



CHARMAKEELA AS CUTANEOUS WARTS: A LITERARY REVIEW

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ABSTRACT

The very first reference about Charmakeela is found in Sushruta samhita. Acharya sushruta has described in detail about Samprapti, Lakshana and Chikitsa of Charmakeela. Reference of Charmakeela is not available in either Vedic or pre-vedic literature. Among Bruhattries, Charmakeela references are available in Sushruta samhita and Astanga hrudya of Vagbhata. Among Laghutries Charmakeela references are available in Madhavanidana and Sharangadhara samhita. In Yogarathnakara and Gadanigraha there is mentioning regarding the Samprapti and Chikitsa of Charmakeela. Even though there are many other references regarding Charmakeela the Nidana and Chikitsa is similar to explanations of sushruta. All the clinical features of Charmakeela can be compared to warts. Charmakeela occur at any age, but are unusual in infancy and early childhood. The incidence increases during the school years. It is estimated that 3 to 20% of school age children have Charmakeela.

KEYWORDS: Charmakeela, Warts, Kshudra Roga, Condyloma, Plantar wart, Papiloma.

INTRODUCTION

Charmakeela is one of the common clinical entities encountered in general practice. Over all general incidence of Charmakeela varies from patient to patient. Charmakeela is a condition which was prevalent from ancient times which needs treatment more in correspondence as cosmetic reasons. Specific treatment has been elucidated in Ayurveda for this clinical entity without its recurrence. Charmakeela is one of the Kshudra roga mentioned by Acharya Sushrutha. "Of all the futile disorders of the skin, it would be hard to find any that are regarded with the greater contempt by the lay public and yet capable of resisting a greater variety of treatment than the group of papillary lesions commonly known as WARTS". This statement was made by Lempiere in 1951.

The Greeks and Romans were the first to use terms describing warts. The word Condyloma is of Greek origin which means Knuckle or Knob. 'Myrmecia' is a term derived from the Greek word for ant hill. The term Verruca originally meant a steep place or height. Early Hippocratic writings also refer to pedunculated warts. In 1712, Daniel Turner suggested that warts might be congealed nutritious juices that had seeped from damaged nerve filaments in the skin. The probable viral origin of warts was suggested by the work of Ciuffo in 1907. He produced warts on his hands by inoculating himself with a wart extract that had passed through a

Berkefeld filter with a pore size that excluded bacteria and fungi. In 1949 Strauss et al first visualized viral particles in warts by using electron microscope. Melnick then classified the wart virus into the Papova virus group in 1962. Although seemingly harmless, warts cause quite a lot of morbidity. Viral warts are self-limiting and most of them will eventually disappear spontaneously, but this takes time and most people would rather face the multitude of possible harmful treatment. The wide range of cures since antiquity and present day cures is evident enough to demonstrate the social impact of warts.

Shabdhotpatti (Derivation)

Charmakeela is derived from the words 'charma' and 'keela'. The word charma is derived from 'Char + sarvadhathubyo manin'. Here 'char' means dathu, 'ma' is pratyaya. The word keela means "keelyatha rudiyathe sou anentra vaa" That which pricks like nail.

Nirukti

'Charmani guhyasya charmapi keela ivethi vaa'. Binding or keela (nail) formed on the charma or in the charma of guhya pradesha like 'Anus' (guda) is known as charmakeela 'Charma keelattheethi' That which takes the form of keela (nail) or binding on charma (skin) is called charmakeela.

SAMPRAPTI OF CHARMAKEELA

Sushruta opines that, the Prakupita Vyana Vayu getting aggravated and associating with Kapha gives rise to peg or nail shaped, immovable sprouts in the exterior of the skin, these are called as Charmakeela or Charma Arsha. These sprouts (Charmakeela) give pricking pain because of Vata, the growth has Knotty shape and the color of lesion is similar to the surrounding area of the skin is due to Kapha. These Charmakeela which is dry, black in color or sometimes white, smooth to touch and profound hardness is produced by Pitta and Rakta. Charmakeela is considered as one sort of Ksudraroga. The Prakupita Vyana Vayu along with Kapha gives Toda and Parusha. Pitta will cause Ushanta and raktha varna. Kapha will cause Snigdghatha, Savarnatha and Grathitwa.

