The Female Genital Tract on MDCT: A Pictorial Review of Normal Anatomy and Incidental Abnormalities

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Abstract

Purpose This article aims to review the pertinent anatomy and the incidental abnormalities involving the female genital tract on multidetector computed tomography (MDCT) through a pictorial review.

Methods The review is based on critical analysis of the existing literature as well as our experience in dealing with incidental lesions involving the female genital tract.

Results The lack of awareness regarding the normal appearances of the female pelvis on MDCT can puzzle the inexperienced radiologist and create management dilemmas for the treating clinician. It is important for radiologists to recognize normal appearances of the female genital tract on MDCT to prevent misinterpretation as pathology. The identification of incidentalomas of the female genital tract on CT can further guide whether additional workup is required or not. This pictorial review familiarizes radiologists with the normal appearances of the female genital tract on MDCT and a few common incidentalomas.

Conclusion It is imperative for a clinical radiologist to be familiar with the anatomy and common incidental lesions involving the female genital tract.

Keywords
- CT
- pelvis
- adnexa
- uterus
- ovary
- incidental findings

Introduction

Multidetector computed tomography (MDCT) has improved detection of incidental female genital tract abnormalities in both the oncology and nononcology patient population.[1] In emergent conditions, the pelvis is invariably scanned for evaluating nongynecological pelvic abnormalities on CT.[2]

A broad spectrum of anatomic variants and enhancement patterns of the uterus, cervix, and ovaries were unrecognized on CT previously.[2] Lack of awareness regarding the normal appearances of the female pelvic organs on contrast-enhanced CT (CECT) can puzzle the radiologist, who may mistake a normal finding as pathological, triggering additional imaging and causing unnecessary patient anxiety. Identification of disease of the female genital tract on CT is essential so that unsuspected, clinically important abnormalities are not misinterpreted, facilitating appropriate

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management.[3] These incidental abnormalities may or may not require serial follow-up imaging depending on the clinical setting. If the abnormalities cannot be completely characterized on CT, sonography and magnetic resonance imaging (MRI) can serve as problem-solving tools.[2]

Normal Appearance of the Female Genital Tract on MDCT

Uterus

The uterus is often a forgotten organ on MDCT; however, it may harbor significant pathology. A second look using intravenous contrast and multiplanar reconstructions is a must to confidently rule out pathologies.[4,5]

On CT, the endometrium is identified as the central hypoattenuating region in the uterus, with its shape classified as tubular or triangular.[1] The endometrium and the endometrial cavity are often a source of confusion on CECT.[2] Axial and coronal planes overestimate the endometrial thickness especially if the uterus is anteverted or retroverted, as the endometrium is imaged in an oblique plane in such scenarios.[2] A sagittal scan facilitates accurate and true estimation of the endometrial thickness[2] (►**Fig. 1**). CT is an insensitive technique for detecting mild endometrial thickening in both pre- and postmenopausal females.[1] The differentiation of endometrial thickening from endometrial fluid cannot be made on the current CT technology and transvaginal sonography remains the modality of choice for this purpose[1] (►**Fig. 2**).

In a study performed by Lim et al,[6] the upper limit of the short-axis endometrial thickness in an asymptomatic postmenopausal female was 12 mm in the sagittal plane which was slightly higher than the 8-mm parameter used for ultrasound. This difference is a consequence of the difference in imaging planes between the two modalities.

In a study performed by Yitta et al,[2] three subtypes of uterine and cervical enhancement were described (►**Fig. 3**):

- Type 1: thick or thin subendometrial band-like enhancement with or without outer myometrial enhancement observed at 30 to 120 seconds after contrast injection, predominantly in premenopausal women (►**Fig. 4A–C**).
- Type 2: enhancement progressing from the outer myometrial region to the entire myometrium or diffuse from the onset, without any defined subendometrial enhancement, observed equally in pre- and postmenopausal women (►**Fig. 4D**).
- Type 3: faint diffuse myometrial enhancement, observed exclusively in postmenopausal women (►**Fig. 4E**).
- A fourth type of pattern of enhancement, patchy heterogeneous enhancement was also reported by Yitta et al[2] (►**Fig. 4F**).

The pattern of enhancement is affected by the timing of contrast injection and cardiac output.[2] The type 1 pattern of enhancement is transitory and progresses to type 3 on delayed imaging[2] (►**Fig. 5**).

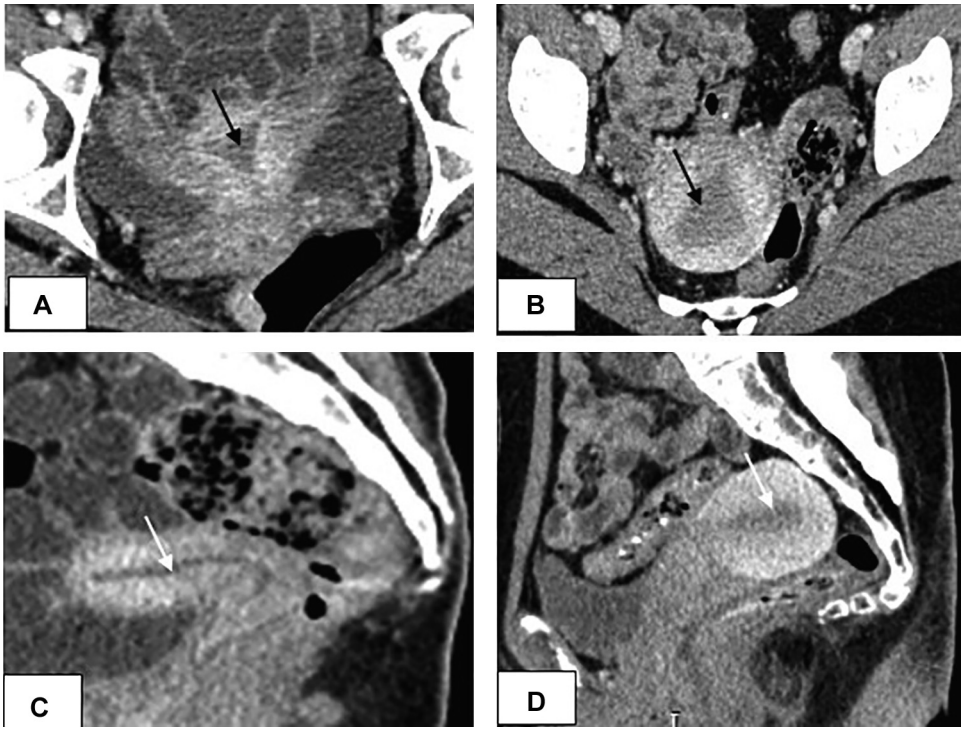

Fig. 1 Misinterpretation of thickened endometrium: On axial contrast-enhanced computed tomography (CECT), a triangular, apparently thickened, hypodense endometrium (arrow) in (**A**) an anteverted uterus and (**B**) a retroverted uterus. (**C**) Corresponding sagittal reconstructions give an accurate estimate of the thickness of the endometrium (arrow) in an anteverted and (**D**) a retroverted uterus, respectively.

