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A CRITICAL ANALYSIS OF ANTIFUNGAL ACTIVITY OF GOMUTRA ARKA IN OTOMYCOSIS

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ABSTRACT :

Otomycosis is a fungal infection of external auditory meatus. It is very common in hot tropical climates. The fungi most frequently found in otomycosis are the Aspergilli although other fungi such as candida, pencillium, mucour and the dermatophytes may also be encountered. The most common species is A.niger. Incidence of otomycosis is observed in both male and female. It is generally unilateral, although bilateral cases are not rare. The most common symptoms are dull pain, itching, tinnitus & sensation of fullness. It is more common in people using ear buds and hearing aids. Use of *gomutra* was explained in Ayurvedic classics thousands of years ago. *Gomutra* is considered as antifungal, antibacterial, antibiotic etc. *Gomutra arka* is the distilled form of *gomutra*. Through distillation *gomutra* become rich in active principles and thus enhances the quality. The usage of *gomutra arka* for the treatment of otomycosis provided good results and is the main motive for studying the antifungal action of *gomutra.*

Key words: Otomycosis, antifungal action, *Gomutra arka*.

INTRODUCTION: Andral and Gavarret in 1843 and Mayer in 1844 first described fungal infections of the external auditory canal. Virchow suggested the term 'Otomycosis' be used to describe this condition.[1] Otomycosis is a fungal infection of the external ear canal that often occurs due to Aspergillus niger, A. fumigatus or Candida albicans. Although Otomycosis has been classically described as a fungal infection of the external auditory canal, it has been suggested that the term be expanded and redefined to include fungal infections of the middle ear and open mastoid cavities.[1] It is seen in hot and humid climate in tropical and subtropical regions.[3] Secondary fungal infection is also seen in patients using topical antibiotics for treatment of otitis externa and middle ear suppuration which leave a medium sterilized of other organisms in which the fungus may flourish. Otomycosis occurs throughout the world and its prevalence changes with location and climate. The aetiological agents of Otomycosis are commonly found in indoor and outdoor air, in the soil and dust, and on decomposing plant matter. Warm humid environments support their growth, and the human ear canal is ideal for their proliferation. In the tropics, Otomycosis accounts for upto 30% of patients with symptomatic ear disease. It occurs in men and women of all ages.[2]

The causal organisms and their habitat-Otomycosis is most commonly caused by Aspergillus species, particularly Aspergillus fumigatus, Aspergillus niger,

Aspergillus nidulans and Aspergillus flavus, and Candida species, particularly Candida albicans, Candida parapsilosis and Candida tropicalis. In temperate regions, there is a slight preponderance of infections with Candida species while in tropical and sub-tropical regions, A.niger is the most common cause of infection.[2] The fungal mass may appear white, brown and black in colour. In aspergillus infections numerous black specks may be seen in the epithelial debris. Pigmented fungal tufts atop a tangle of hyphal threads resembling a cotton ball or moist white plug dotted with black debris ("wet newspaper"). Aggressive infection involves epithelial and subcutaneous tissues and may result in TM perforation. Microscopic examination of a smear from the debris will confirm the diagnosis. Candida Albicans is common in patients getting prolong course of antibiotic ear drops. The EAC appears wet and macerated and is filled with soft, curd-like debris sprouting hyphae.[4] Other moulds that have been implicated include Pencillium and Rhizopus species. Mixed bacterial and fungal infections are common and account for more than 50% of all cultures in Otomycosis.[2]

Several well-recognized factors increase a patient's susceptibility to fungal infections and their complications. Alterations in the immune state(primarily cellular immunity), Systemic steroids, prolonged use of antibiotics, and diabetes can all increase the chance of developing fungal ear infections. Other factors that predispose the patient to Otomycosis include warmth, humidity, and configuration of the ear canal, the presence of open mastoid cavities, hearing aids with occlusive molds, trauma and bacterial infections.[1] Increased sweating and bathing in hot climates are predisposing factors. Swimming pools are a common source of otitis externa. Poking the ear with a finger or towel or ear buds further traumatizes the skin and introduces new organisms. The condition should be suspected when routine treatment fails to relieve a diffuse otitis externa, where there is continued irritation in the ear and when the mass of debris in the meatus rapidly reforms after cleansing.[4]

