Case Report

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Retroperitoneal Castleman's disease in a young Nepalese girl: A rare cause of childhood abdominal mass

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Introduction: Castleman's disease (CD), or benign angio-follicular lymph node hyperplasia, is an uncommon condition in childhood. When a child presents with a huge retroperitoneal mass and inconclusive findings on clinico-radiological evaluation or tissue sampling, management becomes exceedingly difficult. CD herein becomes an uncommon presentation of an uncommon diagnosis.

Case presentation: A six-year-old girl with no past medical problems presented to the office with a slowly progressive, painless mass over the right lumbar region for a year. Abdominal ultrasound showed a well-defined oval mass in the right periumbilical region, further evaluation of which with a computed tomography scan suggested lymphoma. A preoperative core-cut biopsy could not confirm the findings and suggested a neoplastic lesion, probably an inflammatory myofibroblastic tumour or small round cell tumour. She underwent an exploratory laparotomy with in-toto excision of the mass. Intraoperatively, a solid retroperitoneal tumour measuring 8 × 8 × 6 cm was found. Histopathology and immunohistochemistry confirmed a unicentric CD of the hyaline-vascular type. At two years of follow-up, she remained asymptomatic and disease-free.

Conclusion: While CD in children is rare, retroperitoneal localization of the same can further add to the diagnostic conundrum. However, if carefully considered, an en-bloc surgical resection offers complete treatment.

Keywords: Castleman's disease, children, lymphoproliferative disorder, retroperitoneal tumour, unicentric castleman's disease

Introduction

Castleman's disease [(CD); angio-follicular lymph node hyperplasia] describes a heterogeneous group of lymphoproliferative disorders that share common histopathological features. It is clinically categorized into unicentric (uCD) and multicentric (mCD) varieties based on the number of enlarged lymph node regions, with the uCD form being more common with a benign clinical course and mild symptoms. This form is characterized by one or more enlarged lymph nodes in a single area of the body. Similarly, a histopathological classification follows a division into hyaline-vascular (HV), plasmacytic (PC), and mixed cellular variants (mix)[1,2]. Approximately 90% of cases of localized forms are of the hyaline-vascular type. Patients with CD can range in age from children to the elderly, with the median age of onset being 50 years for those with mCD and 30 years for those with uCD. The HV histopathological variant commonly involves the mediastinum, with occasional extrathoracic involvement[3].

A preoperative diagnosis is challenging to establish and entails the integration of clinical presentation, imaging, and pathological features. We present a case of uCD, an HV variant in the retroperitoneal location, who underwent exploratory laparotomy and in-toto excision of the mass. This case has been reported in line with the SCARE criteria[4].

HIGHLIGHTS

- Castleman's disease is a rare finding in children; even rarer is its localization in the retroperitoneum.
- A preoperative diagnosis of Castleman's disease is challenging, more so when it masquerades as a retroperitoneal mass.
- The outcome is essentially curative with en-bloc surgical excision.

Case presentation

A six-year-old girl presented to the surgical outpatient department with complaints of a painless, gradually progressive mass

