CT Characterization of Retroperitoneal Liposarcomas (RPS)

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Abstract: _Objective: This study aims to determine the different imaging features of the retroperitoneal liposarcomas and categorize the histopathological type based on these features. Methods: A retrospective study was performed in Justice K. S. Hegde Charitable Hospital on 10 patients who were histopathologically proven to have retroperitoneal liposarcomas who had also undergone CECT abdomen and pelvis. Results: Out of 10 cases with HPE - proven liposarcoma of the retroperitoneum, the CT features favoring RPS are 90% of the lesions were more than 5 cm, 80% of the lesions were fat density lesions showing heterogenous enhancement, and involving the adjacent structures.7 lesions were having well - defined lobulated margins.50 - 60% of the lesions were having calcifications and internal enhancing septae within. Also in our study 30% were HPE was proven to be well - differentiated RPS, 30% were dedifferentiated, 10 % were round cell type and 10% had myxoid type of RPS. Conclusion: The CT features of retroperitoneal liposarcoma are pathognomonic and this helps in ruling out other retroperitoneal masses and the masses arising from the adjacent structures._

Keywords: Retroperitoneal masses, liposarcoma, sarcoma

1. Introduction

Liposarcomas are the most common fat - containing primary malignant neoplasms. They are most commonly seen in extremities[1]. The incidence of retroperitoneal liposarcoma is very rare with the percentage of 0.07% to 0.2% of all tumors and approximately 12% and 40% of all liposarcomas[2]. Retroperitoneal liposarcomas are mostly asymptomatic and can present with symptoms if the adjacent structures are involved. CT and MRI are the primary imaging modalities for the diagnosis and follow - up of retroperitoneal lesions. Determining the extent of the lesion and imaging features of primary retroperitoneal neoplasms is important for providing a diagnosis and in selecting the appropriate patient treatment. The CT features vary depending on the histological subtype and the tumor components. There are 5 types of retroperitoneal sarcoma histopathologically: well - differentiated (55%), myxoid (9 %), pleomorphic (rare), round cell (2 %) and dedifferentiated (37%). The well - differentiated liposarcoma on imaging can have macroscopic fat whereas the dedifferentiated can show solid components with calcifications[3]. The main treatment includes surgical excision of these lesions, however the chances of recurrence of retroperitoneal liposarcomas are high.

Here we present the imaging features of retroperitoneal liposarcoma in 10 patients, the majority of them presented with mass in the abdomen and few were found as incidental findings.

2. Material and Methods

A retrospective study was performed in Justice K. S Hegde Charitable Hospital on 10 patients who were histopathologically proven to have retroperitoneal liposarcomas who had undergone CECT abdomen.

All subjects had undergone CT on GE evo revolution 128 slice scanner in the spiral mode in contrast - enhanced arterial, venous, and delayed phases from the dome of the diaphragm to the pelvis.5mm thick axial sections were obtained after administering 80 - 110mL of non - ionic iodinated contrast (370mgI/mL) intravenously at 2 - 3mL/s. All patients had initial non - contrast CT. The images were reconstructed using multiplanar reformatted images with a slice thickness of 1.25mm and viewed in various planes. All the patients had histopathologically proven retroperitoneal liposarcomas.

3. Results

Demographic data and clinical presentation:
The distribution of males and females among 10 patients studied was 30% (3) and 70% (7), respectively. The age range of these individuals was 45 - 80 years. Most common presentation was non - specific lower abdominal pain (55%), followed by abdominal mass (38%), and 7% were found to be asymptomatic with incidental detection of the lesion.

MDCT features:
Most of the patients with RPS had fat density lesions (60%) (Fig 1). The other lesions appeared to be of soft tissue density lesions (20%) and both fat and soft tissue dense lesions (20%).

Table 1: Density of the lesions

Density of lesion	No. of Cases	Percentage
Fat density	6	60 %
Soft tissue density	2	20 %
Both fat n soft tissue	2	20 %

In our study, further the lesions were characterized based on the size with majority (90%) of the lesions being greater than 5cm and the remaining 10% to be less than 5 cm.

70% of the lesions had shown to have lobulated outline and had shown to cross the midline. Also 70% of the lesions had

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shown ill defined borders while remaining 30% had well defined borders.

Furthermore, the 50% of the lesions had calcifications and 30% had solid components.

60% of the lesion had enhancing internal septations, 50% of the lesion causing compression on the ureter leading to hydronephrosis and 80% of the lesions were involving the adjacent structures.

