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(Association of Anaesthetists of Indian Medicine)

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August 2001 **Volume 4, Number 2**

CONTENTS

Editorial Board 1

Office Bearers 2

Editorial 5

Gynaecological and Obstetrical Surgery an Ayurvedic View 9
- VANDANA BARANWAL and K.K. PANDEY

Evaluation of Fundamental Concept of Ayurveda and its Significance in the Prevention and Management of Physical and Mental Disorders 13
- ARUNA AGRAWAL

Studies on *Ashwagandha* under Epidural Anaesthesia 25
- D.N. PANDE and D.A.R. SHAKUNTALA

Concept of Marmas with Special Reference to Antradhi Marma in the Light of Modern Anatomical Concept 47
- NEELAM GUPTA, SHIVJI GUPTA, ARUNA AGRAWAL and G.P. DUBEY

Drug Manufacturing and their Standardisation 59
- C.B. JHA

Role of Blood and its Components in Wound Healing 67
- K.K. THAKRAL

Neuromuscular Blocking Drugs 71
- R.K. GOEL

Proceedings - Sangyaharan Day Observed by A.A.I.M. (M.S.B.) 77

The News: Workshops, Seminars and Conferences 79

Editorial

Through this column once again I want to draw the attention of Ayurvedic World (Ayurvedic Students, Physicians, Surgeons, Administrators and Academicians) to accept Sangyaharan as the need of present scenario. We cannot develop Ayurveda as a Total Health Science without developing Sangyaharan in each Ayurvedic Institutions. Our President Prof. D.P. Puranik very clearly presented his realistic view regarding Sangyaharan at an important juncture – ***Inaugural Function of IVth National Conference of A.A.I.M., S.D.M. College, Udupi (Karnataka) on 24th November 2000.*** *This Presidential Address is very much appealing, therefore I am repeating his address in this editorial column as such.*

"No discovery ever made in Medicine has proved more beneficial to human race than the discovery of Anaesthesia, not only because it has alleviated the fearful pain of Surgery but also because the whole structure of modern medicine has drawn strength from its success".

On the otherhand it is seen that stalwarts in Ayurvedic Medicine never gave due importance to Sangyaharan. Because of this unpardonable negligence towards anaesthesia all the branches of Ashtang Ayurved could not do expected progress after certain limit. The branches which suffered most were Shalyatantra, Shalakyatantra and Strirog-prasuti tantra. Because of unavailability of anaesthesia services the Ayurvedic surgeons had no options other than to opt for "Kasharsutra" as the only surgical procedure they could practice.

At least now all the Surgeons and Gynecologists working in the field of Ayurvedic Medicine should realize the importance of Sangyaharan and they should come forward to strengthen and support the organizations like A.A.I.M. They should also put efforts to start Post Graduate Courses in Sangyaharan at various states so that more experts can be made available for their own benefit. Because the present information reveals that there are so many Institutes in India which are imparting Post Graduate training in Shalya-Shalakya-Strirog, but unfortunately there is one and only one Institute in India which is imparting training in Sangyaharan and that is B.H.U., Varanasi. This requires a prompt and immediate change.

So it's my strong appeal to all concerned authorities from C.C.I.M., Directors of Ayurved from various states and the learned stalwarts from various Universities that atleast now they should understand the importance of Sangyaharan and should take necessary steps to start Post Graduate degree courses in Anaesthesia in atleast one Institute in every state.

In the meanwhile, I would say it will be most practicable if a Diploma Courses of two years duration in Sangyaharan are started simultaneously, so that the need for sufficient number of experts can be made available at an earlier stage.

The status of Sangyaharan in various Institutes and Universities is below satisfactory. Specialities of Sangyaharan are given secondary treatment and at many places they are working under the dominance of Surgeons. Even at B.H.U. there is no separate department of Sangyaharan and as yet they have to work as a section of Shalya-Shalakya Department.

So it is my strong demand that a special recognition should be given to Sangyaharan and there should be provision of separate department of Sangyaharan in every Institute of Indian Medicine, in India. I am very proud to mention here that at my Institute at Pune, at Seth Tarachand Ramnath Charitable Ayurvedic Hospital of Tilak Ayurved Mahavidyalaya, Anaesthesia Department has been established in way back in 1950 having separate entity and separate functioning. It will be again interesting to know that State of Maharashtra is the first state in India to start Post Graduate Anaesthesia Courses (Fellow) in 1960's proving that they are the real pioneers to start Post Graduation in Anaesthesia on the pattern of Western Medical Science. I think this is an ideal example to be followed by all states.

No science can do progress without research. Any science or branch of science can show progress only if there is continued process of research in it. Without research, science becomes stand still. So I strongly stress the need of research in Sangyaharan at various levels. At present research work is being carried out at Post Graduate education level at B.H.U. with limited scope. Unless we succeed in starting these courses at many places the process of research will not be geared up. Here I stress the need of "Interpathy Research". Unless our research studies do not have basic modern structure and modern parameters assessment it will not be accepted by the Modern World. Research in Medicine is really boundless and I hope our new generation will certainly devote themselves for this cause. Interpathy Research will definitely promote the process of action, reaction and interaction amongst different pathies, especially Ayurved and Allopathy. This will help in uplifting the standards of research studies in Indian Medicine and widen the scope of acceptance by entire world.

At organisational front, A.A.I.M. is definitely doing satisfactory progress. The number of membership is at increase. Even Modern anaesthetists have shown their willingness to enroll for membership. We have succeeded in opening two new state branches and I am sure, in near future we will be able to open more state and territorial branches to strengthen our

movement. National conferences, workshops, seminars, Sangyaharan Day, Clinical meetings are being organized to provide platform for youngsters to present their academic and research work. Overall I see a very bright future for our Association in coming years.

Though, it seems, that overall things are going smooth and well and progress and status of Association is satisfactory, the path of the Association is not without problems. Association has many obstacles to cross. There is constant oppositions from outside and from inside. To achieve the aim is not an easy task. But I am very confident that with the strong will and efforts of colleagues and Association workers we will cross all obstacles and ultimately will succeed in achieving our goal.

To sum up my speech I put forth following points for pursue. (1) Strong demand should be made to start with Diploma and Degree Courses of Anaesthesia at University level (2) Surgeons and Gynaecologists should join in the movement (3) There should be promotion for interpathy research (4) There should be establishment of separate departments of Sangyaharan at University level and at Institutes of Indian Medicine.

Our ultimate aim is to provide Painless conditions to human race. Modern Medical Science says that we should strive in future to give even better and safer services of pain relief and care to our patient and if West and East meet, will provide the Best for Mankind.

Our great Ayurved Science depicts it with the words.

सर्वेपि सुखिनः संतु, सर्वे सन्तु निरामयाः

With this inaugural speech of our President – Prof. D.P. Puranik, I think our readers will appreciate and will put pressure accordingly on the authorities at their own places to create ***Department of Sangyaharan*** *all over the country.*

Jai Hind-Jai Sangyaharan

Devendra Nath Pande
Chief Editor

Gynaecological and Obstetrical Surgery an Ayurvedic View

BARANWAL VANDANA* and PANDEY K.K.**

A vast part of Gynaecological and obstetrical treatment comprises of surgery. Ayurveda has recognised and reviewed various surgical process in females. Good scientific descriptions of psychophysical preparation of patients, poorva karma (pre operative aspect of surgical treatment), pradhan karma (Operative procedures), paschat karma (post operative management, complications and their management) etc. has been clearly mentioned in Sushrut Samhita, Astanga Hridaya, Astanga Sanigraha, Charak samhita and other ayurvedic texts.

Conditions where operative interference is mainly indicated in female are: Mudhgarbha, Udar roga, Arbud, Vidradhi, Nadi vrana, granthi roga, Mansavridhi, Stana vidradhi, Stana roga, Rakta gulma and Sadyha vrana etc.[1]

Consent

As todays Indian law requires informed consent from patient or responsible person, similarly consent from patients' guardian, consent from rulers of the state, consent of supreme powers through prayers was essential before proceeding for any operative procedure.[2]

Hospital and Hospice Care

Isolation of patient and sterilization of articles not only prevents infection but hastens the good recovery of operated patients. Hospital should be built on ideal, auspicious land, properly ventilated, free from direct sunrays etc. Bed should be clean, comfortable and facing towards east. Attendants should be friendly, expert in patient care, strong, healthy, free from diseases and obedient. This all is necessary for proper patient care. Isolation gives female patients needed privacy too.[3]

A good surgeon must always keep a few things always ready for use such as yantra, shastra, kshar, agni, shalaka, pichu, vastra, sutra, patra, patla, madhu, ghrita, vasa, milk, oil, santarpan dravya, various decoctions, anointing material, drugs, fan, hot and cold water etc.[4]

All the surgical procedures should be conducted on auspicious day and date and at auspicious time. The process should proceed the worshiping supreme powers in form of sacrifices, prayers to God, Agni, Brahin, senior surgeon etc. It not only prepares the patient psychologically for operative procedures but also enhances the surgeons

* Senior Resident, Prasuti Tantra, Institute of Medical Sciences, Banaras Hindu University, Varanasi.

** Lecturer, Stree-Rog Sangyaharan, Department of Prasuti Tantra, Institute of Medical Sciences, Banaras Hindu University, Varanasi.

confidence and attendants faith.[5]

Pre-op. Preparation

Bowel preparation is mentioned if surgery is needed in mudhgarbh, that, patient should remain empty stomach. In care of nadi vrana, arbuda etc. patient should be fed properly before operative procedure so that she had enough strength to bear the pain and doesn't faint easily. As anaesthesiology was not very well developed, strength of patient to bear the pain of trauma of surgery was important. Various types of 'Madya' was given to the patient so that she can bear the pain of surgical trauma.[6]

Qualities of Surgeon

Surgeon performing the surgical procedures should be courageous, fast and precise in his work. He should not hesitate, sweat and tremble while doing surgery. He should be an expert in making precise incisions of appropriate size, at right place and time.[7]

Methods

Tiryaka incision should be made for surgery in axilla, lower pelvis and sides. Incision in abscess of breast is also indicated.

For wound closer suture of fine material like fine thread, fine fibres of bark of Asmantak (ficus rumphii blume), cotton thread, hairs of horse, fibres of murva (masdenia tenacissima W.), guduchi (Tinospora cardifolia) etc. should be used. Wound edges should be lifted and after proper apposition stitches are applied neither too close nor too far apart from one another. As needed vellitak, gofanika, tunnasevani or rijugranthi types of sutures are to be used.[8]

Properly sutured wound is covered with cloth piece or swab. It could be sprinkled with powdered priyangu (callicarpa macrophylla vahl.), madhuyasthi (Glycyrrihiza glabra Linn.), sallaki (Boswellia serrata Roxb.) or ash of souveranjan or ash of atasi (Linns usitatissiumum Linn.).