Clinical feature of Otomycosis include intense itching, discomfort or pain in the ear, watery discharge with a musty odour and ear blockage.[3] Pain and discharge are the most common symptoms of Otomycosis, followed by hearing loss, aural fullness and pruruitis. Tinnitus is an occasional complaint. In more than 90% of cases, only one ear is affected. In chronic infections, eczematoid changes and lichenification of the canal can become marked.[2]

Differential diagnosis of Otomycosis is difficult, although a lack of response to topical antibiotics and steroids, and the onset of hearing loss are suggestive of fungal infection. The diagnosis can be established with confidence only by mycological investigation.[2]

INVESTIGATIONS: Debris and secretions should be obtained from the auditory canal. Direct microscopic examination using a 10-20% potassium hydroxide preparation will reveal branching hyphae, budding yeast cells or both. In cases of Aspergillus infection, the typical sporing heads can sometimes be seen.[2]

Table 1 Microscopic observation according to the etiology of otomycosis[2]

Aetiology	Microscopic observations
Aspergillus (70%) A. niger, A. flavus and A. fumigates	Abundant hyphae, microconidia, and aspergillus heads may be observed even in chronic cases.
Candida spp. (10%) Candida albicans	Clusters of blastoconidia plus pseudohyphae, which indicate the parasitic status.
Hyalohyphomycetes Pencillum spp., Acremoniun spp., Scopulariopsis spp.	Septate hyaline hyphae or, at times, their reproductive structures(phialides and sterigmata)
Mucorales Mucor spp., Rhizopus spp., Absidia spp.	Coenocytic Hyphae(no septum)

Management: The goals of management of Otomycosis are to relieve symptoms, eliminate disease, and prevent recurrence. This is accomplished by identifying the infecting organisms, identifying and treating any predisposing factors, cleaning and drying the ear, and applying topical antifungal medications. Special attention should be focused on meticulous cleaning of the pretympanic sulcus, which is the site of many early infections and the area responsible for recurrences. Systemic antifungals may be necessary as a last resort in refractory cases.[1]

COWS URINE: From Prevedic period, the significance of *panchagavya* was known to the people . *Panchagavya* includes cow's milk, ghee, curd, urine and dung. Vedas and Ayurveda explain numerous formulations containing *panchagavya* as such or separate and provide an idea about the significance of it. *Gomutra*, one among this *panchagavya* was widely used as a single drug or in combination with other medicines to treat various diseases.

Ayurvedic treatise explained eight types of *mutra* and its quality in *mutra vargas*. These are *mutras* from eight different creatures. Among them most superior is cow's urine due to its excellence.[5] While explaining about properties of *mutra* in all the classical text books it is mentioned that all the *mutra's* are having *krimi, visha, sopha, kustahara guna*. Along with this it is having *shodhana* property. Cow's urine have *laghu tikshna ushna* and *kshara guna, katu rasa, agnidipana medhyakarma*, vitiates *pitta* and mitigate *kapha vata. Gomutra* should be collected from female gender.[6]

The popularity of usage of *gomutra* is increasing day by day and thereby a number of studies are evolving for understanding its antimicrobial, anticancerous, antioxidant properties. The biochemical estimation of cow urine has shown that it contains sodium, nitrogen, sulphur, Vitamin A, B, C, D, E, minerals, manganese, iron, silicon, chlorine, magnesium, citric, succinic, calcium salts, phosphate, lactose, carbolic acid, enzymes, creatinine and hormones.[7] Presence of urea, creatinine, *swarna kshara* (aurum hydroxide), carbolic acid, phenols, calcium and manganese have strongly explained for exhibition of antiseptic, antimicrobial and germicidal properties of cow urine.[8] 95% of *Gomutra* is water, 2.5% consists of urea, and the remaining 2.5% is a mixture of minerals, salts, hormones and enzymes.[9] Cow urine has been granted US Patents (No. 6,896,907 and 6,410,059) for its

medicinal properties, particularly as a bioenhancer and as an antibiotic, antifungal and anticancer agent.[10]

