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Case report

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Primary Ewing's Sarcoma of Kidney in Infant: a Rare Case Report

[1]Smita Singh, [1]Rachana Meena, [1]Kiran Agarwal, [2]Rajiv Chadha, [1]Shubham Sharma

[1]Department of Pathology, Lady Hardinge Medical College and Associated Hospitals, New Delhi, 110001, India

[2]Department of Pediatric Surgery, Kalawati Saran Children Hospital and Associated Hospitals, New Delhi,110001,India

Abstract Primary Ewing's Sarcoma (EWS) of kidney is a very rare tumor and very few cases have been reported in literature. The clinical presentation of this tumor is not specific and is characterized by an aggressive course and poor prognosis. We presents a case of 6 months old female presenting with abdominal distension and hematuria for past 1 month. On clinical examination, the lump was palpable in right lumbar and iliac fossa. Contrast Enhanced Computerised Tomography (CT) scan findings were suggestive of Wilm's tumor. Radical nephrectomy was performed .On histopathological examination; diagnosis of Ewing's sarcoma was made. Primary Ewing's Sarcoma of kidney is very rare and extremely aggressive. To the best of the knowledge, this is the first case of primary renal EWS reported in infant.

Keywords: Ewing's Sarcoma; Renal; Infant

Introduction

Paediatrics renal tumors accounts for 7 % of all childhood malignancies[1], out of which Wilm's tumor is the most common. Primary Ewing's Sarcoma (EWS) of kidney is very rare tumor in children and only very few cases have been reported in the literature till date [2-6]. It was first described by Seemayer *et al*., in 1975[7]. Although the cellular origin of this type of cancer is unknown, theories postulated were migration and invagination of embryonic neural crest into kidney during development [1, 2, 5]. It is important to differentiated Ewing's Sarcoma from other paediatrics renal masses because of its aggressive clinical course and strikingly poor prognosis. Here we report a case of 6 month old female infant with renal mass diagnosed as Ewing's Sarcoma on histopathology. To the best of the knowledge, this is the first case of primary renal EWS reported in infant.

Address for correspondence and reprint requests to:
Dr. Rachna Meena, Department of Pathology, Lady Hardinge Medical College and Associated Hospitals, New Delhi, 110001, India

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Case Presentation

A 6 month old female infant presented to Paediatric outpatient department with abdominal distension and hematuria for past one month with no other significant history. On physical examination, the abdomen was distended and there was mass palpable in right hypochondriac, iliac and lumbar fossa region crossing the midline. An ultrasound of the abdomen showed a large heterogeneous solid tumor (10x10cm) arising from right kidney. A contrast-enhanced computerized tomogram revealed a well defined heterogeneously enhancing mass measuring 9.5x8.9x9.7cm with areas of calcifications and necrosis arising from upper & interpolar region of right kidney with distortion of calyces (Figure 1).There was evidence of two well defined round subpleural round soft tissue mass lesions in left lung suggestive of metastasis. No involvement of lymph nodes at renal hilum or retro-peritoneum, left kidney, Urinary Bladder, liver, pancreas, bowel loops and bony metastasis seen. Features were suggestive of Wilm's tumor. Patient was planned

for right Radical Nephrectomy. Intraoperatively, a renal mass measuring 10x10x7cm was noted arising from upper pole of right kidney occupying whole of right side abdomen, infiltrating to underlying muscle with gross spillage of necrosis. Grossly, we received the specimen of right kidney with right ureter measuring 10x8x7cm and 6.5cm respectively. External surface was bosselated with distortion of the normal shape with presence of surface growth of tumor on capsule. Cut section showed circumscribed grey white to brown variegated tumor surface with areas of haemorrhage and necrosis arising from upper pole and compressing the normal renal parenchyma to periphery (Figure 2A). Tumor was involving renal sinus and hilum. Histopathology revealed large areas of necrosis along with sheets and nests of uniform medium round cells with round nucleus, coarse chromatin and 0-1 prominent nucleoli (Figure 2B).Few of these cells showing clear vacuolated cytoplasm (Figure 2C). Capsular breech with surface involvement was noted. Vascular invasion was present .Mitotic figures were 8-10/hpf. Immunohistochemistry was positive for CD99 (Figure 3(A) and vimentin and negative for leucocyte common antigen (LCA), cytokeratin, (Figure 3B and 3C) INI1, epithelial membrane antigen, WT1, myogenin and chromogranin. Diagnosis of Ewing's Sarcoma was made. Chromosomal analysis and fluorescence in situ hybridization (FISH) could not be done as patient expired on day 2 of post operation.

