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Review Article

AUSHADHA SEVAN MARGA IN AYURVEDA - A REVIEW

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ABSTRACT

Ayurvedic drugs are obtained from the natural source that is from plants, animals and minerals. Different drug will act at different sites of action. Administration of drug in appropriate route is very much important to obtain maximum therapeutic effect. Path by which a drug/fluid/poison or other substances is brought into contact with the body can be defined as route of drug administration. Ayurvedic medicines are intended for internal as well as external use. Dosage form is a finished product of a drug containing the active components of a drug. The various dosage forms can be administered through different channels called *Srotas* like; *Mukha* (oral), *Nasa* (nasal), *Karna* (ear), *Akshi* (eyes), *Guda* (rectum), *Mutra marga* (Urethra), *Yoni* (vagina), *twak* (skin) etc. Mostly these routes are topical. The drug action is very quick, as it is the site of the disease as well, it does not enter the systemic circulation. These are considered to be the pathways from which the drug is carried to different target organs, to show its specific action. The physician based on this *yukti* needs to select the route of drug administration depending upon the *dosha*, *dushya*, *satva*, *satmya*, *bala agni* etc. Here an attempt has been made to explain the various routes of drug administration along with its importance according to Ayurveda.

Keywords: *Aushadha sevana marga*, Ayurveda, Routes of drug administration, *Mukha*, *Twak*, Dosage forms.

INTRODUCTION

The dosage form¹ is the finished product of a drug, which can be administered into the body through various channels. Various dosage forms² are *Swarasa*, *Churna*, *Kalka*, *Kashaya*, *Hima*, *Phanta*, *Avaleha*, *Asava*, *Arishta*, *Gutika*, *Guggulu*, *Vati*, *Vataka*, *Taila*, *Ghrita*, *Arka*, *Upanaha*, *Lepa*, *Malahara*, *Bhasma* etc dosages can be classified into three groups;

- Solid Dosage Forms¹:- *Gutika*, *Vati* (Tablets, Pills, Capsules), *Khanda* (granules), *Guggulu*, *Vartis* (suppositories), *Kshara* (alkaline preparation), *Lavana*.
- Powder Dosage Forms:- *Bhasma* (nano particles), *Sattva*(extraction), *Pisti* (paste form), *Parpati* (thin flakes), *Pottali* (solid form), *Churna* (fine Powders, dusting powder, tooth powders etc)
- Semi-solid Dosage Forms¹:- *Avaleha* (confection), *Lepa*, (ointments, paste, gels, vaginal pessaries, emulsions).
- Liquid Dosage Forms¹:- *Swarasa* (juices), *Kashaya* (decoction), *Asava*, *Arista* (alcoholic preparation), *Arka* (distillates), *Taila* (oil), (syrops, suspensions, gargles, drops-ear, eyes, nose, liniments, inhalations)

Advantages of dosage forms: enhancement of solubility and bioavailability, protection from toxicity, enhancement of

pharmacological activity, enhancement of stability, improving tissue macrophages distribution, sustained drug delivery systems, increased compliance, less total drug administration, increased outcome from the patient

Specific time and route for drug administration³;

Pravisrutohe doshahsthanam aatankaaya adhitshthana murdhadin vaaadustaro bhavati

Tatashch sthana visheshena bhashaja visheshah paryeshitavya. (A. Su 23/3)

The circulating doshas³ will get vitiated & those morbid doshas which remain in specific places will lead to pathological condition of those sites therefore the site of disease or pathology must be well understood and accordingly drug may be administered.

Absorption of the drug² in the body depends upon two criteria;

1. Depending on the properties of drug - lipid, Water solubility, molecular size, particle size, physical forms, chemical nature, dosage forms, formulations, concentrations

2. Depending on the site of administration- area of absorptive drugs, vascularity, pH, presence of other substances, disease condition.

