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Original Research Article

Epidemiological review on Gastric cancer

Rohit Pralhadrao Kale[1,*]

[1] *Dept. of Bioprocess Technology, Institute of Chemical Technology (ICT), Mumbai, Maharashtra, India*

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ABSTRACT

The mortality rate of the patients with gastric cancer is reduced dramatically from past few years. Still the gastric cancer the major concern that is in front of health care professionals and is the second leading cause of cancer death across the world. But the trend of infection and the severity of infection differ as per location and histology. While there has been a marked decline in distal, intestinal type gastric cancers, the incidence of proximal, diffuse gastric carcinoma has been increasing, particularly in the Western countries. The severities of gastric cancer infection also differ by change in geographical location, social and economic status of the respective race as well. The main risk factors for distal gastric cancer include Helicobacter pylori infection and dietary factors; whereas gastro esophageal reflux disease and obesity play important roles in the development of proximal stomach cancer. The main aim of this review is to determine the epidemiology of gastric cancer and to discuss about available strategies for its prevention.

1. Introduction

The mortality rate of the patients with gastric cancer is reduced dramatically from past few years. Still the gastric cancer the major concern that is in front of health care professionals and is the second leading cause of cancer death across the world. In 2000, about 880 000 people were diagnosed with gastric cancer and approximately 650 000 died of the disease.[1–3] The two main sites of the gastric tumor includes proximal that is cardiac region and second one is distal that is pyloric region. From past few decades the distal gastric part cancer shown declination in infection but rise in the proximal gastric cancer is increasing the concern. The severities of gastric cancer infection also differ by change in geographical location, social and economic status of the respective race as well. The western countries have shown surge in the infections of gastric cancer. These differences in incidence rate can be attributed to many factors but particularly to differences in dietary habits, and infection to Helicobacter pylori.[4] This review includes a updated and systematic information about gastric cancer and its epidemiology as well as systematic review of published findings on various risk factors and prevention strategies of gastric cancer.

2. Materials and Methods

A search was undertaken in using Pubmed database, using key words such as “stomach cancer, treatment, clinical characteristics, stomach cancer outcome, epidemiology, etiological factor and their corresponding Mesh terms were used in combination. The search was limited to only English literature including those studies which were published from 2000 to 2021 by Indian institutes.

2.1. Pathologic considerations

About 90% of gastric cancers are adeno carcinomas, and are subdivided into diffused type and second one

* *Corresponding author*.
E-mail address: rohit.kale242@gmail.com (R. P. Kale).

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of non diffused type. The intestinal type is related to corpus-dominant gastritis with gastric atrophy and intestinal metaplasia, whereas the diffuse type usually originates in pangastritis without atrophy.[5] The intestinal type of gastric cancer is more commonly found in males, blacks, and older age groups, whereas the diffuse type has a more equal male-to-female ratio and is more frequent in younger individuals. The intestinal gastric cancer is common in public from East Asia, Eastern Europe, Central and South America.[6]

2.2. Risk factors

Helicobacter pylori are the bacteria which is most important risk factor for gastric cancer. Available monograph study classifies Helicobacter pylori as a carcinogenic to humans based on epidemiological evidence. The vast majority of Helicobacter pylori infected individuals remain asymptomatic without any clinical symptoms. Cofactors, which determine that H pylori-infected people are at particular risk for gastric cancer, include bacterial virulence factors and pro inflammatory host factors.[7] The risk of the gastric cancer is increased by infecting the human with more virulent strain of Helicobacter pylori carrying the cytotoxic gene A.[8]

2.3. Diet and life style

The diet and life style plays a important role in the management and occurrence of gastric cancer. Globally available research shows the consumption of green vegetables with fruit and balanced nutritious diet are considered to be probable protective factors. The newly available literature also shows decline in the gastric cancer is due to reduced intake of salt, preserved foods as well.

2.4. Significant increase in the pathogenesis of gastric cancer is due to following food habits:[9]

1. Pickled food.
2. High rice intake.
3. Spicy food.
4. Excess chilly consumption.
5. High temperature food.
6. Smoked dried salted meat.
7. Over consumption of dried salted fish.

3. Alcohol and Tobacco

One of the major risk factor for the gastric cancer is the consumption of tobacco and alcohol. The association between gastric cancer and tobacco smoking has been observed in various epidemiological studies. The tobacco is not only used for smoking but also used for the chewing purpose also inhaled in the form of hukka, snuff, bidis, cigarettes, taibur, Meiziol. Available data study shows that tobacco smokers are at high risk than that of non smokers.[10] Literature study also shows that alcohol may be carcinogenic to the proximal gastric cancer cancers but not to distal gastric cancer.

3.1. Obesity

Obesity is also one of the major factors for gastric cancer. Obesity can promote GE reflux disease which predisposes to Barrett's esophagus, a metaplastic precursor state for adenocarcinoma of the esophagus and GE junction.[11]

3.2. Other risk factors

The secondary risk factors that lead to gastric cancer include

1. Radiation
2. Pernicious anemia
3. Blood type A
4. Gastric surgery
5. Genetic hereditary factors

3.3. Prevention of gastric cancer

3.3.1. Lifestyle modifications

As the gastric cancer is associated with poor life style, the main strategy for improving the clinixcal outcomes is done through primary prevention. The widespread introduction of refrigeration has led to a decrease in the intake of chemically preserved foods and increased consumption of fresh fruits and vegetables by avoiding this the mortality rate of the gastric cancer is prevented.

