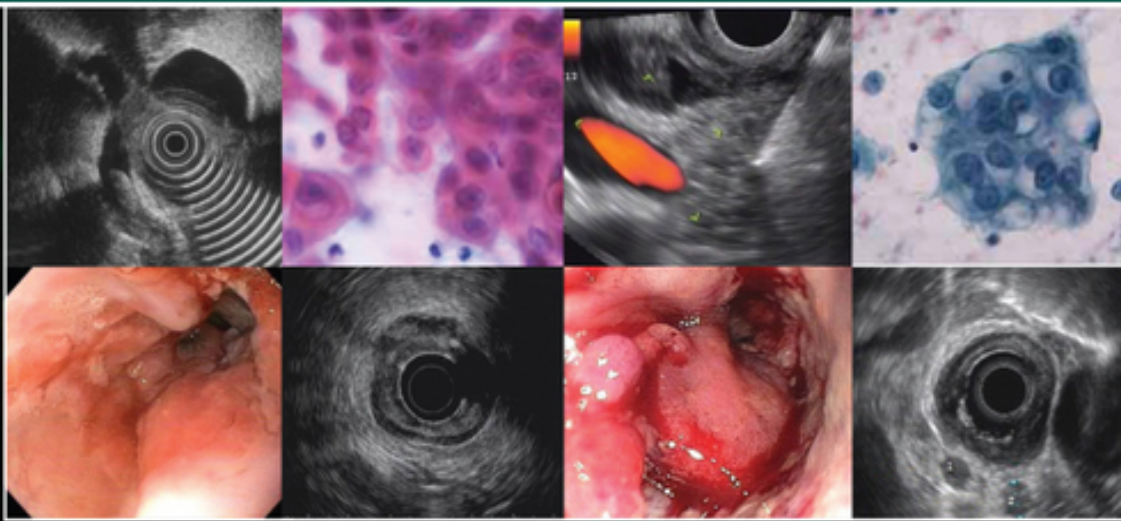


# Atlas of Endoscopic Ultrasonography



EDITED BY

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# **Table of Contents**

**Cover**

**Dedication**

**Title page**

**Copyright page**

**List of Contributors**

**Preface**

## **Part 1: Normal EUS Anatomy.**

### **1 Normal Human Anatomy**

**Introduction**

**Normal EUS anatomy from the esophagus**

**Normal EUS anatomy from the stomach**

**Normal EUS anatomy from the duodenum**

**Normal EUS anatomy from the rectum**

**Vascular videos**

### **2 Esophagus: Radial and Linear**

**Layers of the esophageal wall**

**Normal radial extraesophageal anatomy.**

**Normal linear thoracic anatomy.**

### **3 Normal Mediastinal Anatomy by EUS and EBUS**

**Introduction**

**Anatomical definitions**

**Equipment**

**Technique**

**Complications and safety**

**Conclusions**

### **4 Stomach: Radial and Linear**

### **5 Bile Duct: Radial and Linear**

**Normal bile duct anatomy**

**Normal anatomy of the bile duct and gallbladder with radial echoendoscope**

**Normal anatomy of the bile duct and gallbladder with linear echoendoscope**

### **6 EUS of the Normal Pancreas**

**Radial examination of the pancreas**

**Linear examination of the pancreas**

**Endosonographic appearance of the normal pancreatic parenchyma**

### **7 Liver, Spleen, and Kidneys: Radial and Linear**

**Introduction**

**Liver**

**Spleen**

*Kidney*

*Adrenal glands*

## **8 Anatomy of the Anorectum: Radial and Linear**

*Introduction*

*Examination technique*

*Normal anatomy*

## **Part 2: Upper and Lower GI EUS**

### **9 Esophageal Cancer**

*Introduction*

*American Joint Committee on Cancer*

*staging guidelines for esophageal cancer*

*2010 and implications for endosonographer*

*Role of EUS in staging of esophageal cancer*

*Limitations*

*Impact of EUS staging on management*

*Technique*

### **10 Esophageal Motility Disorders**

*Esophageal motility*

*Catheter-based ultrasound imaging*

*Increased muscle thickness in esophageal motor disorder*

*Ultrasound imaging to detect longitudinal muscle contraction under physiology and pathophysiology*



