CT Enterography in Evaluation of Different Small Bowel Diseases

Essay

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تصوير الأمعاء الدقيقة بالأشعة المقطعية ودوره فى تشخيص الأمراض المختلفة

توطئه للحصول على
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Summary and Conclusion

CT enterography is a powerful tool in the evaluation of small bowel disease. Adequate luminal distention can usually be achieved with oral ingestion of a large volume of neutral enteric contrast material in the evaluation of diseases affecting the mucosa and bowel wall, thereby obviating nasogastric intubation and making CT enterography a useful, well-tolerated study in this setting ***(Paulsen et al., 2006).***

The differential diagnosis of the abnormal small bowel is extensive, including variants and pitfalls, inflammatory conditions, and neoplasms. Optimal evaluation of an abnormal small bowel loop is facilitated when the small bowel is well distended, IV contrast material has been administered, and thin-section CT is used. CT enterography should be used when a clinical concern exists for small-bowel disease. When an abnormal small-bowel loop is recognized, a pattern approach as discussed herein can be used to narrow the differential diagnosis ***(Macari et al., 2007).***

MDCT enterography significantly improved the diagnostic confidence of observers for the interpretation of small bowel obstruction as compared with the use of axial CT images alone. In addition, the use of MDCT enterography was superior to conventional fluoroscopic findings with the use of gastrografin as an oral contrast agent. In appropriately selected patients, the use of gastrografin as an oral contrast agent for 3DCT is a safe and feasible technique for precise evaluation of known or suspected small bowel obstruction ***(Hong et al., 2009).***

Small bowel Crohn's disease can be effectively and efficiently evaluated with CTE. It detects complications of CD with better accuracy than SBFT and, in some cases, is better at detecting small bowel involvement as well. Important CTE

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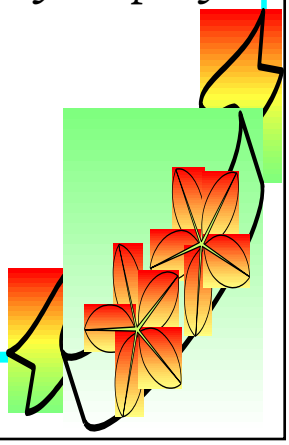

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List of abbreviations

2D	Two Dimensional.
3D	Three Dimensional.
CD	Crohn's Disease
CT	Computed Tomography.
CTA	CT Angiography.
CTE	CT Enterography.
Fig.	Figure.
GIT	Gastro-Intestinal Tract.
GISTs	Gastro-Intestinal Stromal Tumors.
HU	Hounsfield Unit.
IV	Intra-venous.
KV	Kilo-voltage.
mAs	Milli-Ampere per second
MDCT	Multi-Detector CT.
mL	Milli-Litre.
mL/s	Milli-Litre per second.
MPR	Multi-planer Reformation.
ms	Milli-second.
MSCT	Multi-slice CT.
No.	Number.
SBFT	Small Bowel Follow Through.
SBO	Small Bowel Obstruction.
SMA	Superior Mesenteric Artery.
SMV	Superior Mesenteric Vein.
TB	Tuberculosis.

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Introduction

CT enterography is a new imaging modality that has distinct advantages over conventional CT, wireless capsule endoscopy, and barium examination. CT enterography is noninvasive and allows rapid mapping of disease activity before endoscopy and in cases where the endoscope cannot reach the diseased segment. CT enterography is readily available, is operator independent, and allows evaluation of extraenteric complications of small bowel disease ***(Tochetto and Yaghmai, 2009).***

Compared with the traditional small bowel follow-through examination, CT enterography has several advantages: it displays the entire thickness of the bowel wall, it allows examination of deep ileal loops in the pelvis without superimposition, and it permits evaluation of the surrounding mesentery and perienteric fat. CT enterography also allows assessment of solid organs and provides a global overview of the abdomen ***(Paulsen et al., 2006).***

This technique utilizes multidetector scanners with high spatial and temporal resolution; multiplanar reconstructions; and large volumes of enteric contrast to provide bowel distension ***(Huprich and Fletcher, 2009).***

Enteric contrast agents for cross-sectional enterography have been examined by multiple investigators. Because water can be absorbed over the length of the small bowel, agents that prohibit small bowel resorbtion are generally preferred ***(Fletcher, 2009)***.

Several oral negative contrast media can be used in this technique as polyethylene glycol ***(Fletcher, 2009)*** iso-osmtic mannitol ***(Zhang et al., 2005)***, or lactulose solution ***(Arslan et al., 2005).*** Also 0.1% barium suspension can be used ***(Baker et***

al., 2009), combined with the use of intravenously administered contrast material ***(Paulsen et al., 2006).***

CT enterography can be useful in the diagnosis of several small bowel diseases as Crohn's disease, ulcerative colitis, small bowel tumors, celiac disease ***(Paulsen et al., 2006)***, obscure gastrointestinal bleeding ***(Huprich et al., 2008),*** post-operative adhesions, mesenteric ischemia and intussusception ***(Zhang et al., 2005).***

Aim of the Work

The aim of this study is to emphasize the role of CT enterography in evaluation of different small bowel diseases.

Anatomy of the Small Bowel

Gross Anatomy:

The small intestine is a convoluted tube, extending from the pylorus to the ileo-colic valve, where it ends in the large intestine. It is about 7 meters long, and gradually diminishes in size from its commencement to its termination. It is surrounded above and at the sides by the large intestine; a portion of it extends below the superior aperture of the pelvis and lies in front of the rectum. It is in relation, in front, with the greater omentum and abdominal parietes, and is connected to the vertebral column by a fold of peritoneum, the mesentery. The small intestine is divisible into three portions: the duodenum, the jejunum, and the ileum ***(Gray, 2008)*.**

The Duodenum (Fig. 1-1) is the shortest (25 cm.), the widest, and the most fixed part of the small intestine, and has no mesentery, being only partially covered by peritoneum. Its course presents a remarkable curve, somewhat of the shape of an imperfect circle, so that its termination is not far removed from its starting-point ***(Gray, 2008)*.**

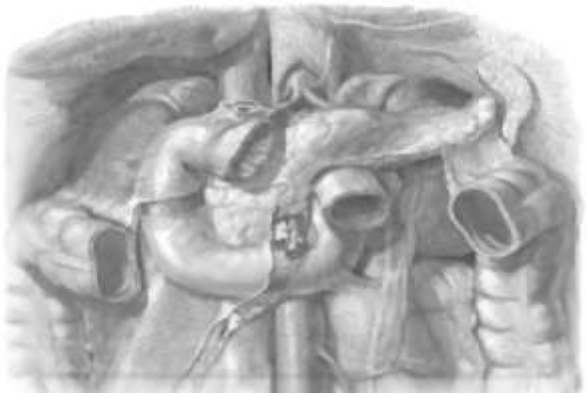

Fig. 1-1: Illustration showing the duodenum and pancreas ***(Quoted from Netter, 2008)*.**