

# Metanephric Adenoma of the Kidney: A Case Report and Literature Review

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**Abstract** Metanephric Adenoma is a rare benign renal epithelial tumor, only a few reports are found in the literature. Reported a 48-year-old female with a palpable mass at left flank, pain and microscopic haematuria. Radiological imaging shows a mass on left Kidney suspected of Renal Cell Carcinoma. Transperitoneal left radical nephrectomy was done. Histopathological results revealed a Metanephric adenoma. The patient is repatriated from the hospital four days after surgery. The patient is in good health, and there is no sign of recurrence on 48 months follow up after surgery.

**Keywords:** renal tumor, radical nephrectomy, metanephric adenoma

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## 1. Introduction

Metanephric Adenomas referred to as "nephrogenic adenoma" or "embryonal adenoma," is a rare benign tumor, which clinically, clinical immunohistochemically and tumor histology of this tumor are unique [1,2,3]. Metanephric Adenoma was first described in 1979 by Bove et al. [1]. Pages and Granier proposed the term nephrogenic nephroma in 1980 [3], regarded as adenomas by Mostofi et al. in 1988 [4]. This type of tumor is only 0.2% of the Renal epithelial neoplasms [5], and so far less than 200 cases were documented in the world literature [6]. According to the theory, these tumors are derived from the primitive metanephric epithelium of the proximal nephron remainings. Histologically, these tumors are associated with Wilms' tumor and another nephrogenic tumor; even it can be found simultaneously [1,2,4,7].

Metanephric Adenoma usually appears in middle-aged women [5,8], but it is also found in children [9,10,11]. Usually, these types of tumors are asymptomatic and discovered incidentally when dealing with other diseases. Symptoms that may arise are in the form of mass in the abdomen, flank pain, microscopic hematuria, hypertension and fever [1-9]. Approximately 12% cases of Metanephric adenoma arise in paraneoplastic syndrome such as polycythemia and hypercalcemia [5,6,7]. Based on radiological and morphological findings, this tumor is solid, well-circumscribed with calcifications and hypovascularity. Clinically and diagnostically, it is essential to distinguish this tumor with other nephrogenic tumors (nodular renal blastema, epithelial Wilms' tumor and Papillary Renal Carcinoma). Knowledge of metanephric adenoma is

essential in its management, in which resection has been proven effective in most cases [4,8,9].

## 2. Case Report

A 48-year-old woman came with chief complaint of palpable mass at the left flank sized as a tennis ball, accompanied by intermittent pain since 5 months ago without complaining hematuria. Physical examination revealed a mass in the left flank region sized 6cm x 6cm x 5cm, hard in consistency, with irregular surfaces and no tenderness. Laboratory findings are within normal limits, microscopic hematuria was found on urinalysis examination. A solid mass was seen in abdominal ultrasound sized 70mm x 63mm x 65mm on lower pole of left kidney without dilatation of pelvicalyceal system and no metastases in other organs. CT urography revealed obvious mass sized 72x93x70 mm at the lower pole of the left kidney. Enhanced contrast CT-scan of the left kidney and right kidney are within normal limits (Figure 1). Chest X-ray resulted in no sign of metastasis.

The patient was diagnosed with left kidney tumor suspected Renal Cell Carcinoma T2NoMo, Karnofsky scores 90%. Transperitoneal left radical nephrectomy was performed, and the histopathological examination revealed nests of a tumor with a clear boundary, small ducts and tubules covered by epithelial cells, slightly larger nuclei than lymphocytes, irregular round-shaped, ovoid, smooth chromatin, overlapping with little cytoplasm and the basement membrane was intact. Prominent few tubules with papillary formations were seen, no mitosis was found (Figure 2). The diagnosis of metanephric adenoma was then made.



Figure 1. Enhanced contrast CT-scan of the left kidney

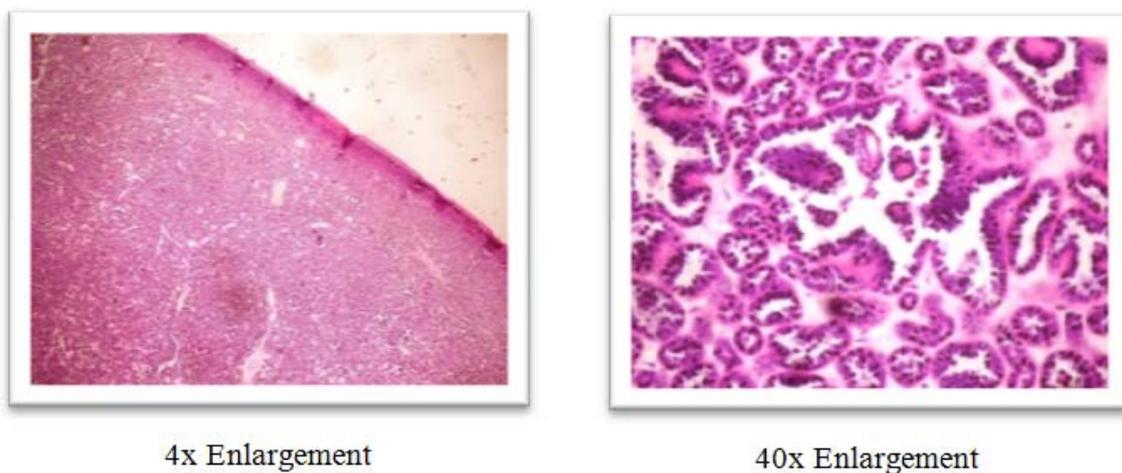


Figure 2. Metanephric adenoma cells with different enlargement

### 3. Discussion

In the embryonic phase, the kidney was developed from metanephric blastema [8]. If there is still tissue left in renal parenchyma after birth, the tissue is then likely to evolve into Wilms' tumor or sometimes develop into Metanephric adenoma. According to the theory, these tumors are derived from the primitive metanephric epithelium of the proximal nephron remainings. Therefore, Wilms' tumor and metanephric adenoma are still considered to have a hystogenetic similarity, sometimes metanephric Adenoma is considered as a benign type of Wilms' tumors in adults [1,2].