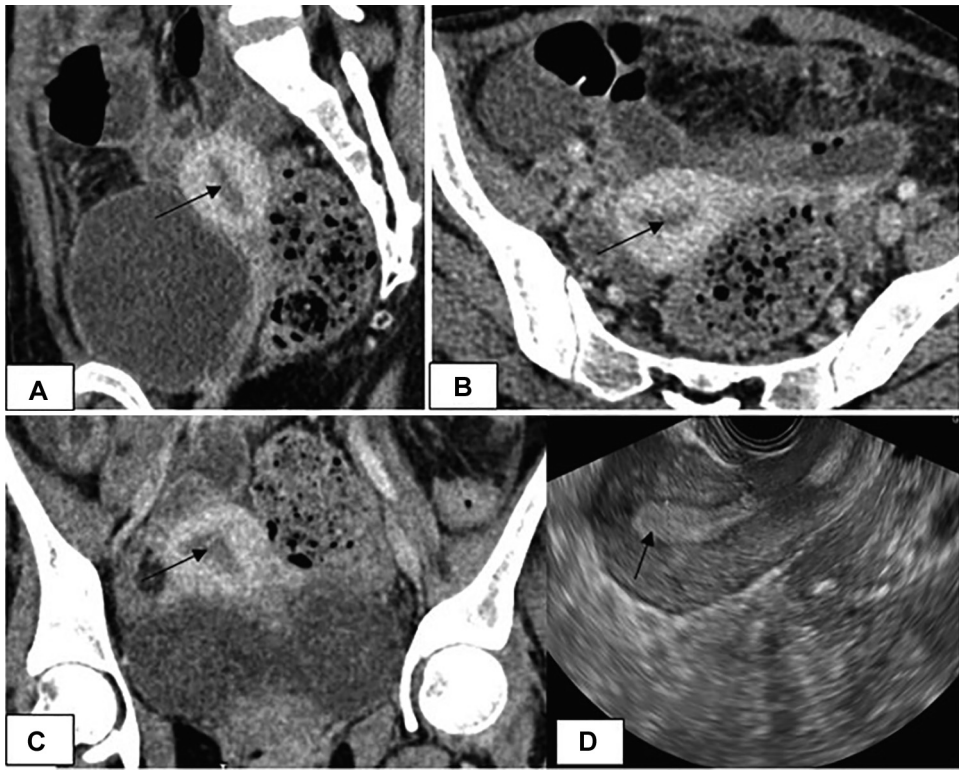

Fig. 2 (**A**) Sagittal, (**B**) axial, and (**C**) coronal contrast-enhanced computed tomography (CECT) of the pelvis showing normal uterine endometrium (arrow) in the secretory phase, mistaken for endometrial fluid. (**D**) Transvaginal sonography (TVS) confirms normal secretory phase uterine endometrium (arrow) and absence of any fluid in the endometrial cavity in the same patient.

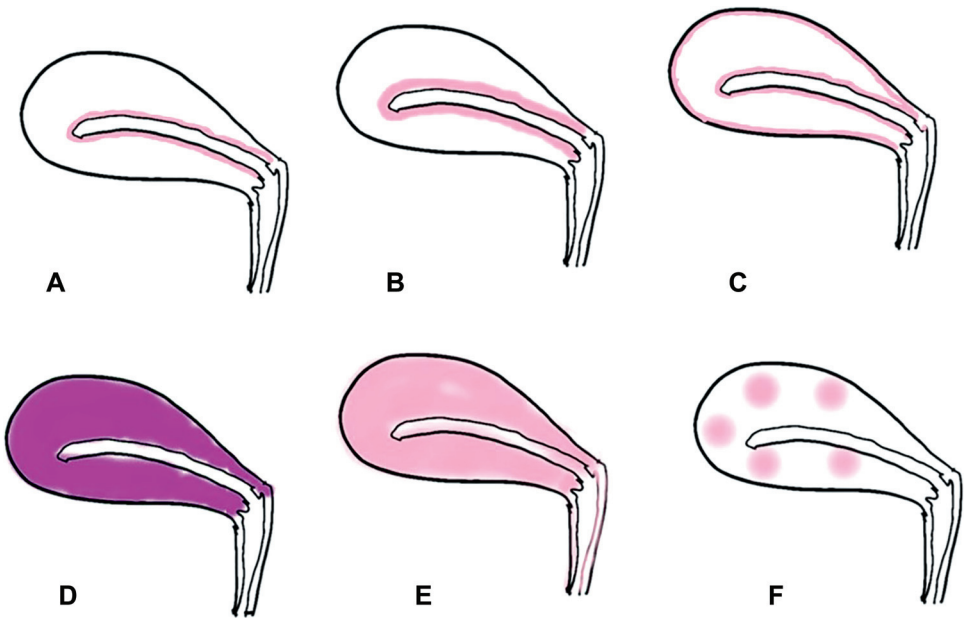

Fig. 3 Patterns of uterine enhancement seen on multidetector computed tomography (MDCT) (adapted from Yitta et al[2]). Type 1 enhancement patterns: (**A**) Thin subendometrial enhancement. (**B**) Thick subendometrial enhancement. (**C**) Subendometrial and outer myometrial type of enhancement. (**D**) Type 2–Diffuse myometrial enhancement. (**E**) Type 3–Minimal diffuse enhancement. (**F**) Patchy heterogeneous enhancement pattern.

Cervix

The cervix appears hypoattenuating (►**Fig. 6**) with respect to the uterus as a consequence of the greater amount of fibrous tissue in its stroma and may show delayed enhancement, which may masquerade as a cervical mass.[2] The demonstration of contiguity of the endocervical canal with the endometrial canal on multiplanar reconstructions helps in the identification of a normal cervix.[2] The zonal enhancement of the cervix is typically characterized by intense central circumferential enhancement (due to the richly glandular

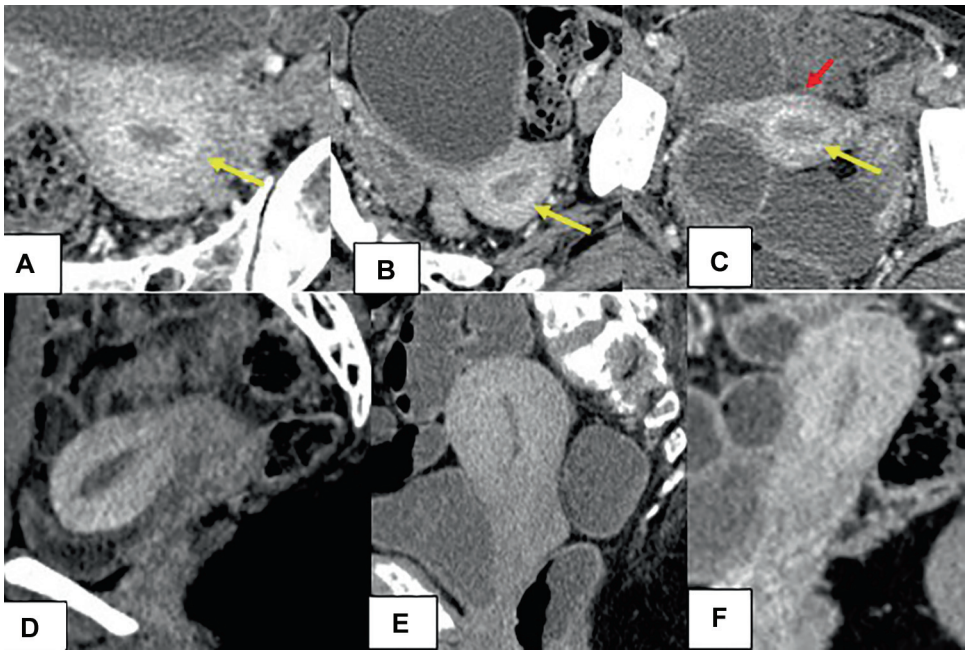

Fig. 4 Patterns of uterine enhancement seen on 64-slice multidetector computed tomography (MDCT): Type 1 enhancement patterns: (**A**) Thick subendometrial enhancement (arrow). (**B**) Thin subendometrial enhancement (arrow). (**C**) Subendometrial (yellow arrow) and outer myometrial (red arrow) type of enhancement. (**D**) Type 2–Diffuse myometrial enhancement in an acutely anteverted uterus. (**E**) Type 3–Minimal diffuse enhancement. (**F**) Patchy heterogeneous enhancement pattern.