CHIKITSA OF CHARMAKEELA

Treatments of Charmakeela mentioned in classics are:

- (1) Agni karma
- (2) Kshara karma
- (3) Chedana Karma

Acharya sushruta has defined the above treatments in different chapters, i.e. the elaboration of Agni, Kshara and Chedana is demonstrated in the respective context. Surgical excision should be performed for Charmakeela later treated with Kshara and Agni. Charmakeela (Jathumani, Tilakalaka and Mashaka) should be treated by Chedana with a Shastra and later with a Kshara or Agni.

“Charmakeela Jathumani Masakan Teelakalakan Utkrutya shastrana dhayat Ksharagnibhya asheshathaha” iti Bhava prakasha.

Bhava prakasha opines that charmakeela should be either excised with a Shastra then it should be treated with a Kshara or Agni. Along with Bhava prakasha other authors like Astanga sangrahakara, Gadani-graha, and Yogarathnakara followed the same line of treatment adopted by sushruta.

AETIO PATHOGENESIS

Papilloma virus: Human papillomaviruses (HPV) are very widespread-toubiquitous in humans, causing subclinical infection or a wide variety of benign clinical lesions on skin and mucous membranes. They also have a role in the oncogenesis of cutaneous and mucosal premalignancies and malignancies. More than 150 types of HPV have been identified and are associated with various clinical lesions and diseases. They infect squamous epithelia of skin and mucous membranes. Clinical lesions induced by HPV and its natural history are largely determined by HPV type. The production of virus particles and virion antigens depends on the state of epithelial differentiation, the fact that the benign papillomas progress towards dysplasia. The role of immunity and genetic susceptibility to papilloma virus infection are incompletely understood. The decrease in

frequency of warts with age implies that resistance to infection develops over time, and much of this resistance may be immunologic. Although the humoral immunity may contribute for resistance to infection, most evidence suggests that cellular immune reactivity plays a significant role in wart regression. Individuals with defective cell mediated immunity are particularly susceptible to papilloma virus infection, and their infections are notoriously resistant to treatment. HPV infection occurs through inoculation of virus into the viable epidermis through defects in the epithelium. HPV's infect keratinocytes and initiate infection through microscopic lacerations in the epithelium which provides access to basal cells. HPV transmits through skin to skin contact. Minor trauma with breaks in stratum corneum facilitates epidermal infection. Contagion occurs in groups – small (home) or large (school gymnasium), and in immune suppressed condition. HPV are disseminated by direct contact and genital HPV's are usually transmitted sexually.

Histopathology

Common warts show marked hyperkeratosis and acanthosis. There are outgrowths of epidermis presenting as slender spires in filliform warts or blunter digitate processes in other variant columns of parakeratosis which overlies the papillomatous projections. There may be haemorrhage into these columns. Hypergranulosis is present where the cells contain coarse clumps of keratohyaline granules. Koilocytes (large vacuolated cells with small pyknotic nuclei) are present in upper Malpighian layer and the granular layer. There is often some inward turning of elongated rete ridges at the edges of lesion. Tricholemmal differentiation and squamous eddies may be seen in old warts. Dilated vessels are often found in the core of the papillomatous projections. A variable lymphocytic infiltrate is sometimes seen and this may be lichenoid in presumptive regressing lesions.

Presentation and Characteristics

Warts appear as hyperkeratotic papillomas with black dots which have thrombosed capillaries within the wart. These lesions can manifest on any site of the body, but specific HPV subtypes may have a tendency to affect a certain anatomic location. HPV1 infection may cause Palmar and plantar warts. HPV-2 causes common warts. HPV-3 and HPV-10 typically cause flat warts. HPV-6 and HPV-11 are the main causes of anogenital warts, or Condyloma acuminatum. Cervical warts or Condyloma Plana may be difficult to visualize by examination without application of acetic acid which cause subclinical lesions to become white.

Location and clinical features

They are typically found on the plantar and palmar surfaces, thickened enophytic papules are extremely painful. They are often grouped at the pressure points on the ball of the foot. They may be small, single lesions or coalesce to form large thick plaques 1 to 2 cms or more in size.

Mode of transmission

Warts are transmitted by direct or indirect contact, and predisposing factors include disruption to the normal epithelial barrier, may affect beard area, hands, feet, anogenital area. Plantar warts are commonly acquired from swimming pool or shower room floors, whose rough surface abrade moistened keratin from infected feet and help to inoculate virus into softened skin of other peoples.

Common hand warts may spread widely around the nails in those who bite their nails or habitually sucked fingers in young children's adults and to the lips. Shaving may spread warts infection over the beard area. Occupational handling of meat, fish and poultry home has high incidences and of hand warts, attributed to cutaneous injury and prolonged contact with wet flesh and water.