These dosage forms are administered in the body by various routes called as Aushadha sevana Margas as explained in the

various classical texts. Path by which a drug/fluid/poison or other substances is brought into contact with the body can be defined as route of drug administration. Depending upon the pre dominant *dosha* involvement in the manifestation of a particular disease, the route can be adopted for administration. The route of drug administration² can be explained as 8 *Srotas* (channels) in Ayurveda are as:-

1. *Mukha* (Mouth),
2. *Netra* (Nose),
3. *Karna* (Ear),
4. *Akshi* (Eye)
5. *Twak* (Skin),
6. *Guda* (Rectum),
7. *Mutra marga* (urethra),
8. *Yoni marga* (vagina)

1. *Mukha* (Oral route)

The oral route is the most common route of drug administration. The drug is given by mouth. Absorption of drug⁴ in oral cavity is faster due to the presence of buccal mucosa which has a high permeability, relatively immobile mucosa, which makes it a more desirable region for retentive systems used for oral treatment. It contains stratified squamous epithelium⁴ and due to the rich blood supply to the oral cavity the rate of absorption is higher. Oral refers to two methods of administration;

- a. Applying topically to the mouth- viz in *Mukha paaka* (stomatitis) condition.
- b. Swallowing for the absorption along with GIT into systemic circulation.

Dosage forms⁵ like *Vati*, *Gutika*, *Churna*, *Asava*, *Arishta*, *Kashaya*, *Avaleha*, *Khanda*, *Sneha* (Ghrita/Taila), *Arka* etc all oral dosage forms which are swallowed.

The absorption of the drug starts from the mouth then through the esophagus to GIT. *Vamana karma* (emesis) is where the drug is given orally. The therapies like *Kavala* (gargles), *Gandusha* (with holding the medicines in the oral cavity), *Mukha lepanam* etc are done orally. Administration of *rasaushadhi Suchikabharana rasa*¹⁵ is done by making a Small prick on *taalu* (palate) and this medicine is introduced into it with a help of a sterile needle. Given in unconscious patient of *unmada*, *apasmara*, *sannipata jwara* (where the person is unconscious due to fever). Here the drug immediately comes in contact of the blood, increasing the rate of absorption¹⁵. Sublingual, *Pottali kalpana* can be given sublingual in the sub conscious patient. As the absorption of the drug is quicker below the tongue, the action of the drug is seen faster. For drugs that come in delayed release or time-release formulations, breaking the tablets or capsules can lead to more rapid delivery of the drug than intended.

Sublingual tablets² contain the drugs which are destroyed, inactivated or not absorbed in GIT but are directly absorbed through the mucosal tissues of the oral cavity. Lozenge tablets² will not disintegrate in oral cavity they will slowly dissolve in oral cavity to produce continuous effect on the mucous membrane or the throat. Soluble tablets² dissolve in liquid like water, used for mouthwash, gargling, skin lotions, antibiotics etc.

Advantages:- It is convenient and can be self administered, pain free, easy for consumption, easy to carry. Absorption⁴

takes place along the whole length of GIT. It is also cost effective compared to most other route and does not require sterilization.

Disadvantages:- Sometimes inefficient and causes irritation to gastric mucosa, less palatability of some drugs and slow absorption. Slow action and cannot be used in unconscious patients⁴. Only part of the drug may be absorbed, causes nausea, vomiting and cannot be used in emergencies.

Research update:- Pandya Neha⁶, Donga Shilpa, Role of *Phala Ghrita* and *Uttarbasti* in the management of *Vandhyatva* (infertility) with reference to cervical factor, Global J Res. Med. Plants & Indigen. Med.

In Group A, 15 ml of *Phala Ghrita* was given orally twice a day for 2 months with warm Milk and in Group B; Intracervical *Uttarbasti* of *Phala Ghrita* (5 ml) was administered in every sitting for 6 days with 3 days interval after cessation of menses subsequently for two cycles. The results of study revealed that oral administration of *Phala Ghrita* is more effective than the *Uttarbasti of Phala Ghrita* on the cervical factor. *Phala Ghrita* has anabolic and regenerative action on whole of the genital tract and correct the *Agni* when it is given orally. The oral route of administration showed better results.

In a case report by - Krithi Amai⁷, Vijay Negalur, Critical analysis of role of *Kavala* and *Gandusha* in the management of Halitosis, JAHM

Oral hygiene plays an important role in the management of halitosis. *Kavala* and *gandusha* improves the oral hygiene and prevent various diseases of oral cavity.