Table 2: Enhancement features

Enhancement characteristics	Cases	Percentage
Homogenous	1	10 %
Heterogenous	9	90 %

Table 3: Lesion Characteristics

Lesion characteristics	Cases	Percentage
A) Size		
< 5 cm	1	10 %
> 5 cm	9	90 %
B) Border		
Well defined	7	70 %
Ill defined	3	30 %
C) Lobulated margins	7	70%
D) Crossing midline	7	70 %
E) Calcifications	5	50 %
F) Solid component	3	30 %
G) Septae	6	60 %
H) Adjacent structure involvement	8	80%
I) HUN	5	50 %

Among the 10 lesions, 50% were HPE proven as well differentiated, 34% as dedifferentiated and 8% as myoid and round cell type each.
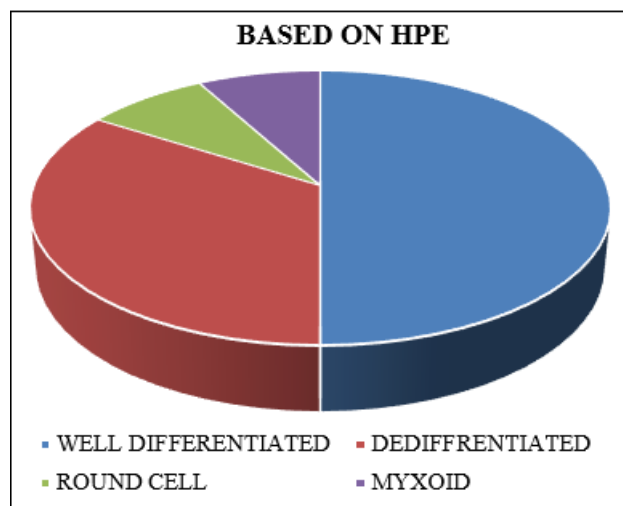

Figure 1: HPE proven lesions

4. Discussion

Liposarcoma accounts for approximately 15% of all sarcomas and mostly occurs in the extremities. Primary retroperitoneal LPS usually originates in the perirenal fat we observed 6 (60%%) perirenal LPS tumors or LPS directly involving the kidney in our study[4] (Fig 1). LPS peaks in the mid - fifties and in our study the patients ranged between 45 - 80 years.
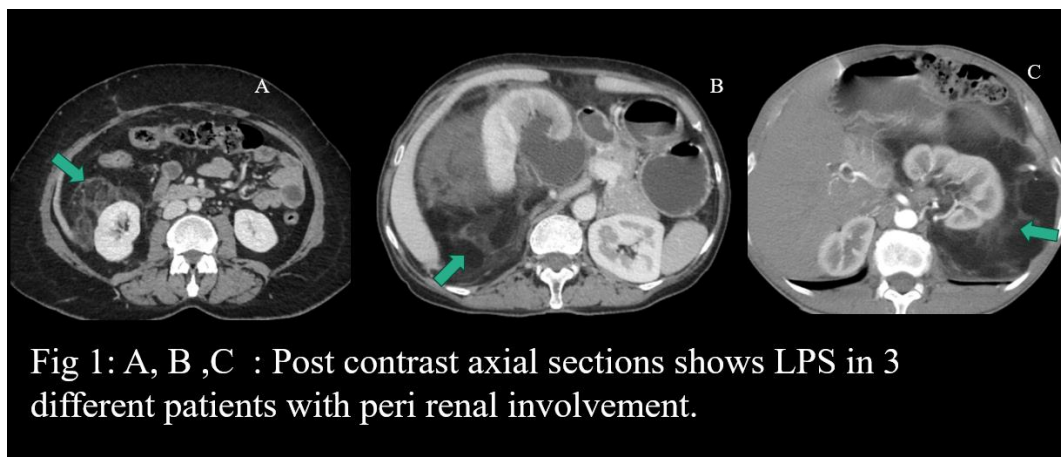

Fig 1: A, B ,C : Post contrast axial sections shows LPS in 3 different patients with peri renal involvement.

Since retroperitoneum is a deep, and expandable space without many bony limitations and slow growing tumors, are generally asymptomatic and do not quickly cause signs or symptoms and may therefore grow to a large size before being diagnosed and these tumors are considered to probably be the largest tumors found in the human body with 60% exceeding 10 cm and 20 - 50% exceeding 20 cm. Lesions measuring <5 cm are considered[5]. In our study 90% of the lesions had exceed more than 5 cm with only 10% of the lesions being less than 5 cm.