3.3.2. Helicobacter pylori eradication

H pylori eradication therapy is another potential strategy for gastric cancer prevention. A course of two antibiotics and an antisecretory agent have shown a cure rate of about 80% with durable responses. The H.pylori therapy on certain patients has resulted in a significantly lower rate of gastric cancer recurrence. Several large-scale chemoprevention trials of H pylori eradication therapy with gastric cancer endpoints are ongoing. Potential downsides of widespread eradication therapy in asymptomatic carriers include developing antibiotic-resistant strains of H pylori and perhaps increasing the risk of GERD and adeno carcinoma of the esophagus and gastric proximal cardiac cancer.[12]

3.3.3. Antioxidants

The dietary consumption of vitamins C and E and β-carotene also may decrease the or may play a protective role in the prevention of gastric cancer. Available study suggest that high serum levels of α-carotene, β-carotene, lycopene, and vitamin C were significantly associated with reduced risk of gastric cancer.[13,14]

3.3.4. COX-2 inhibitors

Aspirin and other non steroidal anti-inflammatory drugs (NSAIDs) are thought to inhibit cancer cell growth primarily through the inhibition of COX-2, and evidence is mounting that COX-2 inhibitors may be beneficial in preventing upper gastrointestinal malignancies.[15] Compared to colorectal cancer, the association between NSAID use and the development of gastric cancer has been studied less extensively. A recent meta-analysis showed that NSAID use was associated with a reduced risk of gastric cancer infection. hence, COX-2 inhibitors provides a chemo preventive strategy against gastric carcinogenesis.

4. Conclusion

In summary, proximal and distal gastric cancers exhibit a unique epidemiologic features characterized by marked geographic variation, diverging time trends, and differences based on race, sex, and socio-economic status. As stomach cancer is one of the common cancers in and second ranked cancer that causes death, studies are required to understand the etiology and prevention of gastric cancer.

5. Declaration of Competing Interest

All authors report no conflicts of interest relevant to this article.

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8. Conflict of Interest

None.

References

1. Ray G, Dey S, Pal S. Epidemiologic features of gastric cancer in a railway population in eastern India. *J Assoc Physicians India*. 2007;55:248–9.
2. Yeh JM, Kuntz KM, Ezzati M, Goldie SJ. Exploring the costeffectiveness of Helicobacter pylori screening to prevent gastric cancer in China in anticipation of clinical trial results. *Int J Cancer*. 2009;124(1):157–66. doi:10.1002/ijc.23864.
3. Zhou L, Yu H, Zheng S. The value of "occult blood bead" in detection of upper digestive tract disorders with bleeding. *Zhonghua Zhong Liu Za Zhi*. 1999;21(1):48–50.
4. Oishi Y, Kiyohara Y, Kubo M, Tanaka K, Tanizaki Y, Ninomiya T, et al. The serum pepsinogen test as a predictor of gastric cancer: The Hisayama study. *Am J Epidemiol*. 2006;163(7):629–37. doi:10.1093/aje/kwj088.
5. Malik MA, Upadhyay R, Modi DR, Zargar SA, Mittal B. Association of NAT2 gene polymorphisms with susceptibility to esophageal and gastric cancers in the Kashmir Valley. *Arch Med Res*. 2009;40(5):416–23. doi:10.1016/j.arcmed.2009.06.009.
6. Tripathi S, Ghoshal U, Ghoshal UC, Mittal B, Krishnani N, Chourasia D, et al. Gastric carcinogenesis: Possible role of polymorphisms of GSTM1, GSTT1, and GSTP1 genes. *Scand J Gastroenterol*. 2008;43(4):431–9. doi:10.1080/00365520701742930.
7. Shen H, Xu Y, Qian Y, Yu R, Qin Y, Zhou L, et al. Polymorphism of DNA repair gene XRCC1 and risk of gastric cancer in Chinese population. *Int J Cancer*. 2000;88(4):601–6. doi:10.1002/1097-0215(20001115)88:4<601::aid-ijc13>3.0.co;2-c.
8. Li H, Chen XL, Li HQ. Polymorphism of CYPIA1 and GSTM1 genes associated with susceptibility of gastric cancer in Shandong province of China. *World J Gastroenterol*. 2005;11(37):5757–62. doi:10.3748/wjg.v11.i37.5757.
9. Yeole BB. Trends in cancer incidence in esophagus, stomach, colon, rectum and liver in males in India. *Asian Pac J Cancer Prev*. 2008;9(1):97–100.
10. Bombay Cancer Registry. Cancer Incidence and Mortality in greater Mumbai, 1994. Report of Bombay Cancer Registry Mumbai, India .
11. Bombay Cancer Registry. Cancer Incidence and Mortality in greater Mumbai, 2005. Report of Bombay Cancer Registry Mumbai, India; 2005.
12. Sankaranarayanan R, Swaminathan R, Swaminathan R, Brenner H, Chen K, Chia KS, et al. Cancer survival in Africa, Asia, and Central America: a population-based study. *Lancet Oncol*. 2010;11(2):165–73. doi:10.1016/S1470-2045(09)70335-3.
13. Cheng SC, Sanderson CR, Waters TE, Goodwin CS. Compylobacter pyloridis in patients with gastric carcinoma. *Med J Aust*. 1987;147(4):202–3. doi:10.5694/j.1326-5377.1987.tb133380.x.
14. Loffeld RJ, Williams I, Flendrig JA, Arends JW. Helicobacter pylori and gastric carcinoma. *Histopathology*. 1990;17:537–41.
15. Danesh J. Helicobacter pylori infection and gastric cancer: Systematic review of epidemiological studies. *Aliment Pharmacol Ther*. 1999;13(7):851–6. doi:10.1046/j.1365-2036.1999.00546.x.

Author biography

Rohit Pralhadrao Kale, M.Tech Student

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