

CLINICAL CASE - TEST YOURSELF Abdominal Imaging

An uncommon cause of scrotal swelling in a young male

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PART A

A 24-year-old man presented to Computed Tomography (CT) Department in our institution with a painless gradually progressive swelling in the left inguinoscrotal region and left lower quadrant of the abdomen for the last four months; and painless swelling in the right scrotal sac for the last six months. Clinically cross fluc-

tuation was elicited between the scrotal swelling and abdominal swelling on the left side. Ultrasound performed elsewhere was reported as inguinal hernia. Patient was further referred for CT abdomen pelvis and inguinoscrotal region (Fig. 1-3). Sagittal and coronal 2D multiplanar reformatted images were reconstructed (Fig. 4).



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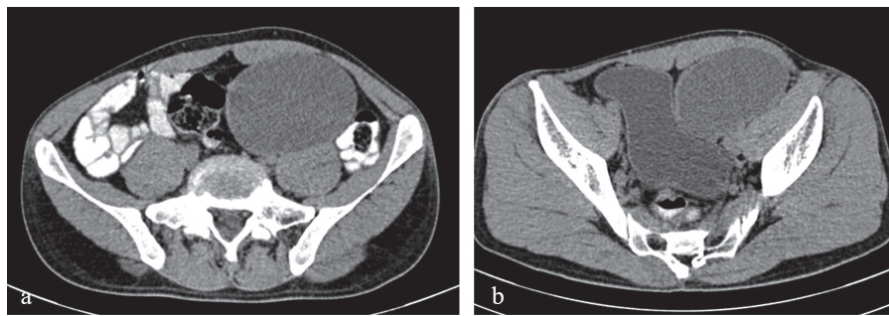


Fig. 1. a and b Non-contrast enhanced CT images of the pelvis in axial views.

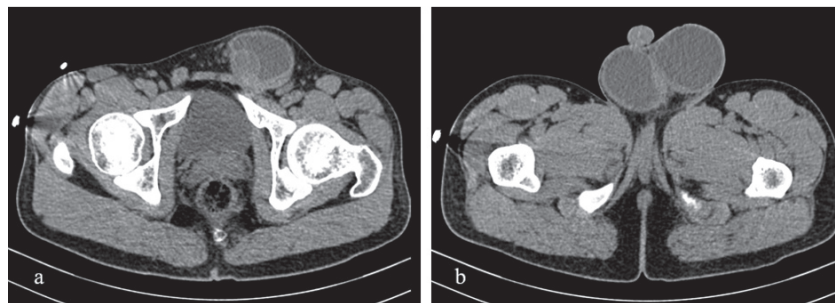


Fig. 2. Non-contrast enhanced CT images of the inguinal region (a), and scrotal region (b) in axial views.

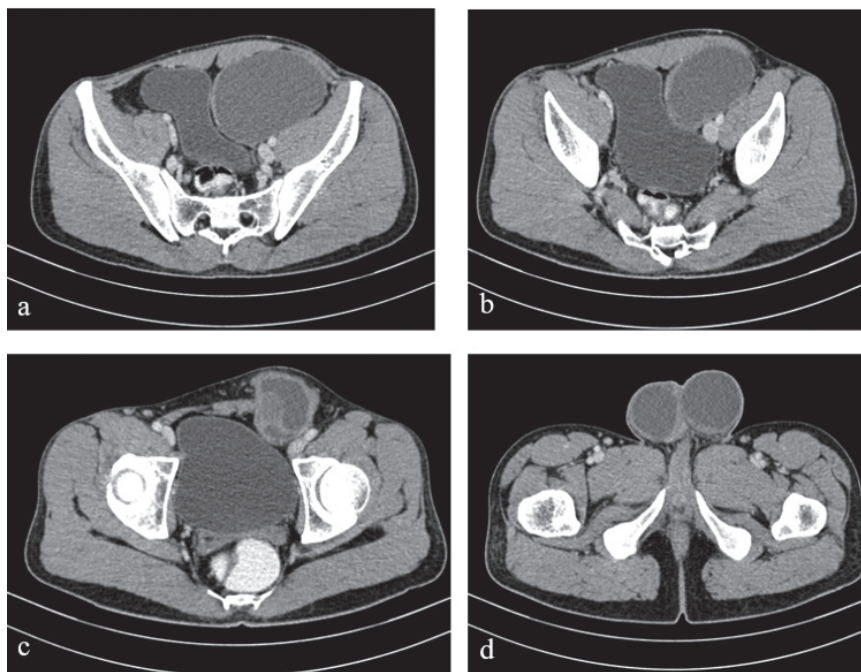


Fig. 3. Contrast-enhanced CT images of the pelvis (a, b), inguinal region (c) and scrotal region (d) in axial views.