## **11 Malignant Mediastinal Lesions**

## **12 Benign Mediastinal Lesions**

## **13 Gastric Cancer**

## **14 Gastric and Esophageal Subepithelial Masses**

**Introduction**

**Lipoma**

**Carcinoid tumors**

**Granular cell tumor**

**Duplication cyst**

**Pancreatic rest (heterotopic pancreas)**

**Varices**

**Gastrointestinal stromal cell tumors and leiomyomas**

**Extrinsic compression lesions**

## **15 Anorectal Neoplasia**

**Colorectal cancer staging by EUS**

**Endoscopic ultrasound for local recurrence of colorectal carcinoma**

**Submucosal tumors of the colorectal wall**

## **16 Anal Sphincter Disease: Fecal Incontinence and Fistulas**

**Introduction**

**Fecal incontinence**

*Perianal fistula*

## *17 Other Pelvic Pathology*

## *18 Vascular Anomalies and Abnormalities*

*Introduction*

*Aortic arch anomalies*

*Vascular calcification and plaques*

*Aneurysms and pseudoaneurysms*

*Venous thrombosis*

*Dieulafoy lesions*

*Neoplasms*

*Miscellaneous aberrancies*

## *Part 3: Pancreatico-biliary*

## *19 Duodenal and Ampullary Neoplasia*

## *20 Biliary Tract Pathology*

## *21 Gallbladder Pathology*

*Introduction*

*Gallbladder stones*

*Gallbladder polyps*

*Gallbladder carcinoma*

## *22 Pancreatic Adenocarcinoma*

*Introduction*

**Tumor identification and diagnosis via fine needle aspiration**

**Evaluation of vascular invasion**

**Evaluation of peripancreatic lymphadenopathy**

**Limitations and complications of EUS in patients with pancreatic cancer**

**Conclusion**

## **23 Pancreatic Malignancy (Non-adenocarcinoma)**

**Introduction**

**Endocrine pancreatic tumors**

**Primary pancreatic lymphoma**

**Solid pseudopapillary tumors**

**Acinar cell carcinoma**

**Secondary metastatic tumors**

**Summary**

## **24 Autoimmune Pancreatitis**

**Introduction**

**Endoscopic ultrasound imaging**

**EUS-FNA and EUS-TCB**

**Histologic features**

**Summary**

## **25 Pancreatic Cystic Lesions: The Role of EUS**

**Introduction**

*Pseudocyst*  
*Serous lesions*  
*Mucinous lesions*  
*Other cystic neoplasms*

## **26 Intraductal Papillary Mucinous Neoplasms: The Role of EUS**

*Introduction*  
*Clinical features*  
*Role of imaging*  
*Cross-sectional imaging*  
*Endoscopic ultrasound evaluation*  
*Management of small IPMN ( $\leq 3$  cm)*

## **27 Chronic Pancreatitis**

*Introduction*  
*Clinical overview of chronic pancreatitis*  
*Endoscopic ultrasound imaging of the normal pancreas*  
*EUS imaging in chronic pancreatitis - historical perspectives*  
*EUS imaging in chronic pancreatitis - the Rosemont Criteria*  
*Endoscopic ultrasound imaging in chronic pancreatitis - the future*

