A retrospective study of adipocytic tumours received at a tertiary care center

ABSTRACT

Aims: To analyze the clinicopathological profile of adipocytic tumours received at a tertiary care center over a period of three years. To determine the distribution of adipocytic tumours among different age groups and gender. To ascertain the most common site of occurrence/organ involved. To determine the most common histopathological subtypes among the benign and malignant adipocytic tumours.

Study Design: Retrospective Descriptive study

Place and Duration of Study: Saveetha Medical College and Hospital, between July 2017-June 2020.

Methodology: All cases of adipocytic tumours (218) inclusive of both resection and biopsy specimens received during the study period were included and their case records were accessed. The demographic details were obtained from the case records at the Medical Records Division and the histomorphological findings from the histopathology registers at the Department of Pathology**.**

Results: In this study, from a total of 20,767 specimens received at our tertiary care center during the period of study, 1.05% (218) were adipocytic tumours, of which 97.25% (212) were benign lipomas and 2.75% (6) were malignant liposarcomas. Out of the total number of malignant tumours (1050) received during the period of study, 2.95% (31) were soft tissue sarcomas, out of which 19.35% (6) cases were liposarcomas. Among the liposarcomas received at our center, 50% (3) cases were well differentiated liposarcoma, 33.3% (2) cases were pleomorphic liposarcoma and 16.7% (1) cases were dedifferentiated liposarcoma.

Keywords: Adipocytic tumours, Lipoma, Liposarcoma, Well-differentiated liposarcoma, Dedifferentiated liposarcoma

1. INTRODUCTION

Soft tissue tumours exhibit vast variations in their histomorphology making them some of the most challenging diagnoses faced by pathologists worldwide. Adipocytic tumours form a large portion of these soft tissue tumours. [1] They range from benign lipomas to malignant liposarcomas with an entire spectrum of various histomorphological sub-types in between. [2] According to the WHO Classification of tumours of Soft tissue and Bone, benign adipocytic lesions include lipoma, lipomatosis, angiolipoma, myolipoma, spindle cell lipoma, and a new entity the atypical spindle cell/pleomorphic lipoma. [2] The lipomas are the most common soft tissue tumour in adults, comprising of at least 30% of all benign soft tissue tumours [2,3], whereas liposarcomas comprise the more common soft tissue sarcoma (STS) subtypes, accounting for approximately 15% to 20% of all the soft tissue sarcomas. [4] Liposarcomas encompass a histologically diverse group of lesions ranging from locally aggressive well differentiated liposarcoma to highly malignant pleomorphic, myxoid and dedifferentiated liposarcomas, and a new addition- myxoid pleomorphic liposarcoma. Liposarcomas represent a significant proportion of consultation cases and the diagnosis of the

histopathological subtype often poses a challenge.[5] Among the liposarcomas, the well differentiated liposarcoma is a locally aggressive tumour, with high rates of local recurrence and a propensity to dedifferentiate. [5] Dedifferentiated liposarcoma is a highly malignant tumour, with very high chances of local recurrence and enormous metastatic potential. [5] Their high chances of recurrence, progression to a higher grade with time, and metastatic potential make an early and correct histopathological diagnosis of liposarcomas imperative.

2. MATERIAL AND METHODS

This study was conducted at Saveetha Medical College, Chennai, India. The Institutional Review Board approval was obtained. It was a retrospective descriptive study wherein hematoxylin and eosin-stained slides of sections of formalin fixed paraffin embedded tissue blocks of all cases of adipocytic tumours received at our tertiary care centre over a period of three years (July2017-June2020) were studied. All cases of adipocytic tumours inclusive of both resection and biopsy specimens received during the study period were included. The demographic details and histomorphological findings were obtained from the case records at the Medical Records Department and the Histopathology registers in the Department of Pathology respectively. The tumours were classified according to the WHO classification of tumours of Soft tissue and Bone, 5th edition, Volume 3, 2020. Statistical analysis was done using descriptive statistics.

