

Original Research Article**Clinicopathological Study of Benign Skin Tumors****Kalpana Ranjitsingh Sulhyan¹, Arti Ramesh Rao Anvikar², Rahul Kanhayalal Rajbhar³, Rajendra Popat Sawant⁴**¹Professor and Head ²Assistant Professor ³Ex PG student ⁴PG student, Department of Pathology, Government Medical College, Miraj, Maharashtra 416410, India.**Abstract**

Background: Benign skin tumors constitute a small part of the surgical specimens. However, histopathologically, there is a wide variety of benign skin tumors.

Aim and Objectives: To study the histopathology of benign skin tumors and to correlate pathological findings with clinical parameters.

Material and Methods: We have studied 64 specimens of benign tumors of skin received in the department of pathology of our tertiary care institute, from January 2012 to August 2015 by histopathological examination. The tumors were classified according to WHO classification of skin tumors 2006. The clinical data of the patients and pathological findings were analysed followed by clinicopathological correlation.

Results: Soft tissue tumors of skin were most common (37.5%) followed by keratinocytic tumors (32.81%). Overall, seborrheic keratosis and pyogenic granuloma were most frequent (17.19% each) followed by verruca (15.63%). Tumors with hair follicular differentiation and those with eccrine/ apocrine differentiation constituted the majority of appendageal tumors (46.66% each). Hidradenoma and pilomatricoma were the most common appendageal tumors (26.66% each) Verruca, hidradenoma, pilomatricoma, pyogenic granuloma and dermatofibroma were more commonly found before fourth decade, whereas seborrheic keratosis was more commonly found after fourth decade. The frequency of benign tumors was equal in males and females. Head and neck region was the most common site (50%) for all the tumors, except verruca which was most frequent on extremities.

Conclusion: Histopathological examination is essential for the diagnosis of benign skin tumors, due to their varied morphological spectrum.

Keywords: Benign Skin Tumors; Adnexal; Seborrheic Keratosis; Pilomatricoma; Hidradenoma.

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(Received on 23.02.2018,**Accepted on** 31.03.2018)**Introduction**

Skin is a complex organ with a wide range of diseases. The tumors of skin are broadly classified according to the line of differentiation as keratinocytic, appendageal, melanocytic, mesenchymal, hematolymphoid and metastatic (as per WHO classification of skin tumors 2006)

[1]. Benign tumors are more common than malignant tumors. Histologically there is a broad spectrum of differentiation, at times with considerable morphological overlap. We have tried to study the clinical and histopathological details of benign tumors of skin at our tertiary care centre.

Material and Methods

The present study was carried out in the department of Pathology of our tertiary care centre. We have studied and analysed the various benign tumors of skin that were diagnosed in our histopathology section during the period of 3 years and 8 months from January 2012 to August 2015.

Inclusion Criteria

All benign tumors of skin including soft tissue tumors of skin

Exclusion Criteria

tumors of genital skin are excluded.

The specimens were received in 10% formalin and fixed in the same for 12-24 hours. Detailed gross examination was done followed by extensive sampling and tissue processing. Three to four micron sections were cut and stained by hematoxylin and eosin. Multiple sections were studied under light microscope. The tumors were classified according to WHO classification of skin tumors 2006. The clinical data of the patients, significant clinical history, clinical examination findings and investigations was retrieved from the requisition forms and medical case records.

Results

A total of 64 benign tumors of skin were encountered during the period of 3 years and 8 months. These tumors were studied by histopathological examination followed by analysis as per the histological type, and age-wise, gender-wise and location wise distribution.

Table 1 shows the distribution of different benign tumors of skin according to histopathological diagnosis (as per World Health Organisation Classification of Skin Tumors-2006) [1]. Out of the 64 benign tumors of skin, soft tissue tumors of skin were most common (37.5%) followed by keratinocytic tumors (31.81%) Overall, seborrheic keratosis and pyogenic granuloma (17.19% each) were most frequent followed by verruca (15.63%). Out of the 11 cases of seborrheic keratosis (Figure 1A), nine were of the acanthotic type, one was of the irritated type, and one was inverted follicular keratosis. Of the ten verrucas (Figure 1B), nine were deep palmo-plantar warts and one was verruca vulgaris. The melanocytic tumors included two intradermal naevi (Figure 1C), one congenital naevus and one spitz naevus (Figure 1D). Congenital naevus was seen in a three year old male child on back. Histopathology revealed extension of nevus cells around and within the sebaceous glands and hair follicles.