If indicated wound should be bandaged with cloth piece, cotton, skin, bhurja patra (Betula utilis), barks of various trees, rope, even metallic baudage also find mention. For abdominal wound vivandh bandh and mandal bandh are indicated, for lower abdomen and pelvis Gofan bandh is indicated.[9]

For management of pain in incised wounds and other surgical cases irrigate the wound with ghrita prepared with madhuyasti powder (Glycirrhiza glabra). According to Charak after mudhgarbha nirharan various types of madya should be given to drink according to strength of patient for 'kastha suddhi' and pain relief.

Balvardhak, Brihan, santarpan, sneharahita yavagu should be given. Deepniya, Jeevaniya, brihaniya drugs should be given. Sneha prepared with madhu and vathar

drugs should be given vasti mainly anuvasan can be given, vednasthapak and vedna shamak chikitsa is done.[10]

For good wound healing dietic and daily regimens of patient should be monitered. A wound treated by learned, experienced vaidya heals well. Guggul (comiphora mukul), agar (A guilaria agallocha Roxb.), Ral (Sal niryas i.e. Boswellia serrata sap), shweta sarshap (Brassica serrata sap), rakta sarshap (Brassica compestris var.), Lavan, neem leaves (Azadirecta indica) mixed in ghrita and dhoopan should be done. It keeps the environment aseptic and thus prevents wound infections.[11]

In cases of haemorrhage, bleeding site should be covered with powder of following drugs - pathani lodhra (Symplocos racemosa Roxb. var.), Mulethi (Glycerrhiza glabra), Priyangu (callicarpa macrophylla), patanga (leaves of tamala tree i.e. cinnamonmum tamala), gairika, ral, rasanjan (extract of berberis aristata), sankha, seep, urada, yava, wheat etc. Bleeding site should be gently rubbed and pressed with ash of cotton cloth. Tight bandage can also be applied. Bleeding site can be covered with leaves of kamal (Nelumbo nucifera) or wet clothes. Patient should be given cold milk, sharkara and rice to eat. She should be made to sleep in a cool calm place. If above procedures fail to check bleeding the site should be burned with khsar or agni. Same vein (which is bleeding) should be tied at other end. Sweet preparations of drugs of kakolyadigana, honey, sharkara should be given for drinking. Blood of various animals like. Aed, harina (species of deers), hare, wild boar etc. should be given to drink. Milk, mungyush, snigdha diet should be given. Other complications arising due to excessive bleeding should be managed symptomatically.[12]

About the prognosis of disease and prognosis of the patient after operative interference, it has been said that those female patients who are young, strong and are pran-sampat, satva-sampat yukta, recover well and in them wound heals easily, they are considered as 'suchikitsya' as in young ladies sharir dhatu are also new, have tendency to grow hence heal normally. Wounds of abdomen, lower pelvis heal comparatively easily and without complications. They are sukhasadhya. But those, who are suffering from other diseases too like madhumeha, kustha, shosha and whose bodies contain toxins, are krisha are considered 'Krichya sadhya'. Wound which get infected and wounds where new wounds form in older wounds are considered 'Krichya sadhya'.[13]

The perusal of the above references reveal that gynaecological and obstetric surgery was well developed during ancient period. The concept of pre op, intra op and post op management was very scientifically established. Not only this, the medicolegal aspect was also understood well.

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Evaluation of Fundamental Concept of Ayurveda and its Significance in the Prevention and Management of Physical and Mental Disorders

AGRAWAL ARUNA*

Ancient Indian physicians have made an all out effort to understand the fundamental meaning and purpose of life. The basis of Indian life was a sort of realistic idealism. The practice of life was made to agree with its philosophy. It was not a mere speculation but a way of living. People have certain objectives in life, which is guided with philosophical and ethical codes. The fundamental concept related to health was not only a systematization of concepts and theories but it is a quest, both of an immediate experience of reality and achievement of virtuous life. The physical and spiritual aspect of life does not stand in isolation but are skillfully blended into a hormoneous whole.

Freedom from the miseries is the ultimate goal of life. This can only be achieved when a man can attain perfect physical and mental health. The richness of Indian speculation about the psychosomatic complex has been due to the immense desire to live full length of purposeful life. Good life means not only an ethically virtuous life, but also a life that is free from disease and which attains its normal span. To be a successful man, it is not sufficient that one practices the ethical virtues only, but one must also practice the physical, physiological and social virtue of life as well. It is the duty of the every person to live a healthy and long life.

Ayurveda is name which the ancient Indians gave to their science of medicine. *Ayuh* means life and *Veda* means knowledge. Therefore, Ayurveda is a science by the knowledge of which life can be prolonged and its nature can be understood. In an broader sense, Ayurveda like *dharma* (religion) is not departmentalized; it includes the adaptation of customs, traditions, ethics, hygiene and medicine. The entire life is a compact unity sutured with an all-pervading idea of nobler experience. According to Charaka, the spiritual life must be intensely active on the right path and direction. It should manifest itself in purity, clear vision and resolute devotion to a definite objective. This can only be possible by the proper knowledge of things, self-control and self-concentration. In brief Ayurveda includes the social, cultural, physical, psychological and spiritual aspects of life. Therefore, total approach of Ayurveda is holistic.

The word *sukha* and *arogya* are synonym, which means happiness and health. Similarly, the word *dukha* or misery and *vyadhi* (disease) are synonyms. State of discomfort or pain is included under the term *vyadhi*. Even psychological discomfort caused by attachment and antipathies have also been included under natural diseases which require immediate attention. Human being is a composite whole of *sattva* (mind),

* Department of Basic Principle, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi - 221 005.

atma (soul) and *sarira* (gross body). Therefore, the concept of health is its undivided and integrated form, which signifies the physical, mental and spiritual health. Normalcy of *vata, pitta, kapha, sattva* and *raja* and *tama* are responsible for the maintenance of physical and mental health and the deviation of the above signifies disease. The normalcy of physical body can be maintained by prescribed regimen of life and balanced diet. Whole *sadvritta* (code of conduct) includes the discipline of sense and mind, alongwith the regulation of moral and social life in order to keep ones mind, and also the humanity as a whole to be happy and healthy. Ancient seers have never considered man in pieces but as a composite whole.

While defining a normal health, *Sushruta* mentions, that apart from the normalcy of structure and function of the body one must have the purity and clarity of his *indriyas* (sense), *manas* (mind) and *atma* (soul). The above definition of normalcy not only includes the physical health but also mental and spiritual health.

The Ayurvedic system of medicine is based on the sound concept which includes *purusha* (conscious process), *prakriti (sattva, raja* and *tama)*, psychophysical reality (panchmahabhutas), *doshas* (sharirika physical or somatic) *manasika* (psychic), *dhatus* (body tissue) and *malas* (metabolic biproducts).

The above concept of health is not a metaphysical speculation but also based on practical applications. The Ayurvedic system or medicine is different from other system of medicine.

The concept of consciousness (*purusha or atma*)

The Ayurvedic concept of origin of life begins with the speculation of soul. The consciousness is the essential characteristics of *atma* or *purusha* (soul). In classical literature of Ayurveda the concept of soul has taken more objective view. This system has adapted a critical, analytical and scientific attitude in explaining certain fundamental concepts about the origin of life. According to Ayurveda *purusha* and *prakriti* are the main cause in the process of evolution. The ultimate components are the three Gunas viz., sattva, raja and tama. The creation of universe take place only when the conscious self (*purusha*) comes in the contact with unconscious nature (*prakriti*).

The *purush* is the witness of all our waking, dreaming and sleeping experiences. Soul is one in each body. It is separate from body and senses.

Ayurveda being an applied science has classified the concept of soul in three groups:

1. *Chetan-dhatu purusha* (pure consciousness)
2. *Shad-dhatu purusha* (Consciousness associated with panchamahabhuta)
3. Chaturvinshatitattvatmak *purusha* (consciousness alongwith 23 other elements)

Chetna-dhatu purusha is consist of one principle and is similar with *purusha* of *Samkhya*. *Sad-dhatu purusha* is the combination of five Mahabhutas and the *atma*. Chaturvinshatritattvatmaka *purusha* is the combination of 24 elements i.e. *prakriti, buddhi, ahamkara*, five subtle elements *(tanmatras), manas*, ten *jnanendriyas* and five *mahabhutas* (Charaka Sharira, 1:80-81, Charaka Sharira, 1:15). Charaka has described various symptoms of presence of *atma* (conscious) in the body. Charaka has mentioned 22 qualities of *purusha* which are referred to the characteristics of *atma*. They are *prana, apana, ucchavasa, nimesha-unimesha, indriyantara samcara* (migration of manas from one *indriya* to other), *prerana* (inspiration), *dharana* (to bear), *deshantargati* in *svapna* (traveling various countries in dream) *panchatva-grahana* (death), *icchha* (desire), *dvesha* (jealousy), *sukha* (happiness), *dukha* (sorrow), *prayatna* (action), *chaitanya* (consciousness), *dhriti* (patience), *buddhi* (intellect), *smriti* (memory), *ahamkara* (ego) reappearance of perception which was perceived by *indriyas* in the past.

Sushrut has described sixteen qualities of *purusha* which are *sukha* (happiness) *dukha* (grief), *iccha* (desire), *dvesa* (jealousy), *prayatna* (effort), *unimesha* (twinkling of eyes), *nimesha* (blinking), *buddhi* (intellect), *manah samkalpa* (mental determination), *manahkarma* (mental functions), *vastu vicara* (thinking process), *smriti* (memory), *vijnanabodha* (scientific knowledge), *buddhi vyapara* (intellectual process), *visayopalabdhi* (knowledge of the words) (Sushruta Sharira 1:18).

From the above study it is evident that Ayurveda has provided logical analysis regarding the origin and nature of consciousness. The propounders of Ayurveda were the first who propounded the rational theory of consciousness to explain its nature in more objective manner.

Concept of *Panchamahabhuta*

The doctrine of human body as well as the greater part of the diagnosis and treatment of Ayurvedic medicine is based on the concept of certain basic substances which pervade the organism and maintain its functioning. The entire universe is made up of *panchamabhutas*. Therefore, the universe is called *Bhautic Srishti*. The development of living organism as well as non-living materials both are *Panchabhautic* in nature.

According to *Charaka, akasha, vayu, agni, apa* and *prithvi* are the five *bhutas* and sound touch, colour, taste and smell respectively are their qualities. Apart from the five special qualities perceived by sense-organs, *Charaka* has defined on the basis of many other qualities such as *kharatva* (hardness) and *gurutva* (heaviness) for *Prithvi, sansiddhi-kardravata* (natural liquidity), *snigdhatva* (stickiness) and *shitatva* (coldness) for *apa, ushnatva* (hotness) and *tikshnatva* (radiancy) for *tejas, chalatva* (mobility) and *rukshatva* (dryness) for *vayu* and lastly *apratighata* (non-resistance) in *laghutva* (lightness) for *akasha*.

