OTOMYCOSIS IN AYURVEDIC PERSPECTIVE

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INTRODUCTION

The importance of ayurveda in global scenario is because of its holistic approach towards positive life style. The complete health care system is the outcome of the great power of observation, generalization and analysis of hundreds of investigators spread over thousands of years. It deals with both the preventive and curative aspects of diseases in a most comprehensive way.[1] Even though there was a glorious past for this inclusive system of medicine, the practice and application of ancient health care system lost its key position due to various causes. Various types of research are needed for establishment of the applied aspect of ayurveda in modern era. Otomycosis is the acute, sub acute or chronic infection produced by fungi that affect the external auditory canal (EAC). Mycosis of the external auditory meatus is popularly known as swimmer’s ear, hot weather ear, panama ear, surfer’s ear, otitis externa diffusa, singapore ear, Telephone ear etc. The fungal agents responsible for this clinical entity are found as saprobes in the environment. The fungi are usually secondary invaders of the tissue rendered susceptible by bacterial infection, physical injury or excessive accumulation of cerumen in the external auditory canal. The prevalence of Otomycosis is greatest in hot, humid & dusty areas of the tropics. It is common in India with a prevalence of 5.2% in the general population (Journals.combridge.org/production/ation/cjo). Approximately 5-25% of the total cases of Otitis externa are due to otomycosis in India (In a research paper in Otolaryngology dept.of JMU Medial college Aligarh- yr 2005) and 9% according to American academy of Otolaryngology – Head & neck Surgery foundation -2006. Otomycosis is sometimes difficult to manage due to different factors related to the microorganism and to the local and general characteristics of the patient. In the last few years the participation of
fungi in external otitis has increased, mainly because of the use of broad-spectrum antibiotics for the treatment of bacterial otitis and to factors relating to changes in immunity.

**Etiology**

There are many predisposing factors of otomycosis like, chronic infection of the ear, use of oils, ear-drops, steroids, swimming, evidence of fungal infection somewhere else in the body like hair, scalp, nails, vagina, skin etc. The majorities of fungi isolated from lesions of otitis externa are generally considered to be saprobic in nature and can commonly be isolated from normal healthy skin. Various factors influence the transformation of saprophytic fungi into pathogenic fungi, but they are not completely understood. Conditions remain obscure; as only one ear gets involved in majority of cases in spite of similar exposure to environment of an individual and all members of the family. All of the following factors have been considered to encourage infection & plays some role to predispose the otomycosis.

(1) Factors, which lowers the resistance of the external meatus. Usually, lipid content of ear secretion (Wax) and slight acidity of the skin surface (Blan, 1939, Fabricant and Perlestein, 1949) protects the external meatus. Fatty acids are efficient as antifungal in acid media (Peck et al, 1939). This protective mechanism is interfered by.

a) Heat and Humidity - which plugs the gland orifice and reduces the secretion i.e. lipid flow.

b) Absence of skin lipid - occurs in absence of cerumen, frequent washing of ear, swimming, sea bathing etc., and lowers the resistance by maceration of skin.

c) Trauma e.g. Matchsticks, hairgrips.

d) Chronic dermatitis - Primary or secondary to ear discharge e.g. seborrhoeic or atopic eczema, psoriasis, contact dermatitis, bacterial infection especially with staphylococcus, streptococcus, protease and pseudomonas.

(2) Factors, which favour the growth of organisms.

a) Optimum temperature required for the growth of fungi is high e.g. for A. fumigatus 35\(^0\) – 45\(^0\) C temperature is needed.

b) Moisture (e.g. in tropics heat and humidity is produced due to more perspiration).

c) Metabolic elements - Raulin (1869), Steinberg (1939) and others found that the essential elements for the growth of fungi are magnesium, sulphur, iron, zinc and phosphorous in order of importance.
d) pH of the medium - slightly alkaline media is more favourable for the growth of fungus. The internal pH of cells of Aspergillus niger is influenced by the pH of the medium if this is less than four and the death of fungus cell occurs.

