Urology Case Reports 34 (2021) 101495

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: http://www.elsevier.com/locate/eucr

Oncology

Renal immature teratoma: A rare entity; A case report and literature review

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ARTICLE INFO

Keywords:
Teratoma
Immature
Kidney
Case report

ABSTRACT

Teratomas are neoplasms commonly arising from the gonads. Kidney is one of the rare sites of origin of the tumor. Immature intra renal teratoma is even more rare and to date only 4 cases have been reported in the literature. We report a rare case of renal immature teratoma diagnosed in a 6 months old female patient, discuss its pathology and review relevant literature.

Introduction

Teratomas are neoplasms that arise from pleuripotent cells and are composed of several types of tissues representing one or more of germinal layers, including ectoderm, endoderm and mesoderm (1). The Gonads are most common site of origin of teratomas. Extragonadal teratomas commonly arise in sacrococcygeal, meditational, sacral, retroperitoneal, alimentary, cervical and intracranial regions.[2] The Kidneys are rare site of teratoma.[1] Based on behavior teratomas are either benign or malignant. Immature teratoma and malignant transformation of a benign teratoma are considered as malignant teratomas. Immature teratoma is composed of variable amount of immature, typically primitive/embryonal neuroectodermal tissue. Since its first description by McCurdy in 1934[2] to dateless than 30 cases of teratomas of kidney have been reported in the literature.[3]

Immature teratoma of the kidney is extremely rare and to the best of our knowledge our case is the fifth report of its kind.[2]

We present a case of intrarenal immature teratoma in a six-month-old female patient, discuss its pathology and review relevant literatures.

Case presentation

A 06 months old girl was brought by her parents with a compliant of abdominal swelling of two months duration. CT (computed tomography) scan of the abdomen revealed a 13.5 × 11.3 × 1 cms measuring left renal solid mass with areas of calcification and cyst with an impression of Wilms tumor. No tumor in other sites of the body was identified on further investigation. Pre operative chemotherapy was initiated with Vincristine and Dactinomycin. A median under umbilical incision was made to find a large mass in left pelvic region. After nephrectomy the specimen was referred to Pathology department. Grossly it was a circumscribed lobulated gray white solid and cystic mass measuring 12 × 11 × 9 cms and weighing 675 gms (Fig. 1A). On sectioning a variegated mass with areas of cyst, hemorrhage, and a solid focus was identified. A thin compressed rim of renal tissue was present at periphery of the mass (Fig. 1B). Microscopically a cyst lined by keratinizing stratified squamous epithelium with skin adnexeal structures was seen (Fig. 2A). Solid focus showed areas of brain tissue, cartilage, and ciliated columonar epithelium (Fig. 2B and C). Foci of immature neuroectodermal tissue with areas of rosette formation was also present (Fig. 2D). No histologic evidence of response to preoperative chemotherapy was noted. With these features a diagnosis of intra renal immature teratoma was made. Follow up three months after surgery with CT scan showed no recurrence.

Discussion

Teratomas are rare neoplasms with tissue derivatives of all three germ layers.[2] They most commonly arise in ovaries and testis, but have also been reported in the anterior mediastinum, retroperitoneum, sacrococcygeal region, brain, gastrointestinal tract and rarely in the kidney. Arrest of migration of primitive germ cells from the yolk sac to the genital ridge probably results in this diverse distribution. The proximity of the genital ridge to the nephrogenic anlage could partly explain how

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https://doi.org/10.1016/j.eucr.2020.101495
Received 23 October 2020; Received in revised form 10 November 2020; Accepted 14 November 2020
Available online 19 November 2020

