Clinical and Radiographic Approach of (Nephroblastoma-Neuroblastoma) in Children

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ABSTRACT

The study showed the prevalence and importance of both tumors in diagnosis and follow-up, as it was found that Wilms' tumor is the most common malignant solid abdominal tumor in children, and that neuroblastoma is the most common solid abdominal tumor in the upper abdomen in children and infants. Wilms' tumor has degrees of risk according to differentiation and spread. There is a laboratory test through which Wilms' tumor can be diagnosed (unlike nephroblastoma). Neuroblastoma compresses the kidney from the outside, while nephroblastoma distorts and damages the kidney from the inside (renal excretory system). The presence of a solid mass inside a kidney that causes internal torsion of the calyx collecting system is considered diagnostic. For Wilms' tumor, ultrasonography can help evaluate the venous extension of the tumor (inferior vena cava and renal veins).

Keywords: Tumors; Nephroblastoma; Neuroblastoma; Kidney; Abdomen

INTRODUCTION

There is a large group of abdominal tumors and masses in children, and the tumors (nephroblastoma and neuroblastoma) are the most common and diagnostic in importance. Medical imaging, along with pathological anatomy, is an accurate way to differentiate between them so that the treatment plan can be determined accordingly [1-3].

Classification of abdominal masses in children: Tumors of the upper abdomen, flank masses, liver masses, retroperitoneal masses, cystic masses in the abdomen and pelvis, pelvic masses.

Neuroblastoma is classified among the tumors of the upper abdomen, but it is considered the most common solid abdominal tumor in the upper abdomen in children and infants. The most common malignant abdominal tumors are found in children under the age of one year. Renal blastoma (Wilms tumor) is also included in the flank masses, and it is the most common malignant solid abdominal tumor in children. Hence their importance in our study. The radiological methods used in diagnosing abdominal masses. Simple abdomen, where bone scan images reveal transitions, contrast radiographs, through which the urinary system-digestive tract is studied: Ultrasound (echoography): All types of color and pulsed-ultrasound Doppler, computed tomography and multi-slice computed tomography, resonance imaging Magnetic, radioisotope, positron imaging: Combined CT-MRI [4-6].

LITERATURE REVIEW

Methodology

Aims of studying: Both Wilms' tumor and neuroblastoma are considered important pathological lesions in all countries of the world that can lead to a high degree of death. Its diagnosis is particularly concerned with computed tomography, magnetic resonance imaging, plain radiography, radioisotopes, positronic imaging combined with computed axial tomography, Positron imaging combined with magnetic resonance imaging, and the

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research aims to study the role of radiological and clinical diagnosis and detection methods for Wilms' tumorneuroblastoma.

Study design: A cross-sectional study to study the role of radiological and clinical diagnosis and detection methods for Wilms' tumor-neuroblastoma.

Patients: The study included 431 male and female patients who were admitted to Children's University Hospital and had Wilms' tumor and neuroblastoma.

Place of study: University Children's Hospital-archives and records of patients in the internal department, clinics and radiology department.

Study time: From February2023 until August 2023.

Methods

A cohort of patients admitted to university children's hospital was studied according to the following.

Inclusion criteria

- Those who have abdominal masses that are palpable clinically or detected by echography.
- Admitting patients who exhibit symptoms and signs indicating the diagnosis of a tumor and mass in the abdomen.

While the exclusion criteria were as follows:

- Patients who continued treatment outside the hospital.
- Patients who had X-rays and CT scans performed outside the hospital.
- Patients who do not have the desire for diagnosis and treatment.
- Damaged patient records and records in which there is insufficient information to serve our study.

Information was collected according to the research form to set the inclusion and exclusion criteria. Clinical history information was recorded in detail, which included: Age, sex, habits, vital signs, and medical examinations. Information was taken about the results of CT scans and plain radiography. All measurements were made for the patient using devices available in the hospital, and x-rays were taken at the center located in the hospital.

