MACROSCOPIC AND MICROSCOPIC PATHOLOGY OF BENIGN AND MALIGNANT SOFT TISSUE TUMOURS

Reily Ann Ivan[1], Viswanathan P[2], Sarada V[3]

[1,3]Department of Pathology, Chennai Medical College Hospital and Research Centre (SRM Group), Tiruchirapalli – 621 105, India

[2]Department of Pathology, Rajah Muthiah Medical College, Annamalai University, Annamalai Nagar – 608 002, India

Corresponding Author's E-mail: kuruvilla_chacko@yahoo.com

ABSTRACT

The incidence of soft tissue tumours, especially the frequency of benign tumours relative to malignant ones, is nearly impossible to determine accurately. Benign soft tissue tumours outnumber malignant tumours by a wide margin. The main objective of this study is to describe the macroscopic and microscopic pathological features of benign and malignant soft tissue tumours. A total of 155 cases of soft tissue tumours over a period of two years were included. Soft tissue tumours accounted for 11.2% of all tumours. The benign tumours accounted 89.7% while malignant tumours constituted 10.3% (8.7:1). Benign soft tissue tumours showed predilection for head and neck region and malignant determined for lower extremities. The early diagnosis and prompt treatment may reduce the severity of morbidity and lessening mortality.

Keywords:Benign tumours, Malignant tumours, Macroscopic description, Microscopic observation.

Access this article online

Quick Response Code:

www.oijms.org.in

INTRODUCTION

Among various type of tumours, Soft tissue tumours are considered as mesenchymal multiplication, that happen in extra skeletal nonepithelial tissue of the body, not including the viscera, covering of brain and lymphoreticular system[1]. Soft tissue tumours can take place at any age. Both benign and malignant soft tissue tumours commonly present as painless mass. They occur everywhere in the body, the most widespread locations being the extremities, trunk, abdominal cavity and head and neck region[2,3]. Soft tissue tumours have spellbound among pathologists for many years because of the wide variety of tumours and histopathological similarities between some tumours with only subtle difference which is discernable on careful microscopic examination thus posing a diagnostic challenge to the histopathologist[3].

Soft tissues are mainly composed of connective tissue, adipose tissue, skeletal muscle, smooth muscle, blood vessels, lymphatics and peripheral nervous system4. Soft tissue tumours are unusual and comprised of 2% or less of surgical pathology cases. A diagnosis previously reached or suspected by light microscopy is supported by help of electron microscopy, immune-histochemistry and tissue cultures. The functions of special stains in soft tissue tumour pathology may be uneven, questionable or may validate the light microscopic diagnosis[4].

Tumours and tumour like lesions of soft tissue continues to be a challenge to both the surgeons and pathologists due to their biological behaviour and histogenesis. Soft tissue sarcoma (STS) is a kind of unusual tumours that can transpire anywhere in the soft tissues of the body including fat, muscle, connective tissue, nerves etc. Sarcomas can initiate anywhere in the body; typically, it develop in the soft tissues that encircle, attach or bear the body's structure and organs[5].

The extensive disparity that many of the soft tissue tumours demonstrate in their histological patterns extends the pathologists diagnostic capability to an edge[6-8]. Conceivably in no other field of diagnostic pathology has there been such a proliferation of newly described entities as in the areas of soft tissue pathology in the last 10-20 years[9]. This infrequency, inconsistency and multiplicity have interested us to take up the study on soft tissue tumours.

The main objective of this study is to find out the macroscopic and microscopic pathology of soft tissues of both benign and malignant. The data of this type of investigation is limited in our Country (India). The incidence of the various soft tissue tumours with special emphasis to macroscopic and microscopic determination was included in this study.

MATERIALS AND METHODS

A battery of 155 biopsy specimens of both incisional and excision were included which was received in the Department of Pathology, Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram. The detailed clinical data comprising of clinical diagnosis, relevant investigations including macroscopic (size, shape, color and macroscopic extension) and microscopic pathology (haematoxyclin and eosin staining) were included.

The specimens were maintained in the 10% neutral formalin for 24 hours and processed; 4mm thick sections were made from representative areas and submitted further for routine processing. The paraffin sections were placed in xylol for 2 minutes and transferred to absolute alcohol for 1 minute. Then it was transferred to haemotoxylin for 10-40 minutes and then the slides were placed in the washing tray for blueing. Sections were dipped in acid alcohol for few seconds and transferred to 1% eosin as counter stain for 3 to 4 minutes. Finally the slides were transferred to xylol I and II; then mounted using DPX. The microscopy depicted nuclei as blue and cytoplasm as shades of pink.

