

DIAGNOSTIC IMAGING UPDATE

URA Physicians

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 schedule a consultation
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24/7 Consultation

Adenomyosis

Adenomyosis is a relatively common gynecologic disease characterized by heterotopic endometrial glands within the myometrium and associated smooth muscle hypertrophy. Typical symptoms are nonspecific and include pelvic pain, dysmenorrhea, and menorrhagia. The clinical diagnosis of adenomyosis can be difficult because of the nonspecific signs and symptoms and the frequent coexistence of other pelvic diseases. Between 60% and 80% of patients with adenomyosis also have additional pelvic disease. The most frequent finding is leiomyoma, which is present in 35%–55% of patients.

High-resolution endovaginal ultrasound images are vital to establishing the diagnosis of adenomyosis; however, even with high-resolution imaging the typical findings and definitive diagnosis are often difficult. Common ultrasound findings of adenomyosis include uterine enlargement, myometrial heterogeneity, and focal areas of decreased echogenicity. Unfortunately, ill-defined leiomyomas can cause a very similar appearance on ultrasound. Other less common findings are myometrial cysts, echogenic nodules, echogenic linear striations, and poor definition of the endomyometrial junction.

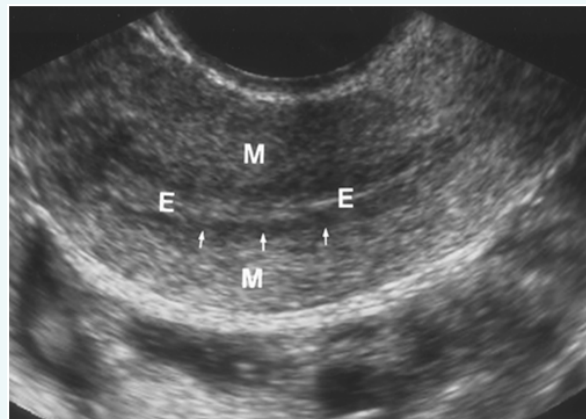


Figure 1 - Normal ultrasound appearance of the endometrium (E) and myometrium (M). Arrows = innermost layer of myometrium or subendometrial halo. From RadioGraphics, 19, S147-S160.

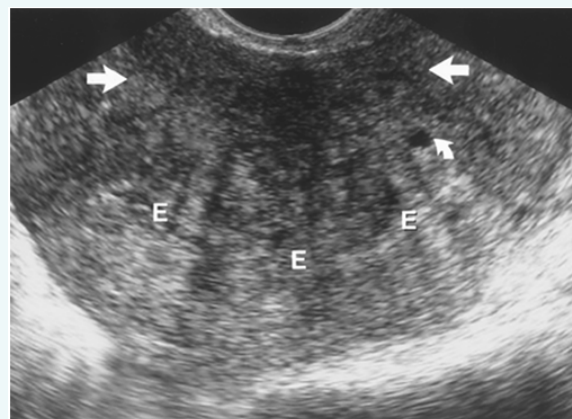


Figure 2 - ultrasound findings of adenomyosis include decreased echogenicity of the anterior wall (large arrows), poor definition of the endomyometrial junction (E), and small myometrial cysts (curved arrow). From RadioGraphics, 19, S147-S160.

Adenomyosis

When the most common findings of adenomyosis are discovered on ultrasound, including uterine enlargement, heterogeneity, and areas of decreased echogenicity, the interpreting radiologist will often recommend MRI. MRI is superior to ultrasound in establishing the correct diagnosis of adenomyosis, evaluating the extent of disease, differentiating adenomyosis from leiomyoma, and differentiating the 2 forms of adenomyosis, diffuse and focal.

Mild diffuse adenomyosis is seen as widening of the inner band of the myometrium, or junctional zone. A normal junctional zone should measure 7 mm or less. 7-10 mm is considered indeterminate for adenomyosis, and a junctional zone measuring greater than 10 mm is diagnostic of adenomyosis. Focal adenomyosis is seen as focal thickening of the junctional zone or a focal adenomyoma within the myometrium. An adenomyoma is a mass-like area of heterotopic endometrial glands that can simulate a leiomyoma on both ultrasound and MRI. It is the most difficult lesion to differentiate from a uterine leiomyoma.