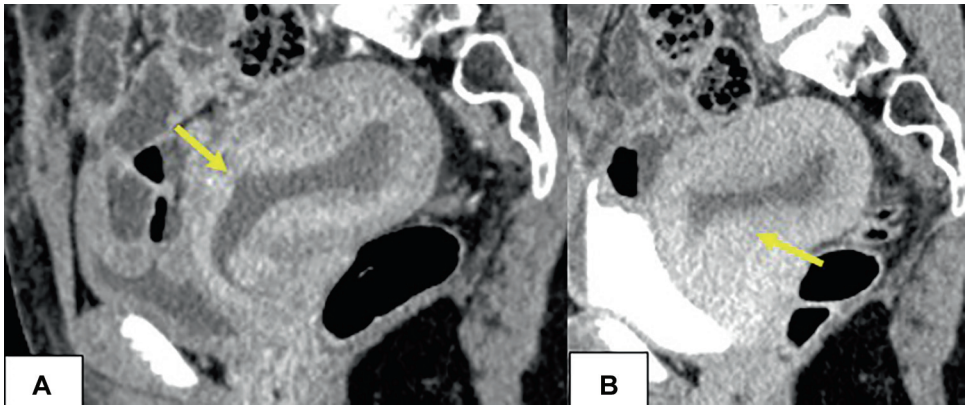

Fig. 5 Change in type of uterine enhancement pattern in triple-phase computed tomography (CT): (**A**) Contrast-enhanced CT (CECT) shows thick subendometrial pattern of uterine enhancement (type 1) in a postpartum uterus on portal-venous phase which changed to (**B**) diffuse pattern of myometrial enhancement (type 3) on the delayed phase.

central mucosa) with less intense enhancement of the surrounding inner fibromuscular stroma.[2] The outermost fibromuscular stromal region enhances more markedly than the inner fibromuscular stroma but less markedly than the central cervical mucosa.[2] The combination of these three layers produces a "target-like" appearance of the cervix (►**Fig. 7**) on axial images.[2]

Vagina

The vagina is often overlooked in cross-sectional examinations of the pelvis. Even though CT is not the primary modality to evaluate the vagina, it is important to be aware of its normal appearance on CT. The appearance of the vagina varies depending on the hormonal influence.[7] In females of reproductive age, the vaginal mucosa enhances brightly, whereas the vaginal wall is hypoattenuating relative to the mucosa and cannot be distinguished from the adjacent pelvic structures (urethra anteriorly, anterior rectal wall posteriorly).[7] The intense central vaginal enhancement corresponding to vaginal mucosa (►**Fig. 8**) can be differentiated from the poorly enhancing vaginal wall.[2] In postmenopausal women, the vaginal mucosa is hypoenhancing, similar to the vaginal wall and adjacent structures.[7]

Ovaries

The normal ovaries do not enhance significantly.[8] On CECT, the ovary enhances less than the myometrium. The appearance of the ovaries also varies with the hormonal status of

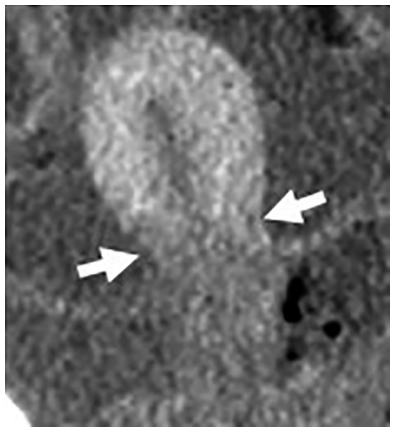

Fig. 6 The cervix has a lower attenuation than the uterus due to greater amount of fibrous tissue; this should not be mistaken for cervical malignancy on contrast-enhanced computed tomography (CECT). A sharp line of demarcation (arrows) is seen between the myometrium and the normal cervix on sagittal reformation.

Fig. 7 Axial contrast-enhanced computed tomography (CECT) of the pelvis showing a target type of enhancement of the normal cervix: an intense circumferential central mucosal enhancement (white arrow), a hypodense inner fibromuscular stromal layer (black arrow), and an enhancing outer fibromuscular stroma (red arrow) which enhances less than the cervical canal.

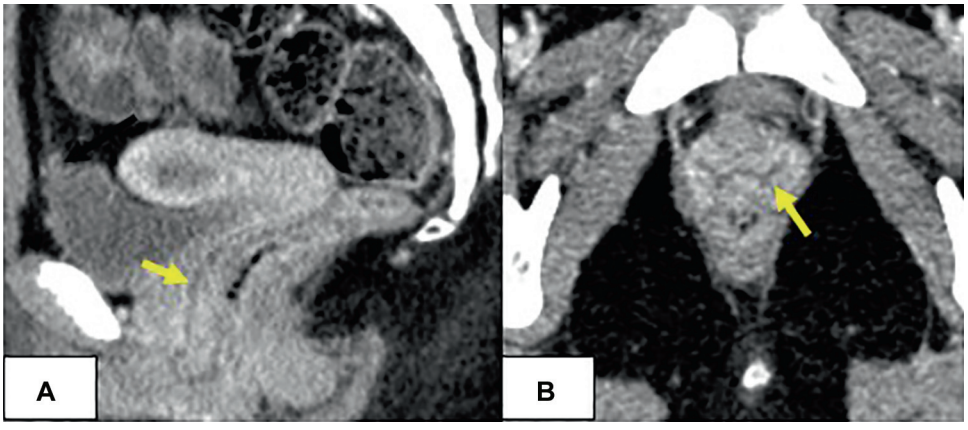

Fig. 8 Normal appearance of vagina on contrast multidetector computed tomography (MDCT): (**A**) Sagittal image: The intense central vaginal enhancement corresponds to vaginal mucosa (arrow) that can be differentiated from the poorly enhancing vaginal wall. (**B**) Axial image showing H-shaped vaginal vault (arrow).

females. In the females of reproductive age group, the ovaries can have a variable appearance and may show fluid or soft tissue attenuation[8] or multiple follicles (►**Fig. 9**). In post-menopausal women, the ovaries are small and featureless with homogenous soft tissue attenuation.[8]

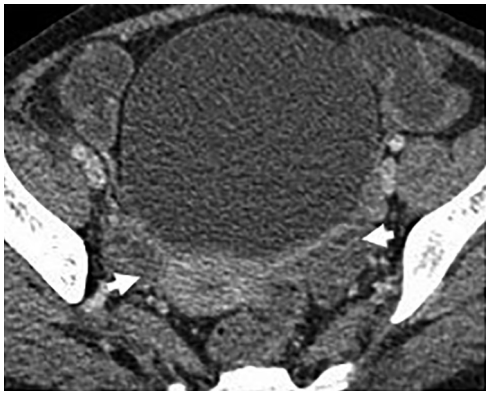

Fig. 9 Normal appearance of ovaries: Axial contrast computed tomography (CT) pelvis showing normal ovaries (arrows) exhibiting soft tissue density, containing small, round hypodense follicles.

