CASE REPORT

Adult Wilms Tumor with Extra-axial Cerebral Extension: Case Report and Review of Literature

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Wilms tumor is very rare in adults. Even more infrequent is an adult Wilms tumor with an extension into the central nervous system.

Reported here is a case of an adult Wilms tumor in a 38-year-old female. She was referred to the JRRMMC with a 2 month history of intermittent hematuria associated with a rapidly enlarging abdominal mass and right-sided facial asymmetry. Abdominal computed tomography revealed a large mass in the right kidney. Cranial MRI showed multiple brain metastases. The patient underwent right radical nephrectomy. Pathological analysis demonstrated nephroblastoma. The patient was discharged unremarkable and underwent adjuvant chemotherapy. After 2 months, the patient succumbed to the disease.

Adult Wilms tumor presents almost similarly with renal cell carcinoma and there is no definitive diagnostic test to confirm it pre-operatively. Even though it's a rare tumor, it should always be included in the differential diagnosis for any renal tumor.

Key words: Wilms tumor, adult, cerebral extension

Introduction

Wilms tumor (nephroblastoma) is the most common renal tumor in children accounting to about 6% to 7% of all childhood cancer. However, in adult it is very rare representing only 0.5% of all renal neoplasm.[1] The most frequent sites of distant metastases of Wilms tumor in children are the lungs (10%), the liver (2%), and the central nervous system (1%).[2] Only approximately 300 well-documented cases of adult Wilms tumor have been reported in the literature to date.[3] In this report, a rare case of adult Wilms tumor with brain metastasis is discussed and a review of the literature. To the best of the authors' knowledge, this case is the first reported case in Philippine literature.

The Case

A 38 year old female presented with a 2 months history of intermittent gross hematuria associated with enlarging right upper quadrant mass, dull right flank pain radiating to the right lower extremities. There was no history of fever, jaundice, vomiting, bloatedness, voiding symptoms or weight loss. Ten days prior to consult, patient experienced decrease sensation on the right side of the face with facial asymmetry, increased salivation, and difficulty in swallowing. There was no weakness, behavioral changes, nor slurring of speech. Examination revealed a mobile, non-tender, 11 cm x 10 cm right upper quadrant mass (Figure 1). Neurological examination showed right peripheral facial palsy, shallow right nasolabial fold, deviation of the

tongue to the right, and absent gag reflex (Figure 2). Laryngoscopy revealed right vocal cord paralysis. Enhanced computed tomography of the whole abdomen confirmed the presence of an 11.6 cm x 9.1 cm x 9.5 cm mixed enhancing, complex mass sparing a small portion of the renal parenchyma with absence of thrombus noted at the right renal vein. No calcifications nor lymphadenopathies were noted (Figures 3 & 4). Roentgenological studies of the lumbosacral spine and pelvis showed no evidence of metastases. Cranial Magnetic Resonance Imaging with Gadolinium contrast showed multiple extra-axial contrast enhancing mass and plaque-like lesions seen involving the right parietal convexity, left parietal convexity, left parietal bone, right anterior frontal and left temporo-parietal convexities (Figures 5 & 6). Renal cell carcinoma was considered in an adult with an enlarging renal mass. Hence, a right radical nephrectomy was performed via trans-abdominal approach. The resected right kidney measured 15 cm x 13 cm x 13 cm and weighed 1,100 grams (Figure 7). The mass was shown to occupy the entire kidney with yellow to red brown lobulations on cut-section and was noted to be confined within the renal capsule (Figure 8). After surgery, the patient was discharged unremarkably. Histologically, the tumor exhibited the characteristic triphasic pattern consisting of tubules, solid sheets of round cells (blastema cells) and stroma. (Figures 9, 10 & 11). One lymph node was positive for metastases. The diagnosis was classified as Stage IV according to the National Wilms Tumor Study Classification. She was admitted at a provincial hospital and received 2 cycles of adjuvant chemotherapy. Patient then succumbed from the disease 2 months after.