Medical values of cow's urine[11]

Uses	
Urea	Anti-microbial activity
Uric Acid :	Anti-microbial activity
Nitrogen :	Diuretic
Sulphur :	Purifies blood
Copper :	Controls fat deposition
Iron :	Production of RBC in blood
Sodium :	Purifies blood, checks hyperacidity
Potassium :	Appetizer, eliminates muscles fatigue
Other salts :	Antibacterial, prevents comma and ketoacids
Carbolic Acid :	Antibacterial, prevents gas gangrenes
Ammonia :	Integrity of body tissue and blood
Sugar-Lactose :	Good for Heart, thirst, giddiness
Vitamin A,B.C,D, E :	Prevent excessive thirst, infuse vigour, increase potency
Creatinine :	Antibacterial
Swarna Kshar :	Antibacterial, improves immunity (aurum hydroxide) acts as antidote
Enzyme-urokinase :	Dissolve blood clot, improves heart disease, blood circulation
Colony stimulating factor :	Effective for cell division and multiplication
Erythropoietin stimulating factor :	Production of RBCs
Gonadotropin :	Promotes menstrual cycle, sperm production
Kallikrein :	Releases Kallidin which expands peripheral veins and reduces blood pressure.
Allantoin :	Heals wounds and tumors
Anticancer substances :	Prevents multiplication of carcinogenic cells
Phenols :	Bactericidal, antifungal

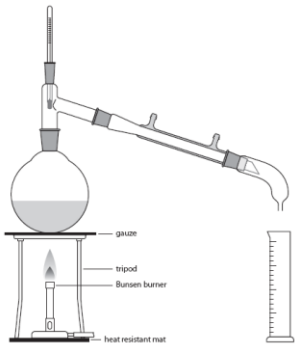
US Patents regarding Cow-Urine

Patent No. 6410059: The invention relates to a novel use of cow-urine as activity enhancer and availability facilitator for bioactive molecules, including anti-infective agents. The invention has direct implication in drastically reducing the dosage of antibiotics, drugs and anti-infective agent while increasing the efficiency of absorption of bio-active molecules, thereby reducing the cost of treatment and also the side-effects due to toxicity.

Patent No. 6896907, 7235262 The invention relates to a novel pharmaceutical composition comprising an effective amount of bio-active fraction from cow-urine distillate as a bioavailability facilitator and pharmaceutically acceptable additive selected from anti-cancer compounds, drugs, therapeutic and nutraceutic agents, ions and similar

molecules which are targeted to the living systems. 13

DISTILLED COW'S URINE: The vapour of cow urine is to be collected by tube device like in distillation process. An earthen or iron pot with cover having tube for vapour outlet is filled with cow urine and put over fire for heating. The vapour, which comes out from this device through the tube, is collected in a pot. The pot is put over cold water, to cool the vapour and get it condensed. The water under the pot should be changed regularly to keep the pot and water cool. The tube of device has to be transparent, so that vapour is visible. If smoke starts coming out, reduce flame or fire.[14] The qualities of *ark* (distilled urine) are not the same as whole cow urine, the concentration and quality of it will increase after distillation.



DISCUSSION:*Gomutra* with its *katu rasa, thikshnushna, kshara, krimihara&sophahara* property act effectively on Otomycosis, which is a fungal infection in the external auditory canal. With proper *pramarjana* and appropriate usage of medicine like gomutra arka is giving good result to this condition. According to modern medicine, the treatment for this condition is cleaning the ear canal, application of antifungal drops or powder to the ear. The main problems that exist in antifungal drugs are drug resistance and they are forced to depend on new drugs.According to modern research, antimicrobial, germicidal, antifungal property of cow's urine was explained due to the presence of urea, creatinine, *swarna kshara* (aurum hydroxide), carbolic acid, phenols, calcium and manganese. Among them the most important component having antifungal property is phenol. Phenols antifungal action involve damage to the plasma membrane, resulting in the leakage of intracellular compounds such as potassium(K^+)leading to cell death.[12] Antifungal activity of cow's urine distillate was analyzed against Aspergillus niger and A. flavus. When the two fungal organisms were compared, maximum growth suppression was observed in A.niger than that observed in A. flavus. It was finally concluded that the inhibitory activity can be used in control of bacteria and fungi of various different origin.

