International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Wilms Tumour with Internal Mammary Lymph Node Metastasis, Pleural Deposits and Supradiaphragmatic Nodal Involvement: A Rare Case Report

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Abstract: ***Wilms Tumour, is the most common pediatric renal tumor, poses significant challenges in its diagnosis and management. This article presents a rare case of Wilms Tumour with internal mammary node involvement, along with pleural deposits and cardio - phrenic adenopathy. The study outlines the clinical presentation, diagnostic evaluation, and multimodal management of this unique case, highlighting the importance of adhering to the latest treatment guidelines for Wilms Tumour. Wilms Tumour, accounts for 6 of pediatric malignant diseases, primarily affects children under 15 years, with a slightly higher incidence in females. The article discusses the specific genetic mutations associated with Wilms Tumour, emphasizing its three main cell components: blastemal, stromal, and epithelial. Diagnosis involves imaging techniques such as abdominal ultrasound, CT scan, and MRI. Treatment protocols vary by region, with neoadjuvant chemotherapy and nephrectomy being common approaches. Radiotherapy is administered based on pathological staging, with an emphasis on prompt initiation post - surgery. The study underscores the impact of lymph node involvement on prognosis, especially in anaplastic histology cases, and explores the significance of lymph node density in patient outcomes. While most relapses occur within the first two years, the article emphasizes the importance of surveillance and adherence to treatment guidelines. This case report sheds light on a previously undocumented instance of Wilms Tumour involving internal mammary nodes, demonstrating the need for comprehensive research in this area. Overall, it emphasizes the complexity of Wilms Tumour management and the importance of tailoring treatment in individual cases.***

Keywords: Wilms Tumour, pediatric renal tumor, internal mammary node involvement, pleural deposits, cardio - phrenic adenopathy

1. Introduction

Wilms Tumour or Nephroblastoma is the most common paediatric renal tumour that originates from the nephrogenic rests. It accounts for 6% of all paediatric malignant diseases (2). One child per 10000 children is affected with Wilms tumour in < 15 year age group (2). The median age of presentation being 41.5 months for boys & 46.9 months for girls for unilateral tumour, with a slight female predominance in presentation (2). Wilms Tumour has been associated with various syndromes & most common being WAGR (chromosomal 11p13), Deny - Darsh syndrome and Beckwith - Wiedemann syndrome (chromosomal 11p15.5). Children often present with abdominal pain, mass, gross haematuria, and hypertension. (3) Around 10 % of Wilms tumour present with upfront lung & liver metastasis (4). Among nodal metastasis, para aortic lymph nodes remain the most common site and has been established as a poor prognostic factor (5). Involvement of Internal mammary nodes in Wilms tumour is a rarity. Herein, we report first case to the best of our knowledge of one such rare case of Wilms tumour with internal mammary node involvement.

2. Case Report

A 4.5 years old female child presented with a 2 - month history of abdominal distension which was evaluated before referral with ultrasound that revealed a left renal mass. The mass was also biopsied before referral and a preliminary diagnosis of Wilms tumour was made. No history of fever, urinary tract obstruction or haematuria was noted. On examination, the child was emaciated and pale with a soft abdomen and a hard, irregular, non - tender mass occupying the whole of the left half of the abdomen was palpable. A left renal mass of the size of 13x12cm was discovered on computed tomography (CT) done outside in left renal fossa extending to left Para - splenic region. Initial biopsy showed a 14 x 10.5 x 5.5 cm mass with blastemal component and infiltrating malignant round cells suggestive of Wilms tumour.

Renal capsule, perinephric fat & gerota fascia involved with 93% viable tumour. Histopathology showed infiltrating tumour with features of malignant round cell tumour. On immunohistochemistry, tumour cells are positive for PAX8, vimentin, CD56, and PanCK (focal, weak), while negative for chromogranin, synaptophysin, LCA and NKX2.2. WT1 shows cytoplasmic positivity.

Computed Tomography (CT) of the thorax, abdomen and pelvis with oral and intravenous contrast demonstrated a large, heterogeneously enhancing solid mass with cystic/necrotic areas within arising from the left kidney, measuring approximately 13 x 11 x 21 cm (anteroposterior x transverse x craniocaudal dimensions) causing moderate left hydroureteronephrosis and with multiple perihepatic, peri splenic and hepatic subcapsular solid deposits along with mild ascites. There was associated thrombosis of the left renal vein. The right kidney was unremarkable. Thoracic findings included bilateral moderate pleural effusions with passive basal atelectasis, few pleural based solid metastatic deposits and multiple conglomerated nodal masses in the right internal mammary and cardio phrenic regions. No intrapulmonary parenchymal involvement was noted. Based on these findings a diagnosis of stage IV Wilm's tumour

with bilateral pleural and IMN nodal metastasis and peritoneal deposits was made and the patient was started on 3 drug Neoadjuvant chemotherapy (NACT). The NACT regimen included vincristine 1.5mg/m2, actinomycin D (45ug/kg dose) and Adriamycin (12mg).