RESULTS

431 child patients (ages from one day to 12 years) were detected and monitored who had abdominal masses that were palpable clinically or detected by sonography. More than (275) children were found to have a renal mass, including renal ascites, stenosis of the pelvic ureteral junction, renal cysts, and nephroblastoma. (Wilms' tumor), invasive neuroblastoma of the kidney, Under the study of Wilms patients only, the sample included (63) children who were diagnosed with Wilms tumor radiologically and had complete surgical resection and observation, and the histopathological result was Wilms tumor, the age groups detected with Wilms' tumor extend from the age of (one week to 3 years), Pathological history: palpation of an abdominal mass, hematuria, urinary infection (laboratory proven). The first radiological examination performed on children was a simple radiograph for all cases (63) children. Findings: a normal simple X-ray of the abdomen (23) cases, homogeneous abdominal shadows (20 cases), atypical calcifications (7) cases of dilatation of intestinal loops following tumor compression (13) cases. Ultrasound imaging was performed in the descending urinary tract (IVP) and the radiological signs mentioned and observed were: Normal secretion with delayed emptying (10) cases, secretion and delayed emptying (10). Cases: Renal edema following tumor (10) cases, rupture of the cysts and pelvis (10), kidney prolapse caused by tumor (13) cases, damage to renal function (10) cases, Ecography findings: In all patients, a unilateral or bilateral renal mass was found. Echoscopic findings: Location of the mass: Unilateral renal mass, right side, 28 cases Unilateral kidney mass on the left side: 30 cases, bilateral mass on both the right and left sides, 5 cases. Edges of the mass: A mass with regular edges, 60 cases, a mass with irregular edges, 3 cases. A clear capsular mass: 60 cases, a mass that exceeds the midline: 3 cases, a mass that does not exceed the midline: 60 cases: Doppler study: Perfusion with shallow functional vessels 25 cases, perfusion with abundant vessels 25 cases, appearance of arteriovenous fistulas 6 cases Accompanying renal venous thrombosis 7 cases Homogeneous appearance of the mass: (56) cases Heterogeneous appearance:(7) cases, solid compounds: (3) cases, cystic compounds: (1) case Mixed compounds: (3) cases, the presence of retroperitoneal phlegmonal nodule enlargements (3) cases, the presence of visceral enlargements:, hepatomegaly (1) case, splenomegaly (1) case, details of the CT study: The study according to what was done in Shaab X-rays after preparing the child on a strict diet, injections were done after confirming the creatinine values, and imaging with a multi-slice computed tomography system. Specifications of diagnosed masses: suprarenal mass 60 cases, mass on the lateral side 2 cases, mass on the medial side 1 case, solid mass measuring more than 30 Hounsfield 54 cases, mass containing cystic components less than 20 units 5 cases, cystic masses with a density of 15-20 Unit 4 states, enhancement ratios for the shadow material: All masses reinforced the shadow matter: (46) states Patterns of enhancement: Complete, comprehensive enhancement of the mass 40 states Partial enhancement 15 states Central enhancement 5 states. Enhancement of screening, no appearance of calcifications within the mass (3) cases, no appearance of calcifications (60) cases, tumor diameters extending from 3 cm to 10 cm, 3-5 cm 42 cases, 5-7 cm 10 cases 7-10 cm 10 cases, notes: The mass was accompanied by renal venous thrombosis (3) cases, the mass was accompanied by inferior vena cava thrombosis (2), the mass was accompanied by liver metastases (one case), the mass was accompanied by bone metastases (one case) Recurrence of Wilms' tumor was observed in (9) cases (14.28%) of the sample and follow-up patients, It was found that there were (156) cases of non-renal abdominal masses, a percentage of 36%. Neuroblastoma patients were studied only, and the sample included (46) children who were diagnosed with neuroblastoma radiologically and had complete surgical resection and observation. The histopathological result was neuroblastoma, from one day to two years of age 35 76% from 2-5 years 11 24% History: Palpation of a large abdominal mass filling the abdomen, weight loss and delayed growth. The first radiological examination performed for children was a simple Osteolytic foci in (10) cases, echographic findings:

Showed the presence of a solid lesion in all cases, echogenic findings: location of the mass: Mass in the upper abdomen behind the peritoneum 30, mass on the adrenal glands 5, mass on the nerve ganglia on the side of the vertebral column 8, edges of the mass A mass with regular edges within the origin 8, a mass extending outside the organ of origin that does not exceed the midline 17, a mass that exceeds the midline 21, Doppler study: Perfusion with shallow functional vessels 21, perfusion with abundant vessels 20, inferior caval thrombosis 5, tomographic study: The view is not homogeneous mass 46, crossing the midline 38, calcifications 40, irregular edges 45, caval invasion 30, percentages of contrast enhancement: All masses had contrast enhancement: (46) cases, patterns of enhancement: cComplete, comprehensive enhancement of the mass 25 cases, partial enhancement 15 cases, central reinforcement 5 cases, blocking reinforcement 23, mass measurements: 5-10 cm 9 10-15 cm 37, distant transmissions: To the liver 30, to the bones 34. To the chest 10, notes: Neuroblastoma recurrence was observed in (17) cases, i.e. 35% of care and follow-up patients, and the presence of tumor remnants was noted in (12) cases, i.e. 30% of care and follow-up patients.

DISCUSSION

- The mass was accompanied by renal venous thrombosis (3 cases).
- The mass is accompanied by inferior vena cava thrombosis (2) The mass was accompanied by liver metastases (one case).
- The mass was accompanied by bone metastases (one case).
- Recurrence of Wilms' tumor was observed in (9) cases (14.28%) of the sample and follow-up patients.
- Recurrence of neuroblastoma was observed in (17) cases, 35% of care and follow-up patients, and the presence of tumor remnants was noted in (12) cases, 30% of care and follow-up patients.

CONCLUSION

In conclusion, this study underscores the significant clinical and diagnostic importance of Wilms' tumor and neuroblastoma, the two most prevalent malignant solid abdominal tumors in children. Wilms' tumor typically presents as a renal mass with various radiological manifestations, often detected through ultrasound and confirmed via computed tomography. It exhibits degrees of risk based on histopathological findings, necessitating meticulous management to address potential complications like venous thrombosis. In contrast, neuroblastoma, primarily affecting the upper abdomen, commonly involves the adrenal glands or nerve ganglia, emphasizing the need for thorough radiological evaluation, including Doppler studies and CT scans, to assess extent and metastatic potential. The study's findings highlight these tumors' distinctive characteristics, aiding in accurate diagnosis and treatment planning crucial for improving patient outcomes and managing recurrence risks effectively.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The Research Ethics Committee at Al-Sham Private University and the Ethical Committees at Al-Mowasat University Hospital approved the study protocol. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or ethical standards similar.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

All data related to this paper's conclusion are available and stored by the authors. All data are available from the corresponding author on a reasonable request.

CONFLICT OF INTEREST

The authors declare that they have no Convict of interest.

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AUTHOR'S CONTRIBUTIONS

Najeh lahej, Ali Aljarad and Mohammad Alhasheesh, conceptualized the study and wrote the study protocol, performed the statistical analysis, participated in data collection, and did the literature search. And participated in the literature search, interpret the results, wrote the main manuscript.

Dr. Khalid khattab revised the draft. All authors read and approved the nal draft.

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ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Institutional Review Board (IRB) of the Faculty of Medicine, Al- Sham Private University, and University Children's Hospital in Damascus. Khattab K, et al.

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