The maximum linear dimension of the ovary is 5 cm for premenopausal women and 3 to 4 cm for postmenopausal women[8]; while the volume is up to 20 and 10 cm^3, respectively.[9] However, in the presence of a physiologic ovarian cyst in a premenopausal patient, the ovarian size can increase up to 7 cm in length.[8]

Fallopian Tubes

The normal fallopian tubes are not visualized on CT unless they are dilated with fluid, pus, or blood.[10] The identification of a well-visualized or dilated fallopian tube should prompt the radiologist to look for the underlying cause pathology. The normal fallopian tubes, however, may sometimes be seen in the presence of ascites.

Lymph Nodes

The incidental finding of prominent pelvic lymph nodes, particularly on coronal reformatted CT images, has become more common with improved scanning techniques.[1] A

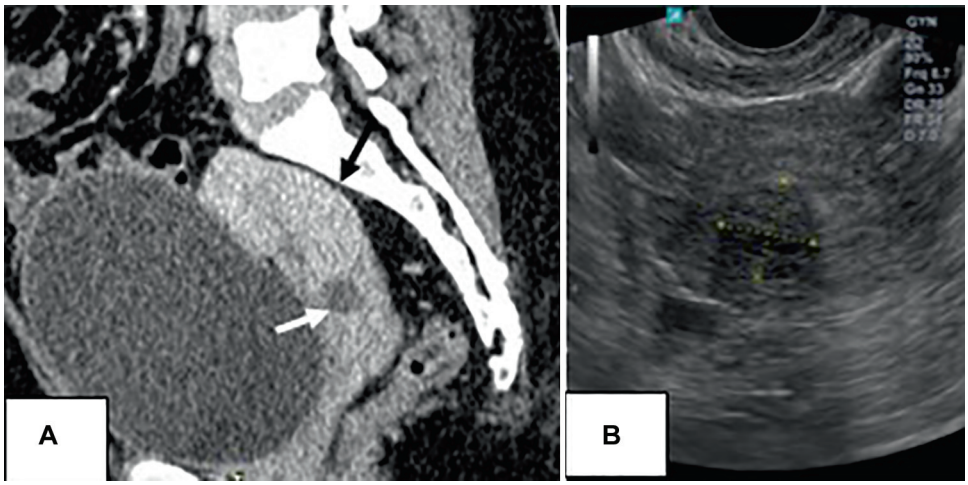

Fig. 10 Fibroid presenting as a contour abnormality: (**A**) Sagittal contrast-enhanced computed tomography (CECT) shows bulge in the posterior wall of the uterus (black arrow), but no well-defined lesion. (**B**) Sonographic image shows a fibroid (between cursors) in the posterior myometrium. A hypodense nabothian cyst was seen in lower uterine segment (white arrow).

normal lymph node has a bean-shaped morphology with a fatty hilum. Pathological lymph nodes need to be differentiated from nonpathological ones, and are more likely to have an irregular border and are more likely to be round than oval, with a short-to-long axis ratio of 0.81, compared with 0.57 for benign nodes.[1] The preservation of a normal fatty hilum indicates a benign node, whereas central necrosis can be seen with metastatic involvement. There is a lack of consensus regarding the normal size limit in the diagnosis of pelvic tumor nodal metastases, although a threshold of 8 mm short-axis diameter is used for pelvic lymph nodes.[1]

Incidentalomas of the Female Genital Tract

Uterocervical Incidentalomas

Uterine Fibroids

Fibroids are the most common pelvic tumor found incidentally on CT. These can be small or giant, homogeneous or inhomogeneous, pelvic or abdomino-pelvic masses.[11] An enlarged uterus with deformed uterine contour is the most common CT finding.[12] Minimal uterine enlargement is difficult to detect on CT; therefore, uterine size alone is not a useful criterion for diagnosing fibroids.[12] Fibroids presenting as alterations in contour or lobulations (►**Fig. 10**) are identified more often in the uterine fundus than the body.[12]

They can appear hypoattenuating, isoattenuating, or hyperattenuating with respect to the normal uterus on MDCT.[2] Calcification or cystic changes may be seen within large masses.[12] The presence of calcification in a uterine mass (►**Fig. 11**) is the most specific sign of a leiomyoma.[12] However, this finding is reportedly uncommon. The dystrophic calcification of solid mass type usually has a mottled appearance with no well-defined curvilinear rim. In multiple uterine leiomyomas, calcification may be present in only one of the tumors or limited to only a part of the tumor.[12] Necrosis or degeneration may be seen on CT scans as a low-attenuation within the fibroid. Areas of high attenuation can be seen in atypical leiomyomas.[12] In infected fibroids, the central core can get filled with purulent material or gas.[12]

Postpartum Uterus

Women may undergo MDCT because of vague abdominal pain, unexplained fever, suspicion of appendicitis, etc. in the postpartum period. The uterus in such patients may be mistaken as abnormal if the patient's clinical history is unknown and the radiologist is unfamiliar with imaging appearance of the postpartum uterus.

Typically, a postpartum uterus is enlarged and boggy, with distension of the endometrial canal which may persist until approximately 6 to 8 weeks. Intrauterine air is normal up to 3 weeks postpartum in the absence of clinical signs of infection.[2] The former site of placental attachment may normally demonstrate a myometrial defect with increased vascularity and enhancement, and this should not be

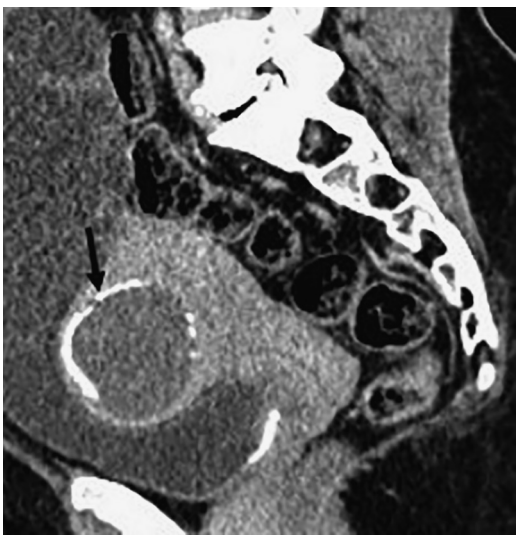

Fig. 11 Sagittal reconstruction of contrast-enhanced computed tomography (CECT) pelvis: peripherally calcified, hypodense, large intramural fibroid in the anterior wall of the uterus.