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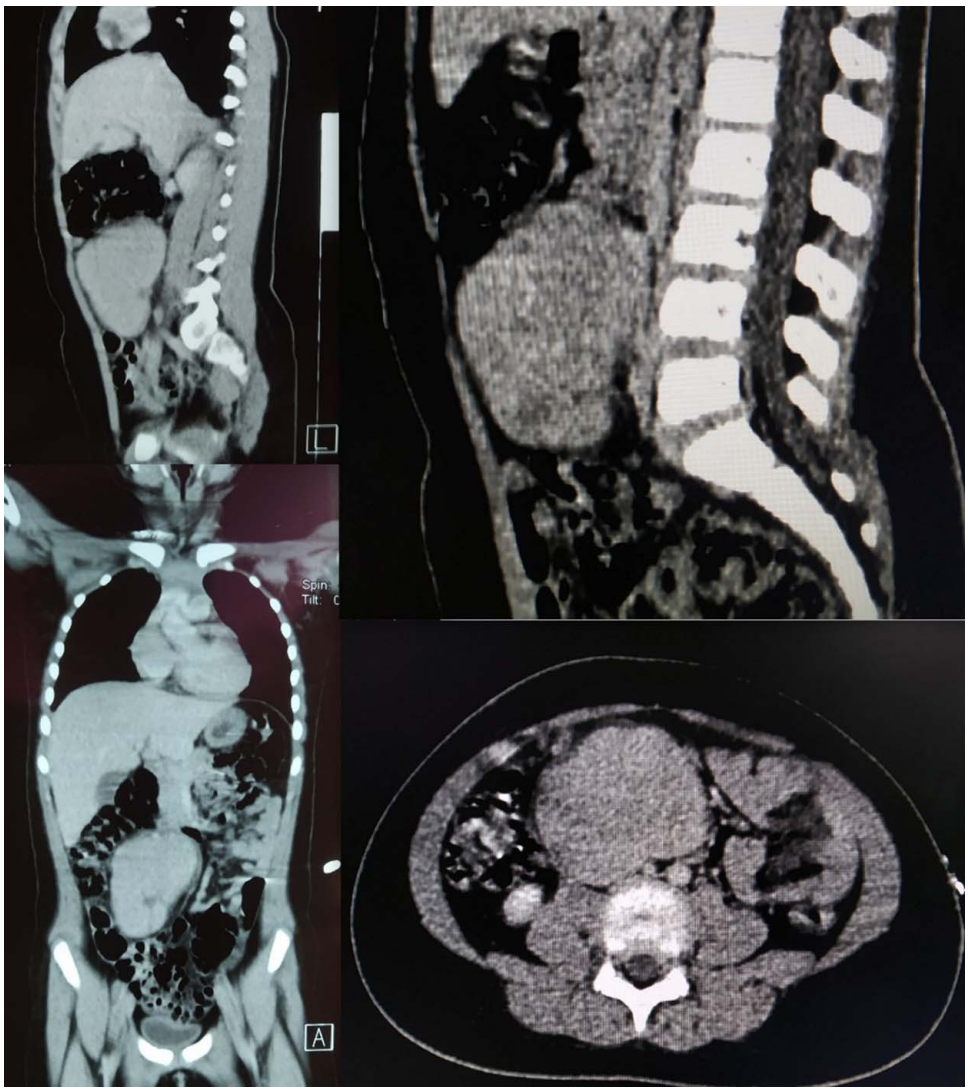

Figure 1. CECT images of retroperitoneal Castleman's disease.

over the right lumbar region for a year. It was associated with mild, intermittent pain that was not severe enough to limit her activities. She did not note any temperature, loss of weight, or loss of appetite and had been moving her bowel and bladder normally. Her vital signs were within normal limits. Abdominal examination revealed a firm mass measuring 8 × 8 cm without local warmth or tenderness and not crossing the midline. The surface was smooth, and the borders were not very distinct. Mobility was appreciable in the lateral direction but not in the cranio-caudal direction. The decreasing prominence in knee-elbow position clinically was suggestive that the mass was retroperitoneal in location. The lymph nodes were impalpable.

Abdominal ultrasonogram (USG) demonstrated a well-defined oval, hypoechoic lesion in the right periumbilical region, while computed tomography (CT) abdomen reported a homogeneously enhancing mass in the right lumbar region, most probably a lymphoma, as shown in Fig. 1.

The preoperative core-cut biopsy was inconclusive and raised the possibility of an inflammatory myofibroblastic tumour or a small round cell tumour. Therefore, with the intent of diagnostic confirmation and to avoid future possibilities of mass effect and compressive symptoms on adjoining organs, an open exploration of the retroperitoneal tumour was scheduled. Intraoperatively, a solid retroperitoneal tumour measuring 8 × 8 × 6 cm was found over the right lumbar region at the level of the umbilicus that was pushing the right ureter medially and the inferior vena cava posteriorly. The transverse and ascending colons were displaced supero-anteriorly as shown in Fig. 2. En-bloc excision of the mass was done.

Grossly, a globular mass measuring 8 × 8 × 6 cm with an outer surface showing an intact capsule along with dilated and engorged blood vessels with areas of brown-black discoloration was noted. The sections showed a lymph node with partially effaced architecture. Numerous regressively transformed lymphoid follicles with well-defined hyaline-vascular changes were observed. There were tight concentric layers of lymphocytes at the periphery of the follicles in an onion skin pattern, and the interfollicular stroma showed hyperplastic vessels of