Liposarcomas are histologically divided into four subtypes including (*a*) well - differentiated liposarcoma (WDLPS), (*b*) myxoid liposarcoma (MLPS), (*c*) round cell liposarcoma (RLPS), and (*d*) dedifferentiated liposarcoma (DLPS) [6]. The different LPS subtypes have specific genetic mutations. For example, the t (12; 16) (q13; p11) reciprocal translocation results in MLPS [8, 11], while gene amplifications in the 12q12 - 21 and 10p11 - 14 regions are associated with WDLPS and DLPS, and an additional amplification in either 6q23 and 1p32 is also necessary in DLPS[4]. Well - differentiated liposarcomas are the most common with predominantly fat as the majority of the lesion (Fig 2), followed by the dedifferentiated subtype with fat and soft tissue component and calcifications as a specific feature for this type[6], [3]. In our study 50% of predominantly fat containing lesions were HPE proven as well differentiated (Fig 2) and 34% of lesions with calcifications as dedifferentiated subtypes (Fig 3). The remaining lesions were myxoid and round cell on histopathology (Fig 4, 5).
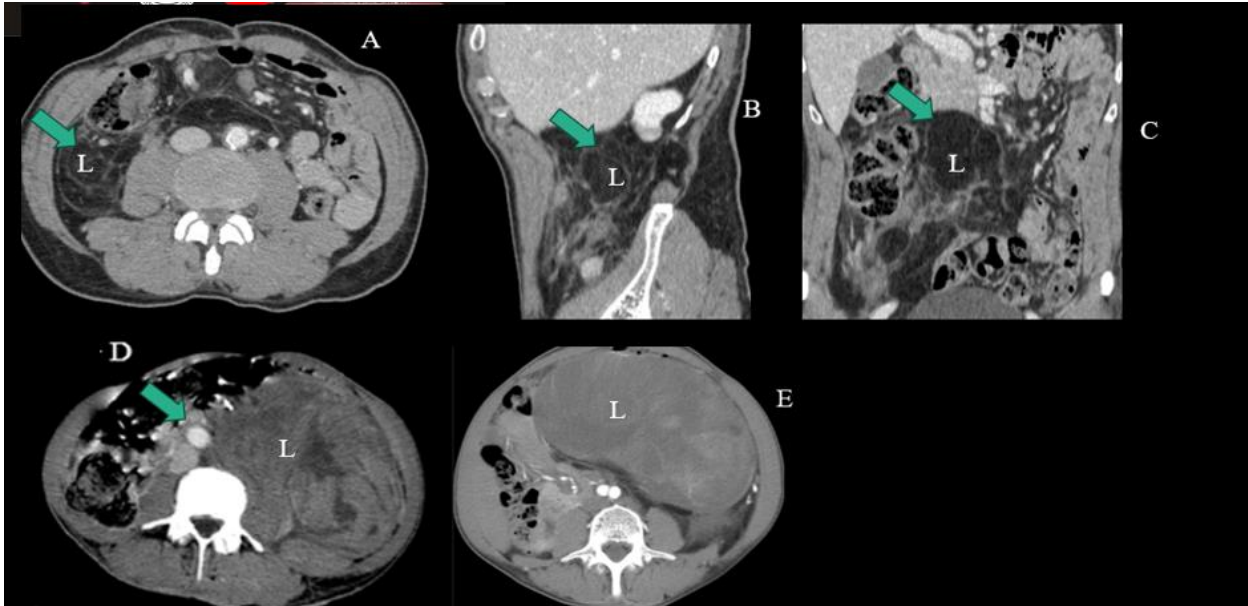
Fig 2 : A(axial),B(sagittal),C(coronal): HPE proven as well differentiated LPS shows a fat density(arrow) region involving the right hypochondrium with the lesion crossing the midline (L: lesion).

