**Title- Verrucous Lesions of Skin**

 Singh A1 \*, Bharti S2 , Kumar T3, Surabhi4, Sinha R5, Bhadani PP6

Author 1: Dr Avinash Singh, Senior Resident, Department of Pathology, All India Institute Of Medical Sciences, Patna, Bihar , India

Author 2: Dr Shreekant Bharti, Asst. Professor, Department of Pathology, All India Institute Of Medical Sciences, Patna, Bihar , India

Author 3: Dr Tarun Kumar, Asst. Professor, Department of Pathology, All India Institute Of Medical Sciences, Patna, Bihar , India

Author 4: Dr Surabhi, Asst. Professor, Department of Pathology, All India Institute Of Medical Sciences, Patna, Bihar , India

Author 5: Dr Ruchi Sinha, Professor, Department of Pathology, All India Institute Of Medical Sciences, Patna, Bihar , India

Author61: Dr Punam Prasad Bhadani, Professor, Department of Pathology, All India Institute Of Medical Sciences, Patna, Bihar , India

\***Corresponding Author**

Full name: Dr Avinash Singh

Institute: All India Institute of Medical Sciences, Patna

Department: Pathology,

Locality: Phulwarisharif

City, State, Postal code, Country: Patna, Bihar, 801507, India

Tel: 8789481771

E-mail:avinashsingh02186@gmail.com

**Title- Verrucous Lesions of Skin**

**Introduction**

Verrucous lesions are described as having a growth pattern that resembles a wart. Verrucous can be used to describe any exophytic/raised growth on the skin's surface or on any organ. Contrary to popular perception, not all verrucous lesions are caused by the human papillomavirus (HPV). A number of them have an outward appearance of warts, but their behaviours and prognoses are quite different. Their differentiation depends heavily on histopathology.1 This chapter aims to highlight specific histological characteristics seen under light microscopy that can aid pathologists in categorising common exophytic/verrucous lesions and distinguishing them from similar-looking lesions. We also want to familiarise practitioners with these conditions so that they can accurately differentiate between them when conducting a biopsy and collect enough tissue for histological analysis.

**Classification of verrucous lesions of skin**

**Infectious causes :2,3**

Viral – Wart

Bacterial – Tuberculosis verrucosa cutis

Lupus vulgaris

Fungal – Chromoblastomycosis

Fixed cutaneous sporotricosis

Cutaneous rhinosporidosis

Cutaneous blastomycosis

Coccidioidomycosis

Ectoparasite – Crusted scabies

**Non infectious causes :**

Papulosquamous – Hypertrophic lichen planus

Psoriasis

Eczema \_ Lichen simplex chronicus

Prurigo \_ Prurigo nodularis

Collagen vascular disorder – Hypertropic variant of Discoid lupus

erythematosus

Deposition disorders – Lichen amyloidosis

Lipoid proteinosis.

Keratinization disorders – Porokeratosis

Acrokeratosis verruciformis

Darier’s disease

Benign tumor – Seborrhoeic keratosis

Stucco keratosis

Pigmentary disorder – Incontinentia pigmenti

Nevi – Verrucous epidermal nevi

Disorder of lymphatics – Lymphangioma circumscriptum

Elephantiasis nostros verrucosa cutis

Disorders of blood vessel – Verrucous hemangioma

Angiokeratoma circumscriptum

Phlebolymphedema

Acantholytic disorders – Warty dyskeratoma

Malignancy – Verrucous carcinoma

Verrucous variant of malignant

melanoma

Kaposi sarcoma

Neuropathy associated – Leprosy

verrucous skin lesions Diabetes Mellitus

**The Viral wart**

The virus that causes viral warts and infects stratified squamous epithelium, whether it is keratinizing or not, is HPV. Warts on the skin can appear at any age. uncommon in infants and young children. In school-age children, adolescence, and early adulthood, the incidence peaks.4,5 Variable from a few weeks to years, depending on the manner of dissemination and the incubation time. Inoculation of the virus into the basal epidermal layer occurs when the epithelial barrier function is lost due to trauma, maceration, or a combination of the two. Plantar warts are typically contracted from shower or pool flooring.6

**Virus**: Double-stranded DNA viruses are papillomaviruses. These viruses will merge with the DNA of the host. It has a 55 nm size. There are more than 200 genotypes of HPV that can harm mucous membranes and skin. Numerous different virus types have been linked to epidermal cancers. They engage in interactions with the host cell's E6 and E7 proteins. Except for plantar warts, common warts are primarily brought on by HPV-2, 1, 4, 27, and 57 serotypes.7,8