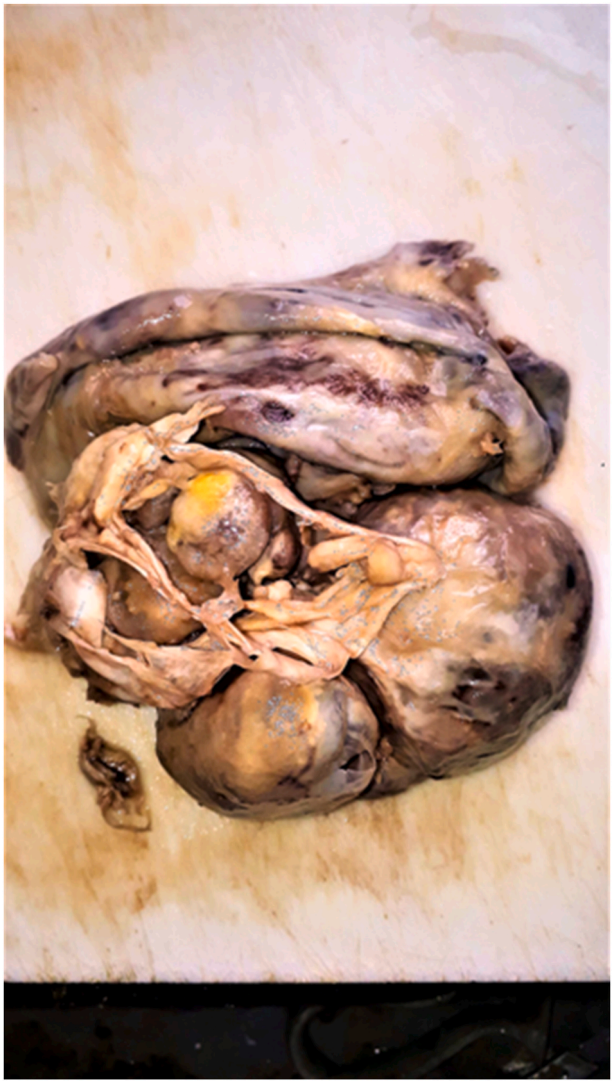

Fig. 1A. Gross view of the mass shows an encapsulated, lobulated, solid and cystic mass.

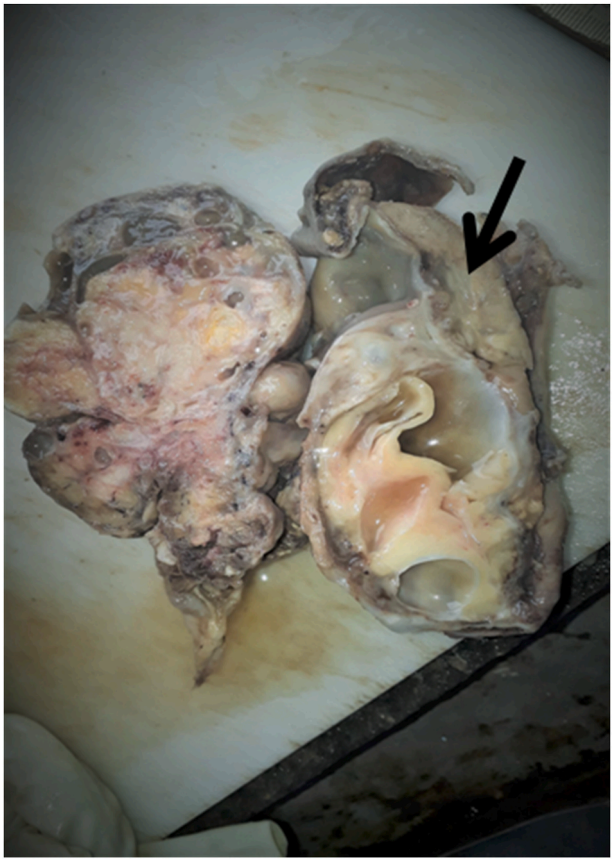

Fig. 1B. Cut section shows encapsulated variegated mass with cystic, necrotic and solid focus. A small rim of compressed renal tissue is indicated by the arrow.

germ cells could be displaced into the kidney.[4] Teratomas are considered as congenital tumors because it is thought that they have been present since birth or even before birth. Renal teratomas include both mature and immature types. Intrarenal teratoma is a rarity, since its first report by McCurdy in 1934 in a seven-week-old child with Prune-Belly syndrome to date less than 30 cases of teratomas of kidney have been reported in literature (3). Renal immature teratoma is even more rare. So far, only 4 articles have reported renal immature teratoma (2). The clinical characteristics, radiologic and pathologic features of these renal immature teratoma are shown in Table 1.