Panchamahabhutas play a significant role in the creation of physical universe including life process. It is the material cause of physical universe. When it is in gross form, it is designated as *bhutas*. *Sushruta* presented a comprehensive scheme of *panchabhautic* creation of universe as well as the life process.

Ayurveda has elaborately dealt with the role of *bhutas* in the development of foetus and their influence on body composition, *bhautic* composition of different body residues, vital organs (*marma*) and sense-organs, conversion of five *bhutas* in *tridoshas*, five types of *bhutagnies* and their role on synthetic aspect of metabolism, manifestation of six tastes, depends upon the predominance of a particular *bhutas*, drug *dosha* relationship and their *bhautic* composition etc.

Doctrine of *Tridosha*

The doctrine of *dosha* play an important role in the development of fundamentals of Ayurveda medicine. *Dosha* has two dimensions.

1. *Sharirika* (Somatic)
2. *Manasika* (Psychic)

The entire psychological make up of an individual is based on *dosha* theory. The psychic component (*Manasika dosha*) represents the temperamental dimension of living being while the bodily component (*Sharirika dosha*) represents the structural and functional aspects (gross and subtle) of the body.

Tridosha theory is the further development of concept of *panchamahabhuta*. *Tridosha* is a biological entity responsible for structural and functional aspects of living organism. The entire concept of health and disease is based on the equilibrium of *Sharirika* (somatic) and *manasika* (psychic) *doshas*. The normalcy of *doshas* is called health while imbalance of *doshas* is responsible for physical and mental disorders. Apart from diagnostic and therapeutic aspect the course, complication and ultimate prognosis of disease are also based on the relative status of *sharirika* and *manasika doshas*.

Ayurveda has provided a comprehensive guideline for maintaining *doshas* within the arbitrary boundary of normalcy. Similarly the management of various disease conditions are also guided by the relative status of *doshas* in the body. *Vata, pitta* and *kapha* are the three essential constituents of living organism which govern the entire structural functional dimension of living being. A gross understanding of the nature of these three *doshas* suggest that entire physical volume in a living body is constituted by *kapha* system. The entire chemical process operating in the living body are the manifestations of *pitta*. The entire functional aspect and the activities are attributed by the *vata* system. It is called *dosha* because it has capacity to vitiate the other *doshas* and producing ill health.

Ayurveda has given a comprehensive description regarding the method of keeping *doshas* in the state of equilibrium. By adopting a specific regimen of life an individual can maintain the health status and can prevent himself from disease and decay.

Vata

Vata is one of the important *dosha* responsible for entire gross and subtle activities of the body. Without *vata* other two *doshas* are inactive. It is considered as the principal source of energy and responsible for the regulation of *manas* (mind). *Sharira vayu* (biophysical force) is considered most significant, because it controls all the vital functions. On the basis of location and function *vayu* has been classified into five types i.e. *prana vyana, samana, udana* and *apana (Sushruta Nidan 11:1). Prana vayu* in its normal condition is located in *Sira* (head), *Uras* (chest), *Kantha* (throat), *Jihva* (tongue), *Nasika* (nose) and *Mukha* (mouth). It is responsible for the respiration and diglutation of food and water. Similarly, it carries food to the stomach (amashya) for the digestion (Charaka Chikitsa 28:6). *Prana vayu* is more important and significant because the existence of remaining *vayu* depends upon *prana vayu. Udana vayu* is responsible for speech and action. It initiates the *marmas* (mind) for its specific functions. *Samana vayu* helps in digestion and it separates the essence of nutrient materials form the food. It is also responsible for physical strength, brightness of complexion and governs enthusiasm *(Charaka Chikitsa 28:3-4).* The main function of *Apana vayu* is to regulate the excretion of sperm, urine menstrual blood etc. It also helps in the foetal movement specially at the time of delivery (*Sushruta Sharira* 7:8-9). In the normal state, the *vayu* is said to perform entire physiological functions on the body.

Pitta

Pitta is one of the important constituents of living human body. *Agni* is located in *pitta* and is responsible for normal and abnormal functions of the body. This quality of *pitta* is known as *antaragni* or internal fire (*Sushruta Sutra* 21:9). Digestion, visual perception, generation of body heat, colour of the body, courage, fear, anger, cheerfulness, confusion lucidity, are the main physiological and psychological functions of the *pitta* (*Charaka Sutra* 12:11). Physically *pitta* is liquid, viscous, light acidic hot, sharp, penetration. The colour of *pitta* is yellow and blue (*Astanga Samgraha Sutra* 1:28; *Sushruta Sutra* 21:6).

The five types of *pitta* have been mentioned in *Sushruta Samhita* and *Ashtanga Hridya*. these are *packaka, ranjaka, sadhaka, alochaka* and *bhrajuka pitta (Sushruta Sutra* 21:6; *Astanga Samgraha Sutra* 20:5). *Pachaka pitta* is located in *amashya* (stomach). It is responsible for appetite and digestion. It causes, thirst, insomnia, yellowness of urine, eyes and skin. It is also considered as the by-product of the blood (*Sushruta Sutra* 21:1; *Astanga Hridya* 3:3,4). *Ranjaka pitta* is located inliver and spleen (*Sushruta Sutra* 21; 10).

Ranjaka *pitta* confers the colour ot *rasa* and is responsible for the formation of blood *Sushruta Sutra* 21:10).

Sadhaka *pitta* is located in *Hridya*. It is also known as *Sadhakagni* (*Sushruta Sutra* 21:10). It is responsible for higher mental faculties and emotional functions (*Sushruta Sutra* 4:31). It helps in the fulfillment of four fold objectives of life (*Charaka Sutra* 12:11). Its functions described by *Charaka* are *Shaurya* (courage, bravery), *bhaya* (fear complex), *krodha*. (anger) or *harsha* (happiness) and *moha* (delusion) (*Charaka Sutra* 12:11). The main function of *alochaka-pitta* is to catch the external object (*Sushruta Sutra* 12:13). *Bhrajaka pitta* is locted in the skin of entire body and its important function is to impact colour to the skin and also to produce lusture (*Charaka Sutra* 12:12).

From the perusal of Ayurvedic literature it is evident that *pitta* is a process which takes part in the various aspect of health particularly in the regulation of digestion, metabolism and energy transformation.

Kapha

Kapha is the most important and stable constituent of the living body. It is responsible for the physical and pyschological funcitonings of the body. The physical characteistics of *kapha* as described in Ayurveda are the promotion of unctuousness (sneha), binder (*bandha*) sturdiness of the body (*sthiratva*), promotion of the bulk of the body (*gaurava*) sexual potency and the capacity to reproduce (*vrishata*), strength (*bala*), forebearance (*kshma*), fortitude (*dhriti*), (*Charaka Sutra* 18:5), lubrication of the body joints (*Sandhi-Sleshana*), the promotion of the unctuousness (*sneha*) healing and repairative processes (*ropana*) storage (*purana*) and firmness to the limbs (*sthiryakrita*) (*Sushruta Sutra*) 14:4). On the basis of specific location and functions *kapha* has been divided into five types, viz. *Kledaka, avalambaka, bodhaka, tarpaka* and *sleshaka* (*Astanga Samgraha Sutra* 20:12). The five types of *kapha* refer to the specific functions performed by it in different parts of the body.

Charaka has described three etiological factors responsible for various diseases i.e. *Asatmendriyartha samyoga* (misuse of sense organs) prajnaparadha (error of judgement) and *parinam* (imbalance of time). Among these three causes of miseries, prajnaparadha includes derrangement of intellect, retention power and memory. A person whose intellect, recall or retention power and memory is derranged, indulges into undersired acts which leads to various diseases. Misuse of sense organs cannot be separated form *prajnaparadh*. Due to *prajnaparadh* (error of judgement) the violation of mind affects the body and speech. Imbalance of time i.e. excess heat, cold or rain, or cold in summer or heat in cold season etc. are responsible for causing many physical and mental disorders.

As a matter of fact the constitutional basis of health and disease is the very fundamental of Indian system of medicine (*Charaka Vimana* 8:93-95, 6: 14-17, *Charaka Sutra* 20:9-10, *Charaka Chikitsa* 7, *Sushruta Sharira* 4: 72, *Astanga Hridya Sharira* 3).

Ayurveda has given a comprehensive account regarding the determining factors of *dehamanas prakriti*. According the detemining factors have been classified into ante-natal and post-natal factors. Constitution or personality of man can be divided into different manners and in different types.

The determining factors may be decided into two major groups.

1. Ante-natal factors
2. Post-natal factors

The antenatal factor includes *shukra-shonita prakriti* (nature of sperm and ovum), *kala-garbhashaya-prakriti* (time of conception), *Matur-ahar-vihar prakriti* (diet and mode of living of pregnant woman) and *Mahabhuta-vikara-prakriti* (predominance of any one of the *bhutas*).

The post-natal factors include- *Jati-prasakta* (caste of race), *Kula-prasakta* (clan or family, *Deshamupatini* (geographical environment), *Kalanupatini* (season, time) *Vayonupatini* (effect of ageing) and *Pratyatmaniyata* (personal habits) (*Charak Viman*-8:106, *Sushruta Sharira* - 4:72, *Ashtanga Hridya Sutra* - 1:4-10, *Astanga Hridya Sharira* 3:10).

The most important one is the *dosha prakriti* i.e. the classification of mankind according to the predominance of one or the other of the three *doshas* which are supposed to be the three essential constituent of the living organism. The natural predominance of one or the other of these three *doshas* presents the natural characteristics of individual human constitution. In Ayurvedic system of medicine the whole concept of health and disease, the prevention and treatment are based on these three types of constitutions. And thus it is rooted in *tridosha* theory of Ayurveda.

Charak, has clearly accepted diachotomy between mind and body. Therefore, he had classified human personality into two main groups.

1. *Manas prakriti* (Psychic personality)
2. *Deha prakriti* (Physical constitution)

***Manas Prakriti* (Psychic dimension of Human Personality)**

The profounders of Ayurveda have clearly recognized the distinction in human temperament and the inter-individual and intra-individual differences in psychological and moral disposition and his reaction to socio-cultural and geographical environment. Following the *samkhya* concept of trigunas all the classical literature of Ayurveda have classified human temperament on the basis of relative predominance of Sattva, Rajas and Tamas (Charaka Sarira - 4: 36, *Sushruta Sarira*-1, 18 *Vagbhatta Sarira*-8:35).