**Clinical characteristics**: Less than 1 mm to more than 1 cm in diameter, firm papules with a rough, horny surface. The backs of the hands and fingers are a frequent location. Months pass by with a single wart remaining untouched. Sago-grain papule is the first sign of a plantar wart. Subsequently develops into a spherical lesion that is sharply defined, with a smooth collar of thickened horn surrounding a keratotic, rough surface. Small bleeding sites are visible while paring. This makes it easier to tell this wart apart from a corn foot.8

**Histopathology**:9,10 At the edge of the verruca, twisted inward so that it appears to point radially toward the centre (arborization), are hyperkeratosis, vertical tiers of parakeratosis, acanthosis, papillomatosis, and elongated rete ridges. Koilocyte foci are found in the stratum malphigii. Small, spherical, highly basophilic nuclei with a distinct halo and pale colouring cytoplasm are features of koilocytes.

**Hypertrophic Lichen Planus** [Lichen planus verrucosus]

Lichen planus is a common inflammatory condition that affects the skin, nails, mucous membranes, hair, and tree moss (Greek leichen, "tree moss," Latin planus, "flat").11

**Clinical characteristics**: Commonly occurring interphalangeal joints, shins, and ankles with hypertrophic lichen planus. Between the ages of 30 and 60, two thirds of cases take place. There isn't any sexual preference. The lesions are frequently verrucous, symmetrical plaques with pruritus that have a centre area that is depigmented and a rim that is hyperpigmented. These lesions scar as they recover. It is typically resistant to treatment. Hypertrophic lichen planus is frequently accompanied by chronic venous stasis. Rarely can it progress to squamous cell carcinoma. In distal extremities, malignant transformation occurs more frequently. It takes at least 12 years from the time hypertrophic lichen planus is diagnosed till cancer.12,13

**Histopathology:** Basal layer vacuolar degeneration, irregular acanthosis, pseudoepitheliomatous hyperplasia, hypergranulosis, and compact orthokeratosis. Infiltration of lymphocytes near the base of rete ridges. Vacuolar degenerations at the interface are distinct and frequently located at the base of rete ridges. The papillary dermis and lower epidermis both contain necrotic keratinocytes.14

**Verrucous psoriasis**:15

There are two distinct forms of this uncommon psoriasis variation. They are crater-shaped papules with a central depression and dome-shaped papules with keratotic plugs.

**Clinical characteristics:** These lesions coexist with other, more typical psoriatic lesions.

**Histopathology**:16 In addition to epidermal hypogranulosis, dilated, tortuous capillaries, parakeratosis, epidermal acanthosis with extension of rete ridges, thin suprapapillary epidermal plates, and a lymphocyte-predominant inflammatory infiltrate that may contain admixed neutrophils in the papillary dermis.The most distinct signs of psoriasis are, respectively, "Munro microabcesses" and "spongiform pustules of Kogoj." Verrucous psoriasis is suggested by papillomatosis, epithelial buttressing, and the lack of infection.

**Tuberculosis Verrucosa Cutis:**

**(Warty Tuberculosis) 17**

A warty, sluggish, plaque-like form of tuberculosis brought on by the injection of Mycobacterium tuberculosis into a patient who has already been sick. There will be a high or moderate level of immunity in this patient. Few organisms are present in these lesions (paucibacillary).18

Pathogenesis:

There are three ways to vaccinate an organism.

1. Accidental hyper infection from external sources: traditionally, post-mortem attendants, pathologists, and doctors are at risk (also known as "anatomist's warts," "prosector's warts," or "verruca necrogenica").

2. Sputum autoinoculation in a tuberculosis patient who is still ill.

3. Children and young adults who are already infected but have some immunity may contract the disease from sputum by sitting on the ground or going barefoot.19

**Clinical characteristics**: Common sites are those exposed to trauma, infectious sputum, or other TB material. The lesion begins as a tiny, indurated, warty papule that is asymptomatic and slightly inflamed. The formation of a verrucose plaque occurs gradually. The colour is either red, brown, or purple. The majority of the consistency is hard, with very few regions of softening. These soft spots and fissures both have the potential to release pus.