## **28 Liver Pathology**

*Introduction*  
*Cirrhosis*

*Fatty liver disease*

*Hepatic cysts*

*Neoplasms*

*Dilated intrahepatic ducts*

## **Part 4: How to Section**

### **29 How to Interpret EUS-FNA Cytology**

*Introduction*

*Technical quality of EUS biopsy material*

*Quality of the interpretation*

*Integration of pathologic and clinical  
information*

### **30 How to do Mediastinal FNA**

### **31 How to do Pancreatic Mass FNA**

*Introduction*

*The technique*

*Summary*

### **32 How to do Pancreatic Mass Tru-cut Biopsy**

*Indications*

*Device design and preparation*

*Biopsy technique*

*Summary*



## **33 How to do Pancreatic Cyst FNA**

## **34 How to do Pancreatic Pseudocyst Drainage**

**Introduction**

**Patient selection**

**Requisite instruments and accessories**

**Assessment of the pseudocyst by EUS**

**Pseudocyst puncture**

**Transmural tract dilation**

**Stent deployment**

**Post-procedure follow up**

## **35 How to do Pancreatic Cyst Ablation**

## **36 How to do Celiac Plexus Block**

**Introduction**

**Technique (Video 36.1)**

**Complications**

## **37 How to Place Fiducials for Radiation Therapy**

**Introduction**

**Equipment**

**Techniques**

**Peri-procedural care**

## **38 How to Inject Chemotherapeutic Agents**

## **39 How to do EUS-guided Biliary Drainage**

**Introduction**

**Techniques**

**Discussion**

## **40 How to do EUS-guided Pelvic Abscess Drainage**

**Introduction**

**Patient preparation**

**Devices and accessories**

**Procedural technique**

**Clinical outcomes**

**Technical limitations**

**Conclusions**

## **41 How to do Doppler Probe EUS for Bleeding**

**Background and equipment**

**Practical application of DopUS probe**

**Conclusions**

## **Index**

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*We dedicate this to our families whose support and love  
allowed us to create this atlas.*



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# ***Preface***

Learning to perform and interpret endoscopic ultrasound (EUS) requires both didactic learning and repetitive exposure to images. We presented detailed aspects of the didactic part of learning in the Gress and Savides textbook *Endoscopic Ultrasonography*. The purpose of this atlas is to allow aspiring endosonographers to visualize numerous examples of images and videos as they improve their pattern recognition of pathologic conditions. Additionally, expert authors have been asked to write a brief, less than 1000 words narrative without references, about the important concepts related to their topics.

This atlas will be of interest not only to those learning EUS, but also those who already perform EUS and want to quickly update their daily use of EUS in terms of diagnosis and therapy. Additionally, the images and videos are in a form which can be easily downloaded from the accompanying DVD in order to give presentations to others.

We are lucky to have added two expert teachers of endosonography, Brenna Bounds and John Deutsch. They bring expertise in EUS video training to the project, as well as contributing significantly from their collections. Without them, this project would not have been possible.

Our contributors are either the “first-generation” pioneers of endosonography or “second-generation” protégés of those pioneers. Their collective experience in applying endoscopic ultrasonography in the management of gastrointestinal diseases is unsurpassed. A tremendous amount of effort on the part of each individual author has led to this new atlas. We are deeply grateful to them for their outstanding collaboration.

*Frank G. Gress*

*Thomas J. Savides*

# ***Part 1: Normal EUS Anatomy***

## ***1***

### ***Normal Human Anatomy***

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## **Introduction**

The Visible Human Project at the University of Colorado has generated large volumes of human anatomy data. The original information is captured by slowly abrading away frozen human cadavers in a transaxial manner and capturing the anatomy by digital imaging. The digital data is compiled and then over the years is manipulated by scientists at the University's Center for Human Simulation to allow access to identified cross sections in any plane as well as to models which can be lifted from the data set. Details regarding the Visible Human Project and its applications to gastroenterology and endosonography have been previously described.

This atlas is fortunate to be able to use the interactive anatomy resources developed by Vic Spitzer, Karl Reinig, David Rubenstein, and others to create movies that help explain what takes place during endoscopic ultrasound (EUS) evaluations. Since EUS is a "real-time" examination, it seems reasonable to present this section primarily as "real-

time” videos. The videos can be viewed over and over, allowing endosonographers to look not only at the highlighted structures, but also at structures they might visualize during EUS that are not specifically identified on the selected video.

This chapter uses the terms “radial array orientation” to describe planar anatomy which would be found perpendicular to a line going through the digestive tract (as would be generated by a radial array echoendoscope, [Figure 1.1](#)) and “linear array orientation” for planar anatomy generated parallel to a line going through the digestive tract (as would be generated by a linear array echoendoscope, [Figure 1.2](#)).

**[Figure 1.1](#)** Visible Human Model of esophagus, stomach, and duodenum. The green circle shows a plane perpendicular to the axis and is similar to a plane developed during radial array endosonography.