The apparent variations in the inter-individual as well as intra-individual psychological behaviour are due to the relative expression at a given movement of the trigunas in the Sharira (body) (*Charaka Sutra*, 1: 45-47). In brief the *Purusha* or living

being is the outcome of the body, mind and there is an integral relationship between the body and the mind. They are supposed to be complimentary to each other and thus the *Purusha* or the living being is a psychosomatic entity.

Charak was the first who gave an elaborate description of *tridosha* theory and propounded the concept of human personality in relation to health and disease. These three humors i.e. *vata, pitta* and *kapha* when they are in the state of equilibrium, there is normalcy of the body. But usually it is not present because at the time of conception, out of three any *dosha* which is in predominance, the body manifest that particular *dosha*. The natural predominance of one or the other of these three humors present the natural characteristic of individual personality. There is always limited genetic variation of these humours in the body. This genetically determined relative preponderance of particular *dosha* reflects into the variations that are seen in the psychosomatic constitution of a man. On the basis of the relative predominance of the one or the three basic *doshas* the psychosomatic constitution of man may be divided into seven categories *vatic, paittic, Kaphaja, vata-pitta, vata-kaphaja, pitta-kaphaj* and *sama-doshaj* (*Sushruta Sarira* - 4:62-63; *Vagbhatta Sarira* - 8,9,10,11).

Clinical significance of constitutional study

Ayurveda has been considerable emphasis on the importance of constitutional assessment in maintaining normal health. Similarly disease susceptibility may also be determine on the basis of particular constitution. It is also pointed out that course, complication and ultimate prognosis can also be determined by constitution assessment of an individual. In our own series of study we have noticed that vatic individuals are more susceptible to infection, allergic reaction, and coronary artery disease, while *kaphaj* individuals are prone to develop diabetes mellitus, hypertension and coronary artery disease. We have noticed that drug and dose requirement also significantly varies according to the type of *prakriti*.

In the recent years attempt has been made to develop objective parameters to determine the *deha-manas prakriti* and to establish relationship between *prakriti* and disease susceptibility. After a scientific study of *prakriti* a new dimension of knowledge has been merged in the field of preventive and promotive medicine. The risk factors of each clinical condition may be identified and preventive measures may be launched accordingly.

The concept of *Saptadhatu* (Body tissues)

The concept of *Saptadhatu* is the later development in the Indian system of medicine. The total body is made up of seven elements known as *dhatus*. The body functions properly so long as the *dhatus* are in proper proportion.

Dhatus (tissues) are seven in numbers viz.; *rasa, rakta, mansa, meda, majja, asthi* and *shukra* (*Charak Chikitsa* 15:16-17). According to Sushruta the term *dhatu* (tissue) is defined as substance, which supports the body. The main function of dhatu is *dharna* (support and nourish). *Tridoshas* are described as *doshas* because they have a tendency to vitiate the *dhatus*. Similarly, the *sapta dhatus* are also known as *dusya* because they have tendency to be vitiated by *doshas*. In abnormal state, both are called malas (Charak Sutra 4: 198). Nutrient substances i.e. the *dhatus*, undergo *paka* (digestion) under the influence of their own ushma (agni) and there after pervade to the *dhatus* through their own (specific) *srotamsi* (channels). The seven dhatus that support the body, undergo two kinds of *pak* (digestion) viz., *prasad* and *kitta*, each under the influence of its own agni. Entire ancient Indian Medical literature has postulated the view that *sapta dhatus* are produced in a kind of progressive evaluative metamorphosis, beginning with *rasa-dhatu* and ending with *shukra-dhatu*. From *rasa* (plasma), *rakta* (blood) is formed, from *manas* (muscle), *medas* (adipose tissue), from *medas, asthi* (bone), from *asthi majja* (bone marrow), from *majja shukra* (semen) and from *shukra-garbha*.

In brief it can be concluded that the structural, functional and behavioural aspects of living beings are governed by *tridosha* theory. Obviously, *tridosha* has three separate groups of processes, i.e. physical, physiological and phychological. The theory of psycho-physiological interaction assumes a mutual influence of these processes while psychological events are said to cause physiological changes and vice-versa. The propounders of Ayurveda were the first to demonstrate that psychic phenomenon particularly anxiety and stress are important cause of stress related diseases. There is a need of scientific evaluation of fundamental concept of Ayurveda for the application of *tridosha* theory in the regulation of physiological homeostasis. In several studies attempt have been made to develop objective parameters to evaluate the utility of the above concept in clinical diagnosis and therapy. Several electrophysiological and biochemical indices have been developed to measure the level of *doshas* not in the form of substance but in the form of biochemical and biophysical parameters. There is a need of global attempt to evaluate the above concept for prevention and management of diseases.

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Studies on *Ashwagandha* under Epidural Anaesthesia

PANDE D.N.† and SHAKUNTALA D.A.R.*

INTRODUCTION

The effective management of post operative pain is matter of great concern for the Anaesthesiologist since very beginning of the origin of surgery. The post operative drugs therapy for pain management is now replaced by the technique of using local analgesic agent particularly in epidural and intercostals blocks. But due to time consumption and due to its serious complications reliance is still placed for the most part, on narcotic analgesic. Though it is an excellent analgesic and hypnotic agent, certain side effects e.g. respiratory depression, nausea, vomiting and addiction restricts its use. So, in our section of Sangyaharan a research was made to find out an analgesic without respiratory depression, sickness and addiction. In continuation to these studies we have tried *Ashwagandha Ghan-Satva* to assess the potentiation of analgesic effect of epidural anaesthesia and synergistic analgesic action with NSAIDs, piroxicam.

MATERIAL AND METHOD

No. of patient	-	45 Female patient
Operation	-	Abdominal and vaginal hystectomy
Anaesthesia	-	Epidural with 0.5% Bupivacain and 2% Xylocain with Adrenaline – 1:200000
Group I (Control group)	-	No. of patients 15
Premedication	-	Atropine sulphate 0.6 mg I.M. 60 minutes before operation
Group II (Control group)	-	No. of patients 15
Premedication	-	Atropine sulphate 0.6 mg I.M. and injection piroxicam 40 mg 60 minutes before operation
Group III (Trial group)	-	No. of patients 15
Premedication	-	One gm of *Ashwagandha Ghan-Satva* Orally 90 minutes before operation with injection atropine sulphate 0.6 mg and Piroxicam 40 mg I.M. 60 minutes before operation

† Lecturer and Incharge, Section of Sangyaharan, Institute of Medical Sciences, Banaras Hindu University, Varanasi.

* Lecturer, College of Indigenous Medicine, Colombo, Sri Lanka.

OBSERVATION AND RESULTS

Clinical study

Result of evaluation of Ashwagandha Ghansatva (water extract) on premedication

Physiological and Psychological effects of Ashwagandha Ghansatva (water extract)

Table 1. The number of patients and nature of premedication drugs in the selected three groups.

Group	No. of patients	Premedication drug
I	15	Inj.-Atropine sulphate 0.6 mg I/M 60 minutes before operation
II	15	Inj.-Atropine sulphate 0.6 mg I/M and Inj. Piroxicam 40 mg I/M, 60 minutes before operation
III	15	Inj. Atropine sulphate 0.6 mg I/M and Inj. Piroxicam 40 mg I/M, 60 minutes before operation and water extract of Ashwagandha Ghansatva 1000 mg, orally with an ounce of plain water 90 minutes before operation

The above table shows the nature and dose of premedication drugs and number of patients in each groups. The number of patients in all the three groups are equal i.e. 15 in each group.

Age and Weight

Table 2A. The mean age (years) and weight (kg.) of all the patients in different groups.

Group	Age		Weight	
	Mean	±S.D.	Mean	±S.D.
I	42.4	2.56	43.73	4.68
II	41.33	3.17	43.4	4.68
III	40.87	2.85	46.46	3.97

Age

The mean age of group I, II and III as shown in Table 2A are 42.4 ± 2.56, 41.33 ± 3.17 and 40.87 ± 2.85 years respectively. On statistical comparison of the mean age between the groups are found comparable (P>0.05).

Table 2B. The Statistical comparison of Mean age and weight between the groups.

Groups Compared	Mean age			Mean weight		
	t value	P value	Remark	t value	P value	Remark
I vs II	1.019	>0.05	N.S.	0.194	>0.05	N.S.
I vs III	1.54	>0.05	N.S.	1.82	>0.05	N.S.
II vs III	0.417	>0.05	N.S.	1.93	>0.05	N.S.

N.S. = Not significant

Weight

The mean weight of group I, II and III as shown in Table 2A are 43.73 ± 4.68, 43.4 ± 4.68 and 46.46 ± 3.97 kg., respectively. The mean weight between the groups are identical (P>0.05).

Height

The mean height (cm) for group I, II and III as shown in Table 3A are 150.13 ± 4.86, 150.86 ± 2.06, 150.13 ± 3.83 respectively. The mean height difference between the groups are found statistically not significant.

Table 3A. The mean height (cm) of all the patients in different groups.

Group	Mean	±S,D,
I	150.13	4.86
II	150.86	2.06
III	150.13	3.83

Table 3B. The statistical comparison of mean height (cm) between the groups.

Group compared	t value	P value	Remarks
I vs II	0.53	>0.05	0.53
I vs III	0.00	>0.05	N.S.
II vs III	0.65	>0.05	N.S.

N.S. = Not significant

Effect on Pulse rate

The mean pulse rate variation as observed before and after premedication in different groups (I, II and III) as shown in Table 4A are 82.53 ± 4.94 (IA) and 93.33 ± 13.19

(IB), 86.8 ± 7.73 (IIA) and 96.0 ± 10.36 (IIB) and 88.53 ± 10.5 (IIIA) and 93.5 ± 13.6 (IIIB) respectively. The difference of the rise in the mean pulse rate, 60 minutes after premedication in both the groups I and II are 10.8 and 9.2 respectively which is statistically significant when compared within the groups (IA vs IB and IIA vs IIB) but in group III it is insignificant. The difference of mean pulse rate/min, between the three groups are identical before premedication level as well as after premedication level.

Table 4A. The mean pulse rate changes (Per minute) before and after premedication in different groups.

Group	Before Premedication		After Premedication	
	Mean	±S.D.	Mean	±S.D.
I	82.53	4.94	93.33	13.19
II	86.8	7.73	96.0	10.36
III	88.53	10.5	93.5	13.6

Table 4B. The statistical comparison of mean pulse rate (per minute) changes before and after Premedication within the groups.

Group compared	t value	P value	Remarks
IA vs IB	2.97	>0.02	Sig.
IIA vs IIB	2.75	>0.02	Sig.
IIIA vs IIIB	1.11	>0.05	N.S.

Sig. = Significant; N.S. = Not significant
A = Before premedication; B = After Premedication

Table 4C. The Statistical comparison of mean pulse rate (per minute) changes, before and after premedication, between the groups.

