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PAEDIATRIC RETROPERITONEAL MASSES IN A TERTIARY CARE CENTRE IN NORTH INDIA: RADIOLOGICAL-PATHOLOGICAL CORRELATION

Radiodiagnosis

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ABSTRACT

Aim: To study the spectrum of various paediatric retroperitoneal masses and to determine the radiological-pathological correlation

Material and Methods: This prospective study was carried out in a tertiary care centre in north India. All Retroperitoneal Lesions were evaluated on Multi-Detector Computed Tomography (MDCT) and findings were recorded. MDCT findings were correlated with histopathological findings.

Results: Majority of patients were males (M:F: 1.4:1). Abdominal pain was the commonest symptom. Primary Retroperitoneal Space masses (PRSM) accounted for majority of cases (47.1%) followed by renal masses (29.4%) and adrenal masses (23.5%). Large proportion of lesions was malignant (44.1%). Diagnostic Accuracy of MDCT was 88.2%.

Conclusions: Retroperitoneal Tumours commonly present in paediatric population. Majority of retroperitoneal masses can be diagnosed with fair accuracy on MDCT. However histopathological correlation is essential for confirmation as well as to establish the true nature of disease.

KEYWORDS

Retroperitoneal; Lesions; Histopathology; Malignant

INTRODUCTION:

Retroperitoneum is one of the largest spaces in the body. It is limited anteriorly by the peritoneal covering, posteriorly by posterior abdominal wall, superiorly by the 12th rib and vertebra, inferiorly by the base of the sacrum and iliac crest, and laterally by the site borders of the quadratus lumbora muscles. It contains connective tissue, the adrenals, kidneys and ureters, aorta and its branches, inferior vena cava and its tributaries and lymph nodes [1].

Retroperitoneal masses constitute a heterogeneous group of lesions and pose a diagnostic challenge for radiologists [2]. Retroperitoneal masses may be primary or secondary. Primary retroperitoneal masses arise within the retroperitoneum but outside the major organs. Secondary masses arise from retroperitoneal organs such as kidneys, adrenals, pancreas and bowel loops. Retroperitoneum is also the site of origin of various non-neoplastic conditions such as inflammatory processes from the kidneys, large bowel, appendix, pancreas, tubercular lymph node or infection from a tuberculous vertebra and idiopathic retroperitoneal fibrosis.

Clinical manifestations due to retroperitoneal masses are vague and appear late in the course of the disease and are caused by compression of the organs and obstructive process. Various imaging modalities are available for diagnosing retroperitoneal masses include Ultrasonography (USG), MDCT and Magnetic Resonance Imaging (MRI). USG is the initial modality and is easy to perform. However it is operator dependent and is adversely affected by bone and gas artefacts and provides less anatomical details. MRI provides excellent soft tissue contrast without any ionizing radiation. However it is time consuming procedure, not easily available and is susceptible to motion artefacts and hence not suitable in paediatric population. MDCT is the modality of choice as it has faster acquisition time and provides explicit anatomical details and morphologic characters of the mass, site of origin, its extent and metastatic spread. Attenuation differences between retroperitoneal fat and adjacent organs increases the diagnostic accuracy of MDCT in evaluation of retroperitoneal diseases. But there is considerable overlapping of the imaging findings and the final diagnosis requires histopathological confirmation. The treatment of retroperitoneal masses is quite challenging, mainly due to their anatomical location, dimensions, vascular involvement, or involvement of adjacent organs [3,4].

MATERIAL AND METHODS:

This prospective study was performed in tertiary care centre in north India over a period of two years from June 2014 to June 2016. 34 patients referred from General and Paediatric surgery departments with clinically palpable or USG detected retroperitoneal mass were included. Detailed clinical history and findings of physical examination were recorded. MDCT examinations were performed with 64 slice (Somatom Definition AS+ from Siemens Healthcare) and 4 slice-MDCT scanners (Somatom plus 4 volume zoom machine from Siemens Healthcare). RFTs were evaluated in all patients and study performed after 6 hours of fasting. MDCT was used to confirm the site of origin of the mass as primary or secondary and masses were evaluated based on consistency, components of the lesion (fat, calcium, necrosis) and pattern of enhancement (unenhanced, homogeneous, or heterogeneous). Histopathological evaluation was performed in all cases and findings recorded.