3. RESULTS

Among the total specimens (20767) received, 1.05% (218) were adipocytic tumours, of which 97.25% (212) were benign lipomas and 2.75% (6) were malignant liposarcomas. Of the total malignant tumours (1050) received during the period of study, 2.95% (31) were soft tissue sarcomas. Liposarcomas accounted for 19.35% (6) of the soft tissue sarcomas.

The maximum number of adipocytic tumours were found to occur in the age group of 21-50yrs. The lipomas exhibited an almost equal gender distribution. However, liposarcomas showed a slight male preponderance with 4 occurring in men and 2 in women. (Table 1)

Table 1: Age and gender distribution of adipocytic tumours

AGE DISTRIBUTION	HISTOLOLOGICAL SUBTYPE																	
	Lipoma		Intramuscular lipoma		Fibrolipoma		Angiolipoma		Spindle cell lipoma		Lipomatosis		Well-differentiated Liposarcoma		De-differentiated Liposarcoma		Pleomorphic Liposarcoma	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0-10yrs	0	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-20yrs	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-30yrs	22	19	-	-	1	1	2	-	-	-	2	1	-	-	-	-	-	-
31-40yrs	25	32	-	1	1	-	-	-	-	-	-	-	-	1	-	-	1	-
41-50yrs	28	30	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-

51-60yrs	13	8	-	1	-	-	-	-	1	-	3	-	-	1	-	-	-	-
61-70yrs	6	2	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-
71-80yrs	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**98**	**98**	**0**	**2**	**2**	**1**	**3**	**0**	**1**	**0**	**6**	**1**	**1**	**2**	**1**	**0**	**2**	**0**

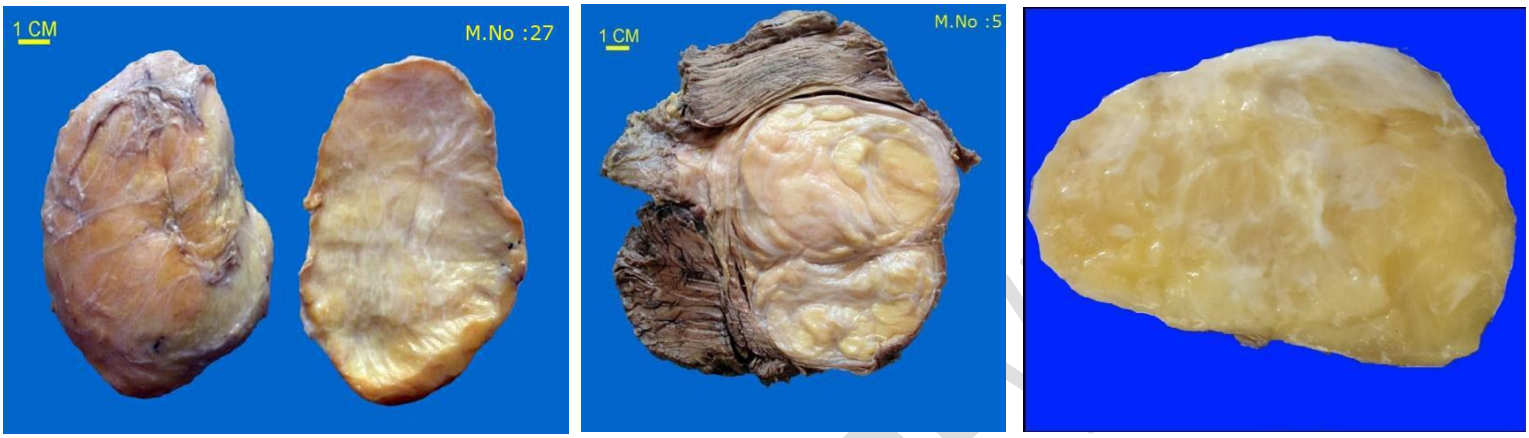
In this study, lipomas were found to occur more commonly in the extremities and back. The liposarcomas were most commonly found to be localized in the retroperitoneum. (Table2)

Table2: Site distribution of different histological subtypes of adipocytic tumours