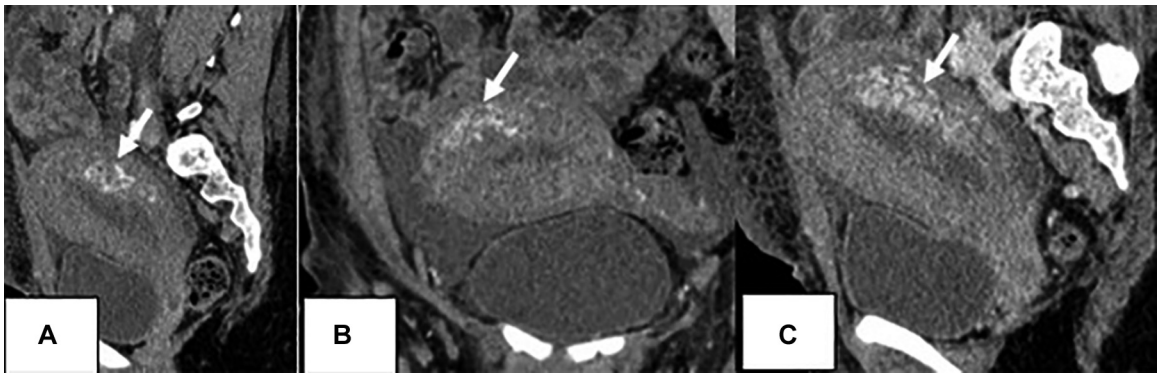

Fig. 12 Arterial (**A**), sagittal, (**B**) coronal, and (**C**) venous phase sagittal contrast-enhanced computed tomography (CECT) images reveal a bulky postpartum uterus with a focal area showing serpentine enhancement (arrow), in the posterior myometrium. This represents the placental attachment site and should not be mistaken for an arteriovenous malformation. Patient had an uneventful postpartum period.

mistaken for more grave pathologies (►**Fig. 12**). In addition, prominent vessels may be seen within the myometrium normally in the postpartum period (►**Fig. 13**).[2]

Post-Caesarean Section Appearances

Caesarean section is a commonly performed surgical procedure in women. The surgical incision line in the uterus is generally located in the lower segment of the anterior uterine wall. Acquaintance with the normal and abnormal findings of the anterior uterine wall is of critical importance for radiologists in this era of ever-increasing caesarean sections.[13] An oval or triangular area of hypoattenuation, which represents edema, can be seen in the myometrium in the anterior lower uterine segment[5] (►**Fig. 14**). Myometrial discontinuity on CT in the first postpartum week should not be interpreted as uterine rupture or dehiscence.[2] Postpartum uterine discontinuity even in the presence of endometrial or parametrial air and intraperitoneal free air are normal findings after caesarean section.[2] Thus, the radiologist must be extremely cautious in diagnosing uterine dehiscence and rule out its mimics.

The uterine cavity is usually empty after a caesarean section and there should not be significant free fluid in the pelvis in the absence of peritoneal irrigation.[5] The low transverse incision site is best visualized on the sagittal reconstruction and the vertical incision site is best visualized on axial sections. A small hematoma which appears hyperechoic on ultrasonography and a high-attenuation on CT may be seen at the uterine incision site or the prevesical space.[5] The imaging findings should always be interpreted along with the clinical findings of the patient.[5]

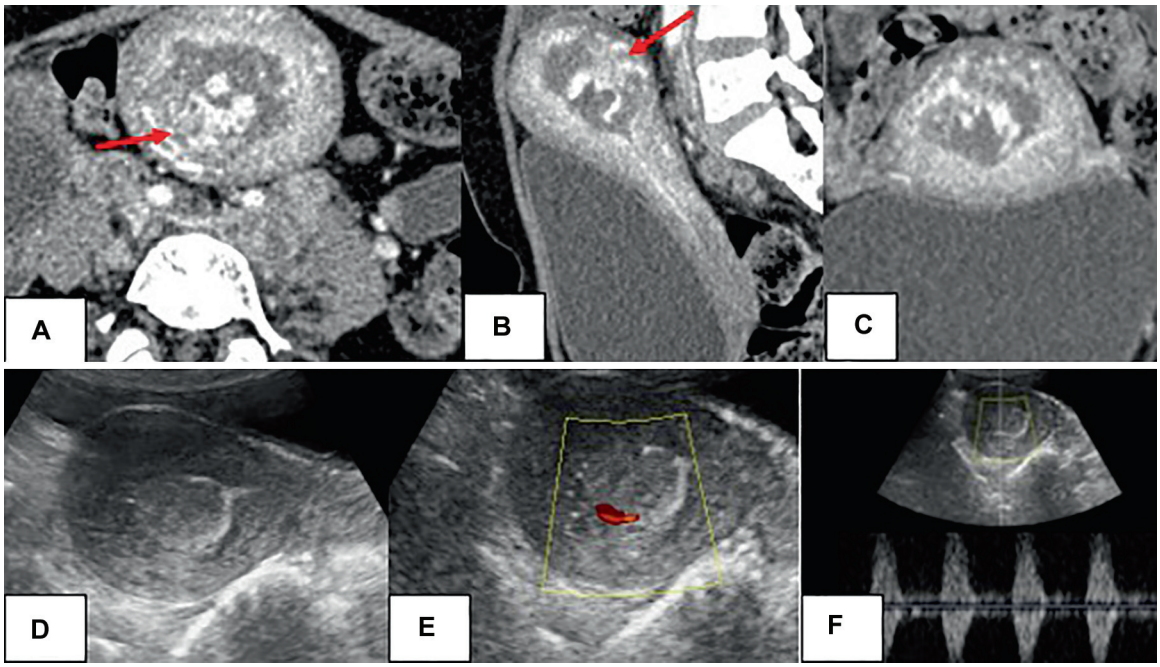

Fig. 13 Postpartum uterus: (**A–C**) multiplanar reformation (MPR) of a bulky uterus with focal, tubular and irregular (arrows) hypervascular areas within the thickened endometrium and myometrium on contrast-enhanced computed tomography (CECT), which was the site of placental attachment. (**D–F**) Transvaginal sonography (TVS) + color Doppler showed a markedly thickened endometrium with mild internal vascularity showing arterial waveform. Patient had no bleeding per vaginum.

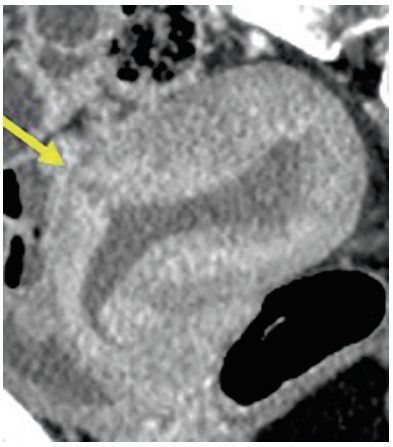

Fig. 14 Post-caesarean section appearance in a postpartum uterus: Bulky uterus showing an irregular, hypodense defect (arrow) in the anterior wall of the uterus with beaking of the endometrium. This should not be misinterpreted as uterine perforation.

Endometrial clot and debris appear as hyperattenuating material on CT. These findings can be seen in healthy patients but are also common findings in the setting of endometritis, making the patient's clinical history extremely important for proper image interpretation. Small amounts of air in the subcutaneous incision, the endometrium, and the urinary bladder (from a Foley catheter) are also routine findings after caesarean delivery.[5] Haziness and stranding or small areas of fluid in the subcutaneous fat can be visualized due to the surgical procedure. However, a discrete, walled-off fluid collection suggestive of an abscess is abnormal and needs to be reported. Small peritoneal fluid collections such as anterior subfascial hematomas and bladder flap hematomas are generally considered normal and are usually not clinically significant if less than 4 cm in size.[13]

Healed Caesarean Scar

A healed cesarean scar appears as a narrow transverse line in the anterior lower uterine segment, best evaluated in the sagittal section.[13] At the level of the scar, thinning and retraction of the anterior myometrium creates wedge-shaped defects which causes distortion of the tissues adjacent to the scar and may give "hourglass" shape on sagittal views.[13]