Table 1: Distribution of benign tumors of skin according to histopathological diagnosis (as per World Health Organisation Classification of Skin Tumors- 2006)

Tumor	Benign	No. (%)
Keratinocytic 32.81%	Verruca	10 (15.63)
	Seborrheic. Keratosis	11 (17.19)
Melanocytic 6.25%	Con. Mel. Naevus	01 (1.56)
	Intradermal nevus	02 (3.13)
	Spitz nevus	01 (1.56)
Appendagea 23.44%	Hidrocystoma	01 (1.56)
	Hidradenoma	04 (6.25)
	Cylindroma	01 (1.56)
	Syringo.papilliferum	01 (1.56)
	Trichoblastoma	01 (1.56)
	Pilomatricoma	04 (6.25)
	Tricholemmoma	01 (1.56)
	Panfolliculoma*	01 (1.56)
	Sebaceoma	01 (1.56)
	Vascular 18.75%	ALHE
Pyogenic. granuloma		11 (17.19)
Fibrous 12.5%	Keloid	03 (4.70)
	Hypertrophic scar	01 (1.56)
	Dermatofibroma	04 (6.25)
Neural 6.25%	Neurofibroma	04 (6.25)
Total		64 (100)

- Con. Mel. Naevus- Congenital melanocytic naevus
- Syringo. Papilliferum- Syringocystadenomapapilliferum
- ALHE- Angiolymphoid hyperplasia with eosinophilia

* Panfolliculoma is not described in World Health Organisation Classification of Skin tumors- 2006).

Table 2 shows histopathological distribution of appendageal tumors (Figure 2). Tumors with hair follicular differentiation and those with eccrine/ apocrine differentiation constituted the majority of appendageal tumors (7 out of 15 cases each). Hidradenoma and pilomatricoma were the most common appendageal tumors (4 cases each). There was only one tumor with sebaceous differentiation. One interesting case of panfolliculoma was observed in a 55 years lady, who presented with a swelling over parietal region of the scalp.

This is a very rare entity not described in WHO classification 2006. Grossly the tumor was well circumscribed ovoid mass with grey white cut surface (Figure 3A). Histologically, it showed lobules of basaloid cells in the dermis surrounded by fibroblastic stroma, at places showing invagination in the lobules (Figure 3B). The tumour showed differentiation towards different parts of hair follicle. Some of the tumour cells showed trichohyaline granules and globules representing inner root sheath differentiation (Figure 3C) and clear cytoplasm representing outer root sheath

Table 2: Distribution of benign appendageal tumors according to differentiation

Appendageal differentiation	Tumor type	Number	Total number Percentage
Hair follicular	Pilomatricoma	04 (26.66%)	7 (46.6%)
	Trichoblastoma	01 (6.66%)	
	Tricholemmoma	01 (6.66%)	
	Panfolliculoma	01 (6.66%)	
Eccrine/ apocrine	Hidradenoma	04 (26.66%)	7 (46.6%)
	Hidrocystoma	01 (6.66%)	
	Syringocystadenomapapilliferum	01 (6.66%)	
	Cylindroma	01 (6.66%)	
Sebaceous	Sebaceoma	01(6.66%)	1 (6.6%)
Total		15	100

- Con. Mel. Naevus- Congenital melanocytic naevus
- Syringo. Papilliferum- Syringocystadenomapapilliferum
- ALHE- Angiolymphoid hyperplasia with eosinophilia

Table 3: Showing age wise distribution of benign tumors of skin

Tumors	Tumors									Total
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	
Verruca	0	3	6	1	-	-	-	-	-	10
Seborrhoeic keratosis	1	1	0	2	2	1	4	-	-	11
Con. Mel. Naevus	1	-	-	-	-	-	-	-	-	1
Intradermal nevus	-	-	-	-	-	2	-	-	-	2
Spitz nevus	-	1	-	-	-	-	-	-	-	1
Hidrocystoma	-	-	-	-	-	-	-	-	1	1
Hidradenoma	1	1	1	1	-	-	-	-	-	4
Cylindroma	-	-	1	-	-	-	-	-	-	1
Syringo. Papilliferum	-	-	-	-	-	1	-	-	-	1
Trichoblastoma	-	-	-	-	-	-	1	-	-	1
Pilomatricoma	-	2	1	1	-	-	-	-	-	4
Tricholemmoma	-	-	-	-	1	-	-	-	-	1
Panfolliculoma	-	-	-	-	-	1	-	-	-	1
Sebaceoma	-	-	-	-	-	-	-	1	-	1
ALHE	-	-	1	-	-	-	-	-	-	1
Pyogenic granuloma	4	1	3	1	1	1	-	-	-	11
Keloid	-	-	2	1	-	-	-	-	-	3
Hypertrophic scar	-	-	1	-	-	-	-	-	-	1
Dermatofibroma	1	1	1	1	-	-	-	-	-	4
Neurofibroma	-	1	-	-	-	1	-	2	-	4
Total	8	11	17	8	4	7	5	3	1	64

