



**Role of Dual energy CT in diagnosis
and preoperative staging of gastric
carcinoma**

Essay

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Degree
In Radiodiagnosis*

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Abstract

Introduction: Gastric cancer is one of the most common cancers worldwide with approximately 989,600 new cases and 738,000 deaths per year, accounting for about 8 percent of new cancers. A good prognosis for patients with this disease requires choosing the correct therapy, and making the right therapeutic choice requires accurate preoperative staging. The recent development of multi-detector row CT (MDCT) scanner has allowed imaging with a thinner section collimation, translating into increased quality on transverse computed tomography scans and multiplanar reconstruction, contributing to the improved accuracy of TNM staging. Nowadays MDCT has been widely used in preoperative staging of gastric cancer. However there are still some controversial problems.

Aim of the Work: The aim of the study is to evaluate the clinical utility of dual energy spectral CT (DEsCT) in detection and pre-operative staging of gastric carcinoma.

Methodology: Gastric carcinoma is still considered the second most frequent cause of cancer death worldwide, though the incidence and mortality decreased remarkably over the former 50 years.

Conclusion: Stomach cancer has a multifactorial etiology whether dietary, genetic, environmental and behavioral where *Helicobacter pylori* (*H. pylori*) infection plays the major role in the pathogenesis. On the other hand; balanced diet comprising fruits and vegetables, improved sanitation and hygiene, screening and treatment of *H. pylori* infection, and follow-up of precancerous lesions are considered preventive tools

Keywords: Role of Dual energy CT in diagnosis and preoperative staging of gastric carcinoma.



وَقُلْ اَعْمَلُوا فَسَيَرَى اللّٰهُ
عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ

قروس قبتلا مقر ؤي لا 105



صَلَّى اللّٰهُ
عَلَيْهِ وَعَٰلِهِ
وَاٰلِهٖ وَسَلَّمَ





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List of Abbreviations

| ABBREVIATION | NAME |
|--------------|--|
| AD | Autosomal dominant |
| AMEIs | advanced monoenergetic images |
| BMI | Body mass index |
| CC | Costal cartilage |
| CNR | Contrast noise ratio |
| C.T | Connective tissue |
| DEsCT/DECT | Dual energy spectral CT |
| DJ flexure | Duodeno-jejunal flexure |
| DS-DECT | Dual-source dual-energy |
| EMR | Endoscopic mucosal resection |
| EUS | Endoscopic ultrasound |
| FAP | Familial adenomatous polyposis |
| FDA | Food and Drug Administration |
| FOV | Field of view |
| GC | Gastric carcinoma |
| GDA | Gastroduodenal artery |
| GEJ | Gastro-oesophageal junction |
| GERD | Gastro-oesophageal reflux disease |
| HNPCC | Hereditary non-polyposis colorectal cancer |
| HU | Hounsfield unit |
| LGA | left gastric artery |
| MAC | Mucinous adenocarcinoma |
| MD | Material decomposition images |
| MDCT | Multi-detector computed tomography |
| MRI | Magnetic resonance imaging |
| nIC | Normalized iodine concentration |
| PEIs | poly-energetic images |
| PET | Positron emission tomography |
| PV | Portal vein |
| RGA | Right gastric artery |
| SMV | Superior mesenteric vein |
| SRC | Signet ring cell carcinoma |
| SS-DECT | Single-source dual-energy CT |

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INTRODUCTION

Gastric cancer is one of the most common cancers worldwide with approximately 989,600 new cases and 738,000 deaths per year, accounting for about 8 percent of new cancers (*Bohle et al., 2011*). A good prognosis for patients with this disease requires choosing the correct therapy, and making the right therapeutic choice requires accurate preoperative staging (*Kwon, 2011*). The recent development of multi-detector row CT (MDCT) scanner has allowed imaging with a thinner section collimation, translating into increased quality on transverse computed tomography scans and multiplanar reconstruction, contributing to the improved accuracy of TNM staging (*Li et al., 2012*). Nowadays MDCT has been widely used in preoperative staging of gastric cancer. However there are still some controversial problems.

Regarding the T-staging, the results from previous reports on the usefulness of CT for T-staging of gastric cancer have shown large variations (overall accuracy rates of 43–82% (*Shimizu et al., 2005*). Over-diagnosis sometimes happens when the interface of the lesion and peripheral tissue is blurred by an inflammatory reaction.

Aside from tumor location and depth of infiltration, lymph node status is of particular interest in the pretherapeutic staging of tumors, especially to establish different therapeutic strategies. In early gastric cancer the presence or absence of lymph-node metastases is a critical determinant of whether less invasive treatment, such as endoscopic mucosal resection, can be performed (*Jemal and Bray, 2011*).

In advanced carcinoma, lymph node status is an important prognostic factor not only regarding long-term survival, but also planning the optimal