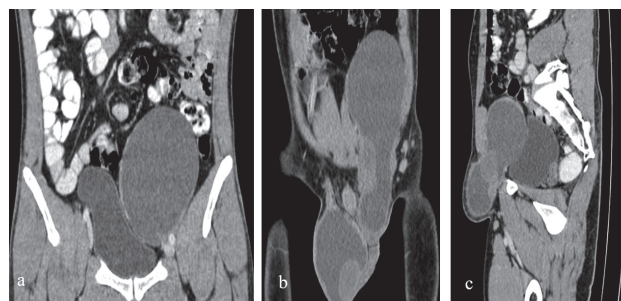


Fig. 4. Contrast-enhanced CT images of the pelvis and inguinoscrotal region in coronal (a, b) and sagittal (c) views.

PART B

Diagnosis: Abdominoscrotal Hydrocele - Complete Indirect Type with undescended testis

Plain and contrast-enhanced CT scan of the abdomen, pelvis and inguinoscrotal region was performed after opacification of bowel loops with positive oral contrast (Fig. 1-3). Coronal, sagittal, and oblique two-dimensional multiplanar reconstruction was performed in the region of interest (Fig. 4).

The left testis was not visualized in the left scrotal sac. It was seen in the left inguinal region where it measured approximately 25 x 18 x 40 mm (anteroposterior x transverse x craniocaudal respectively) – undescended (Fig. 2,3). A large well defined thin-walled hypodense fluid collection (CT value 5 - 20 HU) was noted in the left scrotal sac. It was seen lateral to inferior epigastric vessels in the left inguinal region (Fig. 3b). It was extending proximally through the left inguinal canal in the abdomen along the left lateral pelvic wall. It was extending in the left iliac fossa and left lower lumbar region anterior to the left psoas muscle beneath the anterior abdominal wall in a dumbbell-shaped manner (Fig. 4). The abdominal component measured approximately 73 x 94 mm (anteroposterior x transverse respectively). The left scrotal component measured approximately 50 x 50 mm (anteroposterior x transverse respectively). Both the components were seen to be in continuity with each other across the left inguinal canal. The supero-inferior extent of the lesion was 189 mm approximately. The medial wall of the lesion showed mild thickening (2.2 mm) and enhancement in the contrast study. The lesion was causing an extrinsic mass effect on the left lateral wall of the urinary bladder which was hence compressed and displaced towards the right. Mild extrinsic compression was noted on the anterior wall of the adjoining left ureter and adjoining left iliac vessels.

The right testis was seen in the right scrotal sac. It measured approximately 30 x 25 x 41 mm (anteroposterior x transverse x craniocaudal respectively). Large scrotal hydrocele was noted in the right scrotal sac which measured approximately 60 x 65 x 84 mm (anteroposterior x transverse x craniocaudal respectively). No herniation of bowel loops or omentum was noted on either side.

No hydronephrosis and hydroureter were noted on either side. The rest of the abdomen appeared normal. Diagnosis of left-sided complete indirect abdominal scrotal hydrocele with undescended left testis and right vaginal hydrocele was made.

Dupuytren's in 1834 first described abdominoscrotal hydrocele as "hydrocele en bisac" [1]. It was later defined by Bickle in 1919 as abdominoscrotal hydrocele [2]. It is a rare entity in infancy and childhood up to five years and can also be seen in adults in the third decade [3]. It should be suspected when hydrocele is associated with abdominal mass superior to the inguinal region.

It begins as inguinoscrotal hydrocele as a congenital anomaly of processus vaginalis and gradually extends into the abdomen as a bi compartment intercommunicating hydrocele [4]. The cardinal feature of this entity is free intercommunication between the two compartments.