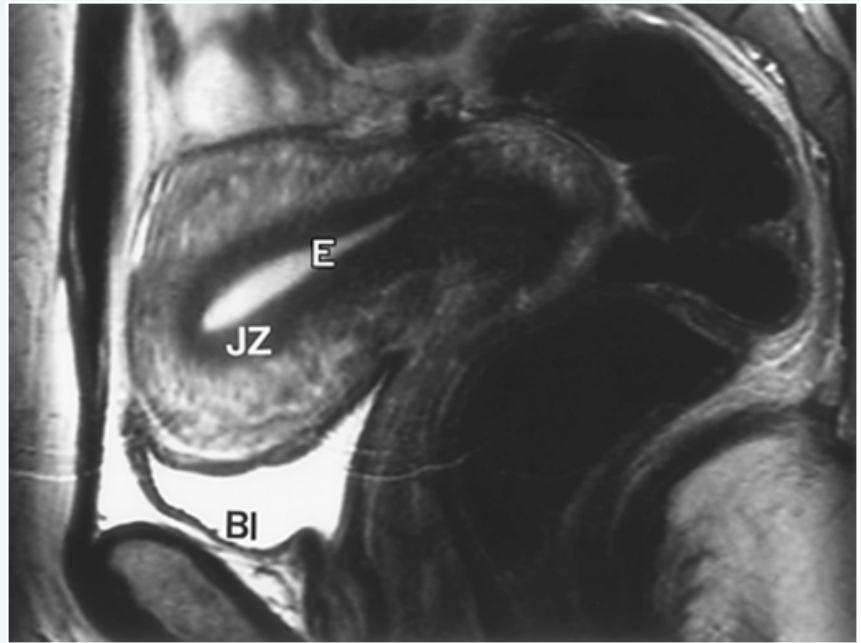


Figure 5 - normal MRI appearance of the endometrium and myometrium. The junctional zone (JZ) is the inner layer of the myometrium seen as a low signal band on T2 weighted images. From RadioGraphics, 19, S147-S160

