

Contents

Foreword	xiii
Suresh K. Mukherji and Lynne S. Steinbach	
Preface: Value Added: MR of the Adnexa	xv
Erica B. Stein and Kimberly L. Shampain	
MR Imaging of the Ovaries: From Puberty to Menopause	1
Nancy Kim and Susan M. Ascher	
<p>The ovary resides in the pelvic cavity and is a dynamic organ with physiologic changes from birth to menopause. The imaging features of the normal ovary depend on the physiologic changes through puberty, reproductive age, and menopause. It is important for radiologists to understand the imaging features of normal physiologic changes in the ovaries and differentiate them from disease states.</p>	
MR Imaging of Müllerian Anomalies	11
Joanie Garratt and Evan S. Siegelman	
<p>Constituting a broad spectrum of developmental abnormalities of the female genital tract, Müllerian duct anomalies (MDAs) are present in up to 7% of the general population and in up to 25% of women who present with infertility and a history of miscarriage. Imaging plays an important role in narrowing the diagnostic considerations in these patients. In this article, we review the normal embryologic development of the female genital tract followed by the MR imaging techniques and protocol recommendations to evaluate such patients. The differential diagnoses and the MR imaging features of MDAs are also reviewed.</p>	
MR of Fallopian Tubes: MR Imaging Clinics	29
Pwint P. Khine, Preethi Raghu, Tara Morgan, and Priyanka Jha	
<p>MR imaging has an important role in imaging evaluation of fallopian tube (FT) pathology, ranging from benign to malignant conditions. Congenital Mullerian anomalies of FTs such as accessory tubal ostia and unicornuate uterus and associated pathology are well assessed by MR imaging. Benign diseases include hydrosalpinx, pelvic inflammatory disease, and its manifestations including salpingitis, pyosalpinx, tubo-ovarian abscess, and tubal endometriosis manifesting as hematosalpinx. Acute benign conditions include isolated FT torsion and ectopic pregnancy. Neoplastic conditions include benign paratubal cysts to malignant primary FT carcinomas.</p>	
MR Imaging of Epithelial Ovarian Neoplasms Part I: Benign and Borderline	43
Shaun A. Wahab and Juliana J. Tobler	
<p>Benign and borderline epithelial ovarian tumors represent a substantial proportion of incidental adnexal lesions and familiarity with the typical imaging features on MR imaging can aid in their diagnosis and management. Clinical information such as menstrual status, age, and associated conditions is also important considerations when</p>	

evaluating an adnexal lesion. Radiologists play an integral role in the preoperative evaluation process and can help guide treatment, particularly in those with lesions demonstrating benign or borderline features and those who may be candidates for fertility-sparing surgery.

MR Imaging of Epithelial Ovarian Neoplasms Part II: Malignant

53

Limin Xu, Susanna I. Lee, and Aoife Kilcoyne

MR imaging shows high sensitivity and specificity for discriminating benign from malignant lesions, thereby aiding in cancer management from assessing the initial extent of disease to subsequent treatment response. Understanding the utility and application of advanced imaging techniques allows better lesion characterization. Subtypes of epithelial ovarian tumors are presented, along with characteristic imaging findings, and illustrated with examples. Select mimics of malignancy are also presented.

MR Imaging of Germ Cell and Sex Cord Stromal Tumors

65

Jacob R. Mitchell, Evan S. Siegelman, and Karthik M. Sundaram

MR imaging is useful in the detection and characterization of adnexal lesions. This review discusses the clinical findings and MR imaging appearances of two types of ovarian neoplasms: germ cell and sex cord stromal tumors. The most common of these lesions, mature cystic teratomas, is characterized by the presence of bulk fat on MR imaging. Some of the other germ cell neoplasms and sex cord stromal tumors may have suggestive clinical, laboratory, or MR imaging features (eg, lipid and fibrosis) to establish a diagnosis. The ability to differentiate benign tumors from possible malignancy can aid in patient management.