- Con. Mel. Naevus- Congenital melanocytic naevus
- Syringo. Papilliferum- Syringocystadenomapapilliferum
- ALHE- Angiolymphoid hyperplasia with eosinophilia

Table 4: Gender wise distribution of benign tumors of skin

Tumors	Male	Female	Total
Verruca	8	2	10
Seborrheic Keratosis	7	4	11
Con. Mel. Naevus	1	-	1
Intradermal nevus	-	2	2
Spitz nevus	1	-	1
Hidrocystoma	-	1	1
Hidradenoma	2	2	4
Cylindroma	1	-	1
Syringo. Papilliferum	-	1	1
Trichoblastoma	-	1	1
Pilomatricoma	2	2	4
Tricholemmoma	1	-	1
Panfolliculoma	-	1	1
Sebaceoma	-	1	1
ALHE	1	-	1
Pyogenic granuloma	4	7	11
Keloid	-	3	3
Hypertrophic scar	1	-	1
Dermatofibroma	2	2	4
Neurofibroma	1	3	4
Total	32 (50%)	32 (50%)	64 (100%)

- Con. Mel. Naevus- Congenital melanocytic naevus
- Syringo. Papilliferum- Syringocystadenomacpapilliferum
- ALHE- Angiolymphoid hyperplasia with eosinophilia

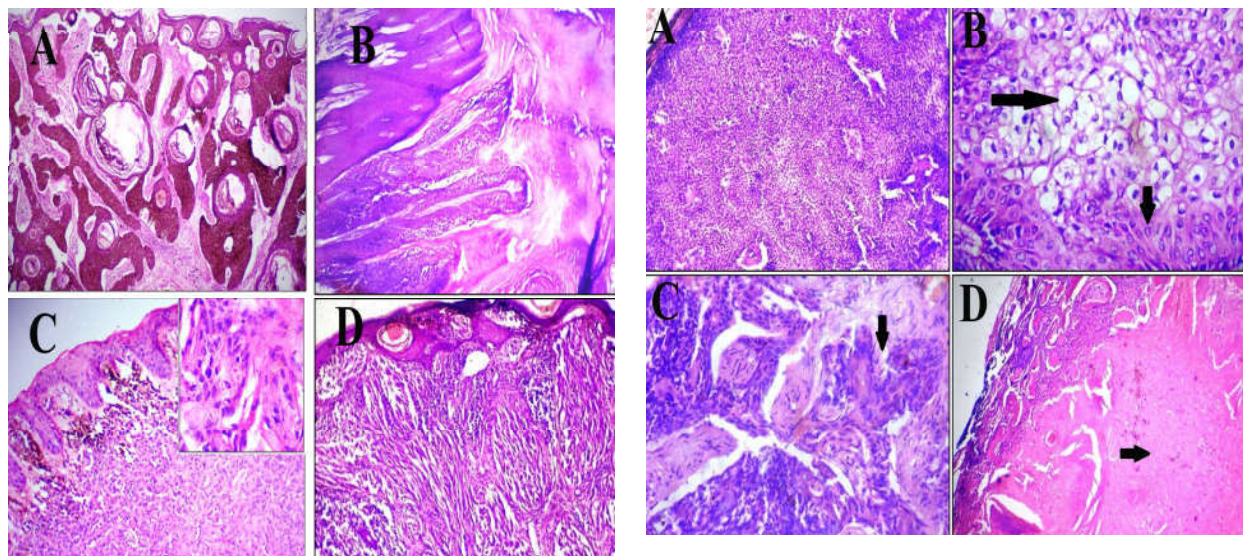
**Fig. 1A:** Seborrheic keratosis- Microphotograph showing keratin filled horn cysts surrounded by basaloid cells. (H and E, x 40).**B:** Verruca- Microphotograph showing hyperkeratosis, acanthosis, papillomatosis and elongation of rete ridges. (H and E, x 100).**C:** Intradermal nevus- Microphotograph showing nests of nevus cells in the dermis. (H and E, x 100) Inset- High power view of nevus cells. (H and E, x 400)**D:** Spitz nevus- Microphotograph showing large spindle cells arranged in nests. (H and E, x 100)**Fig. 2A:** Nodular hidradenoma- Microphotograph showing lobules of tumor cells with eosinophilic to clear cytoplasm. (H and E, x 40).**B:** Tricholemmoma- Microphotograph showing peripheral columnar cells (short arrow) and central polygonal cells. (long arrow) (H and E, x 400).**C:** Trichoblastoma- Microphotograph showing tumor islands encircled by fibroblasts, at places, showing invagination (arrow), (H and E, x 400).**D:** Pilomatricoma- Microphotograph showing two types of cells- peripheral basophilic cells and central shadow cells (arrow). (H and E, x 100).

