Neuroblastoma presenting as an abdominal mass: a diagnostic challenge.

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Abstract

Neuroblastoma is the most common extracranial solid tumor in children under the age of five years and the third most common pediatric malignancy after leukemia and CNS tumors. It is a malignant tumor deriving from the embryonic neural crest which may arise from anywhere along the sympathetic chain. The prognosis of patients with neuroblastoma depends on their age and the stage of disease at the time of diagnosis; infants have the best prognosis. We are presenting a case of a neuroblastoma with rapidly progressing intra-abdominal tumor in an 18-year-old young man. The signs and symptoms of this patient were not typical for neuroblastoma, and the initial clinical, radiological and gross anatomic impression were consistent with that of malignant liver disease or other intra-abdominal neoplasm. Discussion of the differential diagnosis and appropriate work up is presented.

Background

Neuroblastoma is a cancer of embryonic origin of the peripheral nervous system. It develops at any site of the sympathetic nervous system tissue predominantly arising in the abdomen (40% adrenal gland) or retroperitonal sympathetic ganglion.[1] Neuroblastoma is predominantly a tumor of early childhood, with two thirds of the patients presenting in children younger than 5 years. It is the second most common solid malignancy of childhood accounting 8% of all pediatric neoplasm. The median age for diagnosis is 22 months. The incidence is slightly higher in males and whites than females and blacks. Signs and symptoms of disease vary with site of presentation. The most common presentation of neuroblastoma is an abdominal mass. Grossly, it is a multinodular tumor with areas of hemorrhage, necrosis, and cystic degeneration[2]. Generally, the non specific symptoms include abdominal pain, emesis, weight loss, anorexia, fatigue, bone pain, and chronic diarrhea. Since more than 50% of patients present with advanced-stage metastasis, usually to the bone and bone marrow, the most common presentation includes bone pain and a limp. However, patients also may present with unexplained fever, weight loss, irritability, and periorbital ecchymosis secondary to metastatic disease to the orbits. The mass effect may cause chest pain, cough, dysphagia, dyspnoea or vena caval obstruction as well[3]. Neuroblastomas usually secrete catecholamines, their metabolites, or both. But only one in five patients with neuroblastoma is hypertensive, probably owing to the secretion of large amounts of inactive catecholamine precursors and only small amounts of active catecholamines.2 Ultrasonography, followed by CT scan and MRI are useful in the diagnosis of neuroblastoma[4]. A neuroblastoma usually shows a solid heterogeneous echotexture on ultrasound. It also shows heterogeneous characteristics on both CT and MRI with areas of low attenuation often representing areas of cystic necrosis or haemorrhage on CT. Tumor markers including elevated homovanillic acid (HVA) and/or vanillylmandelic acid (VMA) in urine are elevated in 95% of cases. Histopathologic biopsy confirms the diagnosis of neuroblastoma. The disease stage and the age determine the prognosis.

The objective of presenting this case is to describe the usual features of childhood neuroblastoma. Further discussion focuses on the differential diagnoses, and the importance of performing immunohistochemical stains to confirm the diagnosis. This case, on clinical, radiological and gross appearance was thought to be hepatoma or amoebic liver abscess.

Case report

An 18-year-old male patient from Shanbiko presented to the Orotta emergency department with a chief complaint of progressive abdominal swelling of four years duration and general body weakness, anorexia, and considerable weight loss of one year duration. The patient gave history of indigestion, heaviness, dragging, anorexia, weight loss, and shortness of breath as the mass grew in size. He did not have vomiting, diarrhea, cough, night sweats, urgency, frequency, hematuria, or dysuria. He had a history of frequent malarial attack, but did not have any history of chronic illness like hypertension, diabetes, and tuberculosis. He took metronidazole for presumed amoebic liver disease in Agurdet Regional Hospital before his arrival to Orotta. Physical examination revealed a chronically sick looking severely emaciated young man (see Figure 1) afebrile with mild respiratory distress and stable vital signs (blood pressure 120/80 mmHg, pulse rate 80 beats per minute, respiratory rate 20/minute, and temperature 36.5 C°), pale conjunctiva

with slightly icteric sclera. On chest examination, there was dullness on percussion, with decreased air entry at the base of the right lung. Cardiovascular system examination was normal. The abdomen was distended significantly, with an 18x15cm big, hard, nodular, slightly tender fixed mass which extended from the right lower quadrant of the abdomen up to the right hypochondria and crossing the midline to reach the left upper quadrant. Liver edges were difficult to palpate due to the mass. Spleen was not palpable. There was no costovertebral angle tenderness. There was no edema in the extremities and there were no palpable lymph nodes. Urinalysis was positive for protein (25mg/dl), bilirubin, urobilinogen, and erythrocyte 250mg/dl and many WBC per high power field. Stool exam was negative for ova or parasite. Complete blood count was done and results showed WBC 4.2 * 10^3/ dl, Hb- 10.3 gm/dl (reference range 14 – 18 mg/dl), and erythrocyte sedimentation rate 55mm/hour. (See Table 1)

Table 1 laboratory finding of complete blood count and urinalysis

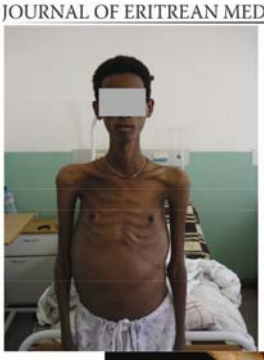
Complete blood count	Patient finding	Reference range
WBC	$4.2x10^3$	4.5 – 10.5
Hgb	10.3 g/dl	11- 18
MCV	88.6 fl	80-99.9
Plt	557 x 10^3/ul	150-450
Urinalysis	**ED**	
PH	5	
Leu	Negative	
RBC	Many / HPF	
Glu	Normal	
Protein	25mg/dl	
ERY	250 ery/ul	

Alkaline phosphatase was slightly elevated, 126 IU/ml (ref range 39 –117) with albumin as low as 2.3g/dl (ref. range 3.4-4.8). Serum- creatinine, Na, chloride and uric acid results were at the borderline of the lowest range (See Table 2).