Post 4 cycles of NACT response CECT thorax and abdomen was done demonstrating reduction in the size of abdominal mass but still encasing the splenic vein and artery and also the left renal artery and vein. There was near complete resolution of deposits seen along the subdiaphragmatic region and in the left paracolic gutter. Similarly, there was Near complete resolution of previously seen deposits seen along the bilateral pleural, right internal mammary and right cardio phrenic region as well as the bilateral pleural effusion. The comparative images of abdominal lesion and IMN lymph node pre and post NACT have been shown in fig no 1.

Based on the response to NACT the patient underwent a left - sided nephroureterectomy and distal pancreatosplenectomy. Postoperative histopathology showed 93% residual tumour with favourable histology (100 % blastemal component), with involved renal capsule, perinephric fat, gerota fascia, pancreas and positive for lymphovascular invasion and perineural invasion. On immunohistochemistry, the tumour is positive for WT1 (diffuse; strong; cytoplasmic), INI - 1 (diffuse; strong; nuclear); negative for Desmin, Cyc - D1, NKX2.2, CD34. Total 2 out of 5 lymph nodes dissected were positive at interaortocaval region, leading to a classification of COG local Stage III (HIGH RISK). Based on post - operative finding and taking into account the initial IMN lymphnodal involvement without lung parenchymal involvement the patient was planned for whole abdominal radiotherapy (WART) along with focal RT to IMN lymphnodal region. A dose of 10.8 Gray in 6 fractions was delivered to WART using 3 dimensional Conformal radiation therapy (3DCRT). Similarly, a dose of 10.8 GY per 6 fractions was given to IMN region using 6 Mev electron with 4x4 cm applicator size in figure2.

3. Discussion

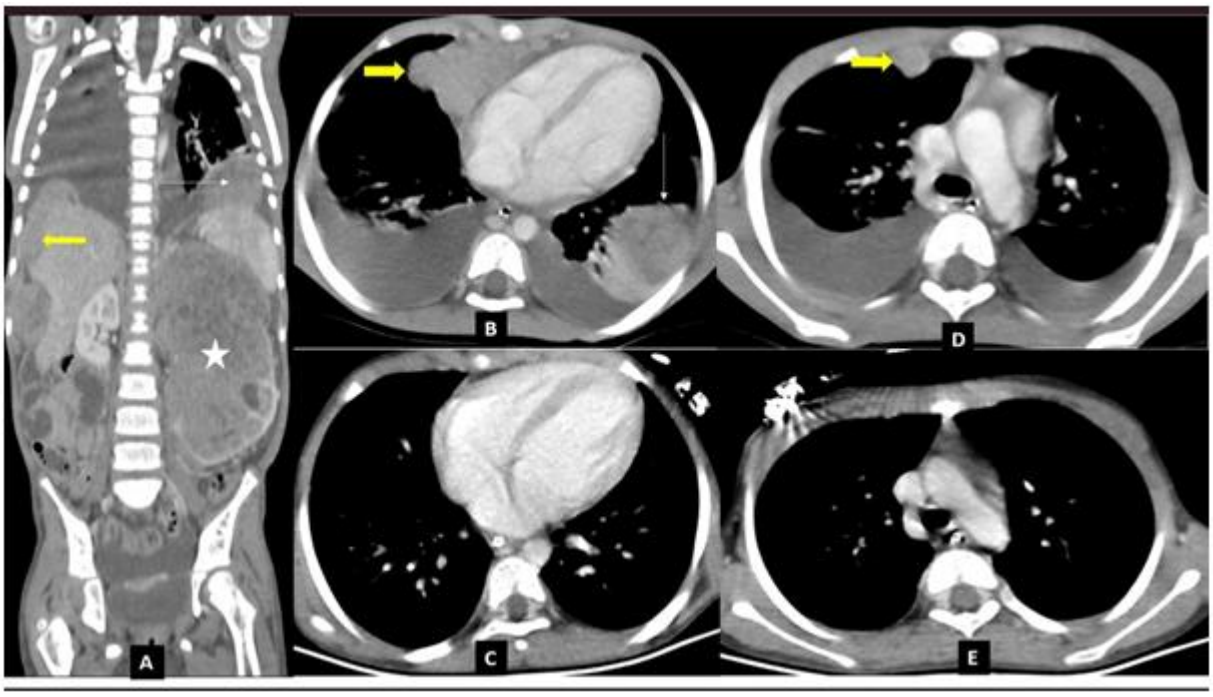
Wilms tumour, the most prevalent paediatric kidney malignancy, constitutes around 6% of childhood cancers (2). Primarily affecting children under 5 years old, it exhibits a slightly higher incidence in females and is characterized by unilateral or bilateral kidney involvement, the latter occurring in about 4 - 8% of cases. Histologically, Wilms tumour comprises three main cell components: blastemal, stromal, and epithelial. This tumour is associated with specific genetic mutations such as WT1, TP53, FWT1, and FWT2 genes, which disrupt normal cellular processes and contribute to its development. The incidence rate among white children under 15 years is about 8.1 new cases per million populations (2). In most of cases child present with complaint of gross haematuria, abdominal pain, or hypertension (6). Diagnosis is done with help of abdominal ultrasonography, abdominal CT scan & MRI abdomen. Based on various guidelines, treatment for Wilms tumour is decided. In Europe, the International Society of Pediatric Oncology manages patients Wilms tumour with neoadjuvant chemotherapy followed by nephrectomy and further chemotherapy & in US treatment protocol made by NATIONAL WILMS TUMOR group includes upfront surgery followed by adjuvant treatment based on pathological staging (7). Double agent chemotherapy i. e Vincristine & dactinomycin is used for localised stage & doxorubicin is added in case of metastatic disease as neoadjuvant treatment (8). Radical nephrectomy is definitive treatment of choice for Wilms tumour. Tumours which are marginally resectable or with large central necrosis who are at increased risk of spillage may benefit from neoadjuvant therapy with chemotherapy (9).