RESULTS:

34 patients formed the material of the study. Majority of them were males with male to female ratio of 1.4:1. Majority of cases were seen in 1-5 year age group. Abdominal pain was the commonest clinical feature followed by abdominal lump and fever. The masses were classified according to site of distribution on MDCT as Primary Retroperitoneal space masses (PRSM) or secondary lesions. PRSM were the commonest masses seen in approx. 47.1% cases followed by renal masses (29.4%) and adrenal masses (23.5%). Commonest PRSM diagnosed on MDCT in our study included lymph nodal masses (20.6%) followed by paraganglioma (8.8%) (Table 1). Most of the lymph nodal masses were malignant (57.2%). Two cases of Fetus in Fetu and one case each of Extra-Gonadal Germ Cell tumour, lymphangioma, PNET and teratoma were also seen. Among the renal masses, wilms tumour was the commonest pathology on MDCT seen in approx. 11.8 % cases followed by renal abscess (8.8%). Solitary case of angiomyolipoma and renal nephroblastomatosis were also observed (Table 1). Among adrenal masses, neuroblastoma was seen in 11.8% cases followed by pheochromocytoma (5.9%). Solitary case of adrenal adenoma and adrenomyelolipoma were also seen (Table 1).

On histopathological evaluation, correct diagnosis on MDCT was made in 30 cases and large proportion of the lesions (44.1%) were malignant. Diagnostic accuracy of MDCT in diagnosing paediatric retroperitoneal masses was 88.2%.

DISCUSSION:

Paediatric retroperitoneal masses constitute a heterogeneous group of uncommon lesions and represent a challenge due to overlapping imaging findings. Large proportion of these lesions is malignant and so needs adequate evaluation on MDCT with further confirmation on histopathology.

Patient's age is one of the most important factors and helps narrow the potential differentials. Relevant history regarding time since onset of mass, rapidity of growth and mass effect on adjacent structures may add further to this information and presence of constitutional symptoms, such as pallor, anorexia, fever, or weight loss, may point toward a malignant lesion [5].

MDCT is an excellent imaging modality in evaluation of

retroperitoneal masses. MDCT with multiplanar reconstructions provide vital information regarding location of the lesion, its organ of origin, enhancement characteristics in various phases of contrast administration, presence of necrotic areas & calcifications, areas of fat attenuation, extensions of the lesion, involvements & invasions and mass effect on adjacent structures [5]. MDCT can provide differential diagnosis based on above mentioned features and a definite diagnosis can be made in majority of cases.

In our study, majority of cases were males with M:F ratio of 1.4:1. Majority of cases were seen in 1-5 year age group. Nagaraju RM et al [5] also observed majority of cases in 1-5 year age group. Primary retroperitoneal space masses (PRSM) were the commonest pathology in our study followed by renal masses and adrenal masses. Among PRSM, lymph nodal masses were the commonest pathology followed by paraganglioma. Majority of the lymph node masses were malignant and showed lymphomatous pathology. Lymphomatous nodes appear homogenous and discrete on MDCT and show homogenous enhancement whereas majority of tubercular lymph nodes show necrosis and conglomeration. Two cases of Fetus-in-Fetu were seen while single case each of lymphangioma, PNET and teratoma were also seen. On MDCT, two cases of lymph node masses and one case each of Extra-Gonadal Germ cell tumour and PNET were wrongly diagnosed and confirmed on histopathological evaluation.

Renal masses were second commonest pathology in our study seen in 29.1% cases. Wilms tumour was the commonest renal lesion in our study followed renal abscess. Wilms tumour appear as large well defined heterogeneous mass arising from kidney and shows reduced enhancement as compared to normal renal parenchyma [5]. Site of origin appears as stretching and splaying giving a 'beak' like appearance. Low attenuation areas within the lesion may represent necrosis/fat deposition [5]. Regional lymphadenopathy, peritoneal, mesenteric and omental involvement may occur and is well depicted on MDCT [6-8]. Solitary case of renal nephroblastomatosis were also seen which was confirmed on histopathological confirmation.

Adrenal lesions were seen in 20.6% cases. Among them, neuroblastoma was the commonest pathology and appears as large, heterogeneous, lobulated soft tissue masses showing heterogeneous enhancement on MDCT. Approximately 80%–90% of Neuroblastoma demonstrates stippled and curvilinear calcifications [5].

MDCT was correctly able to diagnose the pathology accurately in 88.2% cases. A large proportion of the lesions encountered in our study were malignant (44.1%), thereby highlighting the importance of MDCT and histopathological evaluation for surgical planning and further management.

CONCLUSIONS:

The study shows the spectrum of various retroperitoneal lesions in North India. Familiarity with retroperitoneal anatomy and the radiographic signs enable differentiation between primary and secondary masses on MDCT. MDCT can diagnose retroperitoneal masses with fair accuracy based on the composition, enhancement pattern, vascularity, location, and relationship to adjacent structures. However histopathological evaluation is mandatory in all the cases to confirm the diagnosis and to guide the clinician regarding appropriate management.

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