Though its exact pathogenesis is ill-understood, three theories are proposed for its etiopathogenesis.

- A) simple vaginal hydrocele with cephalad extension
- B) High obliteration of processus vaginalis
- C) Persistent processus vaginalis acting as a one-way valve with resultant cephalad extension of hydrocele.

Wlochynski et al suggested 'springing back ball sign' as a characteristic finding in abdominoscrotal hernia rather than cross fluctuation test. The abdominal component becomes prominent during compression of the scrotum. It regains its size once scrotal pressure is released [4,5].

Differential diagnoses are inguinal hernia, encysted hydrocele of the cord, cord lymphangioma, cystic abdominal mass, and ascites [3].

Abdominoscrotal hydrocele has a variable course in the pediatric and adult populations. In children, it rapidly evolves and may spontaneously resolve. In Adults, it is usually a longstanding, progressive and non-resolving cystic lesion.

Ultrasound is the initial modality of choice. It demonstrates scrotal hydrocele and abdominal cystic lesion with intercommunication on graded compres-

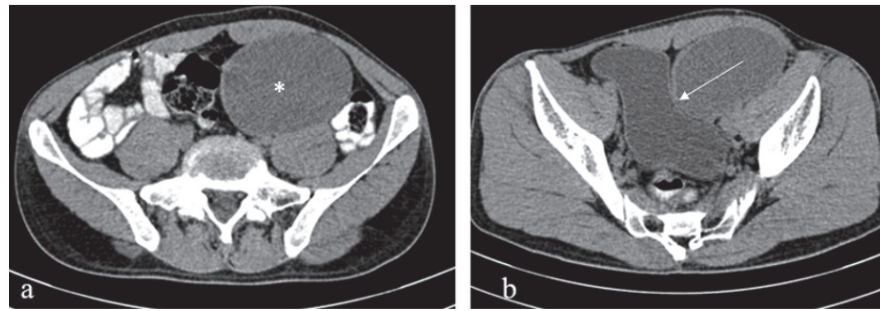


Fig. 1a and b. axial non contrast images of the pelvis a well-defined thin-walled cystic lesion (Asterix) in the pelvis causing mass effect on the urinary bladder (white arrow).

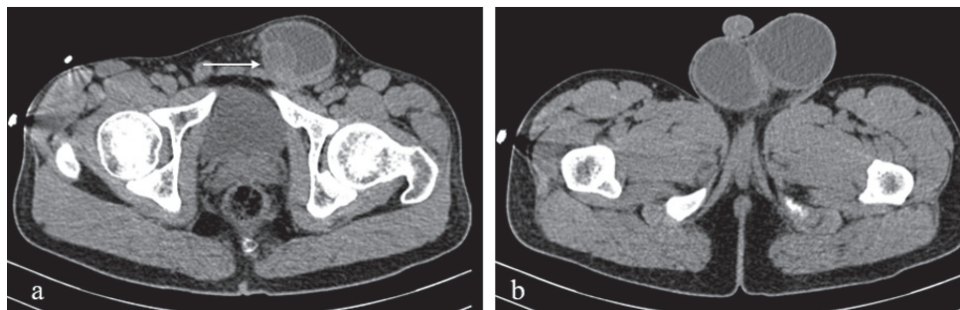


Fig. 2. Non-contrast-enhanced CT (a) Undescended left testis in the left inguinal region (white arrow), (b) bilateral scrotal hydrocele.