(3) Debilitating diseases are often complicated by candidasis due to possibly lowering of immune status.

(4) Endocrinopathies - Commonly the diabetes and other endocrinal disease, sometimes, predispose to candidasis by altering the carbohydrate and fat metabolism.

(5) Iatrogenic - Prolonged use of antibiotics, corticosteroids or immunosuppressant not infrequently result in candidal invasion. Antibiotics mostly act by altering the bacterial flora, immunosuppressant’s act by lowering cell mediated immunity (C.M.I.) and the corticosteroids act in addition to both the factors by altering the carbohydrate and fat metabolism.

(6) Eustachian tube dysfunction - A high incidence of excessive negative middle ear pressure are found in patients suffering from recurrent otitis externa. It has been postulated that impaired eustachian tube function may be an etiological factor in otitis externa. It is suggested that the negative pressure in the middle ear may cause discomfort in inducing the sufferer to probe the ears to relieve it and so traumatizing the meatal skin. Another possible explanation is that the negative pressure interferes with normal migration of epithelium along the external auditory meatus, leading to a build up of epithelial debris in the canal.

Immunity
An immunocompromised host is more susceptible to otomycosis as compared to the immune competent host.

Malnutrition
The prevalence of otomycosis in malnourished children is observed as higher as compared to normal children.

Mental/Emotional
Fatigue, Anxiety, mood swings, memory loss, depression, insomnia, hyperactivity. Those who suffer from Fungus overgrowth are usually low in self worth and very hard on themselves.
Hormonal changes
Thyroid and Adrenal malfunction. Hormonal changes flare up the infection as seen during menstruation and pregnancy.

Antibiotics
Prolonged use of antibiotic & steroids drops kills the bacteria and thus fungus may start growing unhindered. Chemotherapy, Ionising radiation and Cortisone treatment also increase the prevalence of fungal growth.

Clinical Features
Symptoms: The Usual clinical triad of symptoms is earache, itching and otorrhoea. Deafness and tinnitus etc. are the other associated symptoms

Signs
1. Cotton-like growth
2. Wet blotting paper-like mass
3. Swelling
4. Discharge: Colourless, blackish or brownish and scanty discharge may be present.
5. Tenderness: Movement of pinna is tender; there is tenderness below and in front of (tragus) the ear.

The sequence of pathological changes in otomycosis can be narrated as under
1. Implantation of the organism in the external auditory meatus.
2. Growth of the causative organisms (fungus), the rate of which depends on the conditions like temperature, moisture and pre-existing irritation.
3. Invasion of epithelium, which produce itching and discomfort at the site.
4. Exfoliation of epithelium, with casting off of the upper most cells, which suggests the nature’s defence.
5. Denudation.

The general line of treatment of otomycosis includes frequent cleaning of external auditory canal either by suction, evacuation or by syringing, followed by mopping to dry the canal. Topical medications are applied as disinfectants, anti-inflammatory, antifungal ear drops and ointments. Several antifungal agents are available. Oral administration of antifungal drugs
may be given to resistant cases, but side effects like nausea, vomiting, loss of appetite, headache, paresthesia, rashes, hair loss etc. are noted. *(Essentials of medical Pharmacology 5th edition by K.D. Tripathy)*.

Considering these points, there is a need of search for a safe remedy in the field of Alternative Medicines. This conceptual study is for the fulfilment of the same, since a problem can only be solved effectively if it is understood properly and thoroughly.

Otomycosis cannot be directly correlated with a particular disease mentioned in Ayurvedic classics. Rather different stages of this disease depict different diseases from the texts. On the basis of clinical features different stages of otomycosis can be included under **Karnakandu, Kaphaja Karnashoola, Karnasrava and Krimikarna**.