Genital warts have a high infectivity and kissing warts appears on opposing surface of toes and anogenital region.

Iatrogenic transmission:- because of long incubation period i.e. 1-8 months. Iatrogenic spread is difficult to establish and seems to have reported, though the possibilities exists.

CUTANEOUS LESIONS

Common warts:- appears most often on hands.

Common warts (excluding plantar warts) are mainly due to HPV-2 but also to the closely related type 57, 1 and 4. Firm papules with a rough, horny surface, they vary in size from less than 1mm to 1cm in diameter and by confluences can form large masses. They occur anywhere in the body and in any age but most commonly situated on the backs of the hands, fingers and children under 12 years. A single wart may persist unchanged for months or years or large numbers may develop rapidly or alter an interval. New warts may form at sites of trauma. Multiple warts are often seen in nail biters. Common warts usually symptomless, but may be tender on the palmer aspect of fingers.

Plantar warts

Occur on the palmer surface of the foot. Plantar warts involves HPV- 1,2,4 and 57. A plantar wart is firstly appears as a small shining sango grain papule but soon assumes the typical appearance of a sharply defined rounded lesion.

Plane warts /flat warts

Occur on face, arms or around the knee. Plane warts originate mainly due to HPV- 3 and 10. Plane warts are smooth, flat or slightly elevated and usually skin colour or greyish yellow, but may be pigmented. They are round or polygonal in shape and vary in size from 1-5 mm or more in diameter. The face and back of the hand is the site of the predilection and the numbers ranges from 2 or 3 to many hundreds.

Filiform and digitate warts

Filiform and digitate warts commonly occur in males on face and neck, irregularly distributed and often clustered. Digitate warts often in small groups present on scalp in both sex.

Anogenital warts

These are also called condyloma accuminata (condyloma-kunckle; accuminatum-pointed) and produce fungating masses of verrucous tissue, resembling as large cauliflower like masses partially blocking anogenital orifices. These lesions tend to grow very fast during pregnancy and may cause difficulty in parturition. Anogenital warts usually transmit by sexual contact.

Anogenital warts often remain asymptomatic, but may cause discomfort, discharge or bleeding. The typical anogenital wart is soft, pink, elongated and sometimes filiform or pedunculated. Large malodorous masses may form on vulvar and perianal skin. In perianal region warts tend to be hyperplastic. In male the site most commonly affected are in order of frequency the frenulum, corona glandis, prepuce, meatus, shaft, anus and scrotum. In female genital organs the common affected sites are posterior part of introits, labia minora and clitoris, labia majora, perineum, anus, vagina, urethra and cervix.

Virology

The papilloma virus have traditionally has been considered in the family 'papova viridae'. Melnick coined this term in 1962 to denote a group of DNA viruses that comprises the papilloma, polyoma and vocuolating viruses. Papilloma virus have icosahedral, outer protein shell, the capsid that is approximately 55nm in diameter and negative staining reveals 72 capsomeres, composed of three structural proteins. It has no lipoprotein envelop. Its is super coiled, covalently closed, circular, double stranded DNA molecule with an approximate molecular weight of 5×10^6 daltons containing about 8000 base pairs.

Human papilloma virus and warts in special situation

Butchers warts:-Occupational handlers of meat, poultry or fish have a high incidence of warts in skin, which is in prolonged contact in animals flesh, usually the hands, HPV-2 frequently founds in this, but HPV-7 is present in upto a third of lesion.

Laryngeal papillomatosis:-Laryngeal wart are the only HPV induced lesion that can precipitate a medical emergency, because of their location, they may present with hoarseness, stridor or even respiratory distress. Laryngeal warts are white to flesh colored papules that are usually multiple and often coalesce.

Periungual warts:- Warts typically affect periungual tissues, when they involve the hyponychium, proximal subungual growth may raise the nail plate. Biting,

picking and tearing of nails are common habits in subjects with periungual warts.

Two examples of warts syndromes associated with carcinoma requires special mention.

Epidermodyplasia verruciformis: Its rare, familial disease characterised by the progression from childhood of flat, wart like lesions. The lesions are characteristically broad, brownish in colour and covered by a wrinkle scale. The face, neck and dorsa of the hands and knees are favoured sites. Most of the affected patients appear to have poor cell mediated immunity function.

Buschke/Lowenstein tumour/verrucous carcinoma

It is occasionally persistent and very large warts of the foot or anogenital region will be progressively destructive and histologically malignant.

