GSC Advanced Research and Reviews

eISSN: 2582-4597 CODEN (USA): GARRC2

Cross Ref DOI: 10.30574/gscarr

Journal homepage: https://gsconlinepress.com/journals/gscarr/

(CASE REPORT)

A case report of a calyceal diverticulum in a specialist hospital in Rivers State, South-South Nigeria: Computed tomography finding

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GSC Advanced Research and Reviews, 2025, 22(03), 137-141

Publication history: Received on 09 January 2025; revised on 26 February 2025; accepted on 01 March 2025

Article DOI: https://doi.org/10.30574/gscarr.2025.22.3.0066

Abstract

Calyceal diverticulum (la) is a rare outpouching or eventrations of the upper collecting system lying within the renal parenchyma. These outpouchings are lined by transitional cell epithelium and they communicate with the main collecting system via a narrow channel which allows for passive filling with urine. Calyceal diverticulum was first described in 1841 by Rayer in ''Traitments des maladies des reins.''. Thought to be either cyst or hydronephrosis, he used the term kyste urinaire to describe his finding of intrarenal urine- containing cavities that communicate with calyces. This disease entity is found in 0.21% to 0.6% of intravenous urogram (IVU) performed in adults, with a similar prevalence in children. The disease process affects women more than males. No predilection towards a particular side of the body. Studies have shown that they are most likely congenital in origin than acquired. Also, the similarity in incidence for both adults and children is consistent with an embryologic etiology. Some other authors came up with several other names depending on the location of the cyst, but Prather coined the word calyceal diverticulum which is what is been used today. Sometimes a misdiagnosis of hydronephrosis, parapelvic or peripelvic cyst is made especially on ultrasound and so a crossectional imaging modality such as computed axial tomography is invaluable in making proper diagnosis. Our objective is to highlight the possibility of occurrence of a symptomatic calyceal diverticulum in a child and also to emphasize the use of computed axial tomography in the proper diagnosis of the disease. In this case we present a 14year old female patient with a 3month history of right upper abdominal swelling with associated loin pain. A diagnosis of? Hydronephrosis was made on ultrasound scan, but no obvious cause of obstruction was identified.

Keywords: Calyceal; Diverticulum; Computed axial tomography; Case report; Nigeria

1. Introduction

A calyceal diverticulum is an eventration of the upper collecting system lying within the renal parenchyma[1]. Majority of authors has favoured congenital origin. One proposed etiology is the formation of a diverticulum during branching of the ureteral bud into metanephric blastema. If one of the branches fail to stimulate the appropriate section of metanephros a diverticulum forms[2,3]. The similarity in the prevalence of the disease amongst adults and children has also reiterated its congenital origin[4,5,6].

There are potentially acquired causes, broadly classified as traumatic, neuromuscular(achalasia), fibrotic(fibrosis of an infundibulum) or obstructive. The latter has been proposed to be secondary to stone formation[7] or infection such as abscess collection within the calyx[8].

They are classified into two types namely: type 1 -these diverticula communicates with the a minor calyx or an infundibulum; type II- they emanate from the renal pelvis or a major calyx, these ones are larger and tend to be

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symptomatic and are located in the central part of the kidney[2] . Dretler proposed another classification that includes both anatomical description and his recommended treatment for each.

- Type I diverticulum- has an open mouth and short neck.
- Type II- has a closed mouth and long neck
- Type III- has a closed mouth and a long neck while type IV has an obliterated neck. Shock-wave lithotripsy (SWL) is recommended for type I, ureterorenodscopic management was recommended for type II, and percutaneous treatment for types III and IV.

Calyceal diverticula are usually asymptomatic, however one third to one half of patients present with flank pain, urinary tract infection, and or hematuria[9]. Diagnosis is often made on imaging. On ultrasound they appear anechoic with acoustic enhancement, similar to cysts except when filled with stones, in which the stones will appear mobile in dependent positions with associated acoustic shadow.,

On ultrasound they are often misdiagnosed as hydronephrosis because they produce hypoechoic lesions within the pelvis. Therefore, a computed tomography scan with contrast is necessary to differentiate

2. Case

A 14-year old female with a 3-month history of right upper abdominal swelling and associated loin pain. History of fever, hematuria and dysuria was denied. Her vital signs were within normal limits. Laboratory tests such as renal function test and urinalysis showed no abnormalities.