Groups Compared	Before Premedication			After Premedication		
	t value	P value	Remark	t value	P value	Remark
I vs II	1.80	>0.05	N.S.	0.61	>0.05	N.S.
I vs III	2.00	>0.05	N.S.	0.034	>0.05	N.S.
II vs III	0.51	>0.05	N.S.	0.56	>0.05	N.S.

N.S. = Not significant

Effect of Blood Pressure

Table 5A. The mean of mean blood pressure (M.B.P.-mmHg) changes before and after premedication in different groups.

Group	Before Premedication		After Premedication	
	Mean	±S.D.	Mean	±S.D.
I	90.30	7.89	93.32	8.82
II	91.37	9.04	94.70	4.99
III	93.06	5.57	95.02	6.85

Table 5B. The statistical comparison of mean of mean blood pressure (mmHg) changes before and after Premedication, within the groups.

Group compared	t value	P value	Remarks
IA vs IB	0.99	>0.05	N.S.
IIA vs IIB	1.25	>0.05	N.S.
IIIA vs IIIB	0.85	>0.05	N.S.

N.S. = Not significant

A = Before premedication; B = After Premedication

Table 5C. The Statistical comparison of mean pulse rate (per minute) changes, before and after premedication, between the groups.

Groups Compared	Before Premedication			After Premedication		
	t value	P value	Remark	t value	P value	Remark
I vs II	0.345	>0.05	N.S.	0.52	>0.05	N.S.
I vs III	1.108	>0.05	N.S.	0.59	>0.05	N.S.
II vs III	0.61	>0.05	N.S.	0.14	>0.05	N.S.

N.S. = Not significant

The mean of M.B.P. (mm Hg) changes as observed before and after premedication in group I, II and III as shown in Table 5A are 90.31 ± 7.89 (IA) and 93.32 ± 8.82 (IB), 91.37 ± 9.04 (IIA) and 94.4.99 (IIB) and 93.06 ± 5.57 (IIIA) and 95.02 ± 6.85 (IIIB) respectively. The differences between the pre and post premedication readings in all the three groups are insignificant after statistical comparison within the groups. On statistical comparison between the groups all the readings at pre and post premedication level are identical. A negligible rise in the mean of M.B.P. in all the groups after premedication carries no value.

Effect on Respiratory Rate

Table 6A. The mean respiratory rate (per minute) variations before and after premedication in different groups.

Group	Before Premedication		After Premedication	
	Mean	±S.D.	Mean	±S.D.
I	19.93	1.43	19.66	1.54
II	20.2	1.97	19.8	1.56
III	19.3	1.04	19.3	1.17

Table 6B. The statistical comparison of mean respiratory rate (per minute) changes before and after Premedication, within the groups.

Group compared	t value	P value	Remarks
IA vs IB	0.519	>0.05	N.S.
IIA vs IIB	0.624	>0.05	N.S.
IIIA vs IIIB	0.00	>0.05	N.S.

N.S. = Not significant
A = Before premedication; B = After Premedication

Table 6C. The Statistical comparison of mean respiratory rate (per minute) changes, before and after premedication, between the groups.

Groups Compared	Before Premedication			After Premedication		
	t value	P value	Remark	t value	P value	Remark
I vs II	0.43	>0.05	N.S.	0.36	>0.05	N.S.
I vs III	1.4	>0.05	N.S.	0.75	>0.05	N.S.
II vs III	1.6	>0.05	N.S.	1.0	>0.05	N.S.

N.S. = Not significant

The mean respiratory rate changes as observed before and after premedication in different groups (I, II and III) as shown in Table 6A are 19.93 ± 1.43 (IA) and 19.66 ± 1.54 (IB), 20.2 ± 1.97 (IIA) and 19.8 ± 1.56 (IIB) and 19.3 ± 1.04 (IIIA) and 19.3 ± 1.17 (IIIB) respectively. The statistical comparison shows that the difference of mean respiratory rate/min within the groups, before and after premedication, as well as the changes before and after premedication between the three groups are statistically comparable.

Effect of Temperature

Table 7A. The mean temperature variations (°F) before and after premedication in different groups.

Group	Before Premedication		After Premedication	
	Mean	±S.D.	Mean	±S.D.
I	98.06	0.48	98.36	0.52
II	98.08	0.34	98.24	0.61
III	98.02	0.44	98.26	0.41

Table 7B. The statistical comparison of mean temperature (°F) variations, before and after premedication, within the groups.

Group compared	t value	P value	Remarks
IA vs IB	1.87	>0.05	N.S.
IIA vs IIB	0.89	>0.05	N.S.
IIIA vs IIIB	1.54	>0.05	N.S.

N.S. = Not significant

A = Before premedication; B = After Premedication

Table 7C. The statistical comparison of mean temperature variations (°F) before and after premedication, between the groups.

Groups Compared	Before Premedication			After Premedication		
	t value	P value	Remark	t value	P value	Remark
I vs II	0.135	>0.05	N.S.	0.63	>0.05	N.S.
I vs III	1.69	>0.05	N.S.	0.66	>0.05	N.S.
II vs III	0.428	>0.05	N.S.	0.103	>0.05	N.S.

N.S. = Not significant

The mean temperature variations as observed before and after premedication in different groups (I, II and III) as shown in Table 7A are 98.06 ± 0.48 (IA) and 98.36 ± 0.52 (IB), 98.08 ± 0.34 (IIA) and 98.24 ± 0.61 (IIB) and 98.02 ± 0.44 (IIIA) and 98.26 ± 0.41 (IIIB) respectively. The statistical comparison shows that the variations of mean temperature (°F), within the groups and between the groups, before and after premedication are identical.

Desirable and Undesirable Effects

Table 8A. Incidence of desirable effects in the patients of the different groups, after premedication.

Desirable effects	Groups I		Groups II		Groups III	
	No. of patients	%	No. of patients	%	No. of patients	%
1. Sedation						
Present	01	6.66	0	0.00	13	86.66
Absent	14	93.33	15	100.0	02	13.33
2. Lack of apprehension						
Present	0	0.00	02	13.33	13	86.66
Absent	15	100.0	13	86.66	02	13.33
3. Lack of excitement						
Present	4	26.66	03	20.0	15	100.0
Absent	11	73.33	12	80.0	0	0.00

Sedation

Sedation is found in 6.66%, and 86.66% patients in groups I and III respectively, but in group II sedation is completely absent.

Lack of apprehension

Lack of apprehension was observed in, 13.33% and 86.66% patients in groups II and III respectively, but it was recorded as nil in group I.

Lack of excitement

26.66% of patients is group I and 20% of the patients in group II show lack of excitement where as 100% of the patients in group III shows lack of excitement.

Dizziness

Dizziness was observed was observed in 6.66% patients in both the groups II and III but non in the group I.

Nausea and Vomiting

The emetic symptoms are completely in all the three groups.

Dryness of Mouth

Dryness of mouth was found in 100% patients in both the groups I and II but in group III it is 53.33%.

Table 8B. Incidence of some undesirable effects in the patients of the different groups, after premedication.

Undesirable effects	Groups I		Groups II		Groups III	
	No. of patients	%	No. of patients	%	No. of patients	%
1. Dizziness						
Present	0	0.00	1	6.66	1	6.66
Absent	15	100.00	14	93.33	14	93.33
2. Nausea						
Present	0	0.00	0	0.00	0	0.00
Absent	15	100.00	15	100.00	15	100.00
3. Vomiting						
Present	0	0.00	0	0.00	0	0.00
Absent	15	100.00	15	100.00	15	100.00
4. Dryness of Mouth						
Present	15	100.00	15	100.00	8	53.33
Absent	0	0.00	0	0.00	7	46.66

Effects on the course of subsequent Anaesthesia

Effect pulse rare

Table 9A. The mean pulse rate (per minute) changes before premedication and during course of subsequent anaesthesia, in different groups.

Group	Before Premedication		During Anaesthesia	
	Mean	±S.D.	Mean	±S.D.
I	82.53	4.94	83.66	1.04
II	86.8	7.73	86.73	23.88
III	88.53	10.5	84.00	4.76

Table 9B. The statistical comparison of mean pulse rate (per minute) changes before premedication and during course of subsequent anaesthesia, within the groups.

Group compared	t value	P value	Remarks
IA vs IB	0.87	>0.05	N.S.
IIA vs IIB	0.011	>0.05	N.S.
IIIA vs IIIB	1.52	>0.05	N.S.

N.S. = Not significant
A = Before premedication; C = During anaesthesia

Table 9C. The statistical comparison of mean pulse rate (per minute) changes before premedication and during course of subsequent anaesthesia, between the groups.

Groups Compared	Before Premedication			After Premedication		
	t value	p value	Remark	t value	P value	Remark
I vs II	1.80	>0.05	N.S.	0.49	>0.05	N.S.
I vs III	2.00	>0.05	N.S.	0.26	>0.05	N.S.
II vs III	0.51	>0.05	N.S.	0.43	>0.05	N.S.

N.S. = Not significant

The mean pulse rate (per minute) changes before premedication and during course of subsequent anaesthesia, as shown in Table 9A are 82.53 ± 4.94 (IA) and 83.66 ± 1.04 (IC) 86.8 ± 7.73 (IIA) and 86.73 ± 23.8 (IIC) and 88.53 ± 10.5 (IIIA) and 84 ± 4.76 (IIIC) respectively. Although the differences of the mean pulse rate before premedication and during anaesthesia, are 1.13 rise in group, 1, 0.07 and 4.53 decrease in group II and III respectively, comparison within the groups are statistically insignificant (P>0.05). The difference of the mean pulse rate before premedication and during subsequent anaesthesia, between the groups are also statistically identical (P>0.05).

Effect of Mean Blood Pressure (M.B.P.)

The mean of M.B.P. (mm Hg) changes before premedication and during course of subsequent shown in Table 10A are 90.30 ± 7.89 (IA) and 91.15 ± 4.73 (IC), 91.37 ± 9.04 (IIA) and 88.77 ± 6.50 (IIC) and 93.06 ± 5.57 (IIIA) and 89.92 ± 6.43 (IIIC) respectively. Although the differences of mean of M.B.P. before premedication and during anaesthesia are, 0.85 rise in group 1, 2.6 and 3.14 decrease in group II and III respectively. On statistical comparison within the groups are identical (P>0.05), Table 10B). The difference

of mean of M.B.P. before premedication and during subsequent anaesthesia, between the groups are comparable (P>0.05, Table 10C).

Table 10A. The mean of M.B.P. (mm Hg) changes before premedication and during course of subsequent anaesthesia, in different groups.