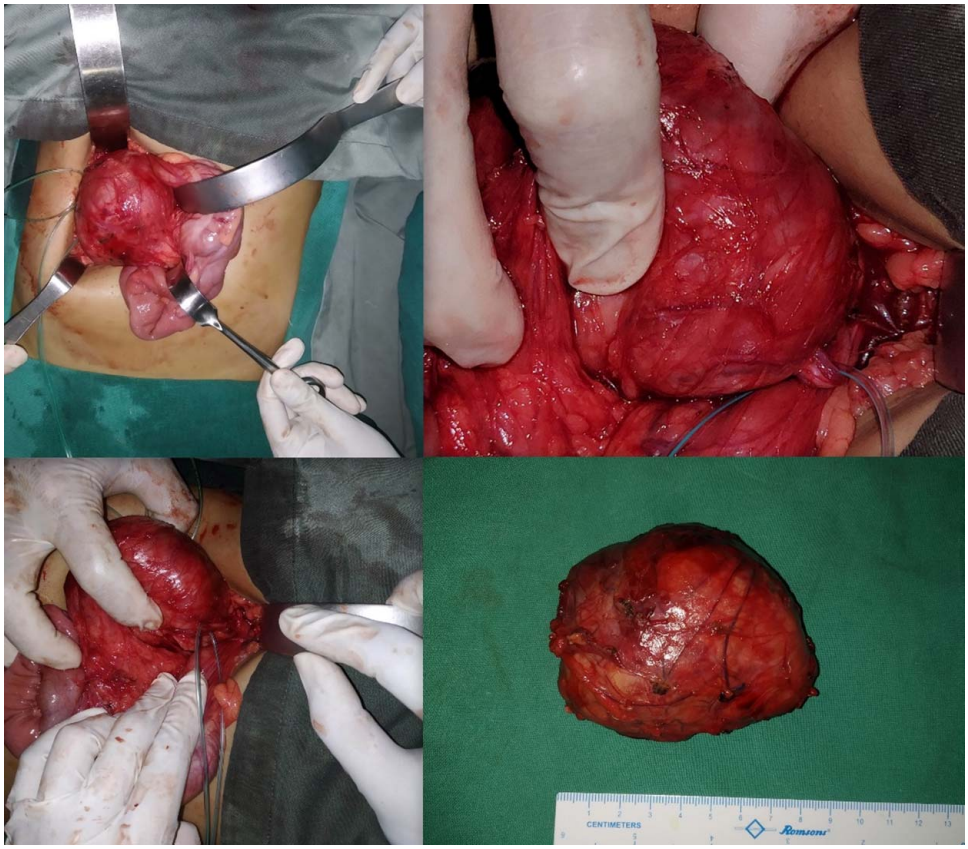

Figure 2. On table images of retroperitoneal Castleman's disease.

the post-capillary venule type as shown in Fig. 3. The characteristics were consistent with CD of the hyaline-vascular type; however, further confirmation with immunohistochemistry was advised.

The immunohistochemical result was as follows: favoring CD, as shown in Table 1 and Fig. 4.

She had an uneventful postoperative recovery and remained asymptomatic and disease-free at two years of follow-up.