Ovarian-Adnexal Reporting and Data Systems MR Imaging: Nuts and Bolts

79

Kira Melamud, Nicole Hindman, and Elizabeth Sadowski

MR imaging plays a key role in the characterization of adnexal lesions of indeterminate malignant potential found at ultrasound. Recently, the Ovarian-Adnexal Reporting and Data Systems (O-RADS) MRI lexicon and scoring system was developed to aid in standardization of reporting and interpretation of adnexal lesions, allowing for risk stratification based on MR imaging findings. This in turn can help improve communication between radiologists and referring providers, and potentially aid the selection of optimal treatment options. This article provides a detailed review of the lexicon and the scoring rubric of the O-RADS MRI risk stratification system.

Imaging of Metastatic Disease to the Ovary/Adnexa

93

Molly E. Roseland, John D. Millet, and Ashish P. Wasnik

Ovarian metastases tend to arise in young women, either in patients with known cancer or as the first presentation of a previously occult extraovarian malignancy. Although imaging cannot always differentiate between secondary and primary ovarian neoplasms, and pathologic confirmation is generally required, it is important to recognize suggestive imaging features on pelvic MR imaging. Ovarian metastases are commonly described as bilateral, solid, heterogenous, and hypervascular. Features vary based on the tumor origin and histology. Knowledge of these features, plus the appropriate clinical context, can help guide radiologists to include metastases in their differential diagnosis for atypical adnexal masses.

Magnetic Resonance Imaging of Acute Adnexal Pathology 109

Erica B. Stein and Kimberly L. Shampain

Acute pelvic pain is a common presenting symptom in women, but the etiology is often not readily apparent. The differential diagnosis varies greatly for pre versus postmenopausal and pregnant versus nonpregnant women. In addition to physical examination and laboratory evaluation, imaging plays an important role in narrowing the differential diagnosis. Pelvic ultrasound (US) is the first-line imaging modality, but occasionally pelvic magnetic resonance imaging (MRI) is used for problem-solving in the acute setting. The aim of this article is to educate radiologists on the appearance of acute adnexal pathologies that can be definitively diagnosed at MRI.

MR Imaging of Endometriosis of the Adnexa 121

Michelle D. Sakala, Priyanka Jha, Angela Tong, Myles T. Taffel, and Myra K. Feldman

Endometriosis is the presence of ectopic endometrial glands outside of the uterus. MR imaging is particularly useful for characterizing deep infiltrating endometriosis but can also be useful in characterizing endometriomas and hematosalpinges, characterizing broad ligament deposits, assessing for endometriosis-associated malignancy, and differentiating malignancy from decidualized endometriomas. Masses and cysts with hemorrhagic or proteinaceous contents can sometimes be difficult to distinguish from endometriomas. Imaging protocols should include pre-contrast T1-weighted imaging with fat saturation, T2-weighted imaging without fat saturation, opposed- and in-phase or Dixon imaging, administration of contrast media, and subtraction imaging.

MR Imaging of Mimics of Adnexal Pathology 137

Tugce Agirlar Trabzonlu, Mallika Modak, and Jeanne M. Horowitz

Mimics of adnexal masses can include uterine leiomyomas, intraperitoneal cystic and solid masses of mesenteric or gastrointestinal origin, and extraperitoneal cystic and solid masses. When a pelvic mass is discovered on imaging, a radiologist should recognize these mimics to avoid mischaracterization of a mass as ovarian for optimal patient management. Knowledge of pelvic anatomy, determining whether a mass is intraperitoneal or extraperitoneal, and troubleshooting with MR imaging can help determine the etiology and origin of a pelvic mass. Imaging characteristics and keys to diagnosis of these adnexal mass mimics are reviewed in this article.

MR imaging of the Adnexa: Technique and Imaging Acquisition 149

Andrea G. Rockall, Aurélie Jalaguier-Coudray, and Isabelle Thomassin-Naggara

MR imaging has a high diagnostic accuracy and reproducibility to classify adnexal masses as benign or malignant, using a risk stratification scoring system, the Ovarian-Adnexal Reporting and Data System (O-RADS) MR imaging score. The first step in achieving high accuracy is to ensure high technical quality of the MR scan. The sequences needed are clearly described in this article, with tips for handling difficult cases. This information will assist in obtaining the best possible images, to allow for accurate use of the O-RADS MR imaging risk score.