Krimijanya rogas have been affecting the mankind since time immemorial. Description of krimijanya rogas in ayurveda is in a scattered form in various chapters. Since the vedic period, the Indian physicians have been well aware of the presence of micro-organisms. They described the etiological factors vividly. The word “Krimi” was used in a broad sense in ayurvedic literature, i.e., it includes all the pathogenic and non-pathogenic organisms covering a wide range of infection and infestation to the host by the agents ranging from bacteria, fungi, viruses, worms etc. There are twenty varieties of krimi described and they are broadly grouped as external and internal. The word krimi is derived from ‘kramu-pada viksepe’ meaning crawling, slowly going, hopping, spreading and increasing, which indicates organism like bacteria, fungi, viruses, etc. *(STM Journal Research & Reviews: A Journal of Medicine Volume 2, Issue 1, April 2012)*

In Ayurveda, pioneer scholars recognized the existence of pathogenic organism and the diseases arising from their infection. Many commentators consider bhutas as microorganisms like bacteria, fungi, and viruses etc. These organisms may be treated as the Rakshogana or Bhutasamgha.

Fumigants play an important role in agriculture, industry and health. In Charaka samhita an independent chapter dealing with *Janapadodhwamsa* (epidemics) has many such references dealing with measures of purifications of air, water and soil.[2] These can be broadly grouped under preventive and curative measures. These are aimed at the control and elimination of
harmful micro and macro organisms. However these natural fumigants are mostly scattered and very few have been studied on scientific parameter for their mode of action.

Acharya Susruta gives a generalized treatment protocol for karnasrava, putikarna and krimikarna. Sirovirecana, dhoopana, karnapurana, pramarjana, dhavana, and prakshalana are the therapeutic procedures to be adopted according to different stages of these conditions.\[3\] According to acharya Charaka, dhoopana relieves ruja (pain), srava (discharge), durgandha (foul odour) and vranajakrimi.\[4\] Dhoopana also facilitates the procedure of healing of ulcer. According to acharya Susruta vranadhoopana imparts vedanaupasamam, vranavisadyam and sravaupasamam.\[5\] Acharya recommends incorporation of the management of dushtavrana in putikarna\[6\] the features of which can be seen in later stages of otomycosis.

**AYURVEDIC VIEW**

Otomycosis cannot be directly correlated with any one particular disease mentioned in ayurvedic classics. Rather different stages of this disease depict different diseases from the text. Initially in otomycosis patients are usually asymptomatic wherein implantation and growth of causative organism occurs. As there are no symptoms these stages reflect the part of samprapti before formation and manifestation of the disease- that is the stages before ‘sthanasamshraya’. The entity called ‘disease’ or ‘roga’ will always have one or more ‘rupas’. In next stage of otomycosis patient experiences itching and mild discomfort in the ear. This stage can be compared with ‘karnakandu’ (described by both acharya Susruta & Vagbhata). As the disease progresses to last stage, the next symptom to appear is pain and discharge from the ear. This is because of exfoliation of epithelium & denudation. This stage can be compared to karnashoola’ (kaphaja) and ‘karnasrava’ (kaphaja) as described by acharya Susruta. If the pathogenesis is not checked at this stage, it may take a dangerous turn and can lead to superficial ulceration and eczematoid dermatitis. This suggests vitiation of all three doshas and involvement of deeper dhatus as described in the disease ‘krimikarna’. If the damage caused is grave, it can also lead to deafness.

**Karnakandu**\[7\]

Acharya Susruta and Vagbhata describe the disease karnakandu as an independent disease, which manifests in karna and also have the same view that karnakandu is defined as the itching in the ear caused by vitiation of kapha but according to Madhavacharya, vata in association with kapha produces karnakandu. Treatments like nasya, vamana, dhoopana etc
are indicated here.[8] Karnakandu can be a stage of otomycosis as itching is the main feature of otomycosis.