Group	Before Premedication		During Anaesthesia	
	Mean	±S.D.	Mean	±S.D.
I	90.30	7.89	91.15	4.73
II	91.37	9.04	88.77	6.50
III	93.06	5.57	89.92	6.43

Table 10B. The statistical comparison of mean and M.B.P. (mm Hg) changes before premedication and during course of subsequent anaesthesia, within the groups.

Group compared	t value	P value	Remarks
IA vs IB	0.36	>0.05	N.S.
IIA vs IIB	0.902	>0.05	N.S.
IIIA vs IIIB	1.43	>0.05	N.S.

N.S. = Not significant

A = Before premedication; C = During anaesthesia

Table 10C. The statistical comparison of mean of M.B.P. (mm Hg) changes before premedication and during course of subsequent anaesthesia, between the groups.

Groups Compared	Before Premedication			After Premedication		
	t value	p value	Remark	t value	p value	Remark
I vs II	0.345	>0.05	N.S.	1.44	>0.05	N.S.
I vs III	1.108	>0.05	N.S.	0.59	>0.05	N.S.
II vs III	0.61	>0.05	N.S.	0.48	>0.05	N.S.

N.S. = Not significant

Effect on respiratory rate

The mean respiratory rate (per minute) changes before premedication and during course of subsequent anaesthesia, as shown in Table 11A are 19.93 ± 1.43 (IA) and 19.93 ± 1.86 (IC), 20.2 ± 1.97 (IIA) and 19.26 ± 0.703 (IIC) and 19.3 ± 1.04 (IIIA) and 19.2 ± 1.26

(IIIC) respectively. The comparison of the differences of mean respiratory rate, within the groups as well as between the groups, before premedication and during anaesthesia are identical statistically (Table 11B and 11C P>0.05).

Table 11A. The mean respiratory rate (per minute) changes before premedication and during subsequent anaesthesia, in different groups.

Group	Before Premedication		After Premedication	
	Mean	±S.D.	Mean	±S.D.
I	19.93	1.43	19.93	1.86
II	20.2	1.97	19.26	0.703
III	19.3	1.04	19.2	1.26

Table 11B. The statistical comparison of mean respiratory rate (per minute) changes before premedication and during subsequent anaesthesia, within the groups.

Group compared	t value	P value	Remarks
IA vs IC	0	>0.05	N.S.
IIA vs IIC	1.77	>0.05	N.S.
IIIA vs IIIC	0.23	>0.05	N.S.

N.S. = Not significant

A = Before premedication; B = After Premedication

Table 11C. The Statistical comparison of mean respiratory rate (per minute) changes before premedication and during subsequent anaesthesia, between the groups.

Groups Compared	Before Premedication			After Premedication		
	t value	p value	Remark	t value	p value	Remark
I vs II	0.43	>0.05	N.S.	1.31	>0.05	N.S.
I vs III	1.4	>0.05	N.S.	1.25	>0.05	N.S.
II vs III	1.6	>0.05	N.S.	0.16	>0.05	N.S.

N.S. = Not significant

Effect on total fluid input

Table 12A. The mean of total fluid input (ml) changes during course of subsequent anaesthesia, in different groups.

Group	Mean	±S,D,
I	1173.33	177.14
II	1153.33	215.85
III	1284.00	273.69

Table 12B. Statistical comparison of the mean total fluid input (ml) changes during course of subsequent anaesthesia, between the groups.

Group compared	t value	P value	Remarks
I vs II	0.27	>0.05	N.S.
I vs III	1.31	>0.05	N.S.
II vs III	1.45	>0.05	N.S.

N.S. = Not significant

The mean of total fluid input (ml) during course of subsequent anaesthesia, in different groups (I, II and III) as shown in Table 12A are 1173.33 ± 177.14, 1153.33 ± 215.85 and 1284.00 ± 273.69 respectively. The statistical comparison of the mean total fluid input (ml) during anaesthesia, between the groups are insignificant (P>0.05, Table 12B).

Evaluation of Effect on Anaesthetic Time

Table 13A. The mean of anaesthetic time (minutes) of all the patients in different groups.

Group	Mean	±S,D,
I	174.33	7.108
II	176.86	8.806
III	215.53	19.79

The mean anaesthetic time (minutes) in different groups (I, II and III) as shown in Table 13A are 174.33 ± 108, 176.86 ± 8.806 and 215.53 ± 19.79 respectively. Although the difference of rise in mean anaesthetic time (minutes) between the group I and II is 2.53, which shows statistically insignificant (P>0.05). But the difference of rise in mean anaesthetic time (minutes) between the group I and III and group II and III are 41.2 and 38.67 respectively, which shows statistically highly significant (P<0.001, Table 13B).

Table 13B. The statistical comparison of the mean anaesthetic time (minutes) of all the patients, between the groups.

Group compared	t value	P value	Remarks
I vs II	0.86	>0.05	N.S.
I vs III	7.54	<0.05	H S.
II vs III	6.906	<0.05	H.S.

N.S. = Not significant, H.S. = Highly significant

Effect on Surgical Time

Table 14A. The mean surgical time (minutes) of all the patients in different groups.

Group	Mean	±S,D,
I	90.66	25.203
II	77.00	17.402
III	78.8	18.03

Table 14B. The statistical comparison of the mean surgical time of all the patients, between the groups.

Group compared	t value	P value	Remarks
I vs II	1.72	>0.05	N.S.
I vs III	1.48	>0.05	N.S.
II vs III	0.27	>0.05	N.S.

N.S. = Not significant

The mean surgical time in different groups (I, II and III) as shown in Table 14A are 90.66 ± 25.203, 77 ± 17.402 and 78.8 ± 18.03 respectively. The surgical time of the different groups are identical statistically (P>0.05, Table 14B).

Post Anaesthetic Response

Effect on pulse rate

The mean post anaesthetic pulse rate (per minute) changes, in different groups (I, II and III) as shown in Table 15A are 86.73 ± 2.40, 88 ± 4.29 and 86.26 ± 6.88 respectively. The comparison of mean post anaesthetic pulse rate (per minute) changes between the groups are statistically comparable (Table 15B, P>0.05).

Table 15A. The mean post anaesthetic pulse rate (per minute) changes of all the patients in different groups.

Group	Mean	±S,D,
I	86.73	2.40
II	88.00	4.29
III	86.26	6.88

Table 15B. The statistical comparison of the mean post anaesthetic pulse rate (per minute) changes, between the groups.

Group compared	t value	P value	Remarks
I vs II	0.99	>0.05	N.S.
I vs III	0.24	>0.05	N.S.
II vs III	0.82	>0.05	N.S.

N.S. = Not significant

Effect on blood pressure (mm Hg)

Table 16A. The mean of mean post anaesthetic blood pressure (mm Hg) changes of all the patients in different groups.

Group	Mean	±S,D,
I	92.48	2.44
II	90.08	6.76
III	95.15	7.99

Table 16B. The statistical comparison of mean of mean post anaesthetic blood pressure (mm Hg) changes of all the patients, between the groups.

Group compared	t value	P value	Remarks
I vs II	1.304	>0.05	N.S.
I vs III	1.24	>0.05	N.S.
II vs III	1.87	>0.05	N.S.

N.S. = Not significant

The mean of mean post anaesthetic blood pressure (mm Hg) changes in different groups (I, II and III) as shown in Table 16A are 92.48 ± 2.44, 90.08 ± 6.76 and 95.15 ± 7.99

respectively. The statistical comparison of mean of mean post anaesthetic blood pressure changes, between the groups are identical (P>0.05 Table 16B).

Effect on respiratory rate

Table 17A. The mean post anaesthetic respiratory rate (per minute) changes of all the patients in different groups.

Group	Mean	±S,D,
I	22.46	6.34
II	22.33	2.49
III	23.46	3.27

Table 17B. The statistical comparison of mean post anaesthetic respiratory rate (per minute) changes of all the patients between the groups.

Group compared	t value	P value	Remarks
I vs II	0.075	>0.05	N.S.
I vs III	0.54	>0.05	N.S.
II vs III	1.06	>0.05	N.S.

N.S. = Not significant

The post anaesthetic respiratory rate (per minute) changes in different groups (I, II and III) as shown in Table 17A are 22.46 ± 6.34, 22.33 ± 2.49 and 23.46 ± 3.27 respectively. The statistical comparison of mean post anaesthetic respiratory rate (per minute) changes between the groups, show insignificant (P>0.05 Table 17 B).

Effect of temperature (°F)

Table 18A. The mean of recovery period temperature (°F) changes of all the patients in different groups.

Group	Mean	±S,D,
I	98.01	0.05
II	97.94	0.39
III	97.98	0.14

Table 18B. The statistical comparison of mean recovery period temperature (°F) changes of all the patients between the groups.

Group compared	t value	P value	Remarks
I vs II	1.17	>0.05	N.S.
I vs III	0.704	>0.05	N.S.
II vs III	0.42	>0.05	N.S.

N.S. = Not significant

The mean recovery period temperature (°F) changes in different groups (I, II and III) as shown in Table 18A are 98.01 ± 0.05, 97.94 ± 0.39 and 97.98 ± 0.14 respectively. On statistical comparison of mean recovery period temperature (°F) changes, between the groups are statistically identical (P>0.05 Table 18 B).

Analgesic Requirement

First Analgesic dose requirement

Table 19A. The mean of the first analgesic dose requirement time (in minutes) of all the patients in different groups.

Group	Mean	±S,D,
I	40.46	18.81
II	195.93	60.52
III	467.0	139.908

Table 19B. The statistical comparison of mean of the first analgesic dose requirement time (in minutes) of all the patients, between the groups.

Group compared	t value	P value	Remarks
I vs II	9.49	>0.05	H.S.
I vs III	11.69	>0.05	H.S.
II vs III	6.88	>0.05	H.S.

H.S. = Highly significant

The mean of the first analgesic dose requirement time (in minutes) changes, in different groups (I, II and III) as shown in Table 19A are 40.46 ± 18.81, 195.53 ± 60.52 and 467 ± 139.908 respectively. The differences of rise in mean of the first analgesic dose requirement time (in minutes) between the group I and II, I and III and II and III are

135.41, 426.54 and 327.092 respectively, which show statistically highly significant (P<0.001 Table 19 B).

Second Analgesic dose Requirement

Table 20A. The mean of the second analgesic dose requirement time (in minutes) of all the patients in different groups.

Group	Mean	±S,D,
I	297.66	34.37
II	363.66	89.63
III	645.66	137.43

Table 20B. The statistical comparison of mean of the second analgesic dose requirement time (in minutes) of all the patients, between the groups.

Group compared	t value	p value	Remarks
I vs II	2.66	<0.05	Sig.
I vs III	9.50	<0.001	H.S.
II vs III	6.65	<0.001	H.S.

