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RARE IMAGING DIAGNOSIS OF CYSTIC ADRENAL LESION

Radio-Diagnosis

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ABSTRACT

Adrenal cysts are a rare condition, usually benign and asymptomatic, detected as incidental findings on imaging. Although, these are hardly associated with malignancies, they may lead to life-threatening circumstances if misdiagnosed. This case reports an unusually large cyst and aims to highlight the importance of imaging modalities in its diagnosis.

KEYWORDS

Adrenal Cyst, Benign Cyst, Importance Of Imaging Modalities

BACKGROUND

Adrenal cysts are a rare condition (with an incidence of 0.06%) resulting in predominantly unilateral cystic lesions that are discovered incidentally during surgery or imaging procedures (Nerli et al., 2012). Patients are usually asymptomatic however, may sometimes present abdominal pain, cyst rupture, palpable abdominal masses, etc. (Ricci et al., 2013). The diagnosis of these cysts can be done by imaging modalities such as ultrasound, computed tomography (CT) scans and magnetic resonance imaging (MRI) (Wang et al., 2018). The enlargement of adrenal cysts can lead to the compression of nearby organs leading to further complications; thus, appropriate treatment is crucial.

Case Report

History Of Presentation

A 29-year-old male, came in for a health check-up at our hospital and on ultrasound examination, he was incidentally detected with a large cyst in the retroperitoneal region. The exact origin of this cyst was not well appreciated on the ultrasound. Patient was subsequently admitted in the hospital and asked to undergo an MRI examination of the abdomen and pelvis; findings of which are explained in detail further.

Past Medical History

Patient had a no significant history besides smoking since the past 4 years. This was of questionable relevance.

Investigations

I. Sonography of the abdomen and pelvis was performed on the patient on a Phillips iU22 ultrasound machine. It revealed the presence of a large cyst (illustrated with a red arrow in **Fig. 1A**) on the left side of the abdomen, it appeared to be benign in nature and was compressing the left kidney (**Fig. 1B**).

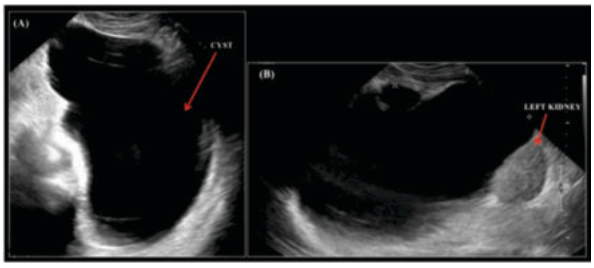

Figure 1 | Ultrasound of the abdomen. *(A) Presence of an anechoic cystic lesion, with a thin cystic wall, showing multiple internal echoes; (B) The cyst displacing the left kidney and compressing it.*

II. Subsequently, a pre and post MRI scan (3 Tesla) of the abdomen was performed using T1 and T2-weighted sequences, in multiple planes. The scan revealed a large, well-defined, thin-walled, T2 hyperintense cystic lesion occupying the entire left hypochondrium and lumbar retroperitoneal region. The lesion resulted in the inferior and medial displacement of the left kidney (**Fig. 2A** and **Fig. 2C**). It did not show any solid component within and showed minimal peripheral post contrast enhancement. The left adrenal gland was not well seen whereas, the right adrenal gland was well visualised on the scan (**Fig. 2B** and **Fig. 2D**).

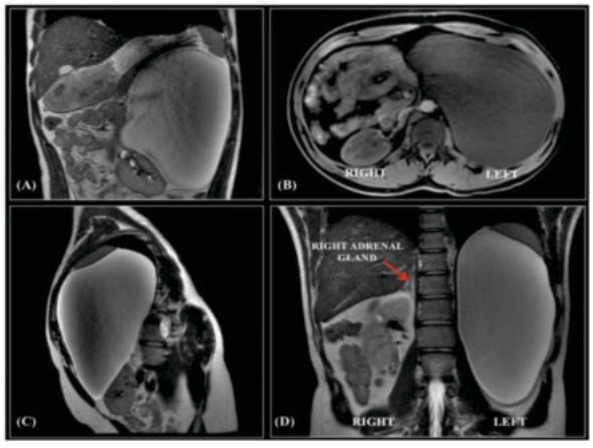

Figure 2 | 3 Tesla MRI scan of the abdomen. *(A) Coronal T2-weighted image showing the displacement of the left kidney by the adrenal cyst; (B) Axial T1-weighted image shows hypointense cystic lesion, displacing the bowel loops to the right; (C) Sagittal T2-weighted image shows the supero-inferior extent of the cystic lesion; (D) Coronal T2-weighted image shows normal right adrenal gland. However, left adrenal gland is not normal.*

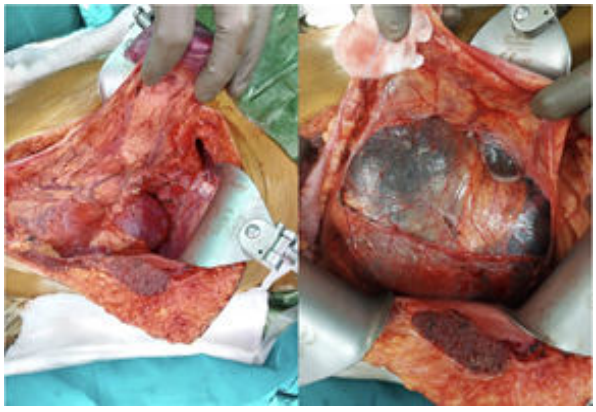

Figure 3 | Intra-Operative Adrenal Cyst lesion

Medical Management

No universal workup recommendations are available. In case of a

small or moderate sized cyst, cyst aspiration is considered. If blood is aspirated, then it is an indication for surgery. Recent literature suggests, large cysts (> 6 cm) with clinical symptoms and other complex features on imaging, are an indication for surgery (Ricci et al., 2013).