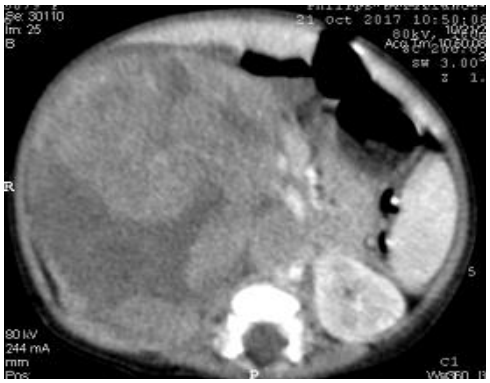

Figure 1: Computed tomographic image of the Right kidney showing well defined heterogenously enhancing mass measuring 9.5x8.9x9.7cm

Discussion

Primary renal EWS in paediatric population (less than 15 years) is an extremely rare entity and has been reported in less than 10 cases worldwide [8-10]. Bing *et al*., reported in his study that the median age of presentation of primary EWS of kidney is 28 years with male preponderance [5]. The most common presentation as described by Hakky *et al*., in their case report and meta analysis is acute flank pain mimicking renal colic [6]. However, the presentation of such tumor is non-specific. Our patient age was 6 months and she presented with abdominal distension and hematuria.

Imaging findings are non specific and the differential may include Wilm's tumor (as in this case), rhabdoid tumor, neuroblastoma, clear cell sarcoma, rhabdomyosarcoma, lymphoma and desmoplastic small round blue cell tumor.

Grossly, tumor size is variable with confluent areas of necrosis and haemorrhage. Microscopically, EWS is composed of sheets of uniform small to medium sized round cells with

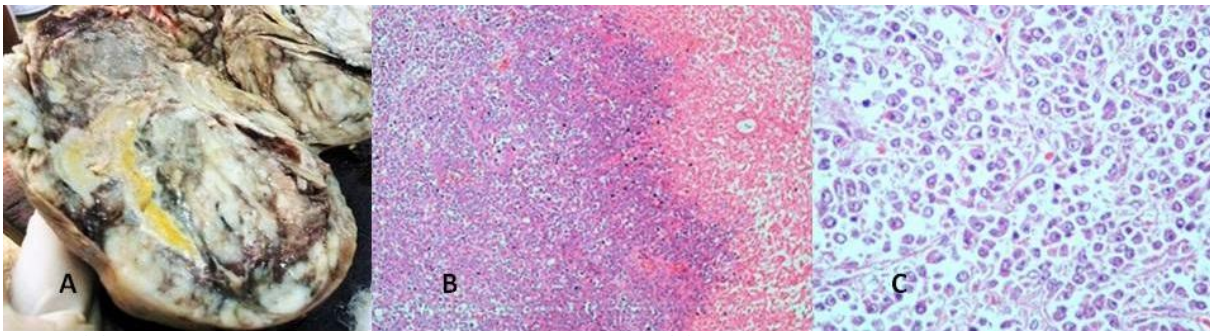

Figure 2: (A) Cut surface of tumor with areas of necrosis and haemorrhage (B) Microscopically, sheets of uniform round cells intermixed with areas of necrosis(H&E,100x) (C) Tumor cells are uniformly small with condensed chromatin and small nucleoli.(H&E,400x)

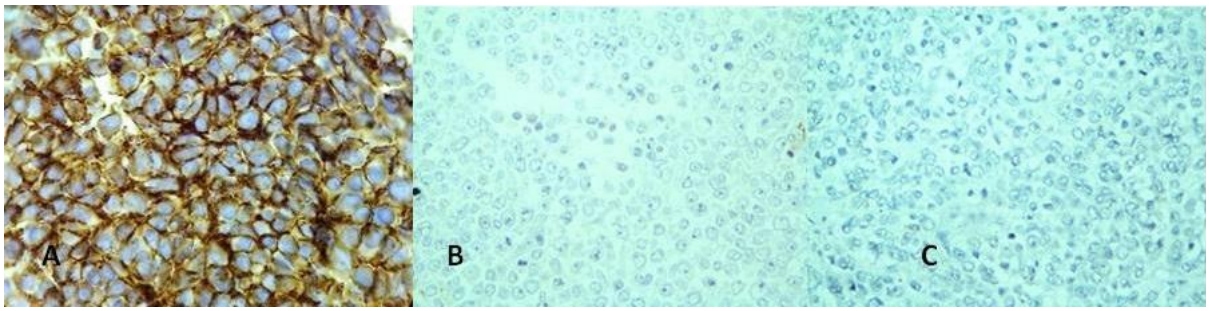

Figure 3: Tumor cells show (A) strong membranous staining with CD99(400x), (B) negative for WT1 (400x) (C) negative for INI 1(400x)

round to ovoid hyperchromatic nucleus and small nucleoli. Few of cells show clear vacuolated cytoplasm. Rosettes may or may not be present.

Immunohistochemically, membranous positivity of CD99 is seen in more than 90% of EWS [11]. Friend leukemia virus integration 1 (FLI-1) is also overexpressed in a majority of EWS [12]. Using large panel of immunohistochemistry markers is necessary to exclude other round cell tumors especially blastemal predominant Wilm's tumor as it responds well to standard regimen of chemotherapy and has much better prognosis than EWS.

The cytogenetic translocation between the genes EWS (22q12) and FLI-1(11q24) resulting in production of EWS/FLI-1 fusion gene plays an important role in confirmation of the diagnosis [11].