H.S. = Highly significant Sig. = Significant

The mean of the second analgesic dose requirement time (in minutes), in different groups (I, II and III) as shown in Table 20A are 297.66 ± 34.37, 363.66 ± 89.63 and 645.66 ± 137.43 respectively. The difference of rise in the mean of the second analgesic dose requirement time (in minutes) between the group I and II, is 66, which shows statistically significant (P<0.05 Table 20 B). The differences of rise in mean of the second analgesic dose requirement time (in minutes) between the group I and III and group II and III are 348 and 282 respectively, which show statistically highly significant (P<0.001 Table 20 B).

The post Anaesthetic complication and side effects

Dizziness

Dizziness was present 6.66% in group I and absent in group II and III.

Dryness of mouth

Dryness of mouth was found 6.66% in group II and absent in group I and III.

Sweating

Sweating was present 6.66% in group III and absent in group I and II.

Table 21. Incidence of desirable effects in the patients of the different groups, after premedication.

Post anaesthetic complication and side effects	Groups I		Groups II		Groups III	
	No. of patients	%	No. of patients	%	No. of patients	%
1. Dizziness						
Present	1	6.66	0	0	0	0
Absent	14	93.33	15	100	15	100
2. Dryness of mouth						
Present	0	0	1	6.66	0	0
Absent	15	100	14	93.33	15	100
3. Sweating						
Present	0	0	0	0	1	6.66
Absent	15	100	15	100	14	93.33
4. Headache						
Present	0	0	0	0	0	0
Absent	15	100	15	100	15	100
5. Nausea						
Present	2	13.33	4	26.66	3	20
Absent	13	86.66	11	73.33	12	80
6. Vomiting						
Present	1	6.66	2	13.33	1	6.66
Absent	14	93.33	13	86.66	14	93.33
7. Hyperasthesia						
Present	0	0	0	0	0	0
Absent	15	100	15	100	15	100
8. Tinitus						
Present	0	0	0	0	0	0
Absent	15	100	15	100	15	100
9. Pain in puncture site						
Present	1	6.66	2	13.33	1	6.66
Absent	14	93.33	13	86.66	14	93.33

Contd...

Post anaesthetic complication and side effects	Groups I		Groups II		Groups III	
	No. of patients	%	No. of patients	%	No. of patients	%
10. Urinary retention						
Present	0	0	0	0	0	0
Absent	15	100	15	100	15	100
11. Chilly sensation						
Present	0	0	0	0	0	0
Absent	15	100	15	100	15	100
12. Hypertension						
Present	0	0	0	0	0	0
Absent	15	100	15	100	15	100
13. Hypotension						
Present	0	0	0	0	0	0
Absent	15	100	15	100	15	100

Nausea

Nausea was found as 13.33%, 26.66% and 20% in group I, II and III respectively.

Vomiting

Vomiting was recorded 6.66%, 13.33%, and 6.66% in groups I, II and III respectively.

Pain in puncture site

Pain in puncture site is recorded 6.66%, 13.33% in groups I and II respectively and not in group III.

Headache, Hyperasthesia, Tinitus, Urinary retention, Chilly sensation, Hypertension and Hypotension

Headache, Hyperasthesia, Tinitus, Urinary retention, Chilly sensation, Hypertension and Hypotension was completely absent in all the groups.

CONCLUSION

- Ashwagandha is capable of producing good sedation and reducing anxiety and apprehension when Ghansatva (Water extract) is used as pre-anaesthetic agent.

- Without producing any undesirable effects, Ashwagandha controlled the Atropine Sulphate induced acceleration of heart rate and dryness of mouth. Hence it may be helpful in patients with pre existing tachycardia.
- Ashwagandha Ghansatva (Water extract) reduces the incidence of complications during the course of subsequent anaesthesia.
- Ashwagandha Ghansatva (Water extract) prolongs the anaesthetic time of local anaesthetics in epidural anaesthesia.
- It has good potentiation of analgesic action of local anaesthetic drugs used for epidural anaesthesia in post anaesthetic period.
- It has good synergistic analgesic action with NSAID, Piroxicam.
- Ashwagandha Ghansatva (water extract) reduces the post operative complications like respiratory upsets, dizziness, dryness of mouth, pain in the puncture site, headache, hyperasthesia, tinitus, hypertension, urinary retention and neck pain.
- It does not reduce the post anaesthetic emetic sequalae.

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Concept of Marmas with Special Reference to Antradhi Marma in the Light of Modern Anatomical Concept

GUPTA NEELAM*, GUPTA SHIVJI, AGRAWAL ARUNA† and DUBEY G.P.#**

The term "Marma" literary communicates the sense of vital parts of the body. The use of the term marma can be traced back to vedic literature. It is Rigveda which has first used this term in connection with the warriors ready to go battle field. They are advised to make themselves fully equipped with required arnaments to protect the vital parts. (Marmas) of the body by the asmọr, so that they may get victory with out having any injury on their vital parts of the body.

"अस्मा इदु त्वष्टा तक्षद् वज्रं स्वपस्तमं स्वर्यरणाय ।
वश्त्रस्य चिद् विदद् येन मर्म तुजन्नी शानस्तुता किमेधा ।।" । ऋग्वेद । मण्डल/६१ सूक्त/६

In another context it is evident from Rigveda where Travsta (Vishvakarma) prepares and sharpens the VAJRA in tortusing the demon VRITTRA by attacking on his "Marma" region of the body.

"मर्माणि ते वर्मणा क्षदयामि सोमस्त्वा राजाम्तनेनानु वस्ताम् ।
उवरोर्वरीयो वरूणस्ते कश्णोतु जयनतं त्वानु देवा मदन्तु ।।" । ऋग्वेद । मण्डल/६/सूक्त ७५/१८

In Atharvaveda there in frequent use of word "Marma" in comparison to Rigveda. In 10th mandal, it has been said that the person who wants to kill some one, "his marmas" and skandha should be disturbed by Indra and Agni.

"यो नस् स्वो अरणी सहदयश् च जिघांसीत ।
इन्द्रश तस्यग्निश् च मर्म स्कन्धेषु विन्द्रताम् ।।" अथर्ववेद (पैप्पलादि) १०–११/११/११

In another context of 8th Mandal of Atharvaveda there is instruction for killing the wretched persons. Addressing the Agni it has been said that let the Agni attack on the "marmas" by the help of its fire flame.

"संवत्सरीण पय उस्त्रियाया स्तस्य माशीद्यातुद्यानोन्चक्षः ।
पीयूषयाने यतमस्ति तश्प्साक्तं प्रत्यंग्यमर्चिषा विध्य मर्माणि ।।" (अथर्ववेद/काण्ड ८/सूक्त ३/१७)

Yajurveda also speaks about the use of word "marmas" but it is not specific and detailed. This word is also used in "KAUTHUM SAMHITA" (2,12,20). In "KAUSIKA SUTRA" AND "KATYAYANA SHORT SUTRA" "Marmas" term in met.

* Senior Resident (Rachana Sharir), Department of Basic Principles, Institute of Medical Sciences, Banaras Hindu University, Varanasi.
** Ex-Senior Resident (Shalya), Department of Shalya-Shalakya, Institute of Medical Sciences, Banaras Hindu University, Varanasi.
† Lecturer, Department of Basic Principles, Institute of Medical Sciences, Banaras Hindu University, Varanasi.
# Ex. Head, Department of Basic Principles and Ex-Dean, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi.

Marmass in Upnishads

In KSHURIPOPNISHAD the use of word "Marma" is present where quality of knife is described, it has been said that it is as strong as Indra Vajra and is capable to cut the "Marma" (Vital parts) of a JANGHA.

''इन्द्रवनंमिति प्रोक्तंमर्म जंगूडानुकीर्तिनम् ।
तद्यानबलयारेगेन धरणाभिर्निकश्त्रनयेत् ।। क्षुरिकोपनिषद्''

In "GARBHOPNISHAD" the term "marma" used while dealing with the anatomical structures of the body. The text has accounted 107 types of Marmas.

''सप्तोत्तरं मर्म शतम् (गर्भोपनिषद्)''

According to Yogopnishad, there are 18 sensitive or vital parts (marmas), distributed all over the body.

Marmas in Epic Literature

The Ramayana and Mahabharat are the two important epics contributing emmuensely the ancient Indian literature.

In Ramayana in Ayodhyakanda "King Dashratha during hunting, threw an arrow which pierced the marmashthana of Shrawan Kumar and ultimately led to death soon after its removal". Here the marmashthan suggested the type of vishlyaghna described in Ayurvedic literature.

''एकेन खलुवाणेन मर्मण्यभिहते मचि ।
दवाबन्धौ निहतौ वश्हदौ माता जन चितचने ।।'' (अयोध्याकाण्ड/६३/३९, ४०)

In Mahabharat "marm" word used in sauptik Parva (3/4 and 3/37) as well as in Bheeshma Parva (5/53).

In old days, the knowledge of the "marma" was in practical use of the warriors during warfare, and in hunting of the wild animals, amiming at the desired sites with arrow. This science was also in practice by the ancient persons trend in martial arts like wrestling, karate, kung Fu, judo etc. There is close relationship in between these physical culturists and the science of "Marma". We come across with three different schools of anatomical approaches in ancient India. In southern part of India, specially in Tamil Nadu, there flourished the Siddha system of medicine to the credit of this particular science goes to its father "Rishi Agastya". The concerned literature speaks about 108 "marmas" similarly in Kerala there existed the traditional martial art popularised as "kalarippayat", the father of this particular art was "Rishi Parashuram". The science is still practiced in the form of traditional style for the sake of self defense under guidance and supervision of Gurukulas. The term "KALARIPPAYAT" consist of two words, where the "Kalari" communicates the sense of gymnasium and the term "payat" tells about the art of combat.

In order to manage the trauma, accidents due to course of training there had been a revival method named as "ATANGALS" by this technique the person suffering from trauma was brought back to consciousness.

In china also, there developed a traditional science of acupuncture which was recently established a worldwide revolution and attraction and attracting the scientist to a great extent toward the fundamental mechanism involved in this particular courses. The science believes that there are millions of undefinable anatomical meridians through which positive and negative fources flow in the body the alarming points of meridians communicate the information about the vital sites, when pressure is applied over these points.

Besides the immense advancement in western medicine the mystery in relation to structural as well as functional integrity of the human body, remain unsolved even today in establishing the link in between the certain ultra microscopic structures of the body and their responses in term of neurohormonal secretion.

In Ayurveda the marma has been considered a very delicate part, having agglomeration of number of tissues and other body structures accounted to be vital points in human body. Any injury at these vital parts of 'Marma' of body make the organ senseless or functionless or cause deformity or severe haemorrhage or even collapse and death instantaneously or late.

Etymologically the term 'marma' has its genesis from Samskrita root word "Mri" - marne and the term "sthan" is suggestive of its location, when both joins together as "Marma sthan", it implies the place of vital importance in the body which when injured results to death sooner or later or serious consequences.