For the photomicrograph, the equipment used in Olymbus BX 51 model manufactured by Olymbus America Inc powered by new UIS-2 (Universal infinity system) and DIC (differential interference contract) optical system and enhanced y shaped frame. The halogen illumination of 12V/100W halogen illumination, two neutral density filters large 22mm field of view and widefield binocular was used. The numbers 10X and 20X indicated the patterns of objectives. Further, the classification of tumours was done according to the Histologic classification of soft tumours proposed by collective effort by pathologists.

RESULTS

Out of four thousand and forty five surgical biopsies, neoplastic lesions were found among 454 (11.2%) specimens. A total of 155 soft tissue tumours were also identified. Out of soft tissue tumours, benign and malignant tumours were interpreted among 139 (89.7%) and 16

ISSN:2454-2385

(10.3%) specimens respectively. The anatomical distribution of soft tissue tumours were well analyzed where vascular tissue (69.7%) dominated among head and neck site. Among upper limb and lower limb, it was found that adipose tissue depicted as 22.3% and 26.3% respectively. Even in the truck region also, adipose tissue was found dominated (23.7%). In all cases, benign type of tumour dominated (Table 1).

Majority of benign tumours like limpomas, fibromas, schwannomas and hemangiomas presented as painless tumour of less than 5 cms with more than 6 months duration. Liposarcomas presented as painless swelling of ≥ 5 cms and ≥ 6 months. Neurofibromas presented as painful tumours of less than 5 cms with more than 6 months. The detailed descriptions of the clinical presentation of soft tissue tumours are depicted in table 2.

The incidences of various soft tissue tumours were determined and analyzed in this investigation. Among them, the maximum incidence was observed in lipomatous tumours (51.8%), followed by vascular tumours (21.6%), neural tissue tumours (17.3%), fibrous tumours (6.5%) and smooth muscle tumours (2.8%). The pictorial description of the incidences of soft tissue tumours was depicted in figure 1.

Among the malignant type of soft tissue tumours, the lipomatous and neural tissue tumours are observed in equal incidences (25%) whereas vascular and fibrous tumours showed equal; incidences (18.7%). Lesser incidence was detected in synovial and skeletal muscle tumours of 6.25% (Figure 2).

Among the soft tissue tumours, Lipoma (46.5%) dominated followed by Hemangioma (19.5%), neurofibroma (9%), schwanomma (6.5%) and others showed trace and less. The microscopic descriptions of lipoma, haemangoma, neurofibroma and schwanomma were depicted in figure 3A, 3B, 3C and 3D respectively. In the microscopic and macroscopic analysis, the tumour lipoma showed distinct multilobular pattern and uniform yellow colour and microscopic description showed mature adipose tissue composed of adipocytes with univacuolated cytoplasm, eccentrically placed nuclei and thin walled blood vessels. The detailed description regarding the microscopic and macroscopic observations was interpreted in table 3.

DISCUSSION

Benign soft tissue tumours are fairly common and are treated with surgery alone. Prior to the 1970s, surgery was the primary therapy for malignant soft tissue tumours, and most patients with high-grade tumours had a poor prognosis and a significant mortality[10,24]. Since the mid-1970s, radiation therapy, chemotherapy, and advanced surgical techniques have helped increase long-term survival and decrease the need for ablative surgery[24].

There are several studies covering individual tumour types but collective studies covering all tumours are relatively less, but some studies have been conducted in the past so as to know the incidence, age, sex and site distribution of soft tissue tumours[1,4]. Though follow up data provides important information on the ultimate biological behaviour of the tumours, due to various reasons, in our study, this could not be obtained[4].

Majority of patients presenting to our institution in advanced stage of the disease, indicating ignorance, fear and reluctance for surgery; as well as economic constraints, that delay early

detection and initiation of proper treatment[2,9]. The incidence appears to be increasing, targeting the younger population. This signifies the lack of awareness among the people and health care workers about cancers[3,7]. It is also disturbing to know that although literate, patients do not understand the disease process and the need to come early in case of illness. Limited availability of diagnostic aids and its high cost are other reasons for delay in diagnosis[5].