2. *Nasa* (Nasal route)

Nostrils act as another route of administration. As the nasal mucosa² which is rich in blood supply with larger surface area, porous endothelial membrane, due to bio adhesive property it is very helpful in the absorption of the medicines instilled through nose. Nasal drops are proposed for instillation into the nostrils, used for antiseptic, local and analgesic or vasoconstrictor property. Inhalations² contain volatile ingredients in liquid form and meant for local or systemic action on nasal or respiratory tract, helps to relieve the nasal congestion and inflammation of tract. It can also be added to warm water and vapours are inhaled for 5-10 minutes.

*Nasya karma*⁸ is instillation of medicated *Taila*, *Swarasa*, *Churna* through nostrils in various disorders like *abhishyanda* (conjunctivitis), sinusitis, migraine, allergic rhinitis etc. This *nasya* is classified as *Marsha*⁸- instillation of drugs through nostril during treatment of disease and *Pratimarsha nasya*⁸- daily two drops instillation of drugs through each nostril. *Pradhaman nasya*⁸ is given in the form of *Churna* in the management of *Apasmara* eg; *Zingiber officinale* (Shunti) is used for *nasya*. *Bharangi arka* is used for nebulization. *Durva swarasa* is instilled in epistaxis. *Dhumapana karma*⁸ (medicated smoke inhalation) done through nose in the treatment of *swasa* (dyspnoea), *kasa* (cough), *pinasa* (chronic sinusitis) etc. Antimicrobial drugs are used as they destroy the microorganisms.

Dosage form used - *Churna*, *taila*, *swarasa*, *arka*.

It provides rapid delivery of a drug across the large surface area of the mucous membrane of the respiratory tract and

pulmonary epithelium²⁵. This route of administration is mainly used for drugs that are gases or those can be dispersed in an aerosol in modern medicine.⁸ This route is particularly effective & convenient for patients with respiratory complaints (such as asthma & COPD) because the drug is delivered directly to the site of action & systemic side effects are minimized.

Research update:- Kajaria Divya Kumar⁹, Nebulization therapy- A novel approval to drug delivery system in Ayurveda, International Research Journal of Pharmacy, B.H.U, Varanasi 2011.

Herbal drugs²⁶ like *Clerodendrum serratum*, *Spreng (Bharangi)*, *Inula racemosa*, *Hook (Pushkaramula)*, *Curcuma zedoaria*, *Rosc (Shati)*, *Albizia lebbeck*, *Benth (Shirisha)*, *Cyperus rotundus*, *Linn (Mustaka)*, *Solanum xanthocarpum (Kantakari)* can be given in the form of aerosol through nebulization apparatus, to manage acute asthma in condition where respiratory distress leads to loss of consciousness where no other route of drug administration other than nasal and I.V is available.

3. Karna (Ear)

Route of administration of the drug² is through ears. Solutions can be used in the form of ear drops in otic administration. In order to get them absorbed quickly a sufficient contact time should be provided. Various procedures to treat the ear disorders is carried out.

Karna dhavana¹⁰ - This is done when there is any obstruction in the acoustic meatus due to hardening of the ear wax. To remove the wax, dhavana (washing) is done with the help of water.

Karna purana¹⁰ - In this the medicated oil such as Deepika taila, Karna shulahara ghrita, warm Arkankura swarasa is being filled in the ear for a stipulated time to get the desired therapeutic effect in diseases like Kaphaja karna shula (earache), Karna shweda, Karna srava (ear discharge) which are seen in acute otitis media (madhya karna shotha). In ear discharge Shaivaladi taila, Priyngvadi taila used for karna purana¹⁰.

Karna dhupana- The dhupana karma's are done with the help of dried bruhat kantakari fruits, Vitex negundo nirgundi leaves, in the disease like Krimi karna. Dhupana karma acts as antifungal, antimicrobial in action¹⁰.

Dosage forms used are - *taila, ghrita*.

Advantages - Easy administration, drug administered to the site directly.

Disadvantages - Co-operation of the patient required, difficult to administer in children

4. Akshi (Eyes)

Route of administration is eyes². The medicines are instilled into the eyes are the ophthalmic administration. The cornea, conjunctiva, anterior chamber and iris usually respond to topical therapy. As the skin over the eyelid is a very thin membrane hence the absorption of the drug is much faster. In case where the systemic treatment fail to cross the blood vitreous, blood aqueous and blood retinal barriers the local effect of drugs are seen topically.

