MR Enterography in the Management of Patients with Crohn'sDisease

Essay

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بسم الله الرحمن الرحيم

(قالوا سبحانك لا علم لنا الا ما علمتنا انك انت العليم الحكيم)

صدق الله العظيم

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Abbreviation

AI …….. Active inflammation

CD ……. Crohns disease

CDAI …… Crohns disease activity index

DWI ……. Diffusion weighted image

DCE- MRI ……. Dynamic contrast enhanced MRI

FLASH……..Fast low angle shot

FIESTA …… Fast imaging employing Steady state acquisition

FISP ……Fast imaging with steady state free precession

GIT ……. Gastrointestinal tract

HASTE ……..Half-Fourier Acquisition Single –shot Turbo-spin-Echo

NSF …… Nephrogenic systemic fibrosis

IBD …… Inflammatory Bowel Disease

IVC …… Inferior Vena Cava.

MRE …… Magnetic Resonance Imaging

SMA ……Superior Mesenteric Artery

SMV …… Superior Mesenteric Vein

SNR ……. Signal to Noise Ratio.

SSFP ……..Steady State free Precession

3D ……..Three dimensional

T1WI …… T1 Weighted Image

T2WI…….. T2 Weighted Image

TPN ……Total Parental Nutrition

THRIVE …… T1wieghted High Resolution Isotropic Volume Examination

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Introduction

- Crohn's disease is an inflammatory bowel disease characterized by asymmetrical mucosal and transmural inflammation of the gastrointestinal tract. The disease can affect any part of the gastrointestinal tract, with small bowel involvement seen in 80% of patients Disease incidence and prevalence in industrial countries are estimateated five per100,000 and 50 per 100,000respectively.**(Jaffe et al.,2007)**

- Review of epidemiologic studies has shown that the incidence of the disease appears to be increasing. The bimodal distribution of age at diagnosis classically refers to a peak incidence in the second and third decades (15–25 years old), followed by a second smaller peak in the sixth or seventh decade. Early age at diagnosis has been associated with a family history of Crohn's disease and a more complicated disease course with greater small-bowel involvement and higher frequency of surgery .**(polito et al.,1996)**

- Barium small bowel follow-through studies and enteroclysis have been the traditional radiologic standards of reference for assessment of the small bowel. However, both techniques may fail to clearly depict extraluminal complications such as fistula and abscess formation, and both have limited sensitivity, particularly when there are overlapping pelvic loops. In addition, there is a radiation burden with both techniques**.** Magnetic resonance (MR) imaging was useful for the evaluation of the small intestine, this modality has become increasingly important in the diagnosis, assessment, and exclusion of small bowel disease .**(jaffe et al.,2007)**

- Magnetic resonance imaging (MRI) has an increasing diagnostic impact on patients suffering from inflammatory bowel disease. Its attributes include: high soft tissue contrast ,static and dynamic imaging capabilities, direct multiplanar imaging capabilities, and the use of non-ionizing radiation.**(Horsthuis et al.,2005)**

- MR would be the preferable diagnostic procedure, dueto the absence of ionizing radiation and its easy comparability,for the initial evaluation and the follow-up ofthese patients that need to repeat examinations during their life .**(Furukawa et al.,2004)**

- A more comfortable and highly sensitive examination of the small bowel would therefore increase patient's acceptance of repeated examinations, often necessary in patients with Crohn's disease. The oral approach using the oral approach (MRenterography), which is more acceptable to the patient than the intubation-infusion method (MR enteroclysis),which is less well tolerated in the absence of conscious sedation.**(Maglinte et al.,2000)**

Aim of work

- Describe how to perform MR Enterography and interpretation of its results in the assessment and management of small –bowel Crohn's disease.

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Basic Anatomy of the Small Bowel