Patient was referred from a private hospital to the radiology department of a tertiary institution to have a contrast computed tomography of the abdomen done. Below are the images:

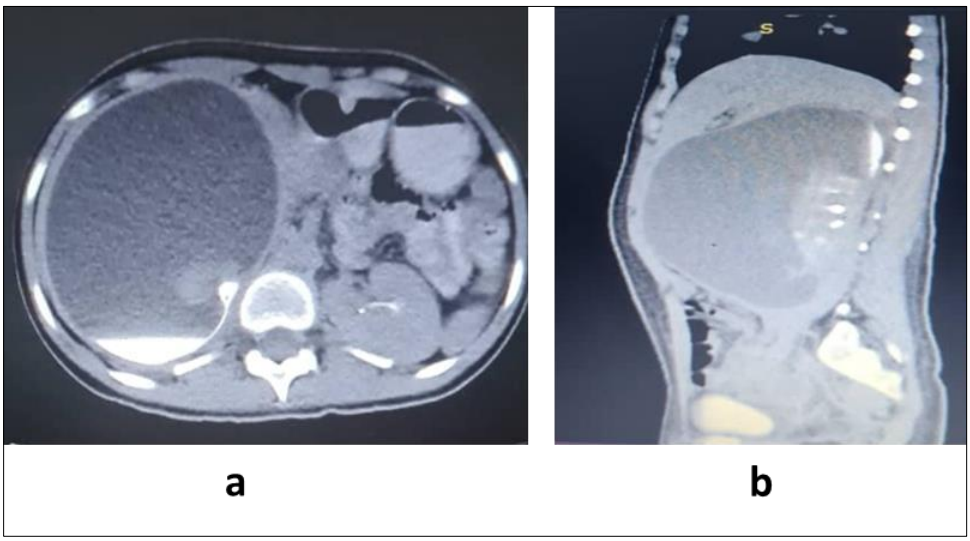

Figure 1a and 1b are contrast enhanced computed tomography(CECT) axial and sagittal views respectively showing the connection of the calyceal diverticulum with the pelvic

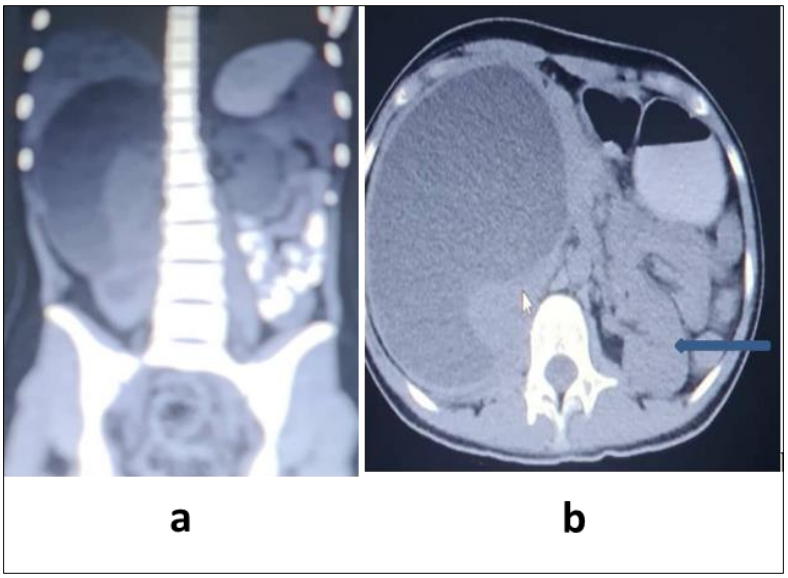

Figure 2 a and 2b are non-contrast enhanced computed tomography (NCECT) coronal reformatted and axial views respectively showing the right calyceal diverticulum, white arrow is showing the right kidney which is compressed by the calyceal diverticulum and the left kidney is seen(blue slim arrow)

