

Evaluation of recent Updates regarding Screening and Management of Colorectal Carcinoma

Alhanouf Ibrahim Alzanitan^{1*}, Abdullah Nasser Alnawdal², Mohammad Abdulaziz Alabood³, Mohammed Khaldun Waleed Alelwan⁴, Ramlh Mohammed Y Al Sameen⁵, Fatimah Sulaiman Mohammed Alhawiti⁶, Abdulaziz Mohammed Bin Hassan⁷, Salhah Mohammad Alajmi⁸, Norah Saud Alfahaid⁹, Mezzher Mohammad Alsaeed¹⁰, Ahmed Khalid Alaqil¹¹

¹ Faculty of Medicine, AlFarabi College of Medicine, Riyadh, KSA. ² Department of General Surgery, Buraydah Central Hospital, Al Qassim, KSA. ³ Department of General Surgery, King Fahad Specialist Hospital, Buraydah, KSA. ⁴ Faculty of Medicine, Prince Sattam University, Riyadh, KSA. ⁵ Department of Paediatric Surgery, Maternity and Child Hospital, Alhassa, KSA. ⁶ Faculty of Medicine, Tabuk University, Tabuk, KSA. ⁷ Faculty of Medicine, Ibn Sina National College, Jeddah, KSA. ⁸ Faculty of Medicine, Imam Abdulrahman Bin Faisal University, Dammam, KSA. ⁹ Faculty of Medicine, King Saud University, Riyadh, KSA. ¹⁰ Department of Paediatric Surgery, Maternity and Children Hospital, Dammam, KSA. ¹¹ Faculty of Medicine, Majmaah University, Riyadh, KSA.

Abstract

Colorectal is a commonly diagnosed cancer worldwide. The incidence and mortality are on the decline due to wide screening and appropriate management. A multitude of factors continues to cause colon cancer, but the disease is mainly related to combined genetic susceptibility and environmental predisposition. **Objectives:** In this review, we aimed to review the recent literature on colorectal carcinoma screening and management. **Methodology:** PubMed database was used for articles selection, and the following keywords were used: colorectal carcinoma, pathophysiology, screening, and management. **Conclusion:** Colorectal carcinoma is common, deadly yet declining in incidence and mortality. Largely attributed to increased awareness in the population and advancement of screening tests. Attentiveness to such diseases is required in countries with unstructured screening programs.

Keywords: Colorectal carcinoma, pathophysiology, screening, management

INTRODUCTION

Colorectal carcinoma undeniably is a prevalent disease worldwide. This disease is only second to breast cancer in females, while it is the third most common carcinoma in males.^[1] Generally, the entire population are at risk of many diseases including the infamous colorectal cancer. Colorectal cancer is highly associated with increasing age. Hence, specific age groups are recommended for screening; these are people in the sixth up to their eighth decade in the United States.^[2] Or later in the seventh decades in countries like the United Kingdom. Moreover, people with certain genetic inheritance are at risk of developing carcinomas. These include genetic mutations of adenomatous polyposis gene, and hereditary nonpolyposis colorectal cancer as in families afflicted with Lynch syndromes.^[3] Moreover, while differences in gender outcomes with regards to morbidity and mortality do exist, research has extensively not focused on gender differences.^[4]

Screening the whole population would be ideal, but the lack of resources and infeasibility are major obstacles. Therefore, through evidence-based research screening, it is narrowed down to specific age groups and genetically susceptible populations. Even with the availability of screening methods, many challenges still remain, including awareness of the population, and availability of treatment. We aimed to review

the recent literature on colorectal carcinoma, screening, and management. We explain colorectal carcinoma and where it occurs, how we identify susceptible populations, and stratify disease in affected people.

METHODOLOGY

PubMed database was used for articles selection, and the following keywords were used in the search: colorectal carcinoma, pathophysiology, screening, and management. In regards to the inclusion criteria, the articles were selected based on the inclusion of one of the following topics;

Address for correspondence: Alhanouf Ibraheem Alzanitan, Faculty of Medicine, AlFarabi College of Medicine, Riyadh, KSA.

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colorectal carcinoma, and its screening and management. Exclusion criteria were all other articles that did not have one of these topics as their primary endpoint.