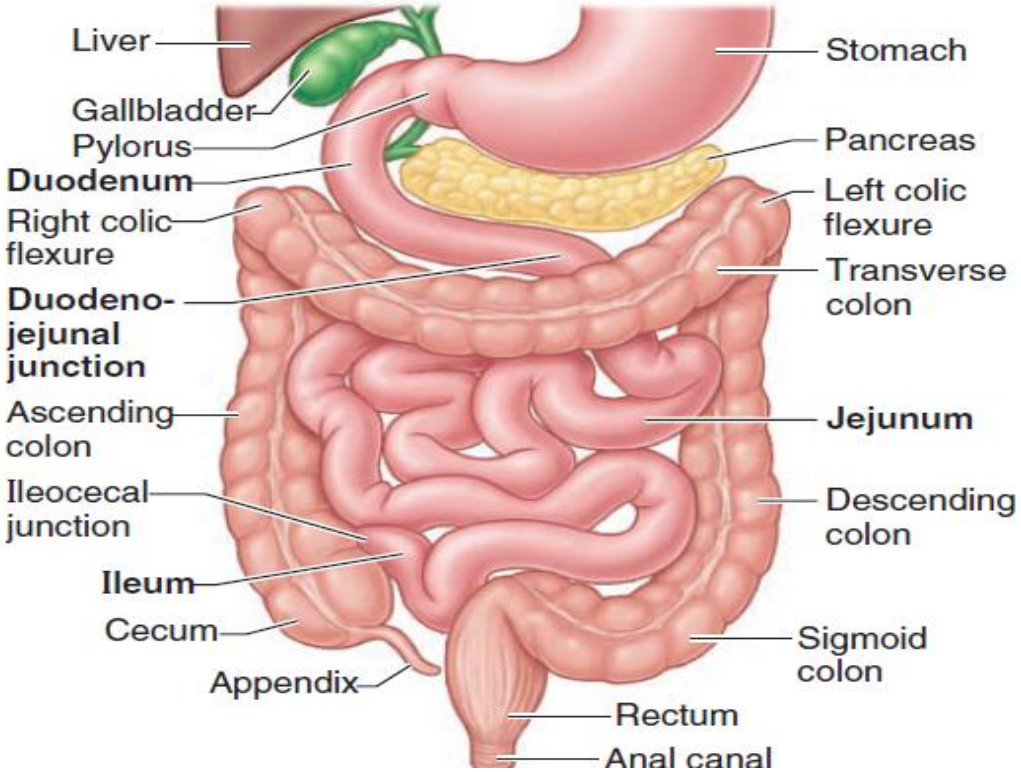

Fig . (1) : Small and large intestine in situ quoted from *(Moore et 2015).*

The small intestine (Fig. 1) is an intra-peritoneal structure, except for the duodenum, which is retroperitoneal. The total length of the small bowel measures 4 to 5 m in autopsy samples; in vivo its length is approximately 2. 5 to 3 m *(quoted from : Umschaden et al; 2000).*

It is consisting of the duodenum, jejunum and ileum, extends from the pylorus of the stomach to the ileo-cecal junction where the ileum joins the cecum, the first part of the large intestine. ***(Moore et al; 2015).***

The duodenum:

- It is a roughly C-shaped tube, which runs from the pyloric canal to the jejunum. For most of its curved course it has the pancreas on its inner margin **(Fig. 2).** For descriptive purposes it is divided into four parts, although there is no structural change between each part ***(Dominic B; 2007).***

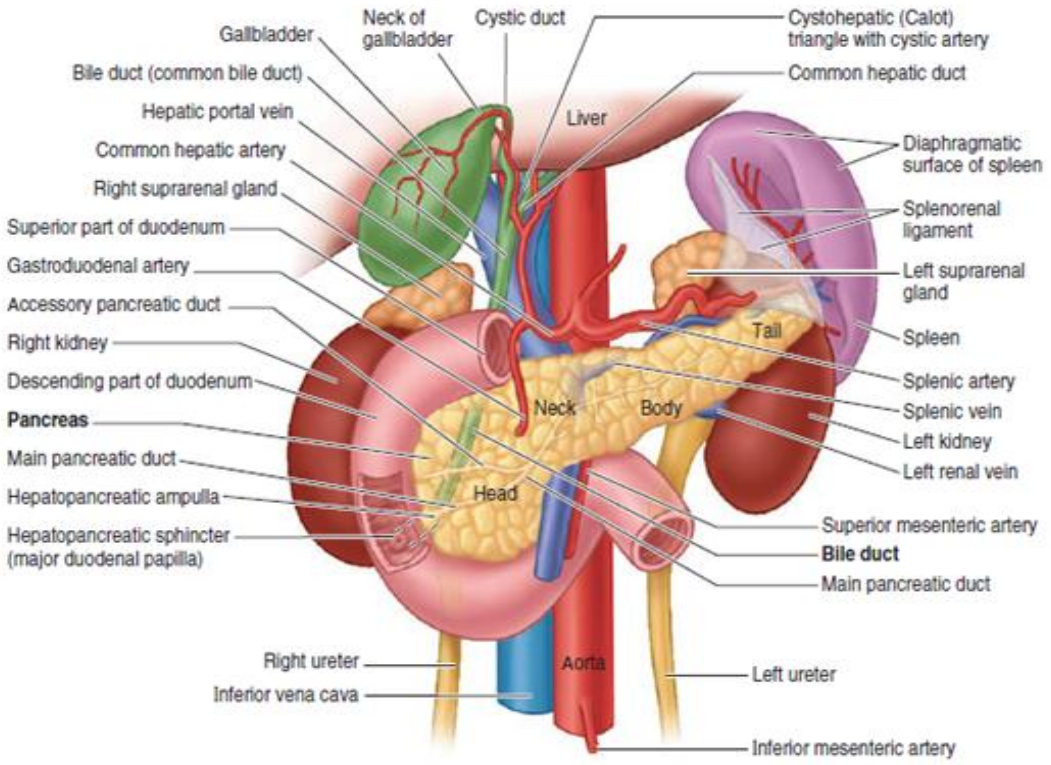

Fig.(2) : Relations of duodenum(quoted from: Moore et al ;2015).

The four parts are:-

***1*-Superior (first) part:** short (approximately 5 cm), mostly horizontal, and lies anterolateral to the body of L1 vertebra.

2-Descending (second) part: longer (7 to 10 cm) and runs vertically along the right sides of the L2 and L3 vertebrae , curving around the head of the