Table 5: Anatomical distribution of benign tumors of skin

Anatomical site		Number	Total
Head and neck	Scalp	12	32 (50%)
	Face	17	
	Neck	03	
Extremity-Upper	Arm	03	15 (23.4%)
	Elbow	01	
	Forearm	04	
	Hand	07	
Extremity-Lower	Gluteal	-	10 (15.6%)
	Thigh	01	
	Popliteal	-	
	Leg	01	
	Foot	08	
Others	Axilla	-	7(10.9)
	Chest	01	
	Back	04	
	Abdominal. Wall	02	
Total		64	64

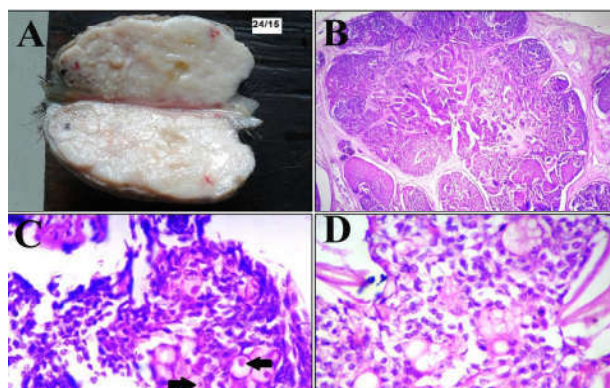


Fig. 3 A: Panfolliculoma- Gross appearance showing an ovoid skin covered tumor with grey white cut surface.
B: Panfolliculoma- Microphotograph showing tumor lobules (H and E, x 40).
C: Panfolliculoma- Microphotograph showing trichohyaline granules (arrows) depicting inner root sheath differentiation. (H and E, x 400).
D: Panfolliculoma- Microphotograph showing clear cells representing outer root sheath differentiation. (H and E, x 400)

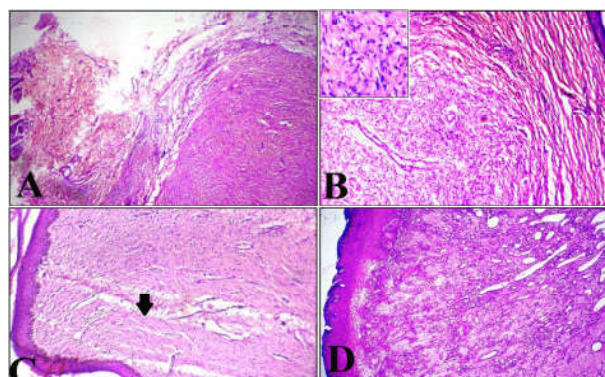


Fig. 4 A: Dermatofibroma – Microphotograph showing storiform pattern of spindle cells. (H and E, x 40).
B: Neurofibroma– Microphotograph showing dermal tumor with spindle cells arranged in fascicles and haphazard manner. (H and E, x 100) Inset shows elongated wavy buckled nuclei. (H and E, x 400).
C: Hypertrophic scar– Microphotograph showing horizontally arranged collagen bundles (arrow) in the dermis (H and E, x 40).
D: Pyogenic granuloma- Microphotograph showing lobules of capillaries in an edematousstroma. (H and E, x 40)