Fig D and E: HPE proven well-differentiated LPS with solid and fat components showing no enhancement and displacing the aorta (arrow) and IVC.
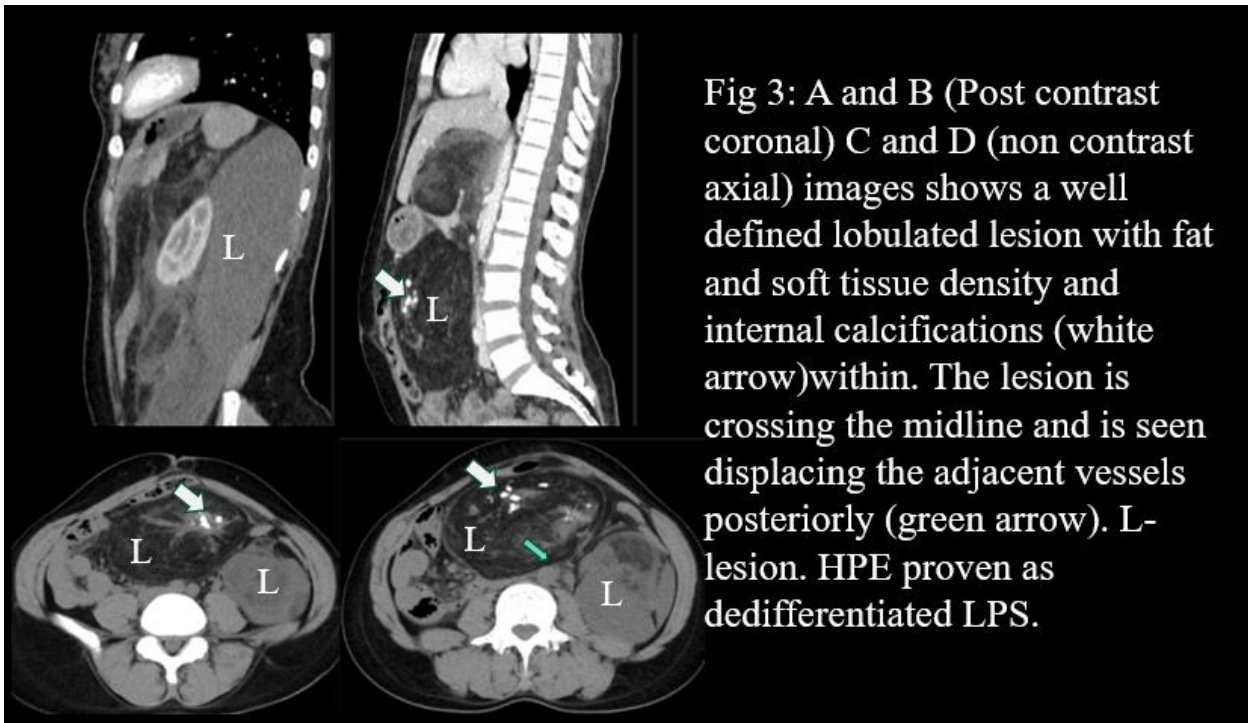

Fig 3: A and B (Post contrast coronal) C and D (non contrast axial) images shows a well defined lobulated lesion with fat and soft tissue density and internal calcifications (white arrow)within. The lesion is crossing the midline and is seen displacing the adjacent vessels posteriorly (green arrow). L-lesion. HPE proven as dedifferentiated LPS.
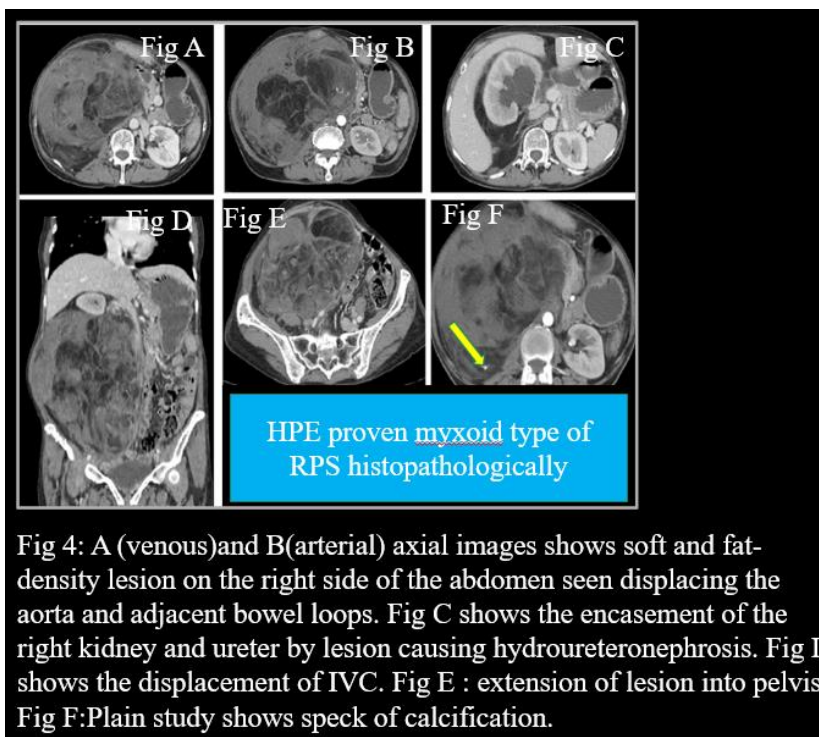
Fig 4: A (venous) and B(arterial) axial images shows soft and fat-density lesion on the right side of the abdomen seen displacing the aorta and adjacent bowel loops. Fig C shows the encasement of the right kidney and ureter by lesion causing hydroureteronephrosis. Fig D shows the displacement of IVC. Fig E : extension of lesion into pelvis. Fig F:Plain study shows speck of calcification.
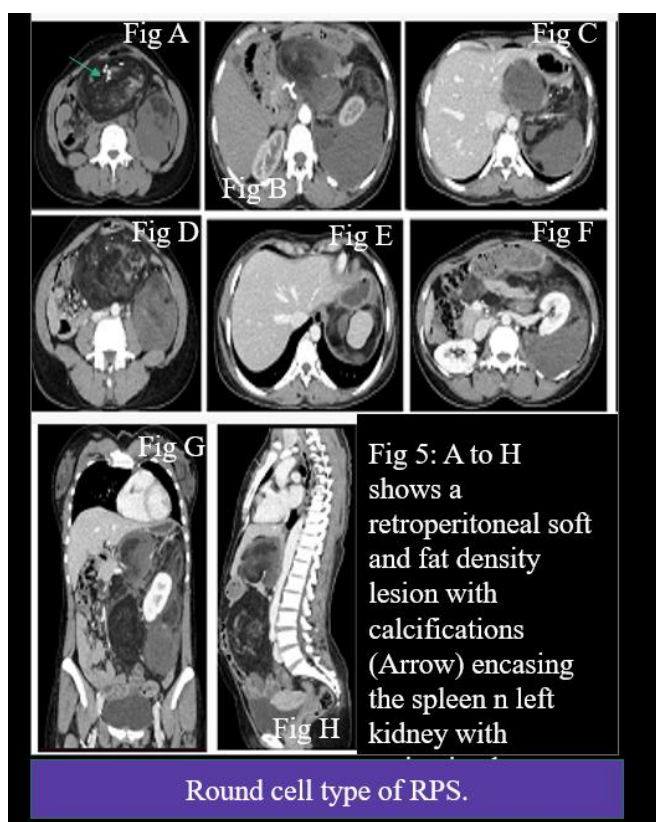

