile, efficacy in most patients and potentially cost-effective [15].
- New treatment development for advance prostate cancer elderly Patients: Deborah Mukherji et al. have mentioned that prostate cancer is more common in elderly men than younger men. They suggested few treatment options for patients with metastatic castration-resistant prostate cancer such as the immunotherapy sipuleucel-T, the androgen biosynthesis inhibitor abiraterone acetate, the cytotoxic cabazitaxel, the radioisotope radium-223 and the antiandrogen enzalutamide which have shown improved survival in randomized phase III studies [16].

Conclusion

Cancer is one of world's leading causes of death with 14.2 million new cases in 2012 out of which 8.2 million deaths have occurred, so scientists should aim at promising new treatments for curing cancer. A lot of research development is already ongoing and targeting major

cancer types such as lung cancer, prostate cancer, breast cancer. Few selected recent developments in cancer which I have mentioned could be a treatment option and could be developed further for cancer treatment.

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