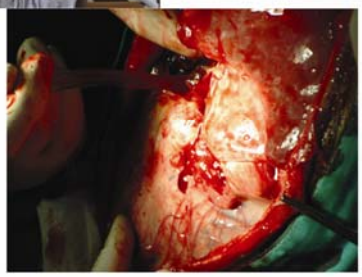
Serological tests, which included VDRL, surface antigen for hepatitis B, and Donovan bodies, were negative.

Hepatic function panel	Patient's result	Reference range
AST (SGOT)	31	0-37 U/L
ALT (SGPT)	11	0- 40 U/L
Alkaline phosphatase	126	39-117 U/L
Total bilirubin	0.6	0.0-1.0 mg/dl
Direct bilirubin	0.2	0-0.3 mg/dl
Indirect bilirubin	0.4	--
Albumin	2.3	3.4- 4.8 g/dl
Renal function panel	Ward	Ref. range
BUN- Serum	8	6-20 mg/dl
Creatinine –Serum	0.4	0.5-1.2 mg/dl
Sodium (Na) – serum	134	135-145 mmol/l
Potassium (K) – serum	3.9	3.6-5.0 mmol/l
Chloride (Cl) – serum	99	101-111 mmol/l
Carbon-dioxide (CO2)	27	21-31 mmol/l
Anion gap	8	2-21 micIU/ml
Uric acid	3.0	3.4- 7.0 mg/dl

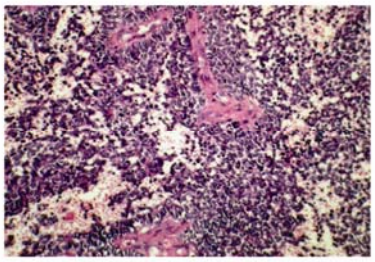
On admission to Orotta Hospital ultrasonography of liver, gallbladder, and kidney was done and results revealed a heterogenous, enlarged liver with focal lesions, normal gallbladder. Kidneys were normal in size with increased parenchymal echogenecity and no calculi. Upper gastrointestinal endoscopy was normal. Aspirated pleural fluid was negative for acid fast bacilli. Intravenous pyelogram revealed difficulty to identify the renal pelvis and ureter of the right kidney. Abdominal and chest Computerized Tomography showed a huge hypodense lesion in the liver and right pleural cavity fluid. Explorative laparatomy was done and intra-operative findings revealed a big mass sized 15x15 cm. with irregular outline just beneath the liver (see Figure 2), crossing the midline. At the junction with the liver there was a bilious jelly like material and deep in the mass fragile tissue with jelly consistency was identified. The transverse colon was pushed down and the lower pole of the mass reached almost the pelvic brim. Microscopic examination confirmed diagnosis of neuroblastoma. Tumor cells of the undifferentiated type are better preserved along the fibro-vascular bundle. Thick fibro-vascular septal tissues separate large clusters of small hyperchromatic cells. A large focus of necrosis was present in the center of the field.



18-year-old boy, emaciated, with huge abdominal mass crossing the midline



Intraoperative finding revealing, an encapsulated, highly vascularized and hemorrhagic mass



Tumor cells of the undifferentiated type are better preserved along the fibro-vascular bundle. H.E.100X

Discussion

Neuroblastoma rarely occurs in adults, and less than 10% of cases occur in patients older than 10 years. The clinical characteristics of neuroblastoma in adolescents are similar to those observed in children. But the biologic behavior and the prognosis of this disease may be different in older than in young children.6,7 Neuroblastoma in an adolescents or adults has a worse long-term prognosis regardless of stage or site and, in many cases, a more prolonged course when treated with standard doses of chemotherapy. Usually neuroblastomas discovered over the age of one year already have demonstrable metastasis at the time of initial diagnosis. The only exception is that bone marrow involvement occurs less frequently, and there is a greater frequency of metastases in unusual sites such as lung or brain.[5, 6] In older children, symptoms from metastatic disease predominate. Bone marrow metastasis may result in pancytopenia. Abdominal distention with respiratory compromise due to massive liver metastases may occur in infants. Histological findings determine the outcome of the treatment and prognosis of the disease. As supported by other reports[5] the older age and undifferentiated immature cells are unfavourable prognostic predictors. The majority of patients with neuroblastoma excrete catecholamines and their metabolites in the urine, their determination aids in the diagnosis and in monitoring the response to therapy.[8] In this patient, the clinical presentation and epidemiological risk favored malignant or amebic liver diseases. Most children with hepatic tumors present with an intra-abdominal mass or abdominal distension. Fever and failure to thrive with weight loss and anorexia, abdominal pain, and vomiting are also seen, but it is rare for children to present with liver failure or jaundice.[9] In the absence of histopathological diagnosis the huge abdominal mass leads to the differential diagnoses of hepatoblastoma/ HCC, Wilms tumor, rhabdomyosarcoma, and lymphoma. Thus we suggest intra-abdominal mass should undergo biopsy to confirm the diagnosis.

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