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Radiology Report

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IMPORTANT

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High-Resolution CT Chest



High-resolution computed tomography (CT) of the chest, or HRCT, is a diagnostic imaging technology of significant clinical utility in the evaluation of certain pulmonary diseases. The images obtained by HRCT offer not only maximized resolution and imaging detail of the lung tissue, but also contribute useful dynamic information regarding how the lungs expand and contract when a patient breathes, as images are obtained both in inspiration and expiration.

HRCT is beneficial in the evaluation of many lung conditions, including a number of interstitial lung diseases (such as asbestosis and pulmonary fibrosis) as well as other chronic diseases, including emphysema. HRCT is useful for diagnosing and evaluating abnormal dilation of the airways, or bronchiectasis. Small airways disease, including bronchiolitis obliterans, is particularly well evaluated by HRCT.

HRCT is also beneficial in the evaluation of patients with lung transplants. For patients who require a biopsy of lung tissue for evaluation of chronic disease, HRCT offers excellent localization of lung disease such that the patient's biopsy can be targeted to the best possible region to obtain a diagnosis.

Many techniques are optimized to maximize the evaluation of lung detail on HRCT. These include using a very thin slice width (less than 2 mm), a focused field of view targeted to the lungs, and a high spatial resolution image algorithm. In order to eliminate artifacts that could limit evaluation for subtle pulmonary findings, intravenous contrast is typically not administered. The net result of these techniques is particularly high-resolution images with maximized spatial resolution of the lung tissue.

Our radiology department is proud to offer this technology to our patients. Please do not hesitate to contact us with any questions regarding high-resolution CT imaging of the chest.

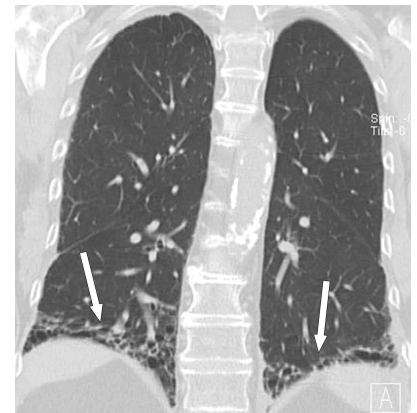
Brian D. Midkiff, M.D., M.P.H.

Indications for HRCT

- Interstitial lung disease
- Pulmonary fibrosis
- Asbestosis
- Bronchiolitis obliterans
- Lung transplant patients
- Hypersensitivity pneumonitis
- Ground glass opacities, mosaic attenuation
- Air trapping

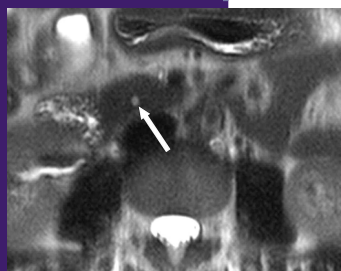


Axial imaging showing bronchiectasis (white arrow) and reticular opacities involving the lung bases (black arrows)

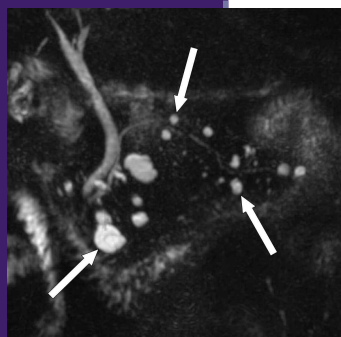


Coronal image in the same patient showing a basilar distribution of this abnormality (arrows), consistent with a type of interstitial lung disease known as usual interstitial pneumonia (UIP)

Management of the Incidental Cystic Pancreatic Lesion



Axial T2-weighted MR image showing a typical incidental 4 mm cystic lesion in the pancreas (arrow)



Coronal T2-weighted MRCP imaging showing several side-branch IPMNs arising from the pancreatic duct (arrows)

With continued improvement in both computed tomography (CT) scanning and magnetic resonance imaging (MRI) resolution, incidental findings such as small cystic pancreatic lesions are increasingly discovered. A unilocular cystic lesion in the pancreas of a patient with pancreatitis is most commonly a pseudocyst. However, what about an asymptomatic patient with an incidentally-detected small unilocular cystic lesion? Unlike in the liver and kidney, where simple cysts are fairly common and are often disregarded, a unilocular cystic lesion found in the pancreas is more likely to represent a cystic neoplasm. An exception to this rule is in patients with inherited conditions such as Von-Hippel Lindau and autosomal dominant polycystic kidney disease, as these patient groups commonly demonstrate simple, non-neoplastic pancreatic cysts.