*Seka achotanam pindi vidalastarpanam tatha
Putapaako anjanam chaibhihi kalpenetra upacharet
(Sha. Uta. 13/1)*

Therapies¹² like *seka, vidalaka, anjana, aschotana, tarpana, pindi, putapaaka* are being carried out in diseases like *abhishyanda, adhimantha, timira* etc. The various medicines used are *triphaldya ghrita* for *tarpana*, *dhumapana* in *timira*, *manahshiladi anjana, kansyadivarti, pathyadivarti* useful in eye disorders. *Triphala kashaya* is used for *seka*¹⁰.

Dosage forms used- *Ghrita, Taila, Kashaya*

Ophthalmic preparations² are usually liquid preparation in which drugs are dissolved in a suitable media and free from foreign particles to avoid irritation. They have properties like antiseptic, anesthetic, anti inflammatory, mydriatic for diagnostic purpose. Eye ointments are used in suppurative condition of eye as they prevent adhesions of eyelids.

Advantages- Fast absorption of the drug, drug administration is done on the site of the disease hence shows quick results.

Disadvantages- Difficult to carry out these procedures in children, co-operation of the patient is necessary.

5. Twak (dermal)

The route of administration of drug is through *twak* (dermal route)². Skin is the outermost covering of the human body which protects the other tissues and organs. The superficial layers epidermis, the stratum corneum, the basal epidermal layers and the underlying dermis are readily permeable, with passive diffusion process. Drugs with low molecular weight (below 800 daltons) with a high water and lipid solubility show the greatest penetration affecting the absorption of the drug¹³.

Therapies like *Lepa, Alepa, Pralepa, Malahara, upanaha, pradeha, abhyanga, udvartana* etc are done on skin. The dermal layer of skin is exposed to all these treatments usually in skin disorders.

Lepa - Fine *churna* of drugs which contain the antimicrobial activity is used in *acne vulgaris* condition. To reduce *shotha* (inflammation) *dashanga lepa* is beneficial.¹⁴ *Dushta vrana, visha chikitsa* and *kushtha roga* application of *lepa* is indicated. Even after *agni karma* (Cauterization) in *charma keela* (warts), *dushta vrana lepa* can be applied.

Malahara (ointment)¹⁴ are used in conditions like *vrana* (wounds), *dagdha vrana* etc.

Abhyanga (oil massage)¹⁴ is also one kind of treatment done on the skin, it can be generalised or even localised depending upon the diseased condition.

Udvartana - powder is used to massage¹⁴ over the whole body in obesity. This fine *churna* will liquefy the excess fats of the body.

Upanaha - It helps the *vrana shotha* to suppurate fast, to reduce pain and to heal the wound earlier by increasing blood supply to the affected part¹⁴.

Dhupana - It can also be done to the wound to keep the wound clean and thus hastens healing process, it can be done to single organ/part or whole body and even house, O.T etc.

Application of drug directly to the surface of the skin leads to absorption of the drug in the body and produces local effects. Ointment penetrates deep into the tissue of the skin and mainly medicament absorbs into the bloodstream. Water soluble substances are more readily absorbed from water soluble bases. The bases used should be compatible with the skin secretion and should have a pH about 5.5 because average pH of the skin secretions is about 5.5. Generally neutral

ointments bases are preferred; base should be easily applicable as well as easily removable from skin¹³. Creams are viscous semisolid ointment like preparations can be easily removed from the skin and clothing because they contain water soluble bases.

Advantages - Lower risk of side effect, user friendly, can be used for child, old age.

Disadvantages- Local therapeutic effect, not well absorbed into the deeper layers of the skin or mucous membrane

Shiras (Head)¹⁴– The scalp is taken into consideration here where various procedures like *shiro basti*, *shiro pichu*, *prachhana karma*, *shiro abhayanga*, *shiro dhara* are done.

Shiro basti is done in *ardita* (facial palsy), *nidranaasha* (insomnia), *timira* (cataract), *darunaka* (dandruff) etc conditions.

Shiro abhyanga where in oil is applied to the head in conditions like *darunaka* to decrease the increased *vata*¹⁴.

Shiro pichu where in medicated cotton swab is kept over the head in condition like headache, dandruff and hairloss etc.