*Karnasrava*[^9^]

According to Susruta samhita, head injury, underwater diving or suppuration of abscess may lead to avarana of vata in the ear resulting in discharge that is called as karnasrava. Among the various causes, due to immersion in water, fungus may develop in the ear causing the disease otomycosis. Acharya Charaka hasn’t described about karnasrava. Charaka has symptomatically incorporated karnasrava in the kaphaja karnaroga. It is interesting to note that while acharya Susruta mentions separate disease as karna srava, acharya Vagbhata includes this into karna shoola itself. He explains specific dosha causing specific type of discharge. Acharya Susruta mentions general line of treatment for karnasrava, putikarna and krimikarna.[^10^] Karnasrava is also a feature of otomycosis. Treatment of karnasrava include nasya, gandusha, dhoopana, pramarjana, dhavana and purana accordingly.

*Karnashoola*

Acharya Vagbhata is explaining 5 varieties of karna shoola named as vataja, pittaja, kaphaja, raktaja and sananipatika each being dominated by respective dosha. When the karnashoola is caused by kapha, there is a feeling of heaviness of head, lower jaw and neck, mild degree of pain, itching, swelling, desire for hot things and in pakwa awastha there is white thick mucoid discharge.[^11^] Unlike Ashtanga hridaya, Susruta samhita describes all types of karna shoola in one shloka itself and does not describe different varieties of karna shoola depending upon dominance of dosha. In karna shoola he gives maximum importance to avaran of vata dosha and describes it as ‘when ever vata situated in karna, gets vitiated by avarana of kapha, pitta, and rakta or by vata itself to take a faulty path and produce severe pain in and around the ear.’[^12^] Mild pain in early stage of otomycosis is due to srotorodha of vata by kapha. Here dhoopana will be ideal treatment which alleviates kapha and there by removing obstruction to vata.

*Krimikarna*

According to acharya Susruta when ear is infected and organisms grow up or lies deliver progeny in ear (Maggot), it is termed as krimikarna.[^13^] According to acharya Vagbhata the ear which is already vitiated by vatadi thridosha leads to mansa, rakta, klada, which facilitates the growth of harmful micro organisms which eat up the tissues of ear and thus cause severe pain.[^14^] This disease is called krimikarna. This can be considered as the later stage of
otomycosis, where all the tridoshas are involved affecting mamsa, rakta leading to kleda and formation of vrana. Dhoopana is a main therapeutic procedure indicated for krimi karna. This condition also requires all the procedures specified for karnasrava. Sarshaptaila is specially indicated for poorana in krimikarna.

The features of karnakandu, karnasrava, kaphaja karnasoola and krimikarna coincide with those of different stages of otomycosis. According to doshic involvement and chronicity of the condition these features are found in varying degrees clinically also. Adopting the management of these conditions in otomycosis is hence justified. Also dhoopana gains prime importance among the therapeutic procedures for these Karnarogas with its innate property of relieving vata, kapha and krimi.

Nidana

Knowledge of nidana is important for complete understanding of the disease and nidana parivarjana contributes a lot to the cure of diseases also. The specific etiology of each karna roga is not mentioned in any ayurvedic classics, certain common etiological factors of karnaroga are described.

1. Avasyaya
2. Jalakrida
3. Karnakandu
4. Mithya yogensastrasya
5. Pratisyaya
6. Other cause

1. Avasyaya
Most essential factor which helps the growth of fungi is moisture or humid air and avasyaya facilitates this prolonged exposure to avasyaya leads to vitiation of kapha, which produces itching in external auditory canal. Patients are stimulated to scratch the ear to relieve itching & discomfort. This will lead to abrasions in EAC and facilitates various infections.

2. Jalakrida
Jalakrida include swimming , under water diving, bath in the river, sea, fountains or sprinkling water etc. which are seetha in property, lead to kapha vitiation. Spending more time in water causes vata vitiation too. Water enters into the external auditory canal, may cause moistening
of wax. These leads to derangement of the defence mechanism of cerumen which has antimycotic and bacteriostatic properties and is insect-repellent. Moreover the microbes harboring in water also may cause infection. And the depth of the EAC (cul de sac) due to its shape, after entering the water provide favorable environment to the fungi growth.