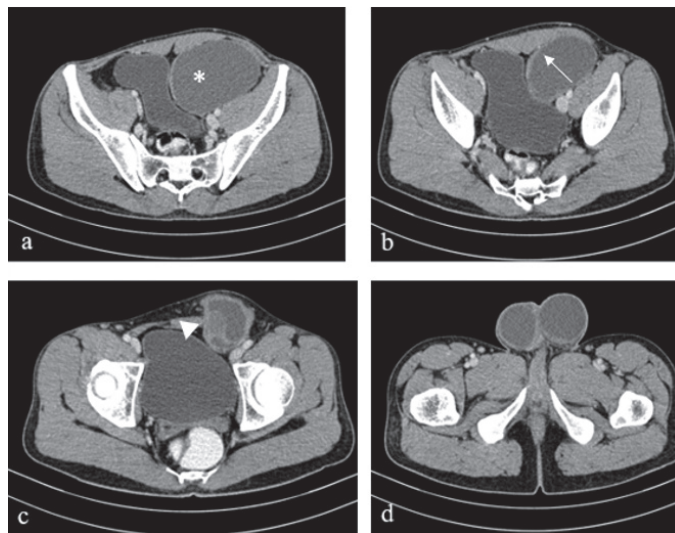


Fig. 3. Contrast-enhanced CT images of the pelvis in axial views. (a, b) A well-defined thin-walled cystic lesion in the pelvis (Asterix) located lateral to the inferior epigastric vessels (white arrow), (c) undescended testis in the left inguinal region (white arrowhead), (d) hydrocele in the bilateral scrotal region.



Fig. 4. Contrast-enhanced CT images of the pelvis and inguinoscrotal region in coronal (a, b) and sagittal (c) views demonstrating the hourglass configuration of the swelling and its abdominal (white arrow) and scrotal component (white arrowhead).

sion in real-time. However if the relationship between the abdominal mass and the hydrocele is not clearly demonstrated on the ultrasound, other imaging modalities like CT or MRI (Magnetic Resonance Imaging) can be used to clearly delineate the anatomy with its multiplanar approach. For uncomplicated ASH, MRI displays normal fluid signal inside the hydrocele whereas CT shows a hypodense collection. In cases of complicated ASH with bleeding, MRI is useful in eliminating other pathologies like testicular tumours, vas deferens cyst, or lymphangioma based on signal intensities [6]. MRI and ultrasound should be the preferred modality of diagnosis in these cases as they pose no significant radiation hazard to radiosensitive organs like the testis and provide better anatomical delineation.

Dupuytren's theory is the most acceptable. Overdistention of the tunica vaginalis forces fluid through the inguinal canal and into the abdomen, forming the abdominal component. Brodman stated that with continued accumulation of secretions in the tunica vaginalis upward pressure is exerted [7]. This upward pressure is transmitted to the internal inguinal ring as inguinal canal is relatively unexpandable. Abdominal extension occurs when the pressure in the hydrocele exceeds the intraperitoneal pressure. A one-way valve is created which derives the fluid from the scrotum into the abdomen. Scrotal pressure is higher as per Laplace's law. The abdominal component can be retroperitoneal or properitoneal [8].

The abdominal mass increases in size when the scrotal portion of the hydrocele is compressed. This forces

fluid from the scrotal portion of the hydrocele to the intra-abdominal portion [9].

Complications of abdominoscrotal hydrocele are - hydronephrosis and hydroureter, inguinal hernia, dysmorphic testis, disorders of spermatogenesis, inflammation of the abdominal scrotal hydrocele, hemorrhage within abdominoscrotal hydrocele, cryptorchidism, crossed testicular ectopia, malignant mesothelioma of the tunica albuginea, oedema of the lower limb [10].

Differential diagnoses of cystic abdominal lesions are - mesenteric cyst, duplication cyst, large hydronephrotic kidney, multicystic dysplastic kidney, large bladder diverticulum, cystic tumour, lymphangioma, hamartoma, teratoma [10]. Rarely abdominoscrotal hydrocele can be bilateral and can be located in the abdominal cavity in the intra or extraperitoneal compartment.

Abdominoscrotal hydrocele can be classified as follows [11] - Complete abdominoscrotal hydrocele - indirect or direct type; Incomplete abdominoscrotal hydrocele- a - abdominal inguinal hydrocele - indirect or direct type, b- inguinoscrotal hydrocele

In conclusion, abdominoscrotal hydrocele is a rare entity which can occur in both children and adults and needs a high index of suspicion for diagnosis. Scrotal hydrocele associated with abdominal mass superior to the inguinal region gives clue to its diagnosis. Free intercommunication between scrotal hydrocele and cystic lesion in the abdomen is the cardinal feature of this entity. **R**

Conflict of interest

The authors declared no conflicts of interest.



KEY WORDS

hernia; hydrocele; undescended testis

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