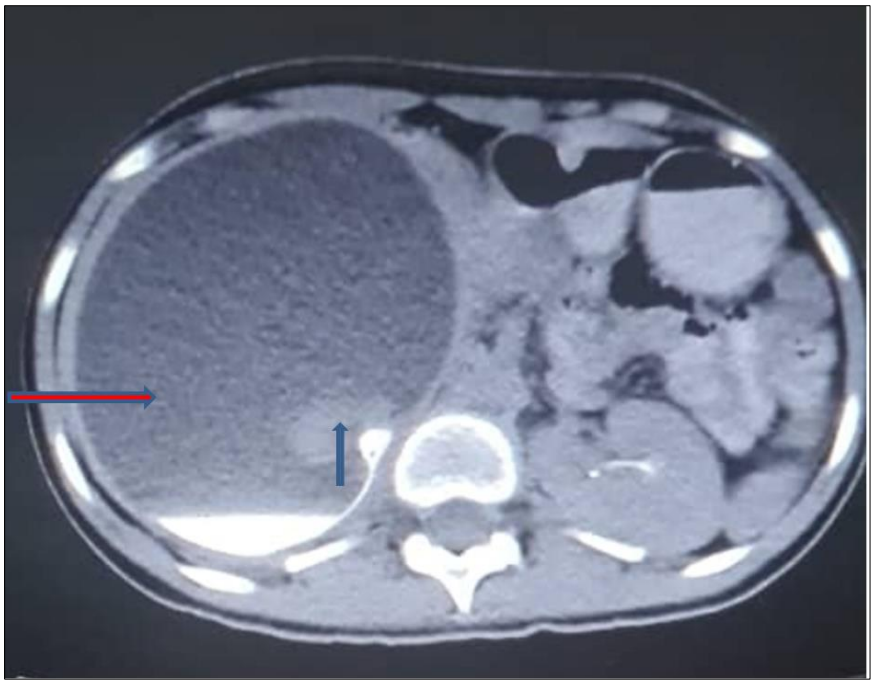

Figure 3 is zoomed axial CECT image showing the right calyceal diverticulum (red arrow) and the ipsilateral kidney (blue arrow)

The computed tomography scan shows a well-defined fairly rounded multiloculated cystic lesion measuring 20.4cmx11.92cm and has a HU of 5.34 and 5.84 for pre and post contrast images respectively. The contrast enhanced images show a homogenous uptake of contrast by the cystic lesion with a fluid- fluid layering and a distinct connection between the cystic lesion and the inferior pole calyceal moiety of the right kidney. Medial displacement and compression of the right kidney is noted. The left kidney is normal in morphology and size.

A nephrostomy was scheduled for the patient

Calyceal diverticulum must be differentiated from similar disease entities and they include hydronephrosis, simple renal cyst, parapelvic cyst, papillary necrosis, renal tumor etc. Imaging is the only valuable means of differentiating

these various entities. In hydronephrosis (hydrocalicosis), there is usually an infundibular obstruction. Simple cyst will not communicate with the collecting system; parapelvic cyst are found adjacent to the pelvis and do not communicate with the collecting system like simple cyst and unlike calyceal diverticulum. Papillary necrosis is seen in medulla and are usually associated with systemic conditions like sickle cell anemia or in prolonged use of non-steroidal anti-inflammatory drugs. A renal neoplasm should also be ruled out through biopsy/histology.

Aim/objective

The aim of this study is to report the existence of this rare disease entity- Calyceal diverticulum in our environment, a specialist hospital in Port Harcourt and also to highlight the invaluable use of cross-sectional image like CT in the proper diagnosis of Calyceal diverticulum and in differentiating it from other lesions that are similar to it as enumerated in the introduction.

3. Discussion

Calyceal diverticulum also known as pyelocaliceal diverticulum is an outpouching of the renal calyx or pelvis. They are an uncommon urologic condition that generally follow an asymptomatic course and rarely require intervention except when they become symptomatic by way of location.

The index case belongs to type II, because the lesion is large and symptomatic. Radiological investigation carried out on her includes Computed axial tomography and ultrasound scans. The former (CT) revealed a huge multiloculated cystic mass at the right hypochondrium lateral to the right kidney, displacing and compressing the kidney medially. The right kidney is seen separate from it, however there is a communication between the upper pole moiety calyx and the calyx. This is evidenced by the presence of contrast within the cyst giving a fluid-fluid level within it.

In this study the cyst is found at the upper pole, this is similar to a meta-analysis combined series done, which reported a 48.9% occurrence at the upper pole. A study carried out by Abeshouse and Abeshouse[4] also showed same pattern of 12:3:2 for upper, middle and lower pole incidence. According to Nikhil Waingankar etal[10],their study was a more comprehensive one as it involved a review of many more patients as against the index case which is just a review of one patient. In their study they found out that 90% of their population had renal stones, which is contrary to our own index case in which there is no evidence of stone.

4. Conclusion

Calyceal diverticulum is a rare congenital disease of the upper urinary system (kidneys). The diagnosis is best made by radiological imaging in which a computed tomography technique like a CT urography (CTU) is the most sensitive for its diagnosis. This was done for our patient and the result is unequivocal.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

Ethical approval was obtained.

Statement of informed consent

Verbal/ written consent was obtained from parent.

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