The present patient was a 6 months old female with an abdominal mass and CT showed 13.5 × 11.3 cms mass in the left kidney with areas of cyst and calcification.

Pre operative diagnosis is often performed on an incisional bioptic or Fine Needle Aspiration Cytology (FNAC) sample. US (ultrasound) or CT-guided FNAC may be a valid diagnostic alternative to biopsy for an accurate, rapid and reliable diagnosis avoiding unnecessary pre operative chemotherapy which may be given with a presumptive diagnosis of Wilms tumor. On FNAC the diagnosis of teratoma could be suspected when squamous cells, columnar cells and mesenchymal portions are observed. Immature forms may be more difficult to diagnose on a cytological sample. Therefore, the diagnosis of renal immature teratoma is very difficult before surgery, and the final diagnosis depends on examination of the excised specimen.[5] For a tumor to be termed a renal teratoma, Beckwith suggested it should meet the following minimal criteria: (A) Primary tumor should be unequivocally of intra renal origin, meaning the entire lesion should be contained within the renal capsule and there are no teratomas in remote sites which may have metastasized to the kidney. (B) Tumor should exhibit unequivocal heterotopic organogenesis, with clearly recognizable evidence of an attempt to form organs other than kidney.[2]

In the present case, tumor was unequivocally of intrarenal origin and mainly contains squamous epithelium with adenexeal structures forming skin and an immature component. Therefore, characteristics in the present case were consistent with the criteria given by Beckwith, and it can be diagnosed as a renal immature teratoma.

Small blue round cell tumors including teratoid Wilm's tumor, metanephric adenoma, lymphoma, peripheral neuroectodermal tumor, rhabdomyosarcoma; and rarely metastatic small cell tumors from lung are possible differential diagnosis and an accurate histologic diagnosis is

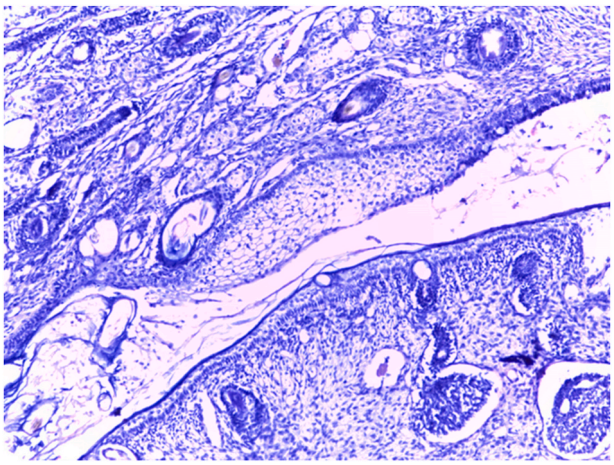

Fig. 2A. Teratomatous component of keratinizing stratified squamous epithelium with skin adenxae

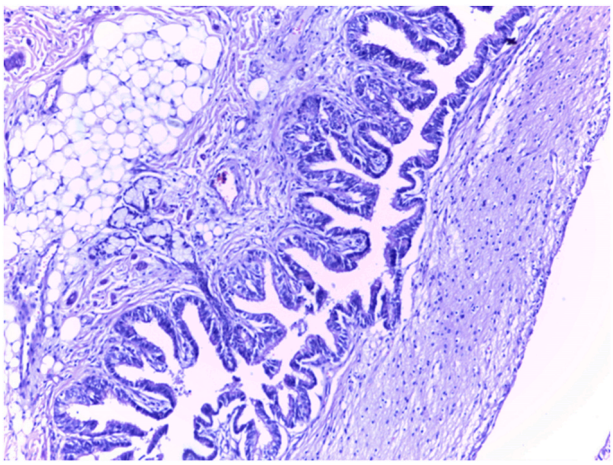

Fig. 2C. Teratomatous component mainly showing tall columonar ciliated epithelium.