Nabothian Cysts

On MDCT, nabothian cysts may be visualized as well-defined, variable-sized lesions in the cervix showing an attenuation similar to that of fluid (10–15 Hounsfield unit [HU]) (►**Fig. 10**). At axial imaging, a centrally located nabothian cyst may mimic a fluid-filled distended endocervical canal. A dilated endocervical canal needs to be differentiated from the nabothian cysts, which appear as thin-walled, rounded structures (►**Fig. 15**). They appear separate from the endocervical canal which is distinguished by its enhancing mucosa.[2] Nabothian cysts must be identified correctly because no treatment is required if they are asymptomatic. On sonography most nabothian cysts appear as simple anechoic cysts in the cervix, without vascularity.[2] However, they may vary in appearance because of proteinaceous or hemorrhagic content, clustering of adjacent cysts, and deep extension into the cervical stroma, sometimes enlarging the cervix.[2] The "tunnel cluster" variant of nabothian cyst appears as a complex multicystic cervical mass that may mimic cervical malignancy and this differentiation is critical.[2]

Adnexal Lesions

Physiological Cysts

Follicular cysts are the most common well-defined adnexal masses. On CT, they appear as a sharply marginated, round, simple fluid collections (attenuation < 20 HU) with a thin nonenhancing wall. When found incidentally on CT, follow-up ultrasound should be done after one to two menstrual cycles as they usually resolve within 4 to 8 weeks.[9] A dominant follicle is differentiated from simple cysts on basis of size being < 2.5 cm (►**Fig. 16**). Corpus luteal cysts are ovarian cysts which arise following rupture of a Graafian

Fig. 15 Axial contrast-enhanced computed tomography (CECT) pelvis shows a hypodense, well-defined, central round lesion of cystic attenuation within the cervix (arrow) which may mimic an endocervical canal, dilated with fluid. However, no enhancing rim is seen. A nabothian cyst was confirmed on sonography.

Fig. 16 Dominant follicle in the right ovary: Axial contrast-enhanced computed tomography (CECT) shows a cystic lesion with thin, smooth, enhancing rim seen in right ovary (arrow) measuring 2.3 cm in size. The size of the cyst (< 2.5 cm) and scan performed during the preovulatory period of the menstrual cycle can confirm the diagnosis.

Fig. 17 Axial contrast-enhanced computed tomography (CECT) pelvis of a young female done on day 20 of the menstrual cycle incidentally showed a characteristic corpus luteal cyst (arrow) within the left ovary with thick, enhancing, crenulated margins.

follicle. They have thick and crenulated walls that may show enhancement (►**Fig. 17**).

Hemorrhagic Cysts

On noncontrast CT, hemorrhagic cysts can appear as unilocular cystic lesions with a density ranging from 25 to 100 HU (►**Fig. 18**).[14] In cases where rupture occurs, fluid–fluid levels and hemoperitoneum can be demonstrated. The identification of hemorrhagic cysts on CT does not need immediate sonographic evaluation unless there is significant hemoperitoneum.[14] A follow-up ultrasound after two to three menstrual cycles will demonstrate change in internal echotexture and resolution of the cyst.[14] There exists considerable overlap between the imaging appearances of hemorrhagic and luteal cysts, and the wall of corpus luteal cysts appears thicker than that of follicular cyst on the postcontrast study.[10]

Dermoid Cyst

Dermoid cysts are the most common germ cell neoplasm and also the most common germ cell neoplasm resected during surgery.[15] Approximately 85% are detected between the ages of 20 and 50 years and most of them are mature and benign, with 99% showing a cystic component. Roughly 3% of these lesions will eventually undergo torsion.[9] CT demonstrates macroscopic fat in more than 90% of ovarian dermoids (►**Fig. 19**). Fat attenuation within a cystic ovarian lesion with or without wall calcification is diagnostic for dermoid cyst.[15] A floating mass of hair can sometimes be detected at the fat–fluid interface on CT.[15] Mural nodules, calcification, and teeth are also depicted on MDCT. The complications of dermoid cysts include torsion, rupture, and malignant degeneration. Malignant transformation of mature cystic teratoma is a rare complication which is reported to occur in 1 to 2% of cases.[15] The appearance of a solid enhancing component within the dermoid cyst should prompt consideration of malignant degeneration and this usually occurs in 6th to 7th decade.[15] Although there is debate regarding their management, most clinicians recommend surgical

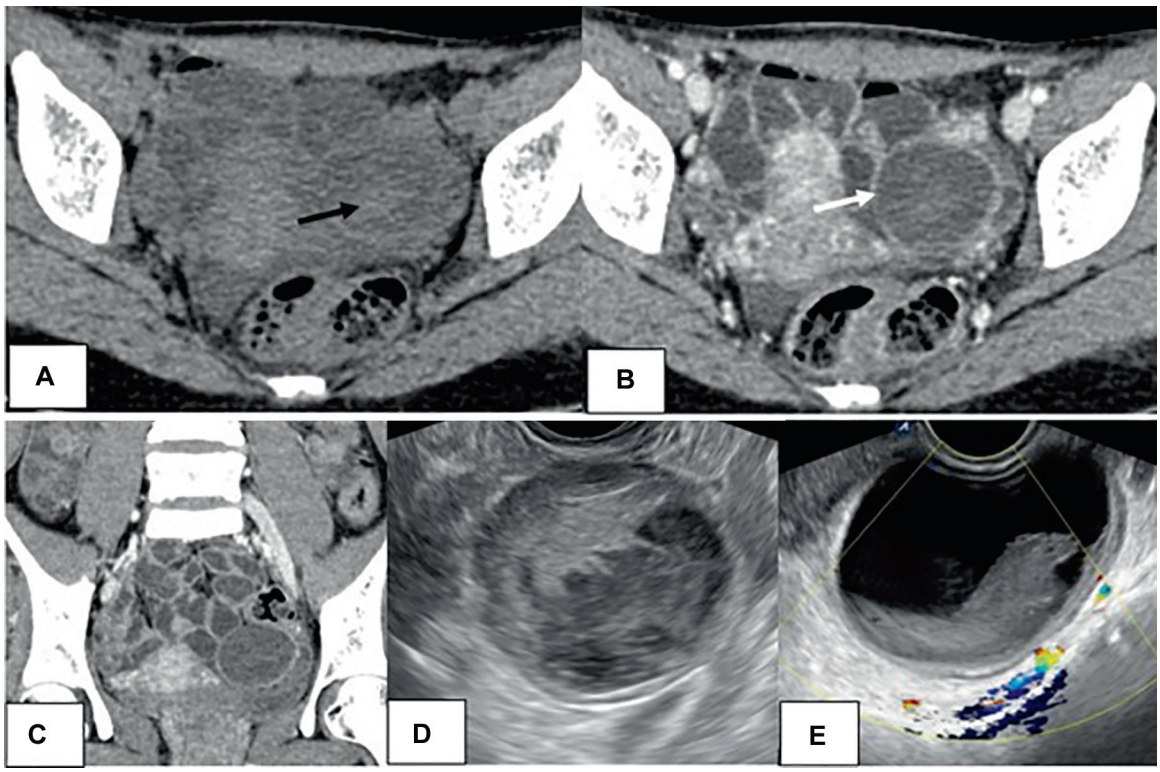

Fig. 18 (**A**) Noncontrast computed tomography (NCCT) showed a cystic lesion with hyperdense content (black arrow). (**B**) Axial and (**C**) coronal contrast-enhanced CT (CECT): cyst showing peripherally enhancing thin rim (white arrow). (**D**) Sonography revealed heterogeneous internal echotexture, confirming a hemorrhagic cyst. (**E**) Repeat Doppler after 1 week showed crescentic echogenic content in dependent location without vascularity.

