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HISTOPATHOLOGIC DIAGNOSIS OF COLORECTAL CARCINOMA AND TUMORS PATHOLOGIC STAGING

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ABSTRACT

Colorectal cancer (CRC) is common, as it is the third most common cancer worldwide in men and women, the second largest cause of death related to cancer and the main cause of death in gastrointestinal cancer. There are several methods for detecting colorectal cancer such as fecal immunochemical test (FIT), guaiac-based fecal occult blood test (gFOBT), fecal-DNA test, Imaging test, (MRI scan) and colonoscopy. There are five stages of colon cancer. According to U.S.National cancer institute (NCI) Data , more than 90% of people treated for early- stage colorectal cancer were alive five years after diagnosis. CRC may not be able to be prevented but can be reduced by managing risk factors like lifestyle, healthy food intake and tracking of family medical history.

Key word : Colorectal cancer , CRC , MSI, carcinoma

INTRODUCTION

Colorectal cancer is a global health burden, like all other types of cancer, It happens when cells grow and divide uncontrollably, Accounting for almost 700,000 deaths per year world-wide [1]. The risk of developing CRC is related to bad alimentary habits, smoking, intestinal inflammatory disease, polyps, genetic factors, and aging. Of the patients that are diagnosed with colorectal cancer ;90% are older than 50, with a median age of 64 years. According to the American Cancer Association, it was measured for more than 49,700 deaths in 2015.

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Early diagnosis and treatment is crucial to reduce its mortality rate. The patient is considered to have a positive familial history if a first-degree relative has been diagnosed with colorectal cancer or colonic polyps before the age of 60. There are several methods for detecting colorectal cancer, such as fecal immunochemical test (FIT), guaiac-based fecal occult blood test (gFOBT), fecal DNA test and colonoscopy [2]. The stage in which the cancer is detected determines the prognosis, survival, and treatment of the patient.

The treatment of colorectal cancer can be aimed at cure or palliation. The decision on which aim to adopt depends on various factors, including the person's health and preferences, as well as the stage of the tumor.[3] Assessment in multidisciplinary teams is a critical part of determining whether the patient is suitable for surgery or not.[4]

Early diagnosis of CRC in earlier stage before metastasis, keeps surgical decision a curative option. However, late diagnosis after metastases limits the role of surgery as curative option and directs the treatment more towards palliative option in order to relive sypte including radiotherapy , immunotherapy and chemotherapy. Conducted research from different databases such as PubMed, Medline, Medscape, on the definition, diagnostic methods, epidemiology, survival and treatment of colorectal cancer, have shown a central role of pathologists

In analyzing histologic features of the tumors that are suggestive of microsatellite instability (MSI).

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In this literature review, our aimed objective is to summarize all the available information focuses on CRC and explain its histopathologic diagnosis of CRC and pathologic staging .

HISTOPATHOLOGIC DIAGNOSIS OF COLORECTAL CARCINOMA

More than 90% of colorectal carcinomas are adenocarcinomas originating from epithelial cells of the colorectal mucosa [6]. Other types of colorectal carcinomas include neuroendocrine, squamous cell, adeno-squamous, spindle cell and undifferentiated carcinomas. Conventional adenocarcinoma is characterized by glandular formation, which is the basis for histologic tumor grading. In well-differentiated adenocarcinoma,>95% of the tumor is gland forming. Moderately differentiated adenocarcinoma shows 50-95% gland formation. Many studies have demonstrated that a 2-tiered grading system, which combines well and moderately differentiated to low grade (50% gland formation) and defines poorly-differentiated as high grade (<50% gland formation). It should be emphasized, however, that histologic grading should apply only to conventional adenocarcinoma. Some of the histologic variants, may show high grade morphology but behave as low grade tumors because of their MSI status.

The vast majority of colorectal carcinomas are initially diagnosed by endoscopic biopsy or polypectomy. The key aspect of microscopic examination is to look for evidence of invasion. However, this can be difficult when the biopsy is superficial or poorly-oriented. If the muscularis mucosae can be identified, it is important to determine whether it is disrupted by neoplastic cells. Invasive carcinoma typically

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invades through the muscularis mucosae into the submucosa. Another important feature of invasion is the presence of desmoplasia, in which; fibrous proliferation surrounding tumor cells secondary to invasive tumor growth has been explored Invasive colorectal carcinoma also frequently shows characteristic necrotic debris in glandular Lumina. Unlike invasion, colorectal carcinoma submucosal invasion is required for the diagnosis of a stage pT1. Mucosal invasion of the part gastrointestinal tract (esophagus, stomach and small intestine) is classified as carcinoma of the diagnosis. Invasion confined to the lamina propria and muscularis mucosae has no risk of nodal or distant metastasis. Thus, intramucosal carcinoma is preferably called high grade dysplasia by pathologists in order to avoid unnecessary surgical intervention. In the American Joint Committee on Cancer (AJCC) Cancer Staging Manual [7]. The identification of high grade dysplasia or intramucosal carcinoma. The decision to perform surgical resection should be ultimately determined by the gross appearance of the lesion, endoscopic ultrasound findings, and endoscopic resectability.