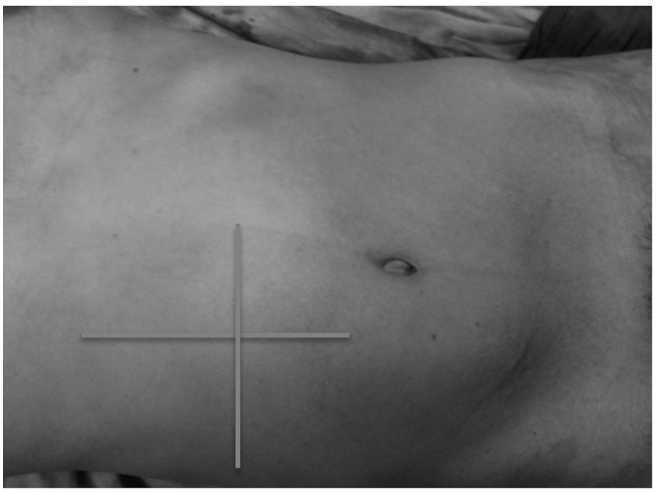

Figure 1. An 11 cm x 10 cm mobile, non-tender right upper quadrant mass.

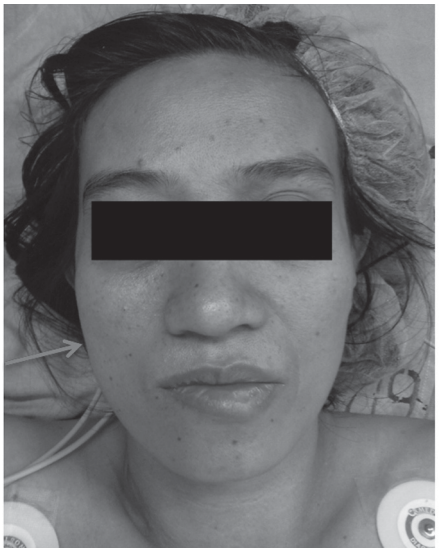

Figure 2. Physical examination showed right peripheral facial palsy with shallow right nasolabial fold.

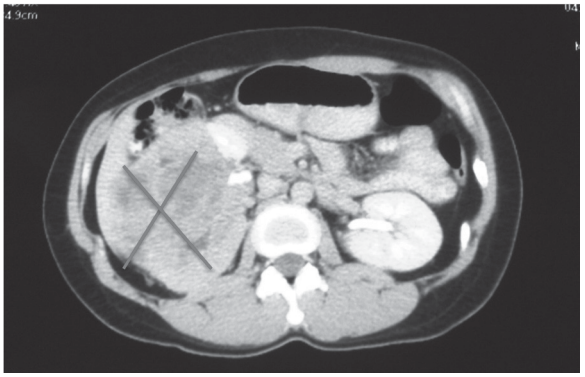

Figure 3. On cross-section, the mass is noted to be 11.6 cm x 9.1 cm x 9.5 cm, mixed enhancing, complex mass.

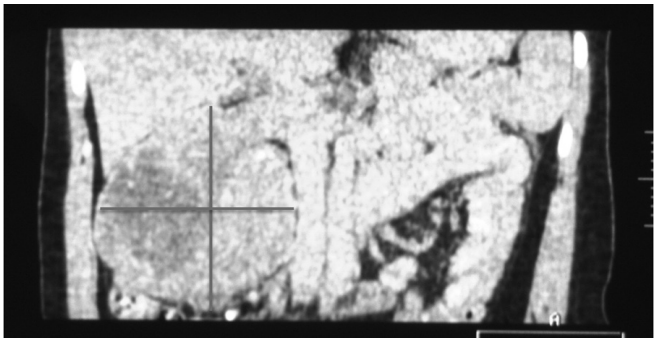

Figure 4. On coronal section, the same mass is seen occupying the right renal fossa, no thrombus on the renal vein seen.

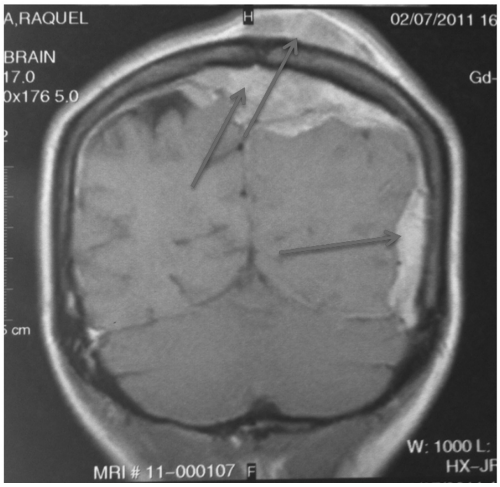

Figure 5. Cranial MRI showed multiple extra-axial contrast enhancing mass involving the left frontal and temporo-parietal convexity, and left parietal bone.