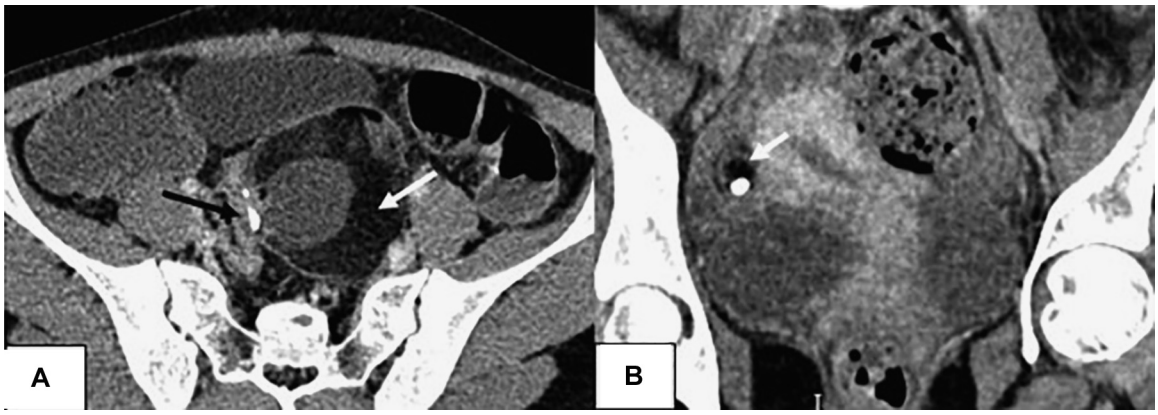

Fig. 19 Dermoid cyst: (**A**) Axial contrast-enhanced computed tomography (CECT)—a large cystic lesion containing fat (white arrow) with focal calcification (black arrow) in its wall is seen. (**B**) Coronal CECT pelvis in another young female shows a similar tiny lesion in the right ovary containing fat (white arrow) and calcification.

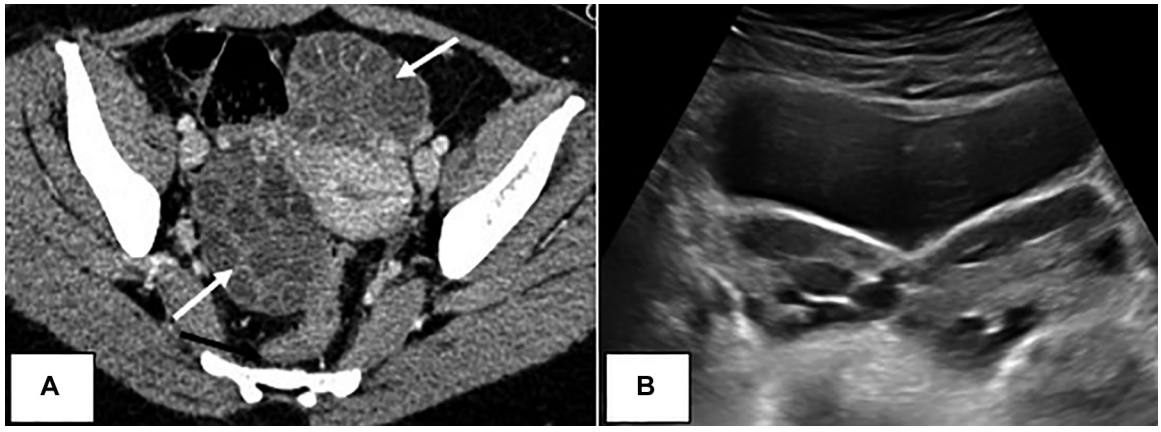

Fig. 20 Bilateral theca lutein cysts: (**A**) Axial contrast-enhanced computed tomography (CECT): multiloculated cystic enlarged ovaries, right measuring 6.4 × 4.5 cm and left measuring 6.7 × 5.38 cm (arrows), respectively. (**B**) Transvaginal sonography (TVS) confirmed bilateral enlarged ovaries with multiple follicles (4–5 mm). The patient who underwent CT for road traffic accident, revealed history of being on ovulation induction therapy.

intervention in symptomatic, large (> 5 cm), and potentially malignant cysts.[16]

Theca Lutein Cysts

These may be identified as bilateral, symmetrical, large, multilocular adnexal cystic masses (►**Fig. 20**) in patients on ovulation induction therapy. They may also be incidentally observed following evacuation of a molar pregnancy for 2 to 4 months.

Metastatic Disease to the Ovaries

Five to 20% of ovarian malignancies are metastases and in up to 38% of cases, the identification of metastasis precedes the primary neoplasm.[1] Metastases to the ovaries may occur hematogenously, via direct extension, or by peritoneal spread. Most studies have shown that differentiation between metastatic and primary tumors on the basis of imaging findings alone is difficult. Clinical context can help. Metastases typically are solid, bilateral (►**Fig. 21**), and strongly enhancing. Cystic and necrotic areas are common, and lesions which are predominantly cystic may resemble primary ovarian cancer.

The American College of Radiology Incidental Findings Committee have updated the recommendations for managing adnexal masses incidentally detected on CT and MRI on the basis of menstrual status or age of the patient with the goal of improving the quality of patient care.[17] Patel et al[17] organized the adnexal masses into (1) a simple appearing cyst, (2) cyst with reasonably diagnostic imaging features (benign examples include some hemorrhagic, corpus luteal cysts, peritoneal inclusion cysts, endometriomas, dermoids, etc.), which may be followed up between 6 and 12 months, if required, and (3) a mass with uncertain diagnosis (which need sonography/contrast-enhanced MR for further characterization). The "simple-appearing cyst" is a round or ovoid fluid density mass (–10 to 20 HU) on CT without a solid component, with smooth, imperceptible, or thin walls; they have a very low risk of malignancy. Sonographic characterization of incidental simple-appearing cysts on CT > 3 cm (postmenopausal) or > 5 cm (premenopausal) is justified

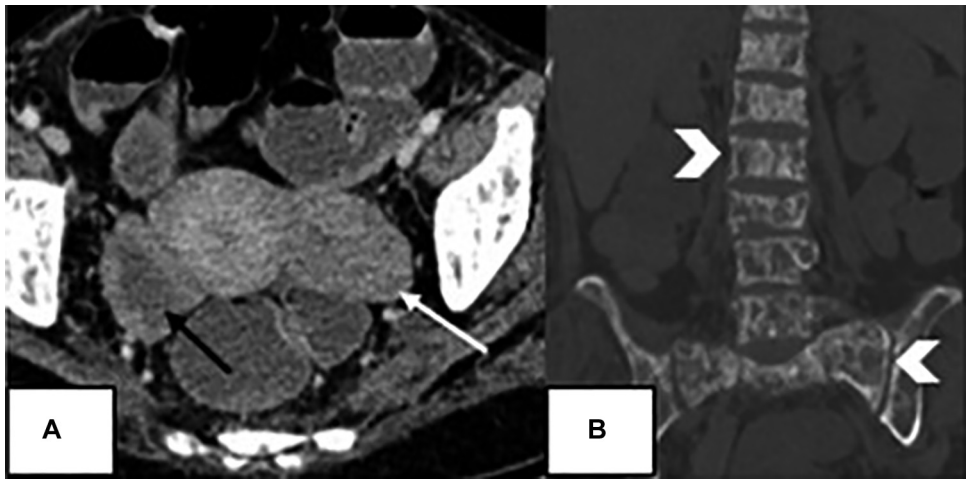

Fig. 21 Krukenberg tumors: Known case of carcinoma breast, (**A**) multidetector computed tomography (MDCT) showed an oval, thick-walled, centrally necrotic lesion involving the right ovary (black arrow) and heterogeneously enhancing oval solid lesion (white arrow) involving the left ovary. (**B**) Bone window shows widespread lytic bone metastases (arrow heads).