Prachhana karma – where in small pricks are being made over the *shiras* with the help of a sterile needle so that small amount of blood is allowed to pass through it first and then the medicine is applied over the skin¹⁵

In *unmada* (psychosis) and *apasmara* (convulsions) where the patient is unconscious, treatment is *Suchimukha rasa*¹⁵ *rasaushadi* given at the site of *bramha randhra* (bregma) a small prick is made with the help of a sterile needle through which *suchimukha rasa* is introduced inside.

6. Yoni Marga (Vaginal route)

Yoni is the female genital organ. Vagina is the birth canal in females. Vagina is more prone to infections (UTI) if hygiene is not maintained. The vaginal rugae¹⁶ and micro ridges on the epithelial cells surface permit the vagina to expand, allow the placement of vaginal formulations and increase the surface area of the vagina thus enhancing drug absorption. The vagina has remarkable features in terms of vaginal secretions, pH, enzyme activity and micro-flora. These factors effect formulation spreading and retention as well as absorption and drug release in vagina¹⁶.

a. *Yoni Dhaarana/Pinda*- Placing a *Kalka* or *Pinda* of medicine inside the vagina is termed as *Yoni Dhaarana*. *Vartis* (suppositories) are used in infectious conditions¹⁷.

b. *Yoni Dhaavana*- This procedure is useful to cleanse the female genital organs of excess fluids, vitiated *Kapha*, *Pitta*. It also improves the tone of the local muscles and maintains moisture¹⁷.

c. *Yoni Dhoopana*- Fumigation at the vaginal end.

d. *Yoni Pichu*- Placing a medicated cotton swab/roll of cloth inside the vagina¹⁷.

The swab/roll of cloth should be retained for a long time so that it exhibits action locally. The effect of the vitiated *dosha* can be nullified. The tissues can be strengthened. Ulcers if present heal, pain subsides and the local hygiene improves.

e. *Varti Kalpana* (suppositories)¹⁷ identical with the vaginal tablets. It is employed for a local action of the drug. Characters of drugs used in *Varti Kalpana* – Astringents, hygroscopic, wound healing.

Selection of drug depends on the type of discharge, accompanying symptoms and pathology. Suppositories are special shaped solid pharmaceutical formulation meant for insertion into the body cavities. They either melt or dissolve at body temperature in the cavity fluid to release the medicament. These may be used for smoothening, lubricating and as antiseptic, local anaesthesia or as astringent. They show systemic effect.

Advantage - Easy to administer, quick onset of action, minimal systemic side effects, an increase in bioavailability, first pass metabolism can be avoided.

Disadvantage – Gender specificity, variability in drug absorption related with menstrual cycle, menopause and pregnancy, personal hygiene, causes irritation to the mucosa, causes discomfort.

Research update:- In a case report by- Verma Anjali,¹⁸ Sarvesh Kumar, Role of *Chandrodaya varti Agnikarma* in the management of cervical erosion, JAHM

Here a case study of 31 year woman complained foul smelling white discharge and intermittent bleeding per vagina after every intercourse. *Chandrodaya varti* is known for its excellence in eye disorder *Chandrodaya varti* is antiseptic antiphlogistic balance *vata* and *kapha*. *Agnikarma* by *Chandrodaya varti* is much more effective in the management of cervical erosion in several aspects as compared to electro-cauterization¹⁸.

7. Guda (rectal route)

It is administration of drug through anal route². Lower portion of rectum affords a large absorption surface area from which soluble substances can pass quickly and reach the venous circulation directly and rapid action of drug is produced. Enema is aqueous or oily solution acts both locally and systemically². Rectum is rich in blood and lymph supply. So drugs administered through it get absorbed into superior haemorrhoidal vein from upper part of rectal mucosa. From there it enters the portal vein and thus enters systemic circulation and acts for the action like purgative, sedative, anthelmintic, anti inflammatory or nutritive effects suppositories produce its action by irritating the mucous membrane of rectum².

Basti (enema) therapy¹⁹ is carried out by this route where in medicated *oil*, *kashaya*, *ghrita*, *kalka* etc is being introduced into the rectum. *Niruha basti*, *anuvasana basti*, *yoga basti*, *matra basti* are various types of *bastis* given through *guda marga*. *Kshara karma*- here *kshara sutra* is used to treat *arsha* (hemorrhoids), *bhagandara* (fistula), warts etc. *Vartis* are given in *vibandha* (constipation) for the easy passage of the faeces¹⁹.