Based on this, the patient was advised surgery. Cyst excision with left adrenalectomy was performed.

Intra operative findings:
A 20 x 15 x 10 cm size cyst along with 2 x 2 x 2 cm sized continuous cyst in the parenchyma of the left adrenal gland was excised (shown in **Fig. 3)**. The sample was sent for histopathology.

Follow-Up
Patient was stable on discharge and was advised for a follow-up after one week. He had normal parameters and was stable after the one-week follow-up.

Differential Diagnosis
Adrenal cysts (represented in **Fig. 4A**) may sometimes be misdiagnosed for pancreatic cysts (**Fig. 4B**) as these cysts have similar clinical manifestations including abdominal pain and the presence of abdominal mass. Pancreatic cysts are fluid-filled protrusions that develop in the pancreas which may be benign or malignant (*Pancreatic Cysts | Memorial Sloan Kettering Cancer Center*, n.d.). Certain adrenal and pancreatic cysts can also be classified as retroperitoneal cysts. Retroperitoneal cysts are commonly defined as benign tumours of the retroperitoneum, with embryonic- tissues of mesothelial and epithelial- origins (Maurya et al., 2003).

It is crucial to carefully distinguish between these cysts and make an appropriate diagnosis for an optimum treatment; imaging studies often aid clinicians with this (shown in **Table 1**).

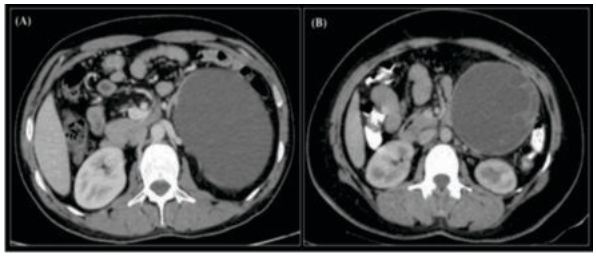

Figure 4 | CT scans demonstrating *(A) Axial contrast positive (C+) portal venous phase image of an adrenal cyst (Niknejad & Knipe, 2017); (B) Axial C+ portal venous phase image of a solid pancreatic tumour(Jones & Gaillard, 2008).*

Table 1 | Differential diagnosis of the different types of cysts based on their clinical profile and various imaging modalities.

Type of Cyst	Adrenal cyst	Pancreatic cyst
Clinical Profile	• Pain or swelling • 40% are incidentally found (asymptomatic) • Functional cysts are very rare	• Signs of biliary obstruction • Gastric outlet obstruction • Secondary infection
Ultrasound Findings	• Thin-walled cystic lesions with posterior beam enhancement • Internal mobile echoes	• Thin-walled • Anechoic • Avascular cysts
CT Findings	• Unenhanced CT used to detect small and large cysts • Post-contrast CT used to differentiate between adrenal adenomas and cysts	• Used to characterise the size and shape of the cyst • Can help in identifying malignancies
MRI Findings	• Hyperintense on T2 images • Adrenal gland is usually not seen separately from lesion • Pancreatic parenchyma is well delineated	• Hyperintense on T2 images • Dependent debris are present • There is disruption of pancreatic duct structure

Ultrasound, CT and MRI findings for differentiating between adrenal and pancreatic cysts for better diagnosis.

DISCUSSION
The first case of the uncommon, cystic adrenal lesions was reported in 1670. These cysts remain underappreciated due to their nonspecific radiologic and clinical characteristics (Goel et al., 2021). Most often, these cysts are recognised incidentally upon imaging as they do not present any symptoms early on. Adrenal gland cysts have been traditionally categorised as epithelial cysts, most prevalent (up to 45%), endothelial cysts (adrenal lymphangiomas and adrenal cysts of lymphatic origin), pseudocysts, parasitic cysts and a small proportion of cases (0.064-0.18%) of cystic neoplasm (Solanki et al., 2023). These cases usually undergo radiological and biochemical investigations to eliminate possibilities of any underlying malignancies. Subsequently, patients are advised to go through pharmacological or surgical interventions (depending on the size and type of cyst) to treat this condition (Goel et al., 2021).

Learning Objectives
- Imaging studies help to appropriately differentiate between adrenal cysts and other cysts including pancreatic cysts and may also help in identification of malignancies.
- Many cysts found are found incidentally.
- Imaging modalities play a key role in appropriate diagnosis, which is crucial for deciding the most effective method of treatment.

CONCLUSIONS
Cystic adrenal lesions are uncommon with unique clinical and etiological presentations which may lead to problems with the diagnosis and management of the condition. This case report describes a patient with an adrenal cyst, which was unusually large and therefore, hard to differentiate. Interestingly, this individual had no significant past history or genetic history and was fairly young. These adrenal cysts can lead to rare, but life-threatening circumstances if not treated, resulting in intracystic haemorrhage leading to hypovolemic shock. Thus, this report depicts the importance of imaging to make an appropriate differential diagnosis for the better clinical management of adrenal cysts.

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