

# بسم الله الرحمن الرحيم





# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



# جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
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## يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



# **Role of diffusion-weighted MRI in diagnosis and post therapeutic follow up of colorectal cancer.**

*Thesis*

*Submitted for partial fulfillment of MD. Degree in Radiodiagnosis*

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## List of abbreviations

<b>MRI</b>	Magnetic resonance imaging
<b>DWI</b>	Diffusion weighted images
<b>ADC</b>	Apparent diffusion coefficient
<b>CRC</b>	Colorectal carcinoma
<b>CEA</b>	Carcinoembryonic antigen
<b>FOV</b>	field-of view
<b>ROI</b>	Region of interest
<b>CRs</b>	complete responders
<b>TN</b>	true negative
<b>FN</b>	false negative
<b>FP</b>	false positive
<b>TP</b>	true positive
<b>PPV</b>	positive predictive value
<b>NPV</b>	Negative predictive value
<b>EAS</b>	External anal sphincter
<b>IAS</b>	Internal anal sphincter
<b>FAP</b>	Familial adenomatous polyposis
<b>DCBE</b>	Double-contrast barium enema
<b>FOBT</b>	Fecal occult blood test
<b>FIT</b>	Fecal immunochemical test

<b>IFOBT</b>	Immunochemical fecal occult blood test
<b>AJCC</b>	American Joint Committee on Cancer
<b>5-FU</b>	5-Flurouracil
<b>Anti VEGF-A</b>	Anti-vascular endothelial growth factor-A
<b>Anti-EGFR</b>	Anti-pidermal growth factor receptor antibodies
<b>OS</b>	Overall survival
<b>SNR</b>	Signal to noise ratio
<b>CRM</b>	Circumferential resection margin
<b>EMVI</b>	Extramural Vascular Invasion
<b>MRC</b>	Magnetic resonance colonography
<b>MDCT</b>	Multidetector computed tomography
<b>PET</b>	Positron emission tomography
<b>18FDG-PET/CT</b>	18 fluoro-deoxy-glucose positron emission tomography computed tomography
<b>CRT</b>	Chemoradiotherapy
<b>mrTRG</b>	MRI tumor regression grade
<b>RECIST</b>	Response Evaluation Criteria in Solid Tumors
<b>TME</b>	Total mesorectal excision
<b>MRF</b>	Mesorectal fascia



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# INTRODUCTION

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Primary colorectal carcinoma (CRC) is a common cancer and one of the deadliest tumors in the whole world. The risk increases with age with almost three-quarters of cases seen in people aged 65 or more. Other risk factors include obesity, family history, cigarette smoking and chronic inflammatory bowel disease. **(Taylor and plumb, 2015)**

It is known that over half of all CRCs arise within the sigmoid colon or the rectum; the rectum alone accounts for one-third of cases. Overall 5-year survival is about 50%. The main prognostic factors include local tumor stage, lymphatic or vascular invasion, tumor differentiation (grade) and preoperative assessment of carcinoembryonic antigen (CEA). **(Taylor and plumb, 2015)**

Rectal cancer and colon cancer are currently treated slightly in different ways. The main treatment for both is surgical excision, but in the rectum it is more difficult to get adequate clearance margins to prevent local recurrence whilst avoiding significant complications. The pelvic position and static nature of the rectum, however, make it amenable to chemoradiotherapy that has been shown to reduce local recurrence in later-stage disease. **(Kim et al., 2009)**

Diffusion-weighted MRI (DWI) is a functional MRI that uses differences in the extracellular movement of water proton to discriminate between tissues of varying cellularity. In tissue with normal cellularity, water protons can diffuse freely which result in loss of signal on DWI, while in tissue with increased cellularity (Tumor) the diffusion of water is restricted resulting in high signal on DWI. **(Lambregts et al., 2011)**

Since apparent diffusion coefficient (ADC) of tumor's water content can show the extent of necrosis, a correlation of ADC with response to treatment can be done. (*Dzik-Jurasz et al., 2002*).

### **Aim of the work**

The purpose of this study is to show the role of diffusion weighted MRI (DWI) in initial assessment and grading of colorectal carcinoma and evaluation of its response to chemoradiotherapy.