Overall there is 50% mortality for patients with soft tissue sarcomas, and the vast majority of patients die from metastatic disease[15,25]. Factors shown to be of importance in predicting survival on multivariate analysis include the grade of the tumour, the size of the tumour, the adequacy of resection, local recurrence and the depth of the tumour[17,20]. These factors are, in general, related more to the biology of the tumour itself. Local recurrence will occur in up to 25% of patients, and factors associated with this on multivariate analysis include the adequacy of surgery and the resection margins, previous local recurrence, grade of the tumour and whether or not radiotherapy has been administered.

With this detailed macroscopic and microscopic investigation, we were able to reassess the clinical profile of soft tissue tumours and their different types with site distribution and clinical pathological determination.

REFERENCES

1. Umarani MK, Prima SL, Bharathi M. Histopathological spectrum of soft tissue tumours in a teaching hospital. IOSR J Dent Med Sci. 2015;14:74-80.
2. Jain P, Srivatsava A, Mallik R. Clinicomorphological assessment of soft tissue tumours. Sch J Appl Med Sci. 2014;2:886-90.
3. Hassawi BA, Suliman AY, Hasan IS. Soft tissue tumours – histopathological study of 93 cases. Ann Coll Mosul. 2010;36:92-8.
4. Vahini G. A Clinicopathological study of soft tissue tumours in correlation with immunohistochemistry. IOSR J Dent Med Sci. 2015;14:31-40.
5. Reily AI, Shameema S, Sarada V. Incidence of various soft tissue tumours among benign and malignant cases. Eur J Exp Biol. 2015;5:34-8.
6. Sing H, Kilpatrick S, Silverman J. Fine needle aspiration biopsy of soft tissue tumours. AdvAnatPathol. 2004;11:24-36.
7. Fletcher CDM, Krishnan U, Merterns F. Pathology and Genetics. Tumours of soft tissue and bone. World Health organization classification of tumours. 2002.
8. Meyer W, Spunt S. Soft tissue sarcoma of childhood. Canc Treat. 2004;30:269-80.
9. Nielson TO, West RB, Linn SC, et al. Molecular characterization of soft tissue tumours: a gene expression study. Lancet. 2002;359:1301-7.
10. Serdar A, Aynur O, Esat N, et al. Electron microscopic analysis of an angiosarcoma of the thyroid from a non-alpine endemic goiter region: a case report and brief review of the literature. OncolLett. 2014;8:2117-21.
11. Soumaya BA, Colondane B, Wafa J, Nadia B, Zeineb BS, Moncef M. Rafia N, Badreddine S. Atypical cutaneous fibrous histiocytoma: an unusual and misleading variant of fibrous histiocytoma.

Case Rep Pathol 2011; 2011: 416-418.
12. Sheila JA, Valeria LL, Carlos DTS, et al. Cellular fibroma of the ovary with multilocated macroscopic characteristics: case report. Case Rep Med. 2012;2012:948-52.
13. Hirofumi N, Ippei K, Keishi N, et al. Well differentiated adult type fibrosarcoma arising from the occipital subcutaneous tissue on a 17 year old man: case report with immunohistochemical study. Jpn J ClinOncol. 1998;28:511-6.
14. Takaaki S, Masahiro T, Michiro Y, et al. A surface based hemangioma of the radius which posed radiological diagnostic difficulties. Nagoya J Med Sci. 2013;75:125-9.
15. Parvin R, Mohsen H, Marzie B, et al. Large ovarian leiomyoma in young women. Adv Biomed Res. 2014;3:88-91.
16. Fatma CS, Cuhal G, Pelin Y, et al. Hamrtoma of the breast in two patients: a case report. OncolLett. 2013;6:442-4.
17. Carlo G, Armando C, Nicola C, et al. Intraperitoneal dedifferentiated liposarcoma showing MDM2 amplification: case report. Wld J SurgOncol. 2013;11:305-10.
18. Kenji I, Jun C, Takeyasu M, et al. Malignant fibrous histiocytoma arising in abutting soft tissue after resection of a benign fibrous histiocytoma of the mandible. Oral Oncol. 2004;40:24-8.
19. Hiroshi Y, Keiichi T, Kazuo S, et al. Malignant peripheral nerve sheath tumour with perneurial cell differentiation arising from the tongue. Oral Oncol. 2005;41:77-80.
20. Subhangi VA, Arun RC. Pigmented neurofibroma: a case report with immunohistochemical and ultrastructural study. Bomb Hosp J. 2009;51:97-100.
21. Ordi J, Stamatakos MD, Tavassoli FA. Pure pleomorphic rhabdomyosarcomas of the uterus. Int J GynecolPathol. 1997;16:369-77.
22. Wang ZB, Shi HY, Yuan J, et al. Clinical and pathologic features of gastric schwannoma. Zhonqhuabing Li XueZaZhi. 2012;41:97-101.
23. Braham E, Aloui S, Aouadi S, et al. Synovial sarcoma of the chest wass: a case report and literature review. Ann Transl Med. 2013;1:9-16.
24. Conrad EU, Bradford L, Chansky HA. Pediatric soft tissue sarcomas. OrthopClin North Am. 1996;27:655-64.
25. Ramnani BG, Kumar A, Chandak S, et al. Clinicopathological profile of benign soft tissue tumours: a study in a tertiary care hospital in Western India. J ClinDiagn Res. 2014;8:1-4.