Fortunately, the vast majority of these small incidental pancreatic cystic neoplasms are benign, especially if they are unilocular, i.e., lacking internal septations or a solid component. Moreover, a cystic lesion known as a side-branch intraductal papillary mucinous neoplasm (IPMN) has been found in many studies to be one of the most common types of asymptomatic, incidental cystic lesion. Communication of a cystic lesion with the adjacent pancreatic duct on MR cholangiopancreatography (MRCP) or CT is diagnostic of a side-branch IPMN. Other incidental unilocular cystic lesions include serous cystadenomas and rare lymphoepithelial cysts.

Studies have shown that the size of pancreatic cystic lesions correlates to the risk of malignancy. Lesions less than 3 cm are typically benign, with Castillo et al. [1] reporting that only 3.5% of lesions less than 2 cm in size were found to be cancerous. Moreover, Sahani et al. [2] found that in 86 patients with small cystic lesions, no patients with lesions 3 cm or smaller had invasive cancer, although a small number of patients did have carcinoma in situ or borderline malignant lesions. Due to higher risk of malignancy, more aggressive treatment should be considered for lesions larger than 3 cm.

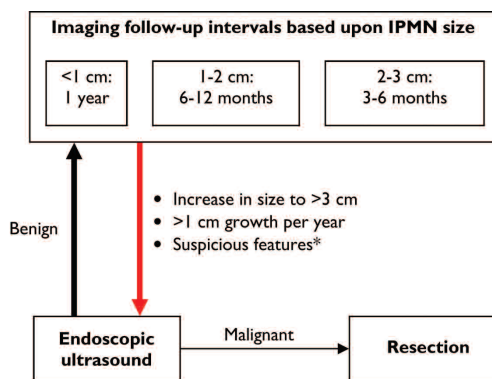
In 2006, International Consensus Guidelines for the Management of IPMN were published, and imaging follow-up guidelines for these lesions were presented [3]. In addition to increasing size, certain imaging features (such as mural nodules) raise suspicion of a malignant IPMN, and when these features are present, correlation with endoscopic ultrasound (EUS) is recommended to better characterize the lesion (see table below). EUS is a more invasive but superior imaging procedure of the pancreas combining endoscopy and ultrasound. EUS can identify a solid component within a cystic lesion with more certainty, and it can be used to perform a needle biopsy.

Unfortunately, the Consensus Guidelines panel did not come to a conclusion as to how long these lesions should be followed, but indicated that “the interval of follow-up can be lengthened after 2 years if no change” [3]. The natural history of small pancreatic cysts has yet to be fully delineated, and if transformation from a benign to a malignant lesion occurs, it may take several years [2]. Other factors such as patient age and lesion location (pancreatic head versus tail) also play a role in management.

Should CT or MRI be used to characterize and/or periodically follow-up these lesions? Sainani et al [4] found that the accuracy of CT compared well to MRI when characterizing small pancreatic cysts. However, internal cyst complexity (such as septations and mural nodules) are often better depicted on MRI, and MRI is superior in identifying communication between an IPMN and the pancreatic duct [5]. Combined with the fact that MRI has no ionizing radiation, MRI with MRCP is typically preferred for both the characterization and periodic follow-up of these indeterminate pancreatic cystic lesions.

Daniel J. Kowal, M.D.

2006 International Consensus Guidelines for Management of IPMNs



*Suspicious features: mural nodules, main pancreatic duct dilatation, intracystic solid component, thick wall or septations, patient symptoms

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2. Sahani DV et al. Radiology 2006; 238:912-929
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4. Sainani NI et al. AJR 2009; 193:722-731
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Iodinated IV Contrast Media: FAQs

Recommendations for Breastfeeding Patients?

Iodinated intravenous contrast refers to the contrast media typically used in the setting of computed tomography (CT) scans. While extremely safe, questions often arise as to the appropriateness of giving iodinated intravenous contrast to patients in certain unique clinical situations. A question that often arises is the following: what should a breastfeeding patient do after receiving iodinated intravenous contrast?

The American College of Radiology (ACR) believes that the available data suggests that it is safe for the mother and infant to continue breastfeeding immediately after receiving either an iodinated or gadolinium-based contrast agent [1]. However, the ACR recommends that “if the mother remains concerned about any potential ill effects to the infant, she may abstain from breastfeeding for 24 hours” following contrast media injection “with active expression and discarding of breast milk from both breasts during that period. In anticipation of this, she may wish to use a breast pump to obtain milk before the contrast study to feed the infant during the 24-hour period following the examination.”

If an iodinated contrast agent is administered to a breastfeeding patient, studies have shown that less than 1% of the administered maternal dose of contrast medium is excreted into breast milk, and less than 1% of the contrast medium in breast milk ingested by an infant is absorbed from the gastrointestinal tract.