3. Karnakandu
Due to samanya nidanas the vitiated vata and kapha give rise to itching sensations in the ear and some people clean the ear frequently. Frequent cleaning and insertion of stick, feathers, hair pin, pencil etc. to relieve itching will lead to rupture of skin of auditory canal and TM. These will lead to bacterial and fungal infection.

4. Mithyayogena sastrasya
Improper introduction of instruments by unskilled persons may injure the external ear or even rupture tympanic membrane. Injury of the squamous epithelial cell of EAC causes the fungal infection rapidly.

5. Pratisyaya
Most of these etiological factors are the prime reasons for Pratisyaya also. Pratisyaya is a main cause of other urdhwa jatrugata rogas. Infection of nose and nasopharynx can spread to eustachian tube and middle ear. Eustachian tube dysfunction creates negative middle ear pressure. Due to this, irritation occurs & insists the patient to scratch the ear. This irritation (trauma) to EAM skin and lower resistance of host may lead to otomycosis.

6. Others
Apart from the visesha nidanas it is essential to consider the samanya nidanas of doshakopa. In the pathogenesis of otomycosis kapha has the major role with a significant role contributed by the sthanika dosha i.e. vata. So among the general etiological factors (vitiating doshas), the factors vitiating kapha and vata have much more importance. The description regarding the etiology of Karna rogas can be seen in various ayurvedic classics. They can be classified under aharaja, viharaja and kalaja factors.

In present times factors like intake of chilled food stuffs like ice creams, juices, bakery items like pastry, spicy fast foods, all cause vitiation of doshas. Viharas like bathing early in morning in cold water, shower bath, travelling exposed in cold climate and head bath late at night contribute to disease of urdhwanga rogas and hence otomycosis.
Samprapti

Even though all three doshas are continuously circulating all over the body certain organs or certain parts of body are dominated by certain doshas, these organs or parts of body which show dominance of specific doshas are called ‘seats’ of that particular dosha. Like wise karna is one of the seats of vata dosha. If we have a look at karna roga nidanas told by acharya it’s very clear that most of them are kapha vardhaka hetus like avashyaya, jalakrida etc. There are many other aharaja viharaja hetus which can lead to kapha vridhi like dadhi sevana, divaswapna, excess intake of madhura, guru, snigdha etc. But kapha increased by such hetus will produce karnaroga only if there is prior weakening of karna srotas i.e. karnasroto dusti. It’s important to note that the manifestation of this disease fulfill both needs of samprapti i.e. kapha vridhi and karna sroto dusti. So whenever persons indulge in excessive intake of such kapha vardhaka nidanas abnormally increased kapha is likely to produce avarana of vata in karna srotas to produce these diseases. Symptoms like soola and gaurava are indicative of kaphavrita vata also.[16] As far as otomycosis is considered role of pitta and rakta cannot be neglected in samprapti. Symptoms like purulent discharge, ulcer of EAC are only possible due to pitta and rakta. If pitta and rakta are not taken care of immediately they can lead the condition to dushta vrana and nadi vrana.

CHIKITSA

The pathogenesis of otomycosis points to the role of krimi and bhoota according to ayurvedic view. Evaluating the features of infestation of these two, dhoopana gains a critical role in otomycosis. According to principles of ayurveda, apakarshana, prakriti vighata and nidana parivarjana are meant for krimi chikitsa.[17] In otomycosis apakarshana is brought about by karnapramarjana (moping), prakriti vighata means eliminating the root cause of the disease. It is also considered as samana by certain acharya. Local therapeutic procedures and internal medication come under this group. Dhoopana is such a procedure effective in controlling otomycosis and reducing its recurrence. Nidana parivarjana as for all pathological conditions is inevitable in otomycosis. All the aharaja and viharaja nidanas should be avoided and pathyakrama should be followed to enhance one’s resistance towards this infection. Acharya Susruta mentions general line of treatment for karnasrava, putikarna and krimikarna which is applicable for different stages of otomycosis.[18]
1. **Sirovirecana**: Sirovirecana is advised to eliminate the vitiated doshas out of siras. The churna of Apamarga bija, Katphala, Marica, Nakachikani etc. are mentioned for sirovirecana.