Fig 5: A to H shows a retroperitoneal soft and fat density lesion with calcifications (Arrow) encasing the spleen n left kidney with
Round cell type of RPS.

Detecting these lesions will aid in treatment and surgery is the primary recommended treatment for retroperitoneal Also phase II or III clinical trials have found that chemotherapy, such as trabectedin and eribulin, may improve LPS prognosis Immunotherapy for LPS is now also under development.

The prognosis of LPS is highly dependent on the surgical approach and the histological subtype. WDLPS, together with low - grade MLPS, has a 5 - year survival rate above 90%. In contrast, the 5 - year survival rates of PLPS, DLPS, and high - grade MLPS are all below 75%, with PLPS showing the lowest of only 50%[4].

5. Conclusion

Retroperitoneal sarcomas constitute a rare and diagnostically challenging group of sarcomas that show a wide range of differentiation. Herein, we provide a practical diagnostic approach to retroperitoneal sarcomas and review their histologic features. The most important factors deciding prognosis include the LPS subtype, presurgical LPS size, adjacent organ involvement all of which will help to know the prognosis of the patient.

References

[1] O'Regan KN, Jagannathan J, Krajewski K, Zukotynski K, Souza F, Wagner AJ, et al. Imaging of Liposarcoma: Classification, Patterns of Tumor Recurrence, and Response to Treatment. Am J Roentgenol.2011 Jul; 197 (1): W37–43.

[2] Deng H, Gao J, Xu X, Liu G, Song L, Pan Y, et al. Predictors and outcomes of recurrent retroperitoneal liposarcoma: new insights into its recurrence patterns. BMC Cancer.2023 Nov 8; 23 (1): 1076.

[3] Eurorad. org [Internet]. Eurorad - Brought to you by the ESR. [cited 2024 Jan 10]. Available from: https: //www.eurorad. org/case/16571

[4] Xiao J, Liu J, Chen M, Liu W, He X. Diagnosis and Prognosis of Retroperitoneal Liposarcoma: A Single Asian Center Cohort of 57 Cases. J Oncol.2021 Apr 1; 2021: e7594027.

[5] Matthyssens LE, Creytens D, Ceelen WP. Retroperitoneal Liposarcoma: Current Insights in Diagnosis and Treatment. Front Surg.2015 Feb 10; 2: 4.

[6] Al - Dasuqi K, Irshaid L, Mathur M. Radiologic - Pathologic Correlation of Primary Retroperitoneal Neoplasms. RadioGraphics.2020 Oct; 40 (6): 1631–57.