REVIEW

Anatomy

The entire colon is defined as the combination of cecum, appendix, rectum, and the ascending.

The ascending colon, descending colon, and rectum are retroperitoneal, while the sigmoid colon, transverse colon, appendix, and cecum are intraperitoneal. The ascending colon is the widest and includes the cecum and appendix. It becomes the transverse colon after passing the hepatic flexure. At the splenic flexure, the descending colon begins. The rectum begins as concave anteriorly as it rests on the sacrum, and continues as concave posteriorly due to the pull effect of the puborectalis muscle. The peritoneal covering of the rectum is only astride lateral superior third and anteriorly on both superior and middle thirds.

Pathophysiology

The pathophysiological course of colorectal adenocarcinoma is commonly used as the quintessential sequence of cancer development. Acidic damage and genetic defects cause abnormalisation of the epithelium, insidiously developing into a small adenoma. This adenoma continues to grow in size and eventually bloom into a fully-fledged colonic or rectal carcinoma. While adenocarcinoma is the most commonly seen type in clinical practice, other forms are rare such as lymphoma, carcinoid, and sarcoma.

Vascular Supply

The colon receives its blood supply from the inferior and superior mesenteric arteries, branching off the aorta at L1 and L3 vertebral levels, respectively. The ascending colon receives supply from the right and ileocolic arteries, branching from the superior mesenteric. The transverse colon receives arterial arcades from the right and middle colic arteries. The descending colon, developing from the hindgut, receives its blood supply from the inferior mesenteric artery branches of the left colic artery and sigmoidal arteries. The rectum receives its arterial supply is from three rectal arteries: superior continuing inferior mesenteric artery, middle branching of the internal iliac artery, and finally inferior branching of the internal pudendal artery. Only the superior rectal vein drains into the portal vein, while the middle and inferior veins drain into the systemic circulation.

Lymphatic drainage

The gastrointestinal tract is embryologically diverse, and this is reflected in its cellular composition and function, and extends to its vascular supply and lymphatic drainage. The lymphatic drainage of the embryological midgut, the ascending and transverse colon, is conceived through the superior mesenteric nodes. While, the embryological hindgut,

the descending and sigmoid colon, pass to the inferior mesenteric nodes. Both former and latter node groups inevitably drain into the cisterna chyli, which explains why the left supraclavicular (Virchow's) node is often enlarged in colorectal and other gastrointestinal carcinomas. The drainage of the rectum is through the pararectal nodes into the internal iliac lymph nodes.

Clinical Features

In any patient presenting with recent changes in bowel function and/or recent rectal bleeding, the diagnosis of colorectal carcinoma should be considered. The NICE guidelines recommend that patients showing certain symptoms at specific ages should be referred to screening. These suspected patients are more than 40 years with unexplained abdominal pain and weight loss, or more than 50 years old with unexplained rectal bleeding, or more than 60 years of age with iron-deficiency anaemia or change in bowel habit, or any patient with positive faecal occult blood tests.^[5] Moreover, many patients would present with classical symptoms that would narrow the location of the carcinoma, and hence guide examination and investigations. Right-sided carcinomas would present insidiously with occult bleeding and iron deficiency anaemia, while left-sided carcinomas are more likely in obvious rectal bleeding and tenesmus. Moreover, surgeons should be able to list a primary differential list in patients with per rectal bleeding. The most commonly associated conditions are haemorrhoids and inflammatory bowel disease, hence, considering these diagnoses is important in approaching suspected colorectal carcinoma.

Screening and Diagnosis

Screening for colorectal carcinoma reduces mortality and morbidity from the disease. While mortality is currently on the decline, it is postulated that more younger patients are at risk of acquiring the illness.^[6] This is largely due to the dietary choices, and attitude towards physical activity.^[7] For this reason, it is important for the physician to advocate screening and encourage patients at risk.