Dosage forms - *Vartis*, *taila*, *ghrita*, *kalka*, *churna*, *kashaya* Any condition of unconscious state refers to rectal administration (enema) of the medicine as this route bypass the portal circulation and reaches the target soon.

Advantage- Causes quick absorption of the drugs due to the high vascularity, can be given easily in unconscious patients.

Disadvantage- Causes irritation and pain in the rectum, not comfortable to the patient, difficult to administer in non cooperative patients.

Research update:- Pragya Singhal²⁰, A clinical study to evaluate the efficacy of combined effect of ayurvedic drugs

and *Basti* in the management of constipation-predominant Irritable bowel syndrome (IBS) *Pakvashayagata vata*

In group A-15 patients were given *panchasakara choorna* and *mahashankha vati*. In group B-10 patients were given combination of ayurvedic drugs *panchasakara choorna*, *mahashankha vati* along with *basti* for a period of 16 days. Group B showed better improvement in comparison to group A. Thus *basti* therapy is effective in the management of *pakvashayagata vata* or constipation predominant IBS.

8. *Mutra Marga* (Urethral route)

Administration of drug is through the urethral passage.² In males urethra acts as passage for both urine and semen. Because of the rich blood supply the rate of absorption of the drug administered is quick². Suppositories are rarely administered to treat erectile dysfunction. As per one research done the urethral route is used as a topical anesthetic route in the treatment of benign prostatic hyperplasia²¹.

Uttarbasti can be given by this route²². *Uttarabasti*- It is given in upper passage (*uttara marga*) urinary or vagina in females, than the usual anal passage and is superior in qualities known as *uttarbasti*. It tones up reproductive organs and improves the quality of *ambu* (cervical mucus). Thus by applying proper drug through *uttarbasti* (intra cervical route), disorders of female reproductive tract can be cured. Given after *Nirooha basti* and given through *mutra marga*. As it does unction (snighdata) it is considered like *anuvāsana basti* and others consider it like *nirooha basti* as it performs cleansing as well. *Uttarbasti* is given for *Vandhyatwa* (infertility) treatment²².

Dosage forms- *Taila*, *ghrita* etc.

Advantages- Commonly used in males, quick action as directly it acts on site of disease.

Disadvantages- If any obstruction in the passage cannot be given, Causes irritation to the sensitive urethral passage, co-operation of the patient is necessary, causes discomfort to the patient.

In a case series - Jasmine Gujarathi²³, Ritesh G, *Uttarbasti* in the management of female infertility with special reference to Anovulation, JAHM.

Uttarbasti was given with *shatpushpa taila*. Preparation mentioned in Kashyap samhita for use in many gynaecological disorders, it showed a significant result in infertility treatment. *Uttarbasti* removes the blockage²³ and helps at level of receptors in endometrium as well as ovary for hormonal balance, it cures anovulation.

DISCUSSION

- *Aushada Sevana Margas* are the routes by which different drug preparations are administered into the body depending on the *dosha*, *dushya* involvement in a particular disease along with the *bala*, *satmya*, *satva*, *agni* etc of the patient and the *yukti* (intelligence) of the physician.
- Involvement of all the *tridoshas* are required for the manifestation of a disease. But the predominant *dosha* can be taken into consideration along with its site, to cure the disease. For example, *kapha dosha* is more predominant in *urdwa jatru gata rogas* and is also the site for *kapha*, so the route of administration can be *nasa*, *shiras* (scalp), oral and therapies like *nasya karma*, *shiro dhara* etc can

be adopted. Orally *vamana karma* acts best for *kaphaja vyadhis*²⁸.

