Role of virtual Endoscopy using MDCT in detection & evaluation of gastric Pathologies

Essay

Submitted for partial fulfillment of master degree in Radiodiagnosis

Presented by

Mohamed Mohamed Hassan Gheith
(M.B.B.Ch)

Under supervision of

Dr. Osama Mohamed Abd El hamid Hetta
Ass.Prof. of Radiodigonosis
Faculty of medicine
Ain shams university

Dr. Hossam Moussa sakr
Lecturer of Radiodiagnosis
Faculty of medicine
Ain shams university

Faculty of medicine
Ain shams university
2010

Acknowledgement

First and foremost I feel always deeply indebted to Allah, the Most Gracious and the Most Merciful.

It was an honor to work under the supervision of Dr. Osama Mohamed Abd El hamid Hetta Ass.Prof. of Radiodigonosis. Faculty of medicine Ain shams university. no words would suffice to express my deepest gratitude to him for his kind co-operation and careful supervision.

I would like to express my great thanks to Dr. Hossam Moussa sakr Lecturer of Radiodiagnosis. Faculty of medicine Ain shams university for his kind guidance and generous supervision.

Special thanks for my wife, my son 'omar' and my brothers for their great help and support.

CONTENTS

List of figures

List of figures (Cont.)

List of tables

List of Abbreviations

AGC	Advanced gastric cancer
CT	Computed tomography
EGC	Early gastric cancer
EUS	Endoscopic ultrasound
FOV	Field of view
GISTs	Gastrointestinal stromal tumors
GU	Gastric ulcer
JRSGC	Japanese Research Society for Gastric Cancer
MALT	Mucosa-associated lymphoid tissue
MDCT	Multi detector computed tomography
MIP	Maximum intensity projection
SRC	Signet ring carcinoma
SR	Surface rendering
UGIE	Upper gastrointestinal endoscopy
UGIS	Upper gastrointestinal series
VG	Virtual gastroscopy
VR	Volume rendering
WHO	The World Health Organization
2DMPR	Tow dimensional multiplaner reformation
3D	Three dimensional

Introduction
&
AIM OF THE WORK

Introduction

Recent advances in computed tomographic (CT) technology, three dimensional imaging software and cheaper data storage capacity have made faster, simpler and more accurate gastric imaging available. Two dimensional multiplaner reformation and CT gastrography including virtual gastroscopy and transparency rendering provide multiple cross-sectional imaging and gastroscopic viewing in the same data acquisition; they are also helpful in detection and evaluation of gastric malignancies and a variety of inflammatory conditions that affect the stomach. **(Oto et al, 2002)**

The term virtual endoscopy refers to using either spiral computed tomography or magnetic resonance scanning combined with computer technology to produce high resolution two and three dimensional imaging**. (Brambs et al, 2003)**

Virtual gastroscopy allows detection of subtle mucosal changes and differentiation of mucosal lesions from sub- mucosal lesions in the same way as conventional gastroscopy. **(Horton et al, 2004)**

Virtual gastroscopy has several advantages over conventional gastroscopy: it has a wider field of view than conventional gastroscopy and it has no blind points because retrospective reformation is available. **(Ingram et al, 2004).**

These techniques allow non invasive assessment of gastric wall and extra gastric extent of diseases and accurate staging of gastric cancer and provide extraluminal information such as presence of lymphadenopathy & distant metastasis**. (Bhandri S et al, 2004)**

Tow dimensional MPR (multiplaner reformation) and CT gastrography including virtual gastroscopy & Transparency rendering can provide the comprehensive information which otherwise would be obtained only by performing four different examinations including gastroscopy, upper gastrointestinal series, endoscopic ultra sound and CT. **(Kim JH et al, 2006)**

AIM OF THE WORK:

To emphasis the role of virtual gastroscopy using MDCT in detection and evaluation of different gastric pathologies.