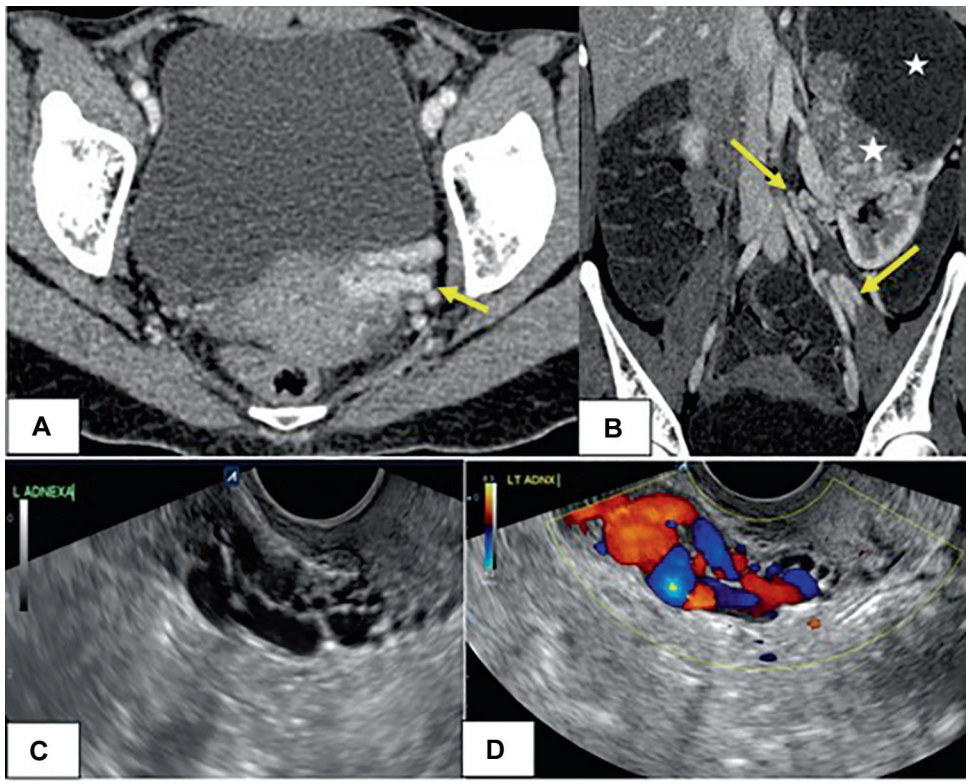

Fig. 22 Prominent gonadal vessels not to be mistaken for pelvic congestion syndrome: (**A**) Dilated left parametrial vessels (arrow) and (**B**) ovarian vessels (yellow arrow) in a known case of renal cell carcinoma (stars), secondary to the compression of the left renal vein causing increased back pressure. (**C** and **D**) Transvaginal sonography (TVS) with Doppler, dilated pelvic vessels on left side.

because the likelihood of CT mischaracterization may be higher. Adnexal calcification in the absence of a mass is inconsequential.[17]

Incidental Dilatation of Pelvic Vessels

Diffuse or focal dilation of the pelvic vessels can be incidentally visualized in patients with abdomino-pelvic neoplasms on MDCT. There are two major processes accounting for this vascular dilation.[1] It may be due to increased blood flow through collateral vessels associated with neoplasms such as gestational trophoblastic disease, ovarian solid tumors, etc. The other mechanism causing dilated collateral channels is benign or malignant venous obstruction or stenosis (►**Fig. 22**), portal hypertension, and left renal

Fig. 23 Known case of pelvic neurofibromatosis (**A** and **B**): axial and (**C**) coronal contrast-enhanced computed tomography (CECT) sections: hypodense, ovoid soft tissue density lesions in the presacral region (long arrows) and widened sacral foramina (small arrows). These should not be mistaken for pelvic lymphadenopathy.

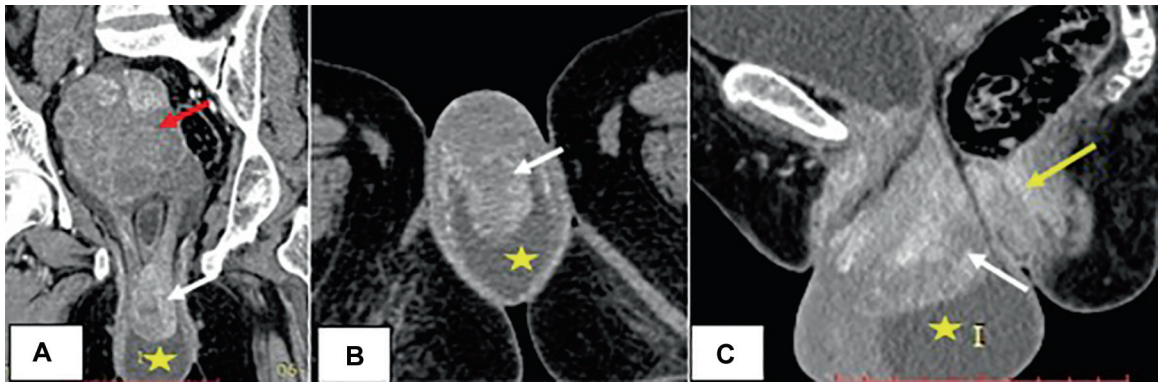

Fig. 24 (**A–C**) In a nulliparous woman with a malignant ovarian tumor (red arrow) multiplanar reconstructions show complete prolapse of uterus (white arrows). Ascitic fluid was seen in a peritoneocele (yellow stars) due to pelvic floor weakness in the rectovaginal region. (**C**) Rectocele (yellow arrow) was also seen.

venous compression between the aorta and superior mesenteric artery causing left gonadal vein dilatation. The assessment of such vessels can assist in identification of tumor origins.[18]

Neurofibromas

CECT may reveal multiple, soft tissue density, well defined, fusiform/oval conglomerated lesions along the course of the sacral nerves which cause enlargement of the neural foramina through which they exit (►**Fig. 23**). Neurofibromas should not be mistaken for pelvic lymphadenopathy.

Procidentia

Like MR, MDCT can demonstrate simple or complex organ descent (►**Fig. 24**) in all pelvic compartments and facilitate comprehensive planning by the surgeon; thus, increasing the success rate of the surgical intervention.

Conclusion

Incidental diseases of the female genital tract are inevitably uncovered with increasing frequency due to technical improvements in cross-sectional imaging. It is important for radiologists to recognize normal appearances of the female genital tract on MDCT to prevent misinterpretation as pathology. To avoid overdiagnosing incidental pelvic lesions that could have a negative effect on overall patient care, radiologists should use clinical correlation to decide when reimaging the pelvis with ultrasound or MRI is indicated, for further characterization of abnormal CT findings.

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Conflict of Interest
None declared.

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