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Review Article

General Aspects of Colorectal Cancer

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Colorectal cancer (CRC) is one of the main causes of death. Cancer is initiated by several DNA damages, affecting proto-oncogenes, tumour suppressor genes, and DNA repairing genes. The molecular origins of CRC are chromosome instability (CIN), microsatellite instability (MSI), and CpG island methylator phenotype (CIMP). A brief description of types of CRC cancer is presented, including sporadic CRC, hereditary nonpolyposis colorectal cancer (HNPCC) or Lynch syndromes, familiar adenomatous polyposis (FAP), MYH-associated polyposis (MAP), Peutz-Jeghers syndrome (PJS), and juvenile polyposis syndrome (JPS). Some signalling systems for CRC are also described, including Wnt-β-catenin pathway, tyrosine kinase receptors pathway, TGF-β pathway, and Hedgehog pathway. Finally, this paper describes also some CRC treatments.

1. An Introduction on Colorectal Cancer

Colorectal cancer (CRC) is one of the leading causes of cancer lethality. In the United States, 143,460 new cases of CRC are foreseen to be diagnosed during 2012 (73,420 men and 70,040 women), and 51,690 patients will die of this disease. From 2005 to 2009, the median age at death for CRC was 74 years of age (approximately 0.0% died under age 20; 0.6% between 20 and 34; 2.5% between 35 and 44; 8.6% between 45 and 54; 16.5% between 55 and 64; 22.0% between 65 and 74; 29.0% between 75 and 84; and 20.8% from 85 years of age and older [1]).

CRC can be separated into 72% for the colon cancer and 28% for the rectum cancer, although incidence of CRC is generally reported together. Classification of CRC is referred to their pathological stage, which can be observed after surgery [2]. The clinical and the pathological stages may be different, as the imaging tests can be different from the observed stage after surgery.

The most common used staging system for CRC is that of the American Joint Committee on Cancer (AJCC), known also as the TNM system. Nevertheless, other staging systems, such as the Dukes [3] and Astler-Coller [4] systems, are still in use. These old systems are not as precise as the TNM system [5, 6] (see Table 1 for correspondences between the three staging systems).

The three letters combined in AJCC system mean the following:

T describes how far the main (primary) tumour has grown into the wall of the intestine and whether it has grown into nearby areas;

N describes the extent of spread to nearby (regional) lymph nodes. Lymph nodes are small bean-shaped collections of immune system cells that are important in fighting infections. To get an accurate idea about lymph node involvement, it is recommended to look under a microscope at least 12 lymph nodes (removed during surgery);

M indicates whether the cancer has spread (metastasized) to other organs of the body (CRC can spread almost anywhere in the body, but the most common sites of spread are the liver and lungs).

These three letters are combined with numbers (from 0 to 4) indicating increasing severity, whereas a letter "X" (instead of a number) means that the information is not available.

Tx: No description of the tumor's extent is possible because of incomplete information.