RT is typically initiated within 10 days of surgery & a delay of ≥14 days after surgery is associated with significantly higher abdominal relapse rate, particularly among patients with unfavourable histology (UH) and intraoperative tumour spillage (10). Flank RT is indicated in stage II with UH or stage III due to lymphnodal involvement or with tumour thrombus, or positive margins. Whole abdomen irradiation is indicated in case of spillage during surgery, peritoneal seeding, malignant ascites & preoperative rupture. Flank RT dose is 10.8Gy per 6 fractions. WAI is done by dose 10.8Gy per 6 fractions. Most common site of metastasis is lung, so in that case whole lung irradiation of dose 12Gy per 8 fraction is done (11).

Most of relapses occur within first 2 years of diagnosis & most commonly occurs in lung in 60% cases but can also occur in abdomen in 20 - 30% cases (12). Prognosis of Wilms tumour is dependent on stage of tumour, histology, time of relapse, site of relapse, chemotherapy received. Lymph node involvement has detrimental impact on the overall prognosis.

Propensity of lymphnodal involvement is more prevalent in anaplastic histology. Surveillance, Epidemiology, and End Result (SEER) database review by walker et al (13) evaluted the prognostic factors in 1489 patients of Wilms tumor. Their analysis shwed tumor size, laterality, stage and age at presenationas independent factors impacting lymphnodal involvement. Among patients with positive lymphnode there was significantly lower 5 year overall survival (OS) in patients with lymphnode density of >0.4 vis a vis those with density

< 0.4 (76.1% vs 89.6%, p = 0.041) (13). There is paucity of literature in which Wilms tumour with internal mammary node involvement is documented so far. In our case multimodality management was used for treatment as per adherence to latest standard guidelines. After doing extensive literature review we have found that this is the first documented case of Wilms tumour with internal mammary node involvement with pleural deposits & cardio phrenic adenopathy.



A] Coronal reformat of contrast enhanced CT study showing large enhancing mass arising from the left kidney (star) with infradiaphragmatic deposits seen around the hepatic capsule (block [B] Axial CT image showing cardiophrenic adenopathy (block arrow) and pleural deposit (line arrow) with bilateral pleural effusions with complete resolution post CTRT [C]. [D] Axial CT image showing metastatic right internal mammary node (block arrow) with complete resolution post CTRT [E].

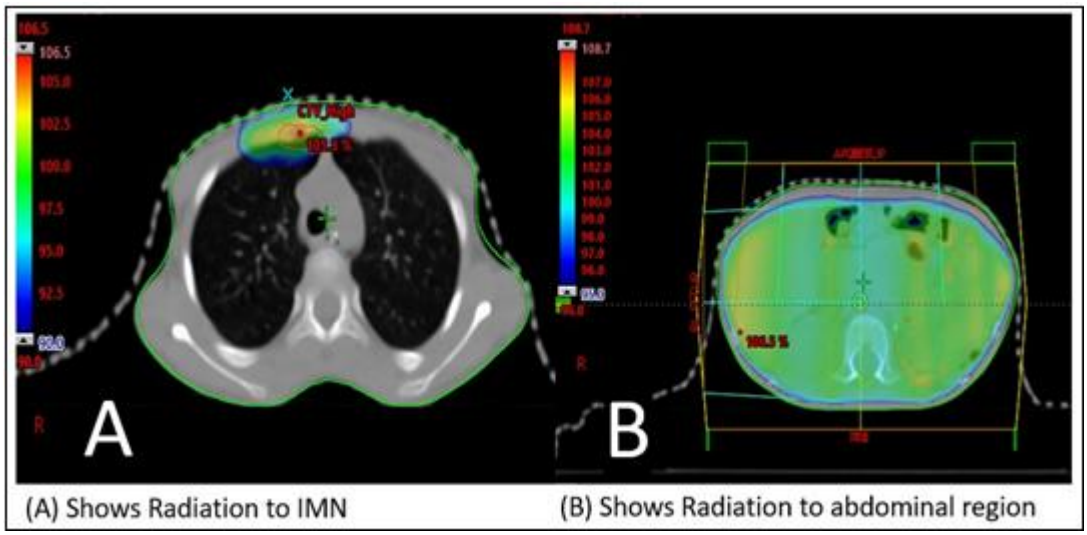


Figure 2

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