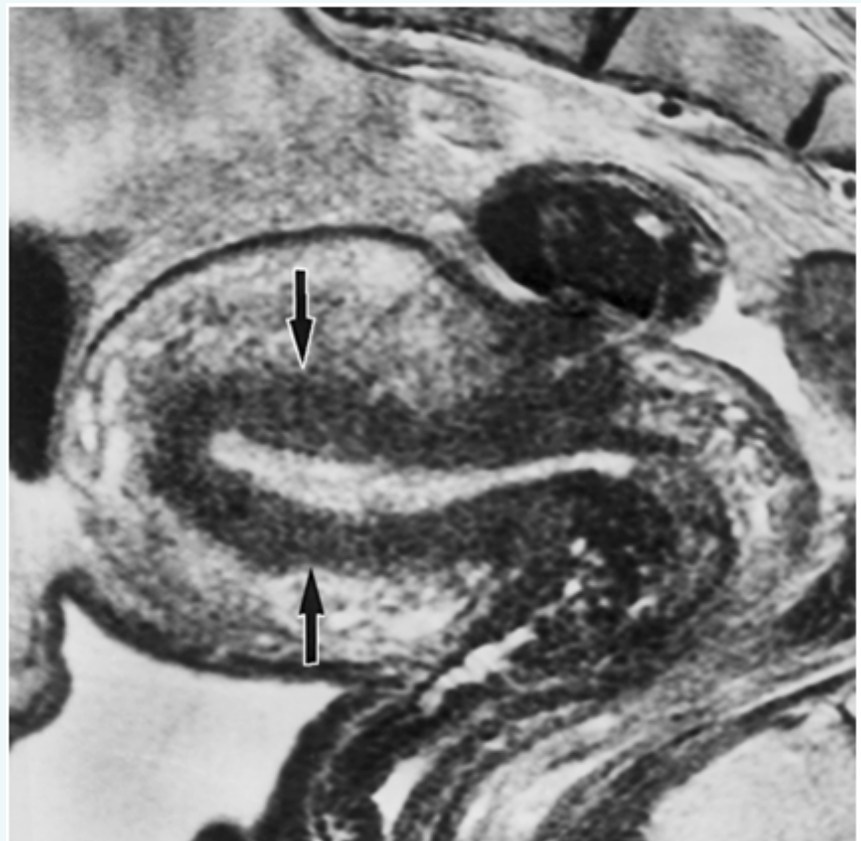


Figure 4 - mild diffuse adenomyosis demonstrates mild thickening of the junctional zone (arrows). From RadioGraphics, 19, S161-S170.



Figure 5 - severe diffuse adenomyosis with diffuse low signal of the myometrium (large arrows), nonvisualization of the junctional zone, and small high T2 signal foci (arrow head). Curved arrowheads=incidental nabothian cysts. From RadioGraphics, 19, S161-S170.

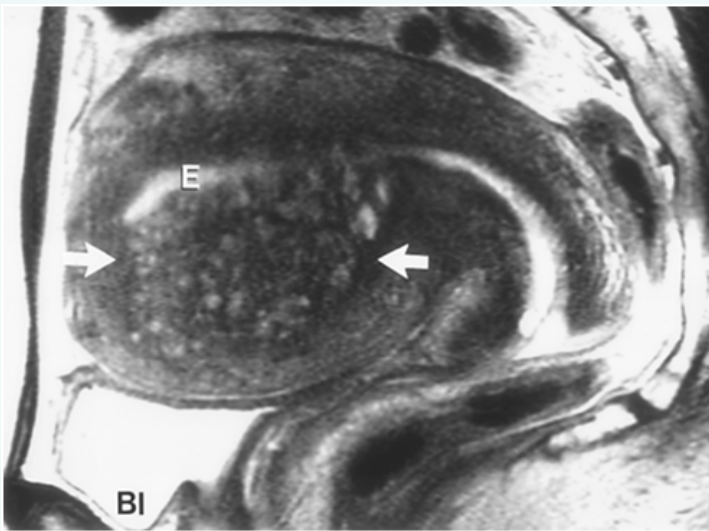


Figure 6 - focal adenomyosis of the anterior wall with large adenomyoma within the myometrium (arrows). This is the same patient as in figure 2. From RadioGraphics, 19, S147-S160.

More severe forms of adenomyosis are seen on MRI marked thickening of the junctional zone, which is often not differentiated from the remainder of the myometrium, along with multiple small high T2 signal foci representing small cystic glands. Sometimes punctate areas of high T1 signal can be seen within the myometrium representing areas of glandular hemorrhage.

References

1. Uterine Adenomyosis: Endovaginal US and MR Imaging Features with Histopathologic Correlation. Reinhold et al. October 1999 RadioGraphics, 19, S147-S160.
2. Diffuse and Focal Adenomyosis: MR Imaging Findings. Byun et al. October 1999 RadioGraphics, 19, S161-S170.



Meet Our New Physicians



Dr. Seth Y. Cardall, M.D. has a primary area of focus in body and cardiac MRI and CT. He is skilled in interpreting and acquiring medical imaging using clinical techniques such as MRI, CT, fluoroscopy, PET, x-ray and ultrasound. He is fellowship-trained and board-certified in diagnostic radiology.

After graduating summa cum laude in his undergraduate work at Brigham Young University, Dr. Cardall attended medical school at the University of California in Los Angeles. After receiving his medical degree, he completed a transitional year internship at the Mayo Clinic in Scottsdale, Arizona. This was followed by a diagnostic radiology residency and a body MRI fellowship at Mallinckrodt Institute of Radiology in St. Louis, Missouri. His professional associations include the Radiological Society of North America, the American College of Radiology, and the Alpha Omega Alpha Honor Medical Society.