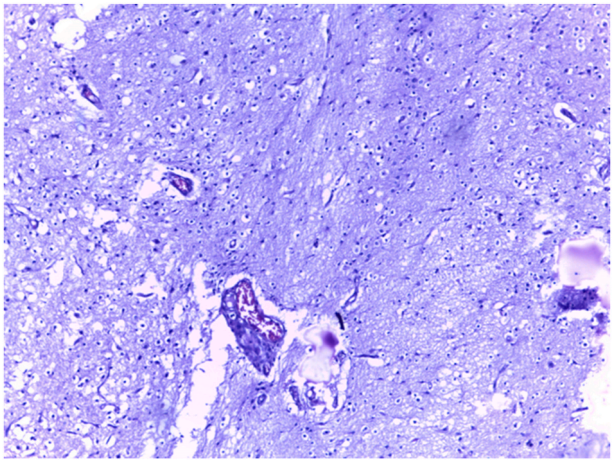

Fig. 2B. Teratomatous component of brain tissue.

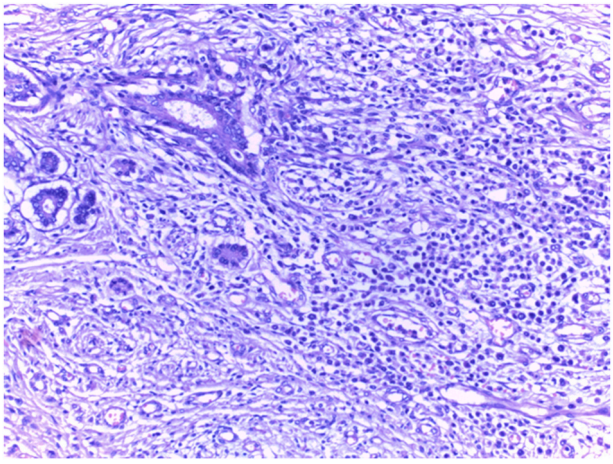

Fig. 2D. Immature neuroectodermal tissue.

crucial for treatment and prognosis.[2]

The current effective mode of therapy for pure immature teratoma is surgical excision with a 3-year event-free survival rate of >85%[3]

Conclusion

Though immature renal teratomas are extremely rare and preoperative diagnosis is difficult, it must be considered in the differential diagnosis of any renal mass in children and adults and should be distinguished from other entities for correct choice of treatment.

Consent for publication

Written informed consent was obtained from the parents for publication.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Yonas Girma Shumiye: Writing – original draft, Writing – review & editing, Selecting case; writing, revising and editing manuscript, Selecting images and corresponding with journal, have read and approved the final manuscript. **Fatuma Yassin Bushra:** Writing – original draft, Writing – review & editing, writing, revising and editing manuscript, have read and approved the final manuscript. **Elizabeth Hailemelekot Sirak:** Writing – original draft, Writing – review & editing, Selecting case, writing manuscript, Selecting images, have read and approved the final manuscript. **Muluken Bekele Wondimagegnehu:** Writing – original draft, Writing – review & editing, revising and editing the manuscript, have read and approved the final manuscript.

Table 1
Clinical, Radiologic and Pathologic characteristics of primary immature teratomas of the kidney.

Journal, year	First author	Age	sex	side	Clinical presentation	Radiographic features of renal mass	Components of teratoma
Medicine,2018	Zhang XL	47	Male	Left	Loin pain, frequency, hematuria	CT - Iso-density occupying shadow with mild to moderate enhancement and small central necrosis	Brain and neuroepithelial tissue
Diagnostic pathology, 2013	Idrissi-Serhrouchni	6 month	Female	Left	Abdominal distension & pain	CT – Renal mass containing low-density	Keratinizing stratified squamous epithelium with skin adnexae, cartilage, mucinous columnar epithelium, bone, melanin containing cells and neuroglial cells with occasional foci of immature neuroectodermal tissue
Pediatric Blood Cancer, 2010	Evans K	6 month	Male	Left	Abdominal mass and hypertension	CT & US - large echogenic renal mass with multiple cystic spaces	A variety of tissue derived from all the 3 germ cell layers.
The Journal of Urology, 2000	Liu YC	2 year 10 month	Female	Left	Poor appetite and poor activity	CT - Huge tumor in the kidney with calcification and necrosis	Yolk sac tumor and immature teratoma

Declaration of competing interest

None.

Acknowledgments

Not applicable.

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