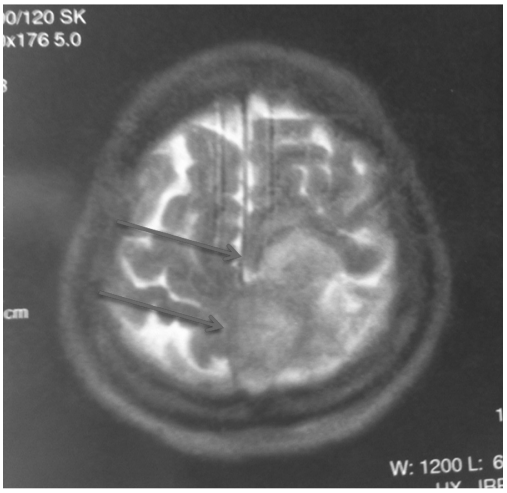

Figure 6. A cross section of the brain showing enhancing plaque-like lesions noted in the right and left parietal convexity.

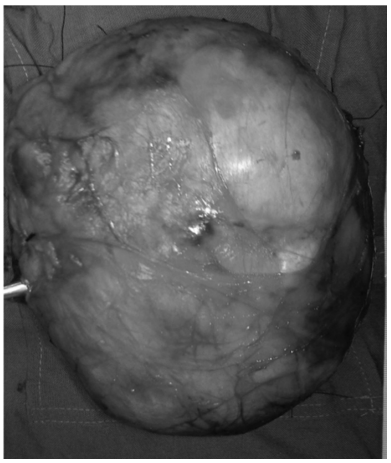

Figure 7. On gross examination, the resected right kidney measures 15 cm 13x cm x 13 cm, and weighs 1,100 grams.

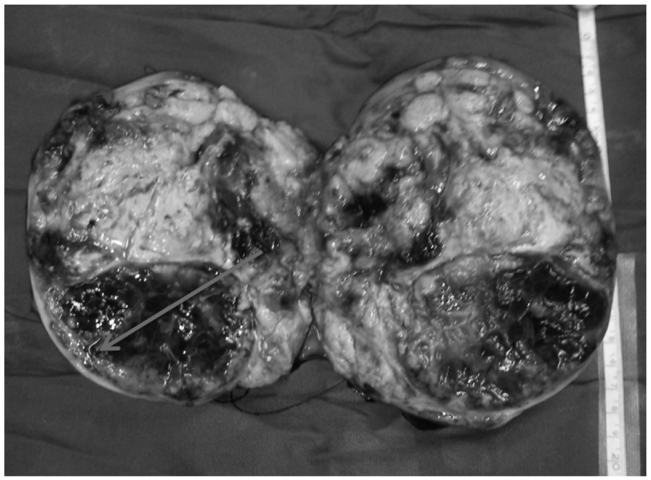

Figure 8. On cut-section, the mass is noted to occupy the entire kidney with yellow to red brown lobulations and confined to the renal capsule.

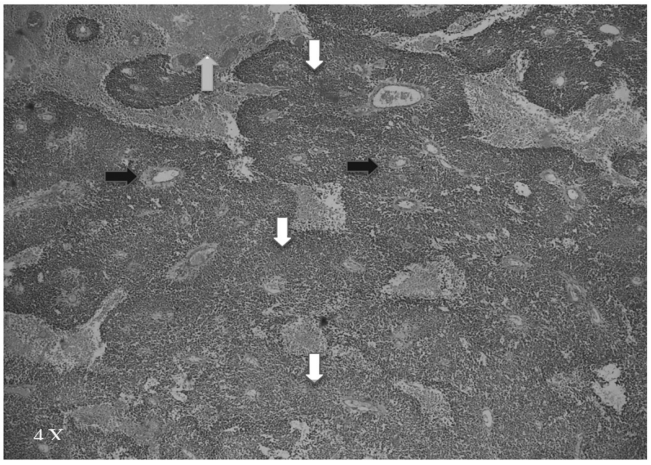

Figure 9. Micrograph showing the characteristic triphasic pattern consisting of tubules (black arrows), solid sheets of small round cells (white arrows), and stroma (gray arrows). H&E stain.

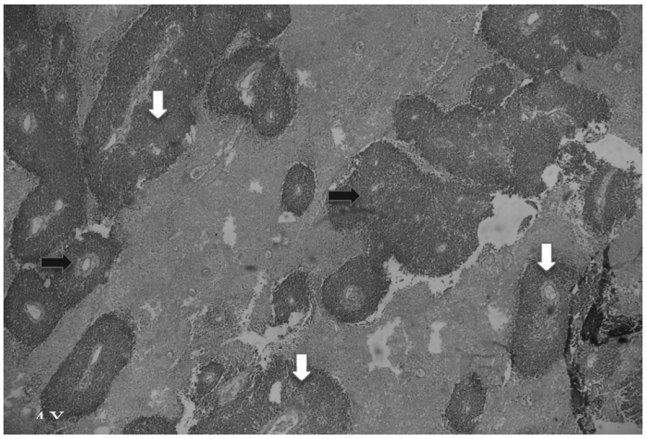

Figure 10. Micrograph showing the characteristic triphasic pattern consisting of tubules (black arrows), solid sheets of small round cells (white arrows) , and stroma. H&E stain.