	HISTOLOGICAL SUBTYPES									
SITE	**Lipoma**	**Intramuscular lipoma**	**Fibrolipoma**	**Angiolipoma**	**Spindle cell lipoma**	**Lipomatosis**	**Well-differentiated Liposarcoma**	**De-differentiated Liposarcoma**	**Pleomorphic Liposarcoma**	**TOTAL**
UL	56	1	-	2	-	4	-	-	-	**63**
LL	39	1	1	-	-	1	-	-	-	**42**
BACK	51	-	-	1	-	-	-	-	-	**52**
CHEST WALL	8	-	-	-	-	-	1	1	-	**10**
ANT. ABDOMINAL WALL	11	-	-	-	-	1	-	-	-	**12**
NECK	8	-	1	-	1	1	-	-	-	**11**
FOREHEAD	11	-	-	-	-	-	-	-	-	**11**
SACLP	5	-	1	-	-	-	-	-	-	**6**
HERNIAL SAC	5	-	-	-	-	-	-	-	-	**5**
APPENDIX	1	-	-	-	-	-	-	-	-	**1**
MANDIBLE	1	-	-	-	-	-	-	-	-	**1**
RETROPERITONEUM	-	-	-	-	-	-	2	1	1	**4**

On gross examination of the lipoma specimens, it was observed that most of them presented as well circumscribed, encapsulated, soft tissue tumours except for the intramuscular lipoma which was poorly circumscribed. Their sizes ranged from 0.5 cm to 12.5 cm. The smallest was located in the upper arm and the largest in the anterior abdominal wall. The cut surface of these tumours was yellow or tan white in colour and they were greasy to touch. (Fig1)