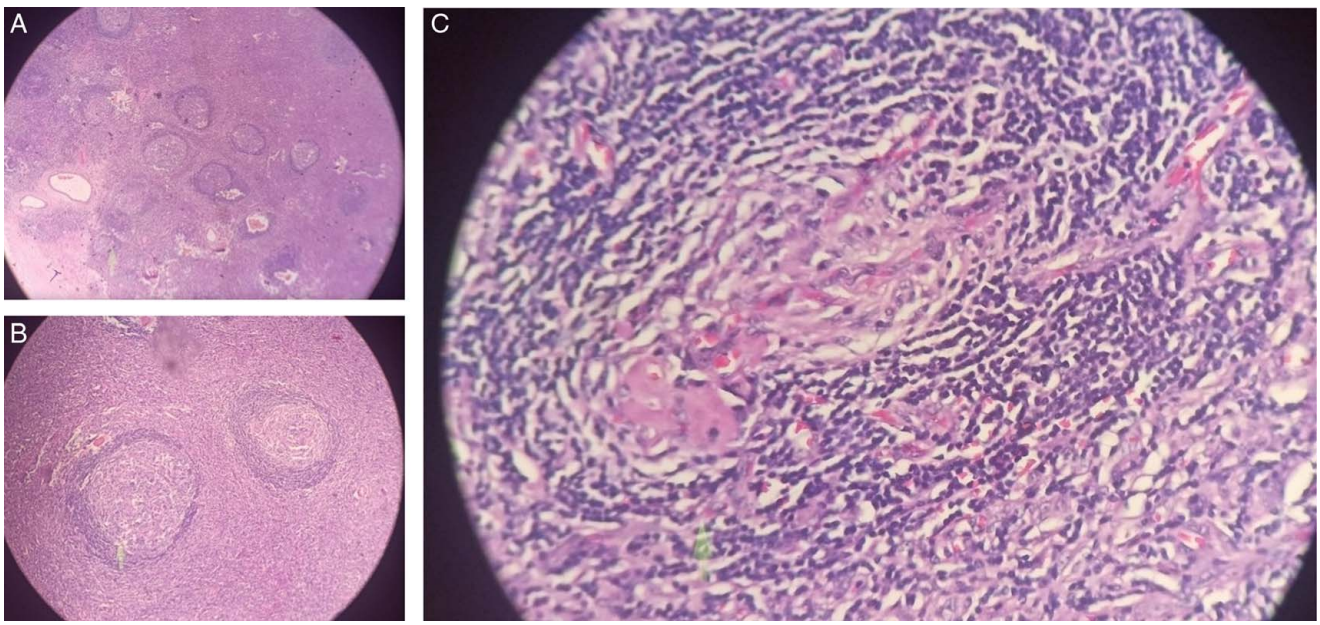

Figure 3. Microscopic appearance of CD (eosin/hematoxylin) at 40× (A), 100× (B) and 400× (C) magnification.

Table 1

IHC markers favoring CD.

Markers	Result
CD3	Highlights T lymphocytes
CD20	Highlights B lymphocytes zone
CD21	Highlights dendritic meshwork
CD138	Highlights scattered plasma cells
CD10	Highlights germinal centres
BCL-2	Immunoreactive in peri-perifollicular region
HHV-8	Non-immunoreactive in lesional cells
BCL-6	Immunoreactive in germinal centres
Ki-67	Polarized in germinal centres

CD, Castleman's disease; IHC, immunohistochemical.

Discussion

The first description of CD was made by Benjamin Castleman in 1954 in patients with enlarged mediastinal lymph nodes resembling thymoma[2]. The disease is known to present with non-neoplastic lymphadenopathy at any site where lymph nodes are normally present. A classification exists based on the anatomical distribution as unicentric (uCD) and multicentric (mCD) disease[3]. The diagnosis is confirmed by the characteristic histological picture and follows a subclassification into three types: HV, PC, and Mix[1].

The exact pathogenesis of CD has not been determined, although a chronic inflammatory response appears to be the likely cause. The germinal centres of the hyperplastic lymph nodes produce large amounts of interleukin-6 (IL-6) that are currently attributed to the pathogenesis of CD[5]. Likewise, in mCD, IL-6 secretion is stimulated by chronic HHV-8 infection, which induces a hyperplastic reaction of the lymphoid system.

The following observations strongly suggest IL-6 as the key element responsible for the disease process: 1. After removal of the enlarged hyperplastic lymph node, a decrease in serum IL-6, acute phase reactants, gamma globulin, and clinical improvement are noted; 2. Alleviation of the symptoms and signs on treatment with anti-IL-6 occurs; and 3. Overexpression of IL-6 in mice produced a phenotype similar to the mCD[5,6].

Elevated serum levels of IL-6 and demonstration of circulating HHV-8 particles through polymerase chain reactions can lead to diagnosis but are not easily available in clinical practice[7], especially in a third-world nation like ours.

The uCD, on the other hand, is characterized by the enlargement of a single lymph node, or at most a group of adjacent nodes in a single region. The lymph nodes most commonly affected are those in the axilla, neck, abdomen, and mediastinum[8]. The hyaline-vascular type, being the most common pathological variant, accounts for 90% of cases. This clinically manifests as enlarged, painless lymph nodes that are asymptomatic unless involving adjacent structures and developing compressive symptoms[3]. Unicentric CD purely involving the retroperitoneal lymph node is an exceedingly uncommon event, and when it does, it can lead to urinary retention, abdominal pain, and gastrointestinal symptoms depending upon the adjacent organ of involvement[7]. An elevated erythrocyte sedimentation rate, C-reactive protein, and leukocytosis are usually appreciable on the hemogram[9].

Owing to its rare occurrence in children, CD can inherently pose diagnostic challenges to the treating team; more so when it masquerades as a retroperitoneal mass, wherein a wide range of