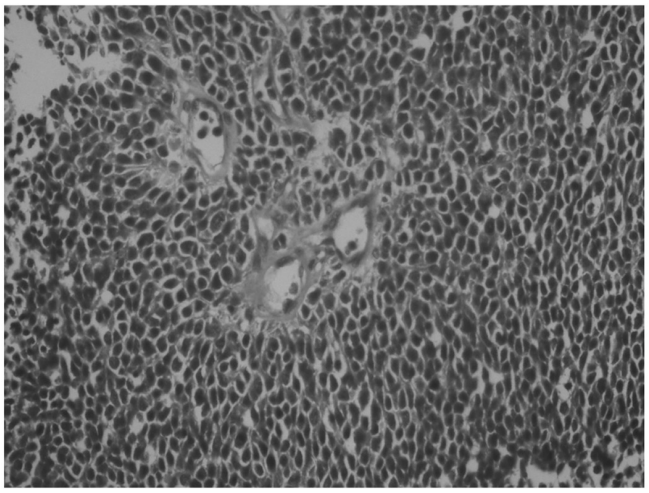

Figure 11. High magnification micrograph showing triphasic pattern showing tubules, blastema cells and stroma.

Discussion

Wilms tumor is a malignant embryogenic tumor of the kidney that usually arises from the metanephric blastema. While it is the most common renal tumor in children, usually before the age of 10, adult Wilms' tumor accounts for only 0.5% of all renal neoplasm.[1] Presented here is a case of a 34 year old female with 2 month history of intermittent gross hematuria with rapidly enlarging right upper quadrant mass. The clinical presentation in patients with Wilms tumor can often be indistinguishable from renal cell carcinoma or other more common adult renal tumors.[3] However, some variables can be seen supporting the diagnosis of Wilms tumor over renal cell carcinoma (Table 1). Compare to renal cell carcinoma, which presents by the 6th – 7th decade of life, Wilms tumor usually presents in young patients as a large, rapidly growing abdominal mass. Kioumehr K, et al.[1] and Byrd, et al.[4] noted that the mean age of patients was 30 years. Women are affected more than men in adult Wilms tumor. However, in renal cell carcinoma, it is seen predominantly in men. Usually the tumor is noted to be very large and palpable or may be as an incidental finding on computed tomography or ultrasound. Flank pain and hematuria are its most common presenting complaints.[5]

Compared to their pediatric counterparts, adult patients present more frequently with advanced clinical stages, mostly stage 3 or 4 diseases. Metastasis rates for children and adults are 10% and 29%, respectively.[6] The most frequent places of metastasis are lung, liver, bones, skin, bladder, colon, contralateral kidney and rarely, the central nervous system. Since Wilms tumor in adult is rare, the incidence of central nervous system metastasis is undetermined. To the authors' knowledge, there is no reported case of adult Wilms tumor with metastasis to the brain in Philippine literature. In the current case, the patient also developed decreased sensation on the right side of the face with right-sided facial asymmetry, difficulty in swallowing, and absent gag reflex. A suspicion of central nervous system involvement prompted a magnetic resonance imaging of the brain, which showed multiple extra-axial mass and lesions confirming brain metastasis. A case series done by Lowis, et al.[7] reviewed the three United Kingdom Children's Cancer Study Group Trial (UKW 1 – 3) and noted that 7 of the 1249 (0.6%) of the children with Wilms tumor (ranging from 20 – 83 months) developed CNS metastasis. Of these seven, the most common site of involvement is the frontal area. They also concluded that the development of CNS metastasis appears to be associated with concurrent or prior lung metastasis, although, there were also reported cases in whom pulmonary metastasis was never identified.[7] The current case presented with CNS metastasis without prior or concurrent pulmonary metastasis.