2. **Pramarjana**: Pramarjana means to wipe, to clean, to mop out. karnapramarjana is done to clear the discharge, debris, fungal spore mass etc. Dry moping also provides a moisture free atmosphere in the EAC.

3. **Dhoopana**: Dhoopana is mentioned for krimikarna and in poothikarna. Guggulu, Agaru, Sarja etc are the dhoopana dravyas mentioned for fumigation out side the ear and into the external auditory canal.

4. **Purana**: Literary meaning of purana is to fill up, to instill, and to pour. purana is the process of filling the required drava dravya like swarasa, taila etc. into external auditory canal to relieve pain, discharge, itching etc.

5. **Dhavana**: Dhavana means washing and cleansing. Praksalana is a synonym of dhavana. Susruta has mentioned Rajavruksadigana and Surasadigana for karnapradhalana.

6. **Avachurnana**: Avachurnana means sprinkling of fine powder of oushadha dravyas in the EAC.Churna of Rajavruksadigana and Surasadigana can be used.Along with vamana, nasya, gandusha, sweda etc local procedures like karnapramarjana, dhoopana, purana and varthi are told by Ashtanga hridayakara for the treatment of conditions resembling otomycosis. He also advises to follow the treatment of dushta vrana and nadi vrana as required.

**Pathyapathya**

Practicing pathya ahara vihara and restricting apathy are very important in the management of any disease. Ahara and vihara have very important role in the manifestation of disease. So the treatment of disease is complete only by following proper pathya ahara and vihara.

Pathya ahara includes godhuma, shali, mugda, yava, patola, shigru, vartaka, sunnisanaka, kanttilaka, purana ghrita and mamsa of lava, mayura, harina and kukkuta etc. Patients should practice brahmacharya and abhashanam. They should follow dinacharya and ritucharya including snehana, swedana, virechana, vanama, nasya and rasayana.

Ahara dravyas predominant in guru guna and which leads to increase in kapha should be avoided. Head bath, vigorous brushing of teeth, physical exertion, exposure to humid climate, scratching the ear etc. should also be avoided.
DISCUSSION
As stated above, otomycosis may be correlated with karnakandu, karnashoola, karnasrava and mainly later stage krimikarna. After nidana sevana doshas specifically kapha gets vitiated. But kapha increased by such hetus will produce karnaroga only if there is prior weakening of karnasrotas i.e. karnasroto dusti. It’s important to note that the manifestation of disease fulfill both needs of samprapti i.e. kapha vridhi and karnasroto dusti. So whenever persons indulge in excessive intake of such kapha vardhaka nidanas, abnormally increased kapha is likely to produce avarana of vata in karnasrotas to produce these diseases. If we note the major symptoms of otomycosis, here pain is due to vata prakopa because of obstruction by kapha vriddi. Discharge and itching is due to kleda vridhi caused by strotorodha. All are similar to that of symptoms produced by kaphavrita vata.

As far as otomycosis is considered, role of pitta and rakta cannot be neglected in samprapti. Symptoms like purulent discharge, ulcer of EAC are only possible due to pitta and rakta. Itching, pain, blocking sensation, otorrhoea are the chief symptoms of this disease. Though it is simple disease if not treated properly can perforate the tympanic membrane. Once the tympanic membrane is perforated due to a little exposure to cold or entry of water into the ear canal patients will present with karnasrava, pratisyaya etc. Acharya told that due to mithya ahara and vihara more vitiation of doshas occurs, which leads to formation of vidradhi and it gets converted into prapakavastha which is the sannipathika stage of disease. It also hampers the hearing mechanism.

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