Fig1: Gross appearance of lipomas

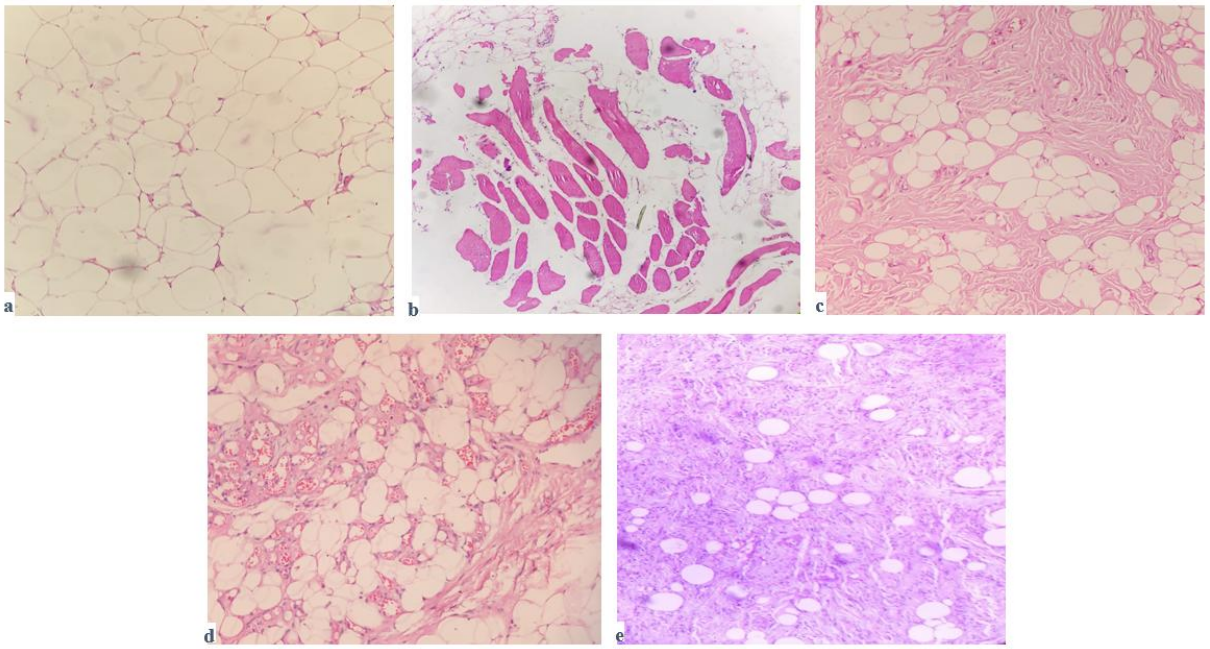


a) Lipoma b) Intramuscular lipoma c) Fibrolipoma

On microscopic examination of H&E-stained sections, the lipoma was composed of mature adipocytes arranged in lobules separated by delicate vascular septae. The intramuscular lipoma showed diffuse skeletal muscle infiltration by adipocytes and atrophy of entrapped muscle fibers. The fibrolipoma was comprised of mature adipocytes admixed with fibrous connective tissue and separated by fibrous septae. A few areas of hylanisation were also present. Microscopic examination of angiolipoma showed mature adipocytes separated by a network of blood vessels, perivascular and interstitial fibrosis and a few vascular channels containing fibrin thrombi. The spindle cell lipoma was made up of thin uniform spindle cells having single elongated nucleus, arranged in short parallel bundles, mature adipocytes and ropy collagen. (Fig2)

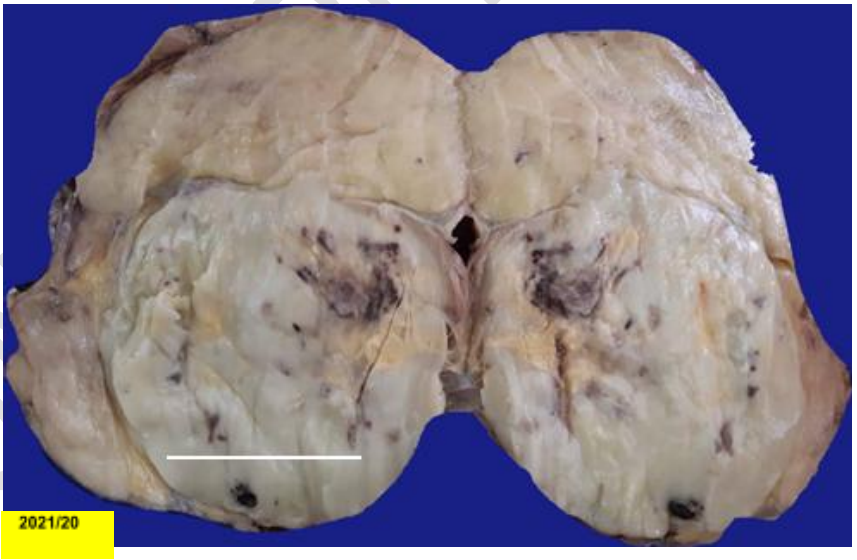
Fig2: Microscopic appearance of lipomas.

a) Lipoma b) Intramuscular lipoma c) Fibro lipoma d) Angiolipoma e) Spindle cell lipoma



On gross examination of the retroperitoneal liposarcomas all of them had smooth, lobular external surface which was grey white to grey brown in colour and a grey white to greasy yellow appearance of the cut surface with few areas of hemorrhage present. The pleomorphic liposarcoma excised from the anterior chest wall was a capsulated tumour with lobulated tan-white to yellow cut surface. No capsular breach was evident on gross examination.