The pre-operative diagnosis of adult Wilms tumor is extremely difficult because there are no specific radiographic findings that can distinguish it from the more common malignant renal neoplasm.[8] Thus, it might have been wrongly diagnosed in several cases. Kioumer, et al.[1] reviewed 29 cases of adult Wilms tumor reported in the literature from 1975-1987 and identified the different radiologic findings that might suggest the diagnosis before surgery. They concluded that in high resolution CT, a large, well-defined, exophytic, inhomogenous mass that is cortical in origin is usually seen. In about 75% of the cases, there was a variable enhancement of the solid component and a greater enhancement of the remaining normal parenchyma is noted appearing as pseudocapsule around the tumor. Renal cell carcinoma, on the other hand, presents as a smaller, infiltrative tumor when compared to Wilms tumor. Other radiographic

findings comparing Wilms tumor and renal cell carcinoma were also included in the study (Table 1). The current case was diagnosed by CT examination, although the tumor type could not be defined pre-operatively.

Childhood and adult Wilms tumor shows no difference histopathologically. However, pathologic diagnosis of Wilms tumor in adult is more difficult because different types of renal tumor should be considered. Kilton, et al. have applied six rigid diagnostic criteria for adult Wilms tumor: 1) primary renal neoplasm, 2) primary blastematous spindle or round cell component, 3) formation of abortive or embryonal, tubular epithelial or glomeruloid structure, 4) no areas diagnostic of renal cell carcinoma, 5) pictorial confirmation of histology, and 6) age > 15 years.[8] Wilms tumor may be separated into 2 prognostic groups based on pathologic characteristics: 1) Favorable: contains well-developed components, and 2) Anaplastic: contains diffuse anaplasia (poorly developed cells). The current case has fulfilled the diagnostic criteria cited by Kilton, hence, a diagnosis of adult Wilms tumor is made. The triphasic pattern (tubules, round cells, and stroma) is also seen in the current case, making it having a favorable characteristic.

Due to the rarity of the disease, no definitive treatment plans are defined and adult treatment protocols are adopted from the recent pediatric protocols. The National Wilms' Tumor Study Group (NWTSG) in the United States recommends that all adult patients with favorable histology should be treated with stage-appropriate combined therapy, as done in children.[9] The NWTSG and other studies have recommended multimodal therapy for the disease with surgery, chemotherapy (actinomycin D, vincristine and doxorubicin) for 15 months and tumor bed irradiation in the case of stage III disease.[10] Less aggressive therapy with two drugs is advised in stage I and II disease.[10] A report done by Sharma M, et al.[11] noted that surgical treatment (radical nephrectomy with

Table 1. Clinical and radiographic manifestations of Wilms tumor compared to renal cell carcinoma.

	Renal Cell Carcinoma	Wilms Tumor in Adult
Age	Elderly (60-70 yrs old)	Young (20-30 yrs old)
Gender	More common in male	More common in female
Clinical Presentation	Hematuria Flank pain Abdominal mass	Hematuria Flank pain Abdominal mass
Radiographic findings		
Intravenous pyelography	Mass effect with calcification	Mass effect without calcification
Ultrasonographic findings	Solid mass with heterogenous echogenicity	Large, complex mass with large cystic components
CT-scan findings	Smaller tumor with heterogenous contrast enhancement and calcifications.	Large, well defined, exophytic, inhomogenous mass that is cortical in origin
Angiographic findings	Hypervascularized mass with irregular vessels inside, tortous, with an absence of normal tapering and unpredictable branching	Hypovascular mass with neovasculascularity extending to the tumor with a spaghetti pattern or creeping vine appearance

lymph node dissection) has the highest priority and even the discovery of metastatic disease should not prevent exploration or the attempted removal of the primary tumor. If the primary tumor is initially inoperable, then following chemotherapy, a second look laparotomy is worth considering.[11] The presented case underwent a radical nephrectomy followed by adjuvant chemotherapy.

The prognosis of adult Wilms tumor is significantly worse than children and more adults seem to have a more advanced stage at the time of diagnosis. According to the NWTSG, treatment outcomes in adults with favorable histology have an overall survival rate of 82%.[10] Izawa, et al.[12] reviewed 128 cases with adult Wilms tumor treated between 1973 and 2006 and identified the prognostic variables that predict the survival outcomes. They concluded that an unfavorable histology (poorly differentiated), presence of anaplasia and stage predict a poorer prognosis while the extent of surgery including the regional lymph nodes improves local recurrence rates and survival.

In conclusion, the current report highlights a rare case of adult Wilms tumor with a rare site of metastasis. Due to its rarity, it should always be included as a differential diagnosis of renal cell carcinoma. Since there is no definite diagnostic test to confirm it pre-operatively, radical nephrectomy as done for renal cell carcinoma is still the recommended treatment and after confirming the diagnosis by histopathology only then is adjuvant chemotherapy initiated.

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