There is no standard treatment regimen for this tumor. The primary modality is surgical resection with adjuvant chemotherapeutic agents like vincristine, cyclophosphamide, doxorubicin, etoposide, actinomycin D and ifosfamide. Despite aggressive treatment regimen, prognosis remains strikingly poor with median survival of 2 years in young adults [13]. The most common site of metastasis include lung, liver and bone [6]. Patients with metastatic disease have 4 times more increase in relative risk of death as compared to patients without metastasis [14]. In our study, patient had lung metastasis and died day 2 post surgery.

Conclusions

Primary renal EWS is a rare lethal entity and should be considered in the differential diagnosis of renal masses in paediatric age group because of its highly aggressive behaviour and low survival rate in spite of multimodality treatment. We reported this case as none of the cases mentioned in literature were described in infants.

Ethics approval and consent to participate

The written informed consent was obtained from next of kin of the patient for publication of this case report. Copy of the consent is available with the authors.

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Conflicts of interests

The authors declare that there are no conflicts of interests.

Author's contribution

SS: contributed to conception and design, acquisition of data and interpretation of data, drafting the article or revising it critically for important intellectual content and final approval of the version to be published She agreed to be accountable for all aspects of the work.

RM: contributed to conception and design, acquisition of data and interpretation of data, drafting the article and preparation of manuscript and final approval of the version to be published. She agreed to be accountable for all aspects of the work.

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SS: contributed to conception and design, acquisition of data and interpretation of data, drafting the article and preparation of manuscript revising it critically for content and final approval of the version to be published .He agreed to be accountable for all aspects of the work.

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References

1. Howlader N, Noone AM, Krapcho M, et al, eds. SEER Cancer Statistics Review, 1975–2010. Bethesda, MD: National Cancer Institute. Available at: http://seer.cancer.gov/csr/1975_2010/. Accessed October 7, 2014

2. Parham DM, Roloson GJ, Feely M, Green DM, Bridge JA, Beckwith JB. Primary malignant neuroepithelial tumors of the kidney: a clinicopathologic analysis of 146 adult and pediatric cases from the National Wilms' Tumor Study Group Pathology Center. Am J Surg Pathol. 2001; 25(2):133-146. [PubMed]

3. Dogra PN, Goel A, Kumar R, Das PK, Gupta SD. Extraosseous Ewing's sarcoma of the kidney. Urol Int. 2002; 69(2):150-152. [PubMed]

4. Saxena R, Sait S, Mhawech-Fauceglia P. Ewing sarcoma/ primitive neuroectodermal tumor of the kidney: a case report. Diagnosed by immunohistochemistry and molecular analysis. Ann Diagn Pathol. 2006; 10(6):363-366. [PubMed]

5. Bing Z, Zhang P, Tomaszewski JE, Maclennan GT. Primary Ewing sarcoma/primitive neuroectodermal tumor of the kidney. J Urol. 2009;181(3):1341-1342. [PubMed]

6. Hakky TS, Gonzalvo AA, Lockhart JL, Rodriguez AR. Primary Ewing sarcoma of the kidney: a symptomatic presentation and review of the literature. Ther Adv Urol. 2013; 5(3):153-159. [PubMed][PMC Full text]

7. Seemayer TA, Thelmo WL, Bolande RP, Wiglesworth FW. Peripheral neuroectodermal tumors. Perspect Pediatr Pathol. 1975; 2: 151–172. [PubMed]

8. Alasmari F,Albadawe H,Alkhateeb S,Alsufiani F,Ghandurah S.Primary Ewing's sarcoma of the kidney: A case report.Int J Surg Case Rep.2017;41:65-67.[Pubmed][PMC Full text]

9. Muhammad S,Iftikhar A,Jamila S,Khushnasseb A.Primary Ewing sarcoma of the kidney: a case report and treatment review.CEN Case Rep.2017;6:132-135.[Pubmed] [PMC Full text]

10. Faizan M, Anwar S, Iqbal S, Mehamood Q, Zaman S, Abbas N et al. Primary Renal Ewing's Sarcoma: A rare Entity. J Col Phys Surg Pakistan 2014; 24(SS1): S86-S87.

11. Folpe AL, Hill CE, Parham DM, O'Shea PA, Weiss SW. Immunohistochemical detection of FLI-1 protein expression: a study of 132 round cell tumors with emphasis on CD99-positive mimics of Ewing's sarcoma/primitive neuroectodermal tumor. Am J Surg Pathol. 2000; 24(12): 1657–1662. [PubMed]

12. May WA, Lessnick SL, Braun BS, et al. The Ewing's sarcoma EWS/FLI-1 fusion gene encodes a more potent transcriptional activator and is a more powerful transforming gene than FLI-1. Mol Cell Biol. 1993; 13(12):7393–7398. [PubMed] [PMC Fulltext]

13. Casella R, Moch H, Rochlitz C, Meier V, Seifert B, Mihatsch MJ, Gasser TC. Metastatic primitive neuroectodermal tumor of the kidney in adults. Eur Urol. 2001; 39(5):613-617.[Pubmed]

14. Risi E, Iacovelli R, Altavilla A, Alesini D, Palazzo A, Mosillo C , et al. Clinical and pathological features of primary neuroectodermal tumor/Ewing sarcoma of the kidney. Urology 2013; 82(2):382–386 [PubMed]