Table 1: Anatomical distribution of soft tissue tumours

Site	Adipose tissue (n=76)		Fibrous tissue (n=12)		Neural tissue (n=28)		Skeletal tissue (n=1)		Smooth muscles (n=4)		Synovial tissue (n=1)		Vascular tissue (n=33)	
	B	M	B	M	B	M	B	M	B	M	B	M	B	M
Head & Neck (n=49)	17 (22.3)	-	2 (16.7)	-	7 (25)	-	-	-	-	-	-	-	23 (69.7)	-
Upper Limb (n=30)	17 (22.3)	-	-	-	7 (25)	2 (7.1)	-	-	3 (75)	-	-	-	1 (3.03)	-
Lower Limb (n=43)	20 (26.3)	3 (3.9)	2 (16.7)	3 (25)	5 (17.8)	2 (7.1)	-	1 (100)	1 (25)	-	-	-	4 (12.1)	2 (6.06)
Trunk (n=33)	18 (23.7)	1 (1.3)	5 (41.7)	-	5 (`7.8)	-	-	-	-	-	-	1 (100)	2 (6.06)	1 (3.03)
Total (n=155)	72 (94.7)	4 (5.3)	9 (75)	3 (25)	24 (85.7)	4 (14.3)	-	1 (100)	4 (100)	-	-	1 (100)	30 (90.9)	3 (9.1)

(B = Benign; M = Malignant) [Figure in parenthesis denoted percentages]

Table 2: Clinical presentation of soft tissue tumours among subjected included

Tumour	No. of cases	Duration		Site				Size		Pain
		≤6M	≥6M	UL	LL	TRU	H&N	≤5cm	≥5cm	
Angiosarcoma	3	2	1	0	2	1	0	0	3	1
BFH	2	1	1	0	2	0	0	1	1	0
Fibroma	7	3	4	0	0	5	2	4	3	0
Fibrosarcoma	2	0	2	0	2	0	0	2	0	1
Hemangioma	30	5	25	1	4	2	23	30	0	0
Leomyoma	4	3	1	3	1	0	0	4	0	3
Lipoma	72	10	62	17	20	18	17	63	9	2
Liposarcoma	4	0	4	0	4	0	0	0	4	1
MFH	1	0	1	0	1	0	0	0	1	0
MPNST	4	0	4	2	2	0	0	0	4	3
NF	14	0	14	5	4	2	3	14	0	8
Pleo-RMS	1	1	0	0	0	1	0	1	0	1
Schwanomma	10	7	3	2	1	3	4	6	4	2
SynSarc	1	0	1	0	1	0	0	0	1	1

[M – Minutes; UL – Upper Limb; LL – Lower Limb; TRU – Trunk; H&N – Head and Neck; BFH – Benign fibrous histiocytoma; MFH – Malignant fibrous histiocytoma; MPNST – Malignant peripheral nerve sheath tumour; NF – Neurofibroma; Pleo RMS – Pleomorphic rhabdomysarcoma; SynSarc – Synovial sarcoma]