Approximately 25% of the patients develops cutaneous carcinomas, usually Bowenoid and sun exposed skin.

Treatment of warts

As most people have been afflicted with at least one wart at some point during their lives, and there is little urgency for immediate clearing, it is no surprise that there is an entire industry catering to the public demand for warts treatment. The routine treatment of warts is unnecessary and undesirable. Before specific treatment is given, it is helpful to explain to the patient that warts can be expected to resolve spontaneously without trace, and that common, more radical measures, such as cryotherapy or cautery have their disadvantages. Patient must be encouraged to persevere with term daily use of simpler preparations. Whatever method is used there will be failures and recurrences. The best clinical guide is the restoration of normal epidermal texture including the epidermal ridge pattern where appropriate. The proper approach to the management of warts depends on the age of the patient, the extent and duration of lesions, the patient's immunologic status, and the patient's desire for therapy.

Chemical destruction

- 1) **Salicylic acid-** Topical salicylic acid is an excellent first line treatment for warts on hands and feet, used in concentration ranging from 15-40%. When used daily for 3 months it cleared 57% of patients with hand warts, 84% with simple warts and 45% of mosaic plantar warts. The only risk of this treatment modality is local irritation which is resolve on discontinuation of treatment.
- 2) **Caustic acid-** The application of caustic acid including monochloro acetic acid, dichloro acetic acid, trichloro acetic acid in concentration of 50-100% are treatment for warts. They are powerful irritants that work by hydrolyzing the cellular proteins, which leads to inflammation and cell death. These acid do not binds preferentially to the wart

infected cell and can cause destruction and produce scarring to the surrounding normal skin if not applied carefully.

- 3) **Formalin-** Formalin is 37% formaldehyde in water and used in concentration of 2-3%. It used primarily for treating plantar warts of weight bearing areas where the keratin is extremely thick. The mechanism of action of formalin is destruction of the warts infected tissue by dehydration.
- 4) **Gluteraldehyde-** Used topically in much the same way as formaldehyde for the treatment of warts. Its effective in 10% solution.

i. Cryosurgery

It is effective for warts on any site including mucosal surface the two most commonly used agents are carbon dioxide snow, which has a melting point of 56.6°C and liquid nitrogen, which vaporizes at 195.8°C. Cryosurgery works mainly by destroying the host cell and stimulating an immune response to the area.

ii. Co₂ snow/dry ice

It can be obtain by passing co₂ gas rapidly through a cylinder. It can be formed in to a carbon dioxide stick with a mold, which should be smaller than the warts. Co₂ snow can also be made into slush by adding a few drop of acetone, it applied to the wart with cotton tipped applicator.

iii. Liquid nitrogen

Is the preferred cryosurgical agent. It is simply holding in a wall holding flask. These flasks can maintain the liquid nitrogen for months. Due to the lower temperature of liquid nitrogen compared with co₂ snow, the duration of treatment of warts is shorter. Liquid nitrogen is applied to the wart with cotton tipped applicator or by the use of liquid nitrogen spray delivered by a hand held unit.

Although cryosurgery is highly successful, easily performed and well tolerated, there are a few complications that must be considered. Scarring is rare but has been reported occasionally, large blister form and may be temporarily debilitating for the patient. Persistent ulcers have been reported on the lower extremities and bony prominences. Cryosurgery on the lateral aspect of the digits may results in sensory loss. The use of cryosurgery on darkly pigmented individuals may lead to area of depigmentation, which often take months to resolve.

iv. Surgical removal

One of the oldest therapeutic approaches to removal of the warts is the surgical intervention. However there is significant reoccurrence rate and a potential to form a permanent scar with this mode of therapy. Other arguments against surgical removal of warts need for anesthesia, significant postoperative pain, risk of secondary infection and inconvenience to the patient.

v. Electro-surgery

The circuitries of all electro surgical instruments share certain features that are required to produce electrical output suitable for electro surgeries. The electricity entering the machine first passes through the transformer that alters its voltage. Then it travels through an oscillating circuit that serves to increase the frequency of the current. The current is then delivered to the patient via hand piece that terminate in the treatment electrode. At the treatment site, impedance (resistance to passage of current) results in the conversion of the high frequency alternating current into heat energy. Electro-surgical machines produce output with frequencies of 500000-3.5 million cycles per second.

a) Electrodesiccation and electro-fulgration

In electrodesiccation, output is of low amperage and penetration results in superficial damage. If the electrode is held at a slight distance from the tissue, a spark found from the electrode to the tissue.