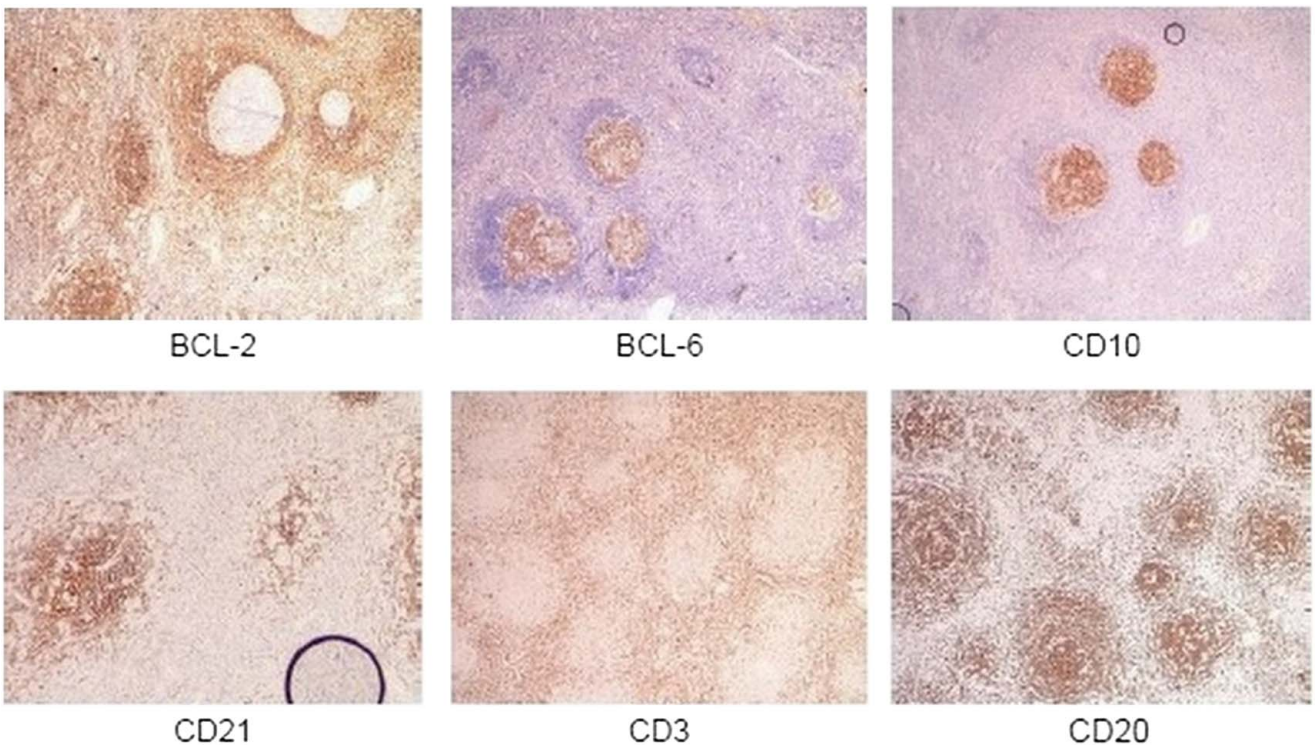

Figure 4. Immunohistochemical panel of Castleman's disease.

differential diagnoses need to be considered, such as lymphoma, carcinoid tumour, paraganglioma, angioimmunoblastic lymphadenopathy, metastasis, or mesenchymal tumours including sarcoma, solitary fibrous tumour, hemangiopericytoma, leiomyoma, and tuberculosis, consequently overlooking a diagnosis of CD with relative ease. As in our case, because of clinico-radiological findings, lymphoma was strongly considered until the findings of the core-cut biopsy. However, the pattern of lymph nodal involvement in lymphoma is multiple smaller nodes as opposed to uCD, wherein a single lymph node can measure up to 5.7 cm on average[9]. Several documented cases of CD have been noted in paediatric populations, with a relatively lower incidence observed in the context of retroperitoneal localization[10–12].

No standard guidelines are available for the treatment of uCD, although a complete surgical excision seems to be curative in the reported literature[9]. There have also been suggestions for alternate treatment modalities, such as radiotherapy; however, these come with assessed risks. With our patient, given the lack of diagnostic certainty, the inability in proper characterization at the core-cut biopsy, and the intent to avoid pressure symptoms in the future, surgical exploration was planned and executed. This turned out to be a reasonable decision in retrospect, with the patient reporting being disease-free at the end of the 2-year follow-up period.

Conclusion

CD is a rare finding in children, more so with its localization in the retroperitoneum. A high index of suspicion is imperative when clinico-radiological findings and core-cut tissue samples yield discordant results, to not miss sinister pathologies and to avoid compressive symptoms in the future. The outcome is essentially curative with an en-bloc surgical excision.

Ethical approval

This case report is exempt from ethical approval due to the nature of the article, as per the ethical review board at our institution.

Consent

Written informed consent was obtained from the patient's guardians for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

A.M. drafted the manuscript. A.L.S., S.K., and R.D. were the treating physician, senior author and supervisor and revised the manuscript.

Conflicts of interest disclosure

None of the authors has any conflict of interest to disclose. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

Research registration unique identifying number (UIN)

None.

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Data availability statement

The manuscript data used to support the findings of this study are available from the corresponding author upon request.

Provenance and peer review

Not commissioned, externally peer-reviewed

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