“Therefore, the expected dose of contrast medium absorbed by an infant from ingested breast milk is extremely low.” Specifically, “the expected dose absorbed by the infant is less than 0.01% of the intravascular dose given to the mother.” Furthermore, this dose “represents less than 1% of the recommended dose for an infant undergoing” an iodinated contrast-enhanced imaging study.

There is no reported evidence of the theoretical risks of contrast agent-induced toxicity and allergic sensitization or reaction in newborns, but there is also little information regarding the safety of these agents in this population. It is also unclear as to what effects, if any, the iodine in contrast agents may have on fetal thyroid function. Both iodinated and gadolinium-based intravenous contrast media have plasma half-lives of approximately 2 hours and are therefore nearly completely cleared from the bloodstream within 24 hours, hence the above recommendations.

Daniel J. Kowal, M.D.

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1. American College of Radiology Manual on Contrast Media, Version 6, 2008
2. Bettmann MA. *RadioGraphics* 2004; 24:S3-S10

Residents' Corner: Meet the Chief Radiology Resident

Welcome to Residents' Corner, a column highlighting the activities and accomplishments of our outstanding radiology residents. Our independent radiology residency program has been fully accredited since its inception in 1972, and we currently have 12 residents. We are proud to announce that all 7 of our residents who recently took their written radiology and physics board exams in September 2010 successfully passed with flying colors.

In this issue, we would like to introduce our Chief Radiology Resident, Dr. Pejman Motarjem. Born in Iran and raised in Israel, Pej graduated from California State University Northridge with a Bachelor of Arts degree in Cell Biology, and with an Outstanding Achievement in Biology award. Before graduating from the Boston University School of Medicine, Pej completed a one-year research fellowship at Massachusetts General Hospital where his research focus was tissue-engineered chondrocytes and nerve repair. In addition, trained by prominent wine sommeliers, Pej worked throughout college and medical school as a bartender, and two of his original cocktails were published in a 2006 bartending book. Pej also enjoys surfing, snowboarding, and reading WW II history, as well as studying the history of medicine. Following his radiology residency, he will begin an Abdominal Imaging fellowship at Johns Hopkins University in Baltimore, MD.



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QUESTIONS, COMMENTS?

The goal of *Radiology Report* is to provide our medical community with up-to-date information regarding radiology examinations and procedures, including the latest imaging protocols available in our department. If you have a question or comment about a particular article in this issue, please feel free to contact any of our authors for further discussion. Also, if there are topics in radiology that you would like to see discussed in a future issue of *Radiology Report*, please email the editors at:

radiology.report@stvincenthospital.com

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David A. Bader, M.D.
Acting Chief of Radiology

Physician Notification System: Personal Communication

The Department of Radiology at Saint Vincent Hospital is committed to high quality patient care and customer service. We have multiple performance improvement processes in place to help assure that all patients receive the highest quality of care. One of the new initiatives introduced last year was an enhancement in referring physician communication. In addition to providing rapid availability of signed reports (within 24 hours, most the same day), we added an additional layer of personal communication.

10,000

The program set a goal of 10,000 personal verbal communications with physicians or their representatives regarding the results of an imaging exam or procedure. These contacts range from a courtesy call for a “wet reading” to emergent communication of critical results. This verbal exchange is subsequently documented in the report. We are proud to announce that we exceeded our 10,000 contacts goal for the year. The response has

been overwhelmingly positive, and we have made the program a permanent part of our service and performance improvement activities.

To help expedite the phone contacts, we also established the support role of a “facilitator” situated directly in our main reading room to be the referring physician-radiologist link. The Facilitator also personally greets referring physicians as they enter the reading room and helps direct them to the appropriate subspecialty radiologist for the case they are seeking to review. We are always seeking ideas and opportunities to improve the quality of our services and raise patient care to new levels of excellence. I welcome any comments or suggestions you may have. Please contact me directly at david.bader@stvincenthospital.com, 508-363-6060.

David A. Bader, M.D.

Meet Dr. Preeti Gupta

We are pleased to introduce our Associate Chief of Radiology, Dr. Preeti Gupta. In addition to serving as the Associate Chief, she is also Director of the magnetic resonance imaging (MRI) division of our department. Dr. Gupta maintains active subspecialty interests in MRI, particularly Abdominal MRI and Musculoskeletal MRI, as well as fluoroscopically-guided procedures, particularly steroid and contrast joint injections. Ultrasound imaging is another area of interest to her, including ultrasound-guided procedures. Prior to joining our staff, she completed a radiology residency at Saint Vincent Hospital, following which she completed a dedicated MRI fellowship at University of Massachusetts Medical Center. In addition to being board certified by the American Board of Radiology, she also holds board certification in Radiology in the United Kingdom and India. When not at work, she enjoys cooking, reading, walking and spending time with her family.