**Histopathology**:20 Hyperkeratosis, acanthosis, and pseudoepitheliomatous hyperplasia are its defining features. creation of a neutrophilic abcess in the upper dermis. Tuberculoid granulomas with a moderate level of necrosis are visible in the middermis. When compared to lupus vulgaris, this illness has a higher number of tubercle bacilli.

**Lupus Vulgaris**

A paucibacillary type of cutaneous tuberculosis with a chronic and progressive history is lupus vulgaris. Patients with moderate to high levels of immunity commonly experience it. Lupus vulgaris is caused by lymphatic, haematogenous, or contiguous spread.21

**Clinical characteristics**: Lower limbs and buttocks are frequent locations in developing nations, especially in youngsters.22

 A small, reddish-brown, pliable flat plaque with a gelatinous nature initially appears. These lesions slowly spread to the sides and exhibit atrophy in some regions. On a diascopy, apple jelly nodules are visible. Except in widespread versions, it often presents as a solitary lesion. Spreading like a sporotrichid can occur.23 Depending on how the local tissue reacts to the infection, there are five clinical types that are known. These categories include plaque, papular, nodular, and tumor-like forms as well as vegetative, ulcerative, and mutilating forms.

**Histopathology**:24 There are ulcers and atrophy in the epidermis. Hyperkeratosis, acanthosis, papillomatosis, and pseudoepitheliomatous hyperplasia are all signs of hyperplastic lesions. The top dermis has a tuberculoid granuloma with epithelioid large cells. Within the tubercle, caseation necrosis is minimal or nonexistent. The healing process results in extensive fibrosis. Rarely are bacilli observed.

**Seborrheic keratosis25**

Elderly people frequently develop seborrheic keratosis, a benign tumour primarily made of epidermal keratinocytes. It typically happens during the fifth decade of life. Tropical nations frequently have these lesions.

**Clinical features:** Superficial verrucous plaque that seems to be adhered to the skin.

**Histopathology**: Church spire pattern caused by hyperkeratosis, acanthosis, and significant papillomatosis with melanocyte proliferation in the immature keratinocytes.26

**Verrucous carcinoma:27**

Ackerman originally used the phrase in 1948. It is a tumour that grows slowly and has a propensity to return locally. Rarely does it spread. It is a kind of squamous cell carcinoma characterised by exophytic tumours that grow slowly.

**Clinical features:** Cauliflower-like lesions at the site of prolonged irritation are its defining feature. According to the anatomical place of involvement, there are four categories. (a) Oral florid papillomatosis - a verrucous carcinoma of the oral cavity (b) Giant condyloma of Buschke and Lowenstein - a verrucous carcinoma of the genitoral region (c) Epithelioma cuniculatum - a verrucous carcinoma of the plantar region (d) Cutaneous verrucous carcinoma - a verrucous carcinoma that develops in other regions. Verrucous carcinoma's pathophysiology is not entirely known.

Epithelioma cuniculatum is a locally destructive, slow-growing, low-grade tumour. It is typically found on the sole of the foot. It may involve periunguium, mucosa and other locations. On the distal portion of the foot's sole, it appears as a warty, mushy bulbous mass with ejection of foul-smelling yellow substance. On the surface, there are several sinuses that can open and exude oily, rancid, and foul-smelling substances. The anterior portion of the foot's sole that bears weight is the typical site of involvement.

Plantar fascia may be impacted by a tumour as it spreads locally. It may break metatarsal bones as it moves toward the dorsal area of the foot.29

**Histopathology**:30,31

Verrucous cancer must be diagnosed with a large, deep biopsy. There will be well-differentiated keratinocytes with a tiny nucleus, as well as hyperkeratosis, parakeratosis, and acanthosis. The tumour pushes aside the collagen bundles by compressing them with its massive, bulging downward growth and keratin-filled cyst in the centre. Therefore, rather than stabling, the tumour has a bulldozing effect. Nuclear atypia, individual cell keratinization, and horn pearls are not present in the deeper areas.