differentiation (Figure 3D). Many of the cells showed loss of nuclei with presence of shadow cells indicating matrical differentiation. Foci of epidermal type and trichilemmal type of keratinization were also noted, indicative of infundibular and isthmic differentiation respectively. Among the cutaneous soft tissue tumors (Figure 4), pyogenic granuloma (11 cases) was most frequently found. Analysis of age wise distribution of benign skin tumors (Table 3) reveals that the frequency of benign tumors was high in first three decades (36 out of 64 cases). Verruca, hidradenoma, pilomatricoma, pyogenic granuloma and dermatofibroma were more commonly found before fourth decade, whereas seborrheic keratosis was more commonly found after fourth decade. Table no. 4 shows that overall, benign tumors of skin were equally

distributed among males and females. Seborrheic keratosis and verruca were more commonly found in males than females. Pyogenic granuloma was more common in females than males. Study of benign adnexal tumors showed that females (65%) outnumbered males (35%). Study of the anatomical distribution of these tumors (Table 5) reveals that head and neck was the most frequently involved region (50% cases) with face being the most common site. However verruca was most frequent on extremities (eight cases on foot and 2 cases on fingers). The adnexal tumors were most common in the head and neck region (70%). Out of the 11 cases of pyogenic granuloma, six cases involved head and neck region and five cases involved extremities.

Discussion

In the present study, we have tried to analyze the histopathology and clinical features of different benign tumors of skin and correlate the histopathological findings with clinical data. Out of the 64 tumors, soft tissue tumors were most frequent (37.5%) followed by keratinocytic tumors (32.81%). Seborrheic keratosis and pyogenic granuloma were the most common benign tumors. Similar to our study, Narhire et. al. [2] also found soft tissue tumors of skin as most common benign skin tumors (32%), followed by keratinocytic tumors (20%). In their study, verruca was the most common benign tumor (16%) followed by pilomatricoma (12%) and compound nevus (12%). Tumors with hair follicular differentiation and those with eccrine/apocrine differentiation were most frequent appendageal tumors in our study (46.6% each) and sebaceous tumors were least common (6.6%). Vani et. al. [3], in their study of skin adnexal tumors found that among the benign adnexal tumors, sweat gland tumors (43.13%) were most frequent (21 out of 38) followed by hair follicle tumors (12 out of 38). Sebaceous tumors were least frequent in their study too. Nodular hidradenoma and pilomatricoma were most common benign appendageal tumors found in their study, similar to our findings. Kaur K et. al. [4] in their study of skin adnexal tumors, found that pilomatricoma was the most common skin adnexal tumor followed by nodular hidradenoma.

Panfolliculoma is a distinctive but rare benign follicular neoplasm which differentiates towards all the components of hair follicle, including upper and lower segments. Our patient was 55 years lady, who presented with a swelling over parietal region of the scalp. Huang et. al. [5] reported it in two cases, one in a 41 years female with the lesion over scalp and other in a 51 years man with nodule on his left eyebrow. Neill et. al. [6] reported cystic panfolliculoma in 64 years female over her right forearm. Hoang et. al. [7] reported cystic panfolliculoma over scalp in a 33 years female. Age-wise distribution of benign skin tumors in our study shows that highest number of cases was found in 2nd and 3rd decades of life. Narhire et. al. [2] found that benign tumors were most frequent in 5th-6th decades of life. The early peak in our study may be due to the more number of cases of pyogenic granuloma in our study, which occurred in younger age group. Verruca was most common in 2nd and 3rd decades in our study similar to that of Kaur et. al. [8]. Seborrheic keratosis was most common in 7th decade in our study. Kaur et. al. [8] found it most frequently in 6th and 7th decades. Gundalli et. al. [9] found one case each of the same in 7th and 8th decades respectively. Pilomatricoma was more commonly found in the age group of less than 20 years, in our study similar to that of Sugumar et. al. [10]. Kaur K et. al. [4] found highest frequency of pilomatricoma in the age group of 20-39 years followed by 0-19 years. Gundalli et. al. [9] also found maximum

number of cases of Pilomatricoma before 4th decade of life. In our study, males and females had equal frequency of benign tumors. Narhire et. al. [2] found slight female predominance (male: female ratio =1:1.2). Keratinocytic tumors were more common in males and appendageal tumors were more common in females in both the studies. Site-wise distribution of benign tumors of skin shows that head and neck region was most commonly involved in our study (50% cases), similar to that of Narhire et. al. [2] (60% cases). In our study 70% of the adnexal tumors were found in the head and neck region (70%). Kaur K et. al. [4] also found head and neck region as the most frequent site for skin adnexal tumors.

Conclusion

To conclude, benign tumors of skin show some clinical peculiarities and significant histologic diversity. Histopathological examination is important for the definitive diagnosis of benign skin tumors.

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