Dr. Daniel L. Corey, M.D. is fellowship-trained and board-certified in diagnostic radiology, and his expertise is Neurological Imaging. After graduating from medical school at The University of Utah Medical Center, he completed a residency in diagnostic radiology followed by further training in Neuroradiology at Oregon Health Science University. Dr. Corey holds a Doctorate of Physical Therapy from Creighton University where he graduated Summa Cum Laude.

Dr. Corey has been involved in research including neurologically-associated intravascular lymphomatosis; anomalous hepatic vein drainage in the right atrium; the effectiveness of strain/counterstrain; and others involving needs of emergency department patients. He is a member of Radiological Society of North America, American Roentgen Ray Society, American Society of Neuroradiology, and American Medical Association.



Dr. John A. Dana, M.D. has expertise in brain and spinal cord injuries, head trauma, stroke rehabilitation, sports and occupational rehabilitation and electrodiagnostic testing. He is board-certified by the American Academy of Physical Medicine and Rehabilitation with certification in Spinal Cord Injury Medicine. Dr. Dana graduated from the UC San Diego School of Medicine. He then completed a transitional internship and residency in Physical Medicine where he was a Diplomate of the National Board of Medical Examiners and a lecturer for the UCI Core Clinical Lecture Series.

Before joining Utah Valley Pain Management in June 2010, Dr. Dana worked for 12 years as the Assistant Medical Director of Rehabilitation Services and Programs at the John Muir Medical Center in Walnut Creek, CA. He also worked in private out-patient practice in general rehabilitation, management of painful conditions, and electrodiagnostic testing in Pleasant Hill, CA, and was the Medical Director of Rehabilitation Services at the Danville Rehabilitation Center in Danville, CA. Prior to that, Dr. Dana worked in acute and subacute inpatient rehabilitation at the Center for Neurology and Rehabilitation in Phoenix, AZ, and in private practice with the Medical Rehabilitation Associates of Las Vegas in Las Vegas, NV. Dr. Dana is a member of the American Academy of Physical Medicine and Rehabilitation, the Physiatric Association of Spine, Sports and Occupational Medicine, and the American Paraplegic Society.



Dr. Gary V. Halversen, M.D. is fellowship-trained and board-certified in diagnostic radiology. His expertise is in Pediatric Radiology, Neurological Imaging/MRI, and PET/CT. After graduating from medical school at The George Washington University School of Medicine, he completed a residency in diagnostic radiology followed by further training in pediatric radiology at the Cincinnati Children's Hospital Medical Center

While in the military Dr. Halversen's responsibilities included Chief of Ultrasound; Quality Assurance and Risk Management Officer in the Department of Radiology; representative to the Madigan AMC Trauma Committee; and a member of the Educational Committee, overseeing a 20 resident training program in Diagnostic Radiology. He has been honored by the United States Army with the Army Achievement Medal in 2002, 2003 and 2005, as well as the Meritorious Service Medal for exemplary service as Academic Staff Radiologist in 2006 in support of Operation Iraqi Freedom while serving as Chief of Radiology for the 47th Combat Support Hospital in Mosul, Iraq. His professional associations include Radiological Society of North America, Society of Pediatric Radiology and European Society of Radiology.



Dr. Thomas B. Sanders, M.D. is fellowship-trained in Neuroradiology and board-certified in Diagnostic Radiology. Dr. Sanders is skilled in interpreting and acquiring medical imaging with an emphasis in brain, spine, skull base and neck imaging.

After graduating magna cum laude in his undergraduate work, Dr. Sanders attended the Medical College of Wisconsin in Milwaukee, WI. Following medical school he completed both a transitional internship and a diagnostic radiology residency at Aurora St. Luke's Medical Center in Milwaukee, WI. As a senior resident he served as chief resident. Following residency he obtained his board certification from the American Board of Radiology. Subsequently he entered a two year diagnostic neuroradiology fellowship at the Barrow Neurological Institute in Phoenix, AZ. His professional associations include the Radiological Society of North America, American College of Radiology, American Society of Neuroradiology.