Anatomy

Gross anatomy of the Stomach

The stomach is a muscular, elastic, pear-shaped bag, lying crosswise in abdominal cavity beneath the diaphragm, it is about 12 inches long and 6 inches wide at its widest point and its capacity varies from about 30 ml at birth increasing to 1000 ml at puberty and about 1500 ml in adults **(Saladin & Kenneth, 2004).**

It varies in size and shape with the volume of its contents, with erect or supine position and even with inspiration and expiration and with build of subject **(Ryan, et al, 2004).**

It is the most dilated part of the digestive tube and is situated between the end of the esophagus and the beginning of the small intestine **(Snell, 2004).**

It lies in the epigastric, left hypochondriac and umbilical regions of the abdomen and occupies a recess bounded by the upper abdominal viscera and completed in front and on the left side by the anterior abdominal wall and the diaphragm (Figure 1). **(Borley, 2005).**

The lowest part of the body of the stomach can even extend into the greater pelvis. The pylorus lies at the level of the lower border of the body of the L1 vertebra **(Saladin & Kenneth, 2004).**

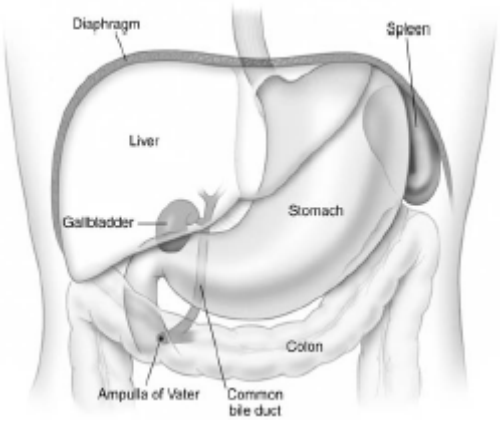

FIGURE (1): Anatomic relationship of the stomach **(Quoted from Haile, 2004).**

Parts of the stomach:

The main divisions of the stomach are the following:

Cardia

The cardia is the portion of the stomach surrounding the cardio-esophageal junction or cardiac orifice.

Fundus

The fundus is the enlarged portion to the left and above the cardiac orifice and is marked off from the body by a plane passing horizontally through the cardiac orifice.

Body

The body or corpus is the central part of the stomach between the cardia and the incisura**.**

Pyloric part

The pyloric part is divided into pyloric antrum and pyloric canal which is the lower or distal portion of the stomach, the outlet of the stomach (pyloric orifice) is marked on the surface of the organ by the pyloric constriction and surrounded by a thickened ring of gastric circular muscle (the pyloric sphincter) which is a very powerful sphincter which regulates the passage of chyme into the duodenum **(Borley, 2004).**

There is a well marked notch on the lesser curve nearer its pyloric end than cardiac end called the incisura angularis which separate the body of the stomach from the pyloric portion (Figure 2)**. (Richard L, et al, 2007).**

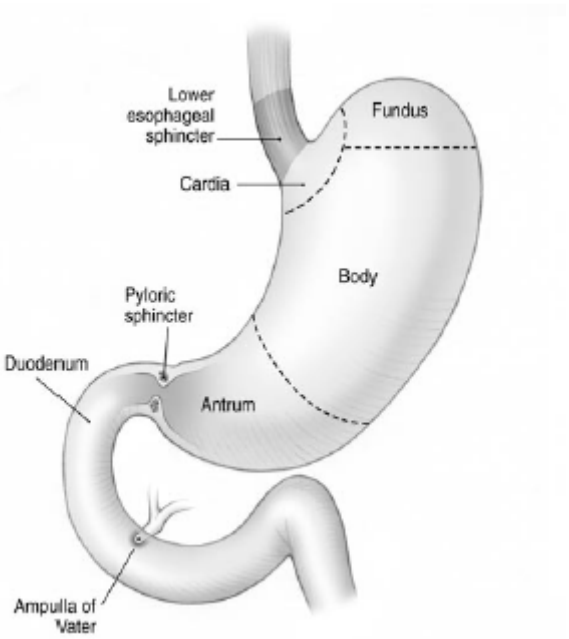

FIGURE (2): Parts of the stomach. (Quoted from Haile, 2004).