- Site of *pitta* being *Pakwaamashyamadhya*, here oral route can be selected for *virechana karma* etc. For *vata dosha pakwashaya* is the site hence *adho marga* of administration like the *guda*, *yonis*, *mutra* can be adopted. *Basti karma* is considered as best treatment for *vata gata rogas*²⁸.
- Depending on the *satva* and *bala* of the patient like if *pravara satva* (more strength) *shodhana* therapies *vamana*, *virechana* etc can be adopted, incase of *avara satva*(less) *shamana* treatment is given. The route of drug administration also depends on the site of disease manifestation where the drug effect is seen more in topically than systemically. Where ever required the physician can give oral medication along with topical application depending on the disease condition. Ayurvedic Dosage forms²⁹ can be administered based on the *aushadha sevan kaala*. All these are based on the *yukti* of the physician to select a good quality medicine³⁰ with proper route of administration
- A well qualified physician has to be aware of all these routes of drug administration to ensure proper treatment. Considerations of anatomy, physiology, pathology, pharmacology, therapeutics and convenience all determine the route of drug administration.
- *Mukha* (oral) route of administration is most commonly used as it is convenient, cost effective and easy, can be self administered, pain free, easy to carry. Absorption takes place along the whole length of GIT starting from the oral cavity and does not require sterilization.
- Nasal route helps in respiratory disorders by giving *dhumpāna*, *nasya* in diseases like sinusitis, migraine, alopecia, greying of hair, respiratory complaints etc. It provides rapid delivery of a drug across the large surface area of the mucous membrane of the respiratory tract and pulmonary epithelium. This route of administration is mainly used for drugs that are gases, liquids and solids (*churna*).The drug is delivered directly to the site of action & systemic side effects are minimized.
- In the routes of administration by *karna* and *akshi* the drugs are easily administered to the site of the disease. The cornea, conjunctiva, anterior chamber and iris usually respond to topical therapy. As the skin over the eyelid is a very thin membrane hence the absorption of the drug is much faster. Where the systemic treatment fail to cross the blood vitreous, blood aqueous and blood retinal barriers so local effect of drugs is seen topically.
- *Twak* - External application (dermal route) application of drug directly to the surface of the skin leads to absorption of the drug in the body and produces local effects. Ointment penetrates deep into the tissue of the skin and mainly medicament absorbs into the bloodstream. It has lower risk of side effects and is user friendly, can be used for child, old ages, painless. In *prachhana karma* the drug directly comes in contact with the blood this can be correlated to the intra venous route of administration in Ayurveda.

- In *Yoni marga* (intra cervical), suppositories either melt or dissolve at body temperature in the cavity fluid to release the medicament. These may be used for smoothening, lubricating and as antiseptic, local anaesthesia or as astringent. They are easy to administer, quick onset of action is seen, minimal systemic side effects, and increased bioavailability, first pass metabolism can be avoided and show systemic effect, but can be done in females only.
- *Mutra marga* (intra urethral) in males is used to give *uttara basti* especially for the infertility treatment. Because of the rich blood supply to urethra, the rate of absorption of the drug administered is quick.
- *Guda* (rectal route) – Lower portion of rectum affords a large absorption surface area from which soluble substances can pass quickly and reach the venous circulation directly and rapid action of drug is produced cures diseases like haemorrhoids etc *kshara karma* is done locally in fistula and haemorrhoids. *Basti* is considered to be the best treatment (*ardha chikitsa*) for vataja disorders and is given through this route for better results.
- The absorption of the drug depends upon lipid water solubility, molecular size, particle size, physical forms, chemical nature and dosage forms etc.
- The topical route of administration acts better in disorders of eyes, ears, skin etc. In condition like (IBS) with constipation, the *basti* along with oral medication of ayurvedic drugs gives better results rather than only oral route.
- The routes of drug administration such as intravenous, intra arterial are not much developed in Ayurveda. This may be due to the fact that Ayurveda believe in using the drug as a whole rather than using its single molecule.
- The route of drug administration is chosen based on the time required for a drug action and duration of drug absorbed at the various sites.
- This indicates that, each route of administration is important in its own way depending upon the various factors of the disease and the diseased, correct route of administration needs to be adopted for a better result of the patient.

CONCLUSION

The various routes of drug administration are mentioned in the classics, this proves that the ancient classics were aware about the physical characteristics of the drug, the rate at which the drug absorbed or released accuracy of dosage and condition of the patient in order to achieve high concentration at particular sites. Based on the time required for a particular drug to act and the site at which the drug is absorbed well are the criteria's on which the route of drug administration is decided along with the consideration of the patient's condition. The need of the hour is to carry out research on new routes of administration, like the intravenous routes etc from which the Ayurvedic drugs can be administered, for the quick betterment of the patient. Further scope in this regard can be carried out with the help of other science.

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