The technique termed electrofulgration is a very superficially destructive procedure. They are most appropriate in the treatment of superficial epidermal lesion, such as seborrheic or actinic keratosis, acrochordons, plane warts, or small epidermal nevi. In addition, mild capillary bleeding can be controlled with these currents.

b) Electro coagulation

In electro coagulation, a moderately damped (partially rectified) current is applied in biterminal manner. This current, which is higher amperage and lower voltage than electrodesiccation, penetrates more deeply, causing potentially more destruction.

c) Electrosection

When slightly damped (fully rectified) current are applied to tissue in a biterminal fashion electrosection results. This current is of low voltage and high amperage. It vaporizes tissues, causing little lateral heat and tissue damage.

vi. Scalpel surgery

Although warts have been removed with scalpel surgery in the past, the high reoccurrence rate associated with this technique has not popularizes it much but better results can be obtained if the base of the warts is cauterized by using caustic acids.

vii. Carbon dioxide laser surgery

The word laser is an acronym connoting 'Light amplification by stimulated emission of radiation.' Laser radiation is a form of light is a part of electromagnetic spectrum. Laser light is a monochromatic, meaning that light from a given source is all of one wavelength or a fixed group of wavelengths. Laser light is a coherent, meaning the wave of energy in phase with each other both in space and in time. Laser light is also collimated, meaning the laser beam component wave are highly

parallel, producing a narrow beam that can be propagated for long distance with minimum divergence or conversance.

Distinct advantages of use of the laser over other modalities for the treatment of warts include accurate control of the depth and periphery of the surgical site which may help limiting scarring, blood less surgical field because it cauterizes vessels of up to 2mm in diameter and sealing off nerve endings which appears to decrease postoperative pain.

Disadvantages to the use of the laser include cost, potential for increased healing time, post treatment scarring which may be more common after treatment of lesions on hands, possible residual deformity after treatment of periungual lesions and generation of potential infections particles in the laser plane.

viii. Pharmacological agents

Podophyllin:-Podophyllin is a complex resin mixture that not only has been used for the treatment of warts but also has proved to be successful treatment for plantar warts. Podophyllin is a crude extract that is derived from two plant species, podophyllum peltatum and podophyllum emodii. Podophyllin probably exerts its beneficial effect in the treatment of warts by two mechanisms. First, its act as a mitotic inhibitor by binding reversibly to tubulin and second it may results, in damage to the microcirculation of the treated tissue.

Podophyllin has been associated with systemic toxicity, especially when used in genital warts ranging from nausea and vomiting due to neurological complication including seizures, coma and peripheral neuropathy. In addition, because of the powerful antimitotic effect of podophyllin, it should never be used in pregnancy.

Cantharidin:-Cantharidin, derived from the blister beetle, is a powerful vesiculating agent and a proven topical therapy for almost all non-genital warts. It act by poisoning mitochondria, thus causing epidermal cell death and acantholysis.

Retinoic acid:-Topical retinoic acid (Tretinoin) is most effective in treating verruca plana of the face with the use of concentrated solution of 0.05%.

Retinoic acid bind up with a specific cellular receptor and produce numerous effects, including alteration of epidermal proliferation and keratin differentiation as well as immunomodulation activity.

5-fluorourasil:-The antimetabolite agent 5-fluorourasil is commonly used topically for the treatment of actinic keratosis. It has also been successfully used in a concentration of 5% for the treatment of warts. Topical 5-FU has been used most successfully for the treatment of verruca plana.

Interferon:-A large family proteins and glycoproteins occur naturally in the body and now can be produced by recombinant biotechnology. Their mechanism of action involves their antiviral, antiproliferative, antitumoral and immunomodulator activities. The major side-effect of interferon therapy is flu like symptoms including fever, chills, headache, fatigues, myalgia, dizziness and nausea.

Bleomycin:-Bleomycin is a combination of polypeptide antibiotics first isolated from a soil fungus, *Streptomyces vericillus*. This mixture exhibits cytotoxic activity and inhibits DNA synthesis in both cell and viruses.

ix. Immunotherapy:-DNCB (Di nitro chloro benzene) a potent sensitizing agent, used for the treatment of recalcitrant warts. Treatment involves sensitizing the patient to the DNCB by applying it to the normal skin often on the inner aspect of upper arm.

x. Psychotherapy:-The most commonly reported psychogenic treatment includes hypnotic suggestions and placebo intervention including painting of warts with colored liquids and injecting placebos. It has been demonstrated by studies that hypnotic suggestion is significantly more effective than that of placebo or no treatment.