CONCLUSION: Otomycosis causes discomfort to the patients with its symptoms like aural fullness, itching, and dull pain and causes irritation in day to day activities. Due to its increased chance of recurrence the sufferer himself is aware of the drugs and without doing inspection, will start medicine. As tympanic membrane perforation is the complication of otmycosis, the medicine will pass through the middle ear cavity and reach round window where it get absorbed through it and causes ototoxicity.

Drug resistance is the major problem faced by pharmacology now a day. Antifungal resistance is also common. In such condition, by the antimicrobial, antifungal, antioxidant, bioenhancer property of *gomutra arka*(cows urine distillate) will give good result and thereby helping the patients to relieve from this condition using a natural source.

REFERENCES:

1. Peter.S.Roland, John A Rutka, Ototoxicity, BC Decker, Canada, 2004, 138p
2. Malcolm D Richardson, David. W. Warnock, Fungal infection- Diagnosis & management 4th ed, Wiley –Blackwell publication, 162p
3. P L Dhingra, Diseases of ear, nose and throat, 4th ed, Elsevier publications, 2007, 51p
4. J F Birrell, Logan Turner's Diseases of the nose, throat and nose, 8th ed, John wright and sons, Britain, 1977, 306p.
5. Vrddha Vagbhata, Astanga Sangraha with the Sasilekha Sanskrit commentary by Indu, Chowkhamba Krishnadas Academy, Varanasi, Sutrastana chapter 6/105, 47p.
6. Susrutha, Susruthasamhitha with Nibandhasamgraha commentary by Dalhanaacharya, Chaukambha surabharati prakashan, Varanasi, Reprint 2012, Sutra Stana, chapter 45/220-221, p.g207.
7. Jain NK, Gupta VB, Garg R, Silawat N. Efficacy of cow urine therapy on various cancer patients in Mandsaur District, India - A survey. Int J Green Pharm 2010; 4: 29-35.
8. Ipsita Mohantyi, Manas Ranjan Senapati, Deepika Jena and Santwana Palai, Diversified uses of cow urine, International Journal of Pharmacy and Pharmaceutical Sciences, ISSN- 0975-1491, Vol 6, Issue 3, 2014
9. Bhadauria H. Cow Urine- A Magical Therapy. Vishwa Ayurveda Parishad, 71-74. Int J Cow Sci.2002;1:32–6
10. Gurpreet Kaur Randhawa,Cow urine distillate as bioenhancer, J-AIM, J Ayurveda Integr Med. 2010 Oct-Dec; 1(4): 240–241.
11. http://www.cowurine.com/research.html
12. Russell, Hugo and Ayliffe's Principles and Practice of Disinfection, Adam Fraise, Jean-Yves Maillard, Syed Sattar, 5th ed, Wiley –Blackwell publication, 2013.
13. Dr. Omaprakash W.Talokar, Dr.Archana R. Belge, Dr.Raman S. Belge, Clinical Evaluation of Cow-Urine Extract special reference to Arsha (Hemorrhoids) International Journal of Pharmaceutical Science Invention ISSN (Online): 2319 – 6718, ISSN (Print): 2319 – 67050X www.ijpsi.org Volume 2 Issue 3 ǁ March 2013 ǁ PP.05-08.
14. SAI KISHORE.V*, LAKSHMANA RAO.R, RAMESH.B, ADITYA.K, Department of pharmaceutics, Bapatla college of pharmacy, Bapatla-522101, India, INDIAN COW URINE DISTILLATION AND THERAPEUTIC USES, Mintage Journal of Pharmaceutical and Medical Sciences, ISSN 2320-3315, 03-12-14.

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