Metanephric adenoma was initially found by Boye et al. in 1979 from a 7-year-old boy, and it was believed to develop from primitive epithelium which failed on maturation process of proximal tubule of kidney [12]. In 1980, Page and Granier suggested the name "Nephrogenic Nephroma" for these tumors [12]. Since then, approximately 130 cases have been reported in the world literature. In 1995, based on 22 years' data obtained from the Armed Forces Institute of Pathology, Washington DC, as many as 50 cases of metanephric adenoma were published by Davis et al [13]. This study includes 36 females and 14

males (F: M = 2,6:1) with histologic results of metanephric adenoma. The patients were varied in age from 5 to 83 years. Metanephric adenoma cases were coincidentally found in 20 patients (40%), and six patients had polycythemia (12%). 11 patients (22%) presented with abdominal pain/flank pain, 5 with hematuria (10%) and another 5 with abdominal mass (10%). Preoperative radiological examination of this tumor showed calcification in 44% cases. Based on the distribution of cases by sex and age, most Metanephric adenoma occurs in young adult and a middle-aged woman, but there are also reported cases in children and adults [13].

Liniger et al. reported metanephric adenoma case in a 15-month-old boy, claimed as the youngest case ever reported. Looser et al. also reported a case of a 2-year-old girl with metanephric adenoma of left renal [14].

Metanephric adenoma is commonly found accidentally during an examination for other diseases, including the polycythemia or during a routine examination. It is also found with abdominal pain or flank pain, hematuria, and mass. Some patients complain of fever [13,15].

Metanephric adenoma varies in size, rarely multifocal [11]. This type of tumor is typically demarcated but with no capsule. The surface color varies from gray, brown or

yellowish. Focal hemorrhagic and necrotic of the tumor are often found, in fact about 20% of the cases were found with small calcifications and in 10% of the cases with the formation of cysts [12].

Adenomas are widely ranged, most are 30-60 mm [5]. Bouzourene et al. reported the size of the largest tumour was 20cm x 19cm x 15cm [16,17,18]. In this case, we presented tumour sized 10 cm x 7cm x 3cm

Metanephric adenomas are difficult to diagnose through radiological examination. On ultrasound examination, metanephric adenoma shows a demarcated, solid, hyper- and hypoechoic mass. However, there were 2 cases of metanephric adenoma with atypical cyst [17].

Doppler examination shows hypovascular lesions. In non-contrast CT examination, metanephric adenoma looks like a well-circumscribed isodense or hyperdense mass compared to the renal parenchyma. [5] The correlation between hyperechoic on ultrasound and hyperdensity on CT scan is the hallmark of benign kidney tumors [18,19,20].

Imaging techniques such as ultrasound and computerized tomography (CT) scan showed demarcated renal lesions [19]. In arteriography, Cases of metanephric adenoma show hypovascularization [20]. In this case, we presented hypoechoic abdominal ultrasound image of the left kidney and hyperdensity in CT- urography obtained at the lower pole of kidney

Metanephric adenoma is a tumor that is highly cellular with a small round, dense uniform acini with an embryonal appearance. Because of acinus and a small hole, sometimes we make a mistake on lower magnification about the pattern, and it is regarded as a solid sheet of cells. Stroma varies from striking up into the loose stroma. Hyalinized scar and focal osseous metaplastic stroma present in 10-20% of tumors. Approximately 50% of tumors contain papillary structures, typically consisting of a small cyst protruded as immature glomeruli. There are occasionally a lot of psammoma bodies. Junction with the kidney is usually sharp and without pseudo-capsule. Metanephric adenoma cells are typically monotonous, with a small homogeneous core with no or inconspicuous nucleoli. The core is only slightly larger than lymphocytes with round or smooth oval chromatin. It contains a few pale or pink cytoplasm with rare to no mitotic activity [21].

The main Differential diagnoses are variant of papillary renal cell carcinoma (PRCC) and Wilms' tumor. Morphology and immunohistochemistry can usually reveal the difference although it can be obtained simultaneously [22].

Another difference between epithelial Wilms tumor and metanephric adenoma includes the younger age of patients with Wilms' tumor. It is known that 90% of Wilms' tumor occurs in the child under six years old [10].

Because of the high prevalence of the Renal Cell Carcinoma and difficult to diagnose on radiological examination, metanephric adenoma can be misdiagnosed preoperatively [19]. Therefore, we perform transperitoneal radical nephrectomy as the gold standard for the management. In other cases, Kosugi et al., Imamoto et al., Granter et al. reported performing partial nephrectomy [23,24,25].

In the future, we should consider other options, such as 'wait and see' [4], needle biopsy [23], and partial nephrectomy when a malignant tumor can be excluded.

In almost all cases, metanephric adenoma showed good clinical outcomes [13,15]. But the presence of regional lymph node metastases in the 7-year-old child was reported by Renshaw et al. [10]. Our patient has been well and healthy without recurrence after 48 months.

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