DISCUSSION

Warts are the diseases in the human community since ancient times; several therapeutic procedures were performed to get rid of them. Warts are benign proliferations of skin with dome shaped papilliferous surface, which consists of an acanthotic epidermis with hyperkeratosis. In Ayurvedic literature Charmakeela is described as growth on the skin, present anywhere in the body which gives pain or irritates similar to that like a peg (nail), immovable in nature. The clinical features of warts are very similar to the clinical symptoms of charmakeela. The management of warts is indistinguishable both in ayurveda and current modern science.

CONCLUSION

Warts are a clinical entity which has troubled the humans since antiquity. Warts cause disfigurement by occurring on the areas, which cause loss of beauty like on face, on hand, etc. Disablement can be caused by a wart on hand, impairing the skill of an artist, musician, surgeon and etc. Discomfort can occur by its location. Aggressive therapies, which are often quite painful and may be followed by scarring, are usually to be avoided because the natural history of cutaneous HPV infections is for spontaneous resolution in months or a few years. Plantar warts that are painful because of their location thus require more aggressive therapies. In the present medical science the treating protocol for wart is topical application or surgical excisions. Acharaya Sushruta opines the same principals for the management of charmakeela by kshara, shastra and agni karma

techniques. The core principles of treating warts (charmakeela) are almost one and the same in both sciences.

REFERENCES

1. Shabdha kalpa dhruma by Raja radha kanta-deva, 3rd edition, varanasi, chowkambha sanskrit series, 1976; 506.
2. Maharshi Sushruta, sushruta samhita, Nidanasthana Arsha nidana, chapter 2, 18th shloka, dalhana commentry, 6th edition, edited by jadavji trikamji acharya, varanasi, chaukhambha orientalia, 1997; P.275
3. Maharshi Sushruta, sushruta samhita, Nidanasthana Arsha nidana, chapter 2, 20th shloka, dalhana commentry, 6th edition, edited by jadavji trikamji acharya, varanasi, chaukhambha orientalia, 1997; 275
4. Maharshi Sushruta, sushruta samhita, Sutrasthana kshara paka vidhi adhyaya, chapter 11, 7th shloka, dalhana commentry, 1st edition, edited by P.V. Sharma, varanasi, chaukhambha orientalia, 2008; 46.
5. Maharshi Sushruta, sushruta samhita, Sutrasthana kshara paka vidhi adhyaya, chapter 11, 12th shloka, dalhana commentry, 1st edition, edited by P.V. Sharma, varanasi, chaukhambha orientalia, 2008; 46.
6. Acharya Agnivesha, Charaka Samhita, chikitsa sthana 23rd chapter, 104th shloka, 5th edition, edited by Vaidya Yadavji Trikamji Acharya, Varanasi, Published by chowkambha surabharati prakshana, 2008; 576.
7. Acharya Vagbhata, Astanga sangraha, utara Sthana, 31st chapter 25th shloka, 14th edition, edited by yadu nandan upadhaya, varanasi, chaukhambha orientalia, 1979; 321.
8. Acharya Vagbhata, Astanga hrudaya, sutrasthana 30th chapter, 25-26th shloka, 36th edition, edited by Dr. Anna moreshwar kunte, Varanasi, coukambha oriental krishnadas academy, 2007; 355.
9. Acharya Madhavakara, Madhava Nidana, poorva kanda, edited by yadu nandan upadhaya, varanasi, chaukhambha sanskrit prathistana, 2007; 900.
10. Fitzpatrick's, dermatology in general medicine, viral and rickettsial diseases 233rd chapter, 6th edition, edited by Freedberg, Irwin M, Eisen, Arthur Z, Mac Graw-Hill, 2003; 1-6.
11. World Health Organisation classification of tumour, pathology and genetics, skin tumours, internation research for cancer, edited by Philip-E, Leboit, Gunter, Burg, 2006; 11: 34-38.
12. Warts diagnosis and management an evidence based approach, 1st edition, edited by Robert T Brodell, Sandra, Marchese Johnson, Francis group London, 2005; 23, 47, 53, 54, 76, 77.
13. Rook's text book of dermatology, 25th chapter, 7th edition, edited by Tony Burns, Stephen, Breathmach Neil Cox, Blackwell Publishers, 2004; 25.