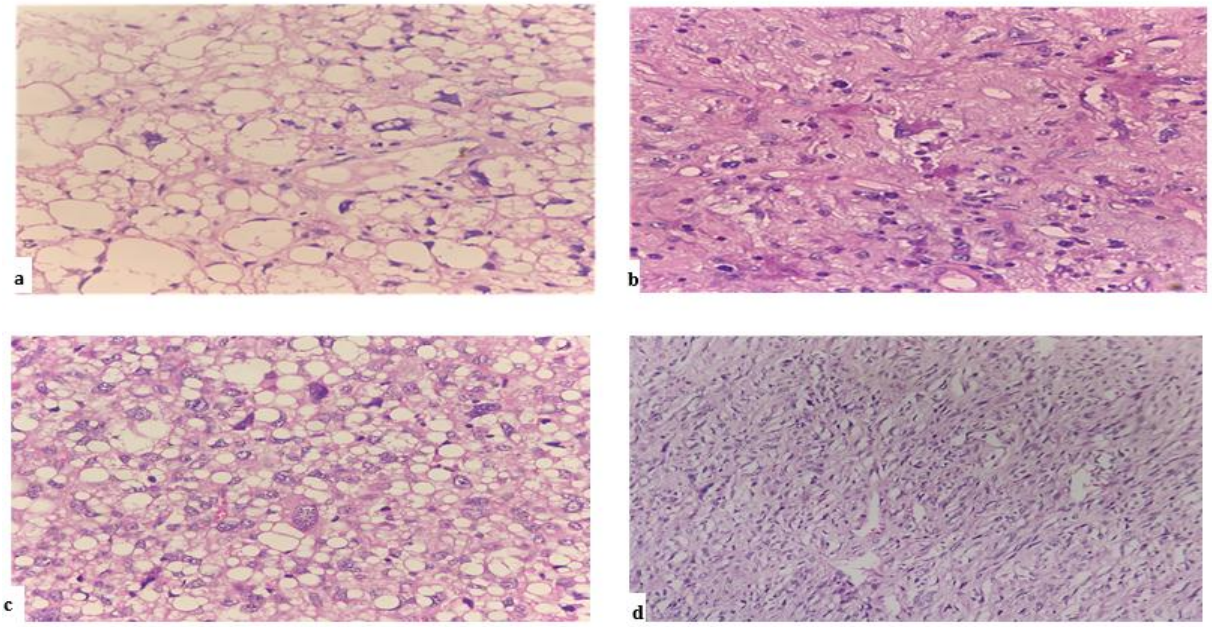
Fig3: Gross appearance of dedifferentiated liposarcoma



Examination of the H&E-stained slides of well differentiated liposarcoma showed mature adipocytes of varying sizes separated by fibrotic bands of stroma containing spindle cells. Focal adipocytic nuclear atypia with hyperchromasia were also seen. Scattered lipoblasts (multivacuolated large cells with cytoplasmic vacuolation and nuclear indentation) were present. Inflammatory subtype of well differentiated liposarcoma showed the presence of chronic inflammatory cells scattered in a fibro-collagenous stroma with sparse atypical multinucleate cells which obscured the adipocytes. Pleomorphic liposarcoma was composed of numerous pleomorphic lipoblasts in a background of a high-grade pleomorphic sarcoma, and spindle cells arranged in short fascicles. In Dedifferentiated

liposarcoma, areas of dedifferentiation showed uniform spindle cells with nuclear atypia, arranged in fascicles, storiform pattern and sheets.

Fig4: Microscopic appearance of liposarcomas



a) Well differentiated liposarcoma b) Well differentiated liposarcoma (Inflammatory subtype) c) Pleomorphic Liposarcoma d) Dedifferentiated liposarcoma

Liposarcomas were graded using the FNCLCC grading system. All cases of well differentiated liposarcomas were found to be of grade 1. In case of pleomorphic liposarcomas, 1 case was of grade 2 and the other grade 3. The dedifferentiated liposarcoma was of FNCLCC grade 2.

Table 3: FNCLCC Grading of Liposarcomas

WHO Subtype of Liposarcoma	Differentiation score	Mitosis count score	Tumour necrosis score
Well-differentiated	1	1	0
Well-differentiated	1	1	0
Well-differentiated	1	1	0
Pleomorphic	3	1	1
Pleomorphic	3	2	2

3.1 DISCUSSION

Even though soft tissue tumours are a common entity, our knowledge about these tumours is still limited. Soft tissue pathology is a very dynamic and rapidly evolving field, especially in the current scenario of molecular pathology.

Incidence of soft tissue tumours as reported by Enzinger F.M. & W.W. Weiss (1983), Robbins et al (1994) and Myhre Jenson et al (1981) is 0.8-1%, 0.8% and < 2% respectively. A major portion of this is formed by benign soft tissue tumours, which outnumber the malignant sarcomas by a large margin.

In our study, among the total specimens (20767) received at our tertiary care center over a three-year period 1.05% (218) were adipocytic tumours, of which 97.25% (212) were benign lipomas and 2.75% [6] were malignant liposarcomas. This was concordant with the study done by Jhonson CN et al. [6]

Soft tissue sarcomas constitute only 1% of all malignant neoplasms as reported by Hui JY, Bill KL et al and Oniscu A et al. [5,7-9] However, they are responsible for almost 2% of all deaths attributed to malignancies. [3] As per the inclusion criteria of this study, soft tissue sarcomas constituted 2.95% (31) of all the malignant tumours (1050) reported during the study period, which was almost three times the incidence reported in other studies.