**References**

1. Chauhan K, Jassal V, Sara GK, Bansal V, Hatwal V. Histopathological study of verrucous lesions and its mimics. J Microsc Ultrastruct 2021;9:86-97.
2. Dermatology: Second Edition: Jean Bolognia,Joseph L Jorizzo: Ronald Rapini: volume one :page no:5,8
3. Lazarus GS goldsmith LA: Diagnosis of skin disease Philadelphia F.A.Davis 1980 pp 189-216
4. Barr A, Coles RB. Plantar warts. A statistical survey. Trans St JohnsHosp Dermatol Soc 1966; 52: 226–38.
5. Kilkenny M, Marks R. The descriptive epidemiology of warts in the community. Australas J Dermatol 1996; 37: 80–6.
6. Bunney MH. Viral Warts: Their Biology and Treatment. Oxford: Oxford University Press; 1982.
7. Massing AM, Epstein WL. Natural history of warts. A two-year study.Arch Dermatol 1963; 87: 306–10.
8. Williams HC, Pottier A, Strachan D. The descriptive epidemiology of warts in British schoolchildren. Br J Dermatol 1993; 128: 504–11.
9. Berman A, Domnitz JM, Winkelmann RK. Plantar warts recently turned black. Clinical and histopathologic findings. Arch Dermatol 1982; 118:47–51
10. Rock B et al. A morphological, pathological , virological study of anogenital wart. Arch Dermatol .1992;128:495.
11. Body AH, Nelder AH:lichen planus :JM Acad dermatol :25:93:1991.
12. Yesudian P, Rao R. Malignant transformation of hypertrophic lichen planus. Int J Dermatol 1985; 24: 177–8.
13. Singh SK, Saikia UN, Ajith C, et al. Squamous cell carcinoma arising from hypertrophic lichen planus. J Eur Acad Dermatol Venereol 2006; 20: 745-6.
14. Patel GK, Turner RJ, Marks R. Cutaneous lichen planus and squamous cell carcinoma. J Eur Acad Dermatol Venereol 2003; 17: 98-100. Lever’s histopathology .10th edition .page no 187.
15. Nakamura S, Mihara M, Hagari Y, et al .psoriasis verrucosa showing peculiar histologic features.J Dermatol.1994;21:102-105
16. Mobini N, Toussaint S, Kamino H. Psoriasis. In: Lever's Histopathology of the Skin (Elder DE, Elenitsas R, Johnson BL Jr, Murphy GF, eds), 10th Ed; Philadelphia, PA; Lippincott Williams and Wilkins, 2009: 174-181.
17. Grange JM, Noble WC, Yates MD et al. Inoculation mycobacterioses. Clin Exp Dermatol 1988; 13: 211–20.
18. Lia-Yin Chong, Kuen-Kong Lo. Cutaneous tuberculosis in Hong Kong: a 10 year retrospective series. Int J Dermatol 1995; 34: 26–9.
19. Wong KO, Lee KP, Chin SF. Tuberculosis of the skin in Hong Kong. Br J Dermatol 1968; 80: 424–9.
20. Gohe DK, Jacobson KW, Doty RD, primary inoculation tuberculosis of skin ,Arch Dermatol 1978;114;567.
21. Kanan MW, Ryan TJ. The localisation of granulomatous diseases and vasculitis in the nasal mucosa. In: Ryan TJ, ed. Microvascular Injury.London: Saunders,1976: 195–220.
22. Vashist P, Sahoo B, Kurana K et al. Cutaneous tuberculosis in children and adolescents:a clinicohistological study. J Eur Acad Dermatol Venerol2007; 21: 40–7.
23. Ramesh V. Sporotrichoid cutaneous tuberculosis. Clin Exp Dermatol 2007; 32:680–2.
24. McKee PH. Pathology of the Skin, 2nd edn. St Louis: Mosby-Wolfe, 1996:4.36–40.
25. Yeatman JM, Kilkenny M, Marks R. The prevalence of seborrhoeic keratoses in an Australian population: does exposure to sunlight play a part in their frequency? Br J Dermatol 1997; 137: 411–4.
26. Baer RL,Garcia RL et al. Papillated squamous cell carcinoma in situ arising in seborrheic keratosis.J Am Acad Dermatol 1982;5:561.
27. Ho J, Diven DG, Butler PJ, Tyring SK. An ulcerating verrucous plaque on the foot.Arch Dermatol*.* 2000;136:550–1.
28. Aird I, Johnson HD, Lennox B et al. Epithelioma cuniculatum: a variety of squamous carcinoma peculiar to the foot. Br J Surg 1954; 42: 245–50.
29. Karin caoglu Y,ciralik H.Three cases of verrucous carcinoma.:Australas J Dermatol 1998;39;251-4.
30. Mohs FE,Sahl WJ.Chemosurgery for verrucous carcinoma of skin.J Dermatol surg oncol 1979;5;302
31. Brodin MB,Mehregan AH. Verrucous carcinoma Arch Dermatol.1980;116;987