Regardless of age, colonoscopy is the diagnostic standard in suspected cases. Moreover, diagnosis is best confirmed by a colonoscopy biopsy.^[8] This endoscopic exam can scan the entire colon with the highest sensitivity. In addition, and along with sigmoidoscopy, allows for excision of lesions at a visualisation for biopsy or total removal. Endoscopic measures are invasive, hence risk complications such as perforation and in-procedure bleeding, and are often unpleasant to the patient as they require sedation and bowel preparation.^[8] Therefore, colonoscopy is not suitable for all patients as many patients are frail with the disease. A suitable alternative for the latter group is the usage of contrast tomographic colonography or flexible sigmoidoscopy.^[8]

While sigmoidoscopy is highly sensitive and more preferable to patients as there is no sedation required, it is limited by assessing up to the distal colon. It is often combined with

faecal occult blood testing, which particularly detects ingested haemoglobin —many patients present with underlying anaemia. Certain investigations are thereafter needed to stage carcinomas. We included Duke's stages for colorectal carcinoma with predicted survival rates (Table 1).

Table 1: Duke Staging for Colorectal Carcinoma

Stage	Description	5 Year Survival %
A	Affects the mucosa without invading the muscularis propria	90
B	Invades the muscularis propria	65
C	Affects regional lymph nodes	30
D	Metastasised distally	Less than 10

Evidence has shown that screening is highly effective in adults from the early fifties to mid-seventies.^[2] Age and screening are of increased importance in females over 65 years, as they are at higher risk of mortality compared to males.^[4] Furthermore, people older than 76 and up to 85 years, in the US, undergo screening if willing, with the physician considering their patient's medical history and previous screening results.^[2] Compare this to other screening programmes, in the UK, where patients aged 60–74 are screened once every two years. The screening for colorectal carcinoma by faecal occult testing and sigmoidoscopy has reduced mortality rates from an otherwise insidious and deadly disease. Faecal occult blood or immunohistochemical tests are relatively low-cost, yet neither can scan for pre-malignant lesions nor remove samples for biopsy.^[8]

In addition to invasive methods, tumour biomarkers can help in the management of patients. Carcinoembryonic antigen is a tumour marker with low specificity and sensitivity to colorectal carcinomas and is therefore of little use in the diagnosis and screening.^[9] However, it is more beneficial in assessing tumour progression, recession with treatment, and recurrence.^[9, 10] Moreover, other biomarkers are available and relevant to colorectal carcinomas, such as p53. This tumour suppressor gene is present in >50% of all colorectal carcinomas and is considered an ominous prognostic sign.^[11]

Management

Before proceeding to management, it is essential to properly evaluate the patient's thorough colonography, MRI, or CT as appropriate to the case.^[12] Each modality has its own advantages, but MRI has higher accuracy than other modalities in detecting liver metastasis.^[12] The mainstay of colorectal carcinoma management is surgical intervention. (Table 2)

Table 2: Summary of Colorectal Carcinoma Surgical Management

Tumour Location	Surgical Approach	Notes on Adjacent Structures Removed
Cecal and Ascending Colon	Right hemicolectomy	Branches of the superior mesenteric artery (note: only right branch of the middle

Transverse Colon	Extended Right hemicolectomy	colic artery) with their mesenteries
Descending Colon	Left hemicolectomy	Left branch of the middle colic artery, left colic branches of the inferior mesenteric artery, and inferior mesenteric vein
Sigmoid Colon	Sigmoid colectomy	Inferior mesenteric artery
High Rectal Tumours (> 5cm from anal opening)	Anterior resection	Preserves the rectal sphincters → do an ileostomy
Low Rectal Tumours	Abdominoperineal resection	Distal colon, rectum and anal sphincters → do a colostomy

The management of colorectal carcinoma may include chemical and radio-ablative therapies. While surgical resection is the definitive cure for colorectal cancer, the latter two modalities can be curative but are commonly used in palliative therapy. Chemotherapy would aid progressed stages, where the lymph nodes have been afflicted with the disease.^[13] Patients with rectal carcinoma would benefit from radiotherapy. Combined chemoradiotherapy in rectal carcinomas helps in reducing the tumour size and facilitating resection.^[14]

CONCLUSION

Colorectal carcinoma is steadily declining due to awareness and screening programmes. While developed countries had set structured programmes for colorectal screening, this is not necessarily the case for developing and underdeveloped nations. It would take time and effort to educate the population on the necessity of periodic screening. Another issue remains in the cost of screening modalities and accessibility of tests in hospitals.

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