Liposarcomas accounted for 19.35% (6/31) of all the soft tissue sarcomas studied. This was in accordance with the findings of Dei Tos AP, Lee AT et al, Hui JY, Bill KL et al, Stock N, Creytens D, Vos M et al, Yang L et al and Knebel C et al, which concluded that liposarcomas were one of the more common subtypes, accounting for almost 20% of all soft tissue sarcomas. [1,4,7,8,10-14]

As reported in earlier studies published by Jhonson CN et al and Hui JY, lipomas in this study too showed a slight male preponderance with the incidence of cases peaking in the age group of 31-60yrs. [6,7] They were most commonly located in the upper limbs followed by the back and lower extremities as reported in other studies. [6,15]

The histological variants of benign lipomatous lesions encountered during the course of this study included, 3 cases each of fibrolipoma and angiolipoma, 2 cases of intramuscular lipoma and 1 case of spindle cell lipoma. [2]

Studies conducted by Lee AT et al, Thway K et al and Bill KL et al concluded that well differentiated liposarcoma and dedifferentiated liposarcoma account for the majority of the cases of liposarcoma diagnosed in adults. [4,8,16] In this study too, well differentiated liposarcoma accounted for 50% (3) of the cases of liposarcomas, similar to the findings published in other studies. [1,4,8,12-14] Pleomorphic liposarcoma and dedifferentiated liposarcoma constituted 33.3%(2) and 16.7%(1) of cases respectively, which far exceeded the proportion of these malignant tumours reported in the studies undertaken by Dei Tos AP, Vos M et al and Yang L et al. [1,12,13]

In studies published by Yang L et al and Anderson WJ et al, pleomorphic liposarcoma was one of the rarest variants of liposarcoma reported, accounting for less than 5% cases. Whereas, in the studies published by Dei Tos AP, Vos M et al and Wang L et al, it accounted for 5-15% of the cases. [1,12,13,17,18]

Dedifferentiated liposarcoma contributed to 15-20% of liposarcoma cases in studies published by Lee AT et al, Knebel C et al and Thway K et al. [4,14,16] However, it accounted for only 13.9% cases of liposarcoma in an Asian population. [14]

Upon re-examination of H&E-stained sections of liposarcomas we did not come across any case of the new histological subtype of liposarcoma – Myxoid Pleomorphic Liposarcoma. [19,20]

Yang L et al and Bagaria SP et al reported that liposarcoma accounted for 45-50% of all retroperitoneal sarcomas. [13,24] In this study also, similar to the findings of Johnson CN et al, Bill KL et al, Thway K et al and Dantey K et al, retroperitoneum was found to be the most common site of localization for liposarcomas. [5,6,8,16,22] Some researchers have reported the lower extremities as being the most common site involved followed by retroperitoneum. [4,7,21,23]

Liposarcomas were graded using the FNCLCC grading system. [2] The highest FNCLCC grade of 3 was attributed to 1 case of pleomorphic liposarcoma while the other case was of grade 2. All cases of well differentiated liposarcomas were found to be of grade 1. The dedifferentiated liposarcoma was of FNCLCC grade 2. [2,25]

4.CONCLUSION

In our study, there was a three-fold increase in the incidence of soft tissue tumours reported, as compared to other studies. Adipocytic tumours comprise a large proportion of the vast histomorphological spectrum of soft tissue tumours. As established in the studies published previously, the incidence of benign lipomas far outnumbers that of liposarcomas. These adipocytic tumours were more common in males. Majority of the lipomas were reported in the age group of 31-60yrs and were most commonly located in the upper extremities. Liposarcomas were the most common histological subtype among the soft tissue sarcomas reported at our center. They seemed to occur at an older age with the mean age of incidence being 60 years and retroperitoneum being the most common site involved. This warrants a high index of suspicion of liposarcoma in any case of a retroperitoneal soft tissue tumour.

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