PATHOLOGIC STAGING

Tumor staging is by far the most important prognostic predictor of clinical outcome for patients with colorectal carcinoma. Histologic examination of surgically resected specimens serves an irreplaceable role in determining the depth of tumor invasion (T) and the extent of nodal metastasis (N). The histologic determination of T1 (tumor invades submucosa), T2 (tumor invades muscularis propria) and T3 (tumor invades through the muscularis propria into pericolorectal tissues) is usually straightforward when using the AJCC TNM staging system.

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Determination of T4a (tumor penetrates to the surface of the visceral peritoneum) and T4b (tumor directly invades or is adherent to other organs or structures) can sometimes be problematic. First, serosal surface (visceral peritoneum) involvement can be missed if the specimen is not adequately sampled for histologic examination. Second, the serosal surface may be confused with the circumferential (radial) or mesenteric margin, which is a nonperitonealized surface created surgically by blunt or sharp dissection. A T3-tumor may involve the radial margin and a T4-tumor may have a negative radial margin. Third, adherence of other organs or structures at the tumor site does not necessarily qualify for T4b. Histologically, the adherent site may show only inflammatory changes, abscess formation and/or fibrosis, but without direct tumor involvement. Finally, there is some confusion about the definition of visceral peritoneum involvement. Clearly, the interpretation of T4a can be unequivocal if; (I) tumor cells are present at the serosal surface with inflammatory reaction, mesothelial hyperplasia, and/or erosion, or (II) free tumor cells are seen on the serosal surface with underlying ulceration of the visceral peritoneum [8] . However, identification of tumor cells close to, but not at, the serosal surface would be considered T4a by some investigators if there are associated mesothelial inflammatory and/or hyperplastic reactions.

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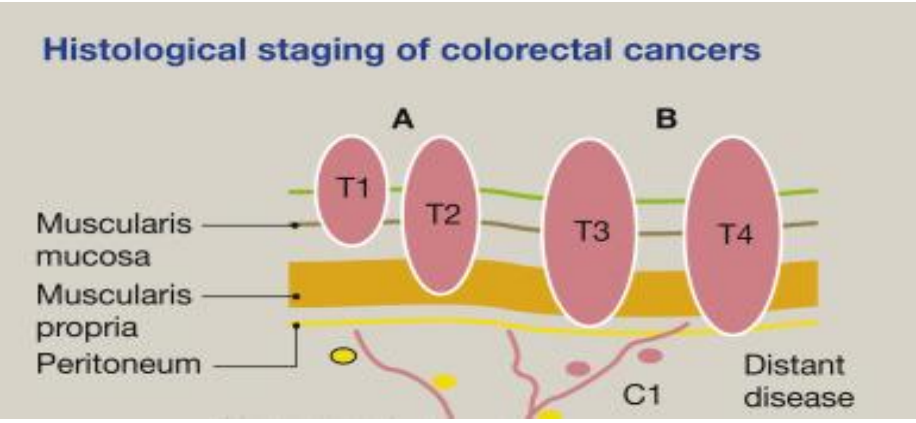

Tumor Stage	Criterion
T1	Tumor invades the submucosa
T2	Tumor invades the muscularis propria
T3	Tumor penetrates the muscularis propria and invades the subserosa or nonperitonealized perirectal tissue
T4	Tumor directly invades other organs or structures

1 Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, Jemal A. Global cancer statistics, 2012. CA Cancer J Clin 2015; 65: 87-108 [PMID: 25651787 DOI: 10.3322/caac.21262]
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CONCLUSIONS

Colorectal adenocarcinoma is a heterogeneous disease that involves multiple tumorigenic pathways. Pathologic analysis provides histologic and molecular information critical to appropriate patient treatment, prognosis assessment, and family counseling. Further understanding the molecular mechanisms in tumorigenesis will certainly lead to the development of new targeted therapies and new molecular tests, which will ultimately benefit the patients and their families.

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