ISSN:2454-2385

Table 3: Macroscopic and Microscopic analysis of soft tissue tumours interpreted

Tumour	No. of cases analyzed	Macroscopic analysis	Microscopic analysis
Angiosarcoma[10]	3	Well capsulated nodule that appeared to be cystic and hemorrhagic on the cut surface	Central area of haemorrhaging, lined by the neoplastic endothelium with prominent nucleoli
BFH[11]	2	Well demarcated nodule of 22mm in diameter; dark brown and yellow components	Unencapsulated dermal nodule with epidermal hyperplasia; predominant histiocyte like and fibroblast like spindle cells in stortiform pattern
Fibroma[12]	7	Smooth greyish external surface; multilocated cavities, solid, whitish fibroelastic features.	hypercellular with nonatypical spindle cells arranged in storiform pattern, compatible with fibroma
Fibrosarcoma[13]	2	Distinct border, firm consistency and broad bean like shape; yellowish white and whorl formation	Spindle shaped neoplastic cells; non blunt fusiform nuclei; typical hemangioperi-cytomatous pattern and contain collagen fibers
Hemangioma[14]	30	Blood tinged multilocular cystic tumour contained in the periosteum	Masses of closely packed small vessels of capillary filled with blood
Leomyoma[15]	4	The mass was grayish white with whorling pattern in cut surface; no hemorrhage or necrosis observed	Interlacing bundles of spindle cells; intersecting fascicles of smooth muscle without atapia, mitotic activity
Lipoma[16]	72	Distinct, greezy, multilobular patterns and uniform yellow colour	Mature adipose tissue composed of adipocytes with univacuolated cytoplasm, eccentrically placed nuclei and thin walled blood vessels
Liposarcoma[17]	4	large, solid, whitish, cerebroid, and myxoid mass, with variable hemorrhage and cystic degeneration, a heterogeneous cut surface	Matured fat cells along with lipoblast like atypical rounded cells with hyperchromatic nuclei.
MFH[18]	1	Gross multilobulated soft tissue mass; solid grey white with minute areas of hemorrhage	Well differentiated fibroblast arrange in a myxoid matrix. Nuclear pleomorphism and mitotic activity
MPNST[19]	4	Yellowish white tumour; no necrosis and haemorrhage; spindle shaped cells with elongated or pleomorphic nuclei and mild atapia	Arrangement in palisading fashion; marked contrast deeply hyperchromatic nuclei and pale cytoplasm
NF[20]	14	Solid homogenously grey white soft tissue mass	Proliferation of axon, Schwann cells, marked elongated nuclei with wavy serpentine configuration and pointed ends
Pleo-RMS[21]	1	Fleshy with focal areas of hemorrhage	Predominantly spindle shaped cells with scattered large cells containing deeply eosinophilic cytoplasm
Schwanomma[22]	10	Homogenous, firm, yellow-white and no true fibrous capsule	Composed of Antoni A and B areas; Spindle cell arranged in palisading fashion along with less cellular
Syn Sarc[23]	1	Well-circumscribed, lobulated tumour with a gray white cut surface, necrotic and cystic changes	Cellular biphasic tumour composed of pleomorphic cells arranged in a fascicular pattern

Figure 1: Incidences of various benign soft tissue tumours

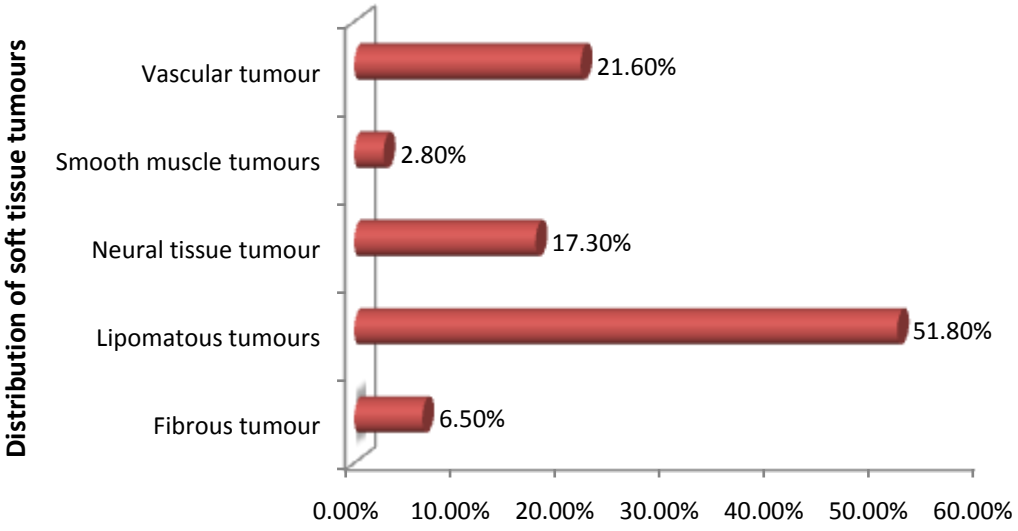

Figure 2: Incidences of various malignant soft tissue tumours