

# CT ENTEROGRAPHY (CTE) AFTER ORAL PREP WITH A LHV ORAL CONTRAST TO EVALUATE PATIENT WITH ZOLINGER-ELLISON SYNDROME

## Introduction

CT is the most widespread tool for the localization and staging of pancreatic endocrine tumors. It has the advantage of being widely available and is not subject to some of the difficulties encountered with ultrasound, such as potentially poor visibility and operator dependence. In cases of Gastrinomas, moreover, the tumor could arise in or outside the pancreas in the Gastrinomas triangle. CT will show the pancreas and the pancreatic triangle as well. It is important, therefore, that the CT technique be optimized.

The pre-contrast scan is performed to identify the level of the pancreas. Following intravenous administration, biphasic scanning is recommended, as functioning tumors are small and subtle with low inherent contrast between the tumor and surrounding pancreas. They are usually isodense with the pancreas on pre-contrast images. As in the angiography literature, the majority of islet cell tumors are hypervascular and will best be seen after intravenous injection of contrast medium. The best phase for the demonstration of those hyper-attenuating small lesions, however, is unclear. Some literature reports that the tumor-to-pancreas contrast is greatest on arterial phase images compared to portal venous phase imaging. Others, however, have found the portal venous phase significantly more helpful in identifying islet cell tumors. At present, therefore, Dr. Youssef and colleagues at the Al-Jahra Hospital, Kuwait, recommend biphasic imaging following intravenous injection of contrast medium to optimize the sensitivity of the technique. Narrow window settings may also help to improve detection.

## Patient History

A 21-year-old female presented with diabetes mellitus, hyperlipidemia, with a long history of hyperacidity and repeated stomach ulcers. Gastroesophageal reflux required prior dilatation of esophageal stricture. Laboratory investigation demonstrated a high Gastrin level.

## Diagnostic Goal

Patient was referred to CT for evaluation of pancreas and upper GI tract for underlying causes. Gastrinoma was suspected, and the goal was potential localization of the tumor.

## Exam Procedure

*CTE with MDCT, IV contrast and VoLumen® (barium sulfate suspension) 0.1% w/v oral prep:* The oral prep consisted of one bottle (450 mL) of VoLumen administered 20 minutes prior to scan. The second bottle was administered 10 minutes prior to scan. The third bottle was administered just prior to the study, followed by one cup of water consumed while patient was on the table to clear VoLumen from the esophagus. CTE was performed with a 64-channel MDCT in the 64 x 0.65 mm mode. IV contrast was administered by a power injector at a rate of 3 mL/sec followed by a saline flush. A total of 150 mL of IV contrast was given without complication. Scanning was performed in pre-contrast and both arterial (30-second delay) and venous phases (70-second delay) of imaging. Review was performed on 2.5 mm axial, coronal and sagittal images and 3D volume MIP views.



**Ehab H. Youssef MD**  
Radiologist, Ministry of  
Health, Kuwait

### Member

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of North America (RSNA)

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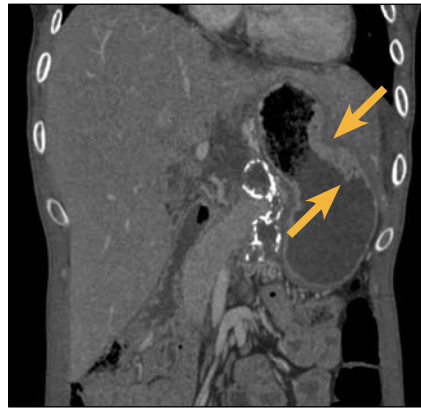
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## Findings

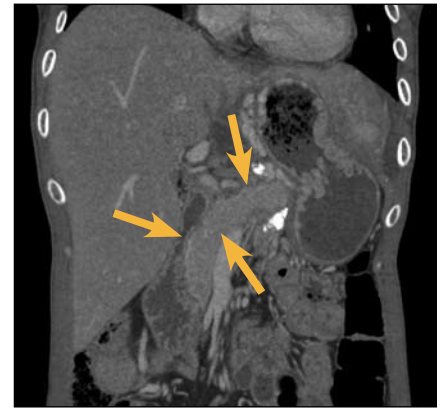
CTE showed marked, significant wall thickening of the visualized distal esophagus down to the stomach and duodenum. Focal thickening and enhancing conglomerate nodules with polypoidal outgrowth were also observed. Diffuse hypodense edematous tissue was seen surrounding the stomach, filling the lesser sac and sweeping into the under-surface of the liver (Figures 1-2). Multiple calcified cystic lesions relating to the pancreas were noted anteriorly and posteriorly. The pancreas was normal (Figure 3). Direction of the endoscopic biopsy to the posterior stomach wall was done for Gastrinoma localization.



**Figure 1.** Axial CT showing enhancing masses in the stomach wall (arrows).



**Figure 2.** Coronal reconstruction showing the enhancing masses in the stomach wall (arrows).



**Figure 3.** Coronal reconstruction showing normal pancreas with no focal lesions (arrows).

## Conclusion

CTE with VoLumen LHV oral contrast helped enable detection of GIT abnormality during pancreas assessment. In this study, Dr. Youssef was able to exclude liver metastasis and pancreatic mass. He was also able to identify a gastric wall lesion and duodenal wall lesions. These findings would have been masked if a typical hypodense (higher-density, positive) oral contrast had been used. In this facility's opinion, CTE with VoLumen as the oral contrast delivers a comprehensive, noninvasive method for evaluating the bowel and extraluminal extent of disease activity. In the same study they can review other extraluminal lesions in cases of functional pancreatic islet cell tumors.



### E-Z-EM, INC.

#### Global Headquarters

1111 Marcus Avenue, Suite LL26  
 Lake Success, NY 11042 USA  
 Phone: 516-333-8230  
 Toll Free: 1-800-544-4624 (US only)  
 Fax: 516-302-2919  
 www.ezem.com

Manufactured by: E-Z-EM, INC., Lake Success, NY 11042 USA

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