The 'marmas' have been included as one of the important chapter in Sharirsthan of Sushruta Samhita. To know the location and name of marmas according to the surface anatomy of the body were found necessary for medical or surgical management.

Maharshi Charak accounts the marma as the vital parts and the seats of pranas in the body in Siddhi sthana emphasizing upon some of the vital organs like Hridaya, Murdha (vault of head) and the Vasti (urinary bladder). He has clearly stated that the pranas or vital breath of man resides over then, hence one should take utmost care to perfect them.

The concept of marmas as advocated by Maharishi Sushruta is that the marmas are juncture place of mamsa, sira (Blood vessels), Snayu (nervous tissue), asthi (osseous tissue) and sandhi. The Pranas are specially situated in the 'marmas' by the virtue of their nature, hence a trauma to any one of these marmas invariably cause physical disturbances in accordance with their particular types.

The commentator Dalhana has also given a nice definition for the marmas, "out of the word marma, the letter "Ma" denotes the pranas and the word "Ra" signifies the seat of location. Hence the term "Marma" as it is a place of pranas (life principle) in the body.

In other context in Sushruta sharir - 6/37, Maharishi Sushruta has further tried to locate the presence of triguna, mahaguna and the bhootatma in the marmas in which views of Soma (jal tatva), Maruta (Vayatatva) Teja (Agni tatva) representing the tridosha in the body and satva, raja, tam as well as bhootatma (supreme power of life principle) are situated in marmas, hence injuries to these marmas are likely to result fatal.

''सोम मारूत तेजांसि रज: सत्वमांसि च ।
त्मर्मसु प्रायश: पुंसां भूतात्मा चात्वतिष्ठते ।
र्म्मस्वभिहितास्य स्यान्न जीवतिन्तशरीरिण: ।।'' (सु. शा. ६/३७)

DIFFERENT SCHOOLS OF MARMAS

In ancient India, depending upon the need of the time the types of injuries over the body during war their consequences in terms of affliction and survival of individuals, there developed 3 predominant school of marmas i.e.

1. Sushruta's School
2. Agasthyar's School
3. Parashurama's School

One the land of India, Sushruta's school of marmas was more prominent in northern part while Agarthyar's school and Parashuramas school was prominent in southern part of India.

Classification

The marma shariram of Sushruta Samhita gives detailed information of marmas based on

1. Structures of body organ involved
2. Consequences of trauma over the marma area
3. Area or size of the marma
4. Sites and location of marmas
5. Shankhya of marmas.

Charak Sushruta and vriddha Vagbhatta all have the same opinion as regards the total number and types of body organs accepted as marmas.

Classification Based on Structures or Body Organs Involved

Mansa Marma	-	10
Sira Marma	-	37
Snayu Marma	-	23

Asthi Marma	-	8
Sandhi Marma	-	20
Dhamani Marma	-	9

Classification Based on Consequences or Prognosis of The Trauma Over The Marmas

Sushruta has given 5 groups i.e.

1.	Sadya pranhar (Death immediately after injury)	19
2.	Kalantar pranhar (Death after some time)	33
3.	Vishalyaghna (Death soon after removing the shalya)	3
4.	Vaikalyakar (injury precipitating the restlessness)	44
5.	Rujakara (Injury causing severe pain)	8

Classification Based on Area or Size of The Marmas

Sushruta has also given great importance to take care of their size and extent covered by them, keeping in view the surgical interference over the marma of the body.

In surgical point of view the area and size of marma is very essential as a little pit of deviation beyond the schedule may lead to fatal consequences in his opinion these are -

Ekangulaman	-	12
Dwianagula man	-	6
Triangula man	-	4
Swapanitalmana	-	29
Ardhanagulamana	-	56

Classification based on sites and location - This based on the sadangas of the body Sushruta has given 5 regions.

1.	Head and neck	-	36 marma
2.	Chest and abdomen	-	12 marma
3.	The back	-	14 marma
4.	The extremities	-	44 marma (11 in each)

Classification According to Sankhya of Marmas

To deal 107 marmas all over the body only 44 nomenclatures of the marma these can be total-

Eka sankhya	-	6 marma
Dwisankhya	-	28 marma
Chatursankhya	-	8 marma
Panchsakhya	-	1 marma
Astasankhya	-	1 marma

Mabhighta suggests injuries to marma region to in the body. Sushruta has dealt symptomatogy of marmas in 3 broad heading.

(A) General symptoms
(B) Particular symptoms
(C) Consequential prognosis of marmas

GENERAL SYMPTOMS

Bhram (Confusion), Loss of perception of senses, Delirium, Weakness, chitanasa, Restlessness, Loss of sensation of parts, Rise in body temperature, Loss of function of joints, Unconsciousness, Shallow breathing, severe pain, bleeding are commonly seen when marmas are traumatised.

PARTICULAR SYMPTOMS

Organs or component of the body like mamsa, sira, snayu etc. getting affected at the time of trauma, the particular symptoms also vary accordingly.

Injury of mamsa marma

Will give rise to continuous oozing of the blood, pallor, loss of perception power of indrias and eventual sudden death.

Injury to Asthi marma

Results into intermittent bleeding mixed with bone marrow and feeling of pain.

Injury to snanyu marma

Will give rise to Ayam (contraction or bending), Akshepa (Convulsion), Stambha (stiffens of the body), Inability to riding, sitting and standing, Distortion or deformity in the body organs and even death.

Injury to sira marma

There will be constant flow of thick blood in large quantity and manifestation like - Thirst, giddiness dyspnoea, delusion and hicough, which ultimately leads to death.

Injury to sandhi marma

There in sense of feeling of full of thorns at the site (of injury), Shortening of the organ 'lamenes even when wound is completely healed up, loss of strength and movement, emaciation or atrophy (of affated body organ), swelling or oedema of the (distal joints).

Injury to sadyah Pranhara marma

Leads to loss of imperfection of the sense organs, loss of consciousness, bewilderment of mana (mind) and buddhi (Inllect) and rasiious severe pain.

Injury to kalartar prantiar marma

Leads to loss of dhatu (Blood etc.) and various type of severe pain.

Injury to vaikalyakar marma

May recovered the function of person if managed by skillful medical persons but a deformity of the effected organ is invevitable.

Injury to vishalyaghna marma

Results in death immediately after removing the shalya (foreign body).

Injury to Rujakara Marma

Gives rise to various types of pain.

The marmas situated in the trunk are comparatively more vital and their consequences of trauma are more severe than the marmas situated in the extrimites. Trauma or injury to any marmas of the body is of surgical importance, particularly for the expertised person.

MARMAS OF THORAX

Out of sadamgas it is Antaradhi which incorporate the two major kosthas named "Uras" and "Udar" while dealing with the 6 major part of the body. Acharya Sushruta has designated the madhyama contents both the thorax and abdomen jointly. The 15 koshthangas described in Ayurveda have occupied their areas mainly is these 2 kosthas of the body.

Anatomically the uras (thorax) is describe a skelatal frame work or thoracic cage, containing the principal organs of respiration i.e. lungs and circulation i.e. heart. Structures, which are present in side thorax are very vital in nature and may result fatal after penetrating or blunt injury on any of them.

S.No.	Name	No.	Nature of Marma	Extent or Area	Consequences
1.	Hridaya	One	Siramarma	4 Angula (7.5 cm)	Sadyah pranhar
2.	Stanmula	Two	Siramarma	2 Angula (3.75 cm)	Kalantar pranhar
3.	Stana Rahita	Two	Siramarma	½ Angula (0.93 cm)	Kalantar pranhar
4.	Apatapa	Two	Siramarma	½ Angula (0.93 cm)	Kalantar pranhar
5.	Spastambha	Two	Siramarma	½ Angula (0.93 cm)	Kalantar pranhar

1. Hridaya Marma

It is one of the most important mahamarma described by Maharishi Charak.

''स्तनयोर्मध्यमधिष्ठायोरस्यामाशयद्वार सत्वरजस्तम्
समधिष्ठानं हृदयम् । तत्रापि सद्य एवं मरणम् ।।'' (सू. शा. ६/२६)

According to ACHARYA Sushruta it can be superficially located (though it is situated deep in thorax) in between stana granthi (breast) and near the opening of the stomach. It is seat of Satva, Rajas and Tamas. An injury to this marma results in immediate death.

''तच्चामाशय द्वारमुखम तेन हि द्वारेणान्नपानमाशय प्रतिशन्ति ।'' (अरूणदत्त)

According to Aryndutta Hridaya has been recognised as amashaya dwar. This statement is not wrong because it is very close to the opening of amasaya. Hridaya rests on diaphragm. The oesophagus pierces diaphragm and meets the stomach in the abdomen. The meeting point of oesophagus and stomach is very close to hridaya. There fore modern Anatomist has named it as cardiac orifice.

Acharya Gananath Sen in his book Pratyaksh sharira has also written-

''तत्रापि ऊर्द्धद्वारमन्नानलिका द्वारनुबधि – तस्य
हार्दिक द्वारमिति संज्ञा हृदयसान्ध्यात् ।'' (प्रत्यक्षशरीर)

Means that upper end of the amashaya is called hridaya dwar as it is very close to hridaya.

It is very vital organ of the body which maintains integrity of the life. An injury either local or general whether blunt or penetrating may cause various complication like cough, fracture of ribs, contusion, rupture of great vessels like aorta etc.

The severity of the injury has got direct concern with the involvement of the vital organs in the thorax like heart and lungs. Apart from traumetic injuries, certain diseases like haemo pericardium, pleurisy, tachycardia etc. giving rise symptom like pain, cough, dyspnoea if not managed immediately mainly leads to death due to many complication. Death due to heart failure is very common feature now a days. It is not only physical trauma but also the mental or psychic trauma leading shock or mental stress and strain may also cause death due to involvement of the heart.

2. Stanamula marma

It is situated bilalerally 2 angula below the stana, injury to these marmas produces troublesome cough and breathing according to Dalhana it is siramarma and kalanter pranhar marma. The base of lungs mainly the diaphragm and its vessels and nerves to be considered under the heading of this marma as the clinical manifestations of trauma to these structures are more or less identical as described by Sushruta.

Any trauma to this marma may lead to pneumothorax haemothorax and paralysis of the diaphragm resulting in to an arrest of respiration leading to death. The paralysis of diaphragm may result due to injury of phrenic nerve.

Dr. Ghanekar has preferred to accept the lower portion of pectoralise muscle as a stanmula marma, but it does not look justified. Any injury to this structure may not lead to death.

3. Stana Rohita Marma

It is situated 2 angula above the chuchuk (nipples) of both slana granthi. An injury to them fills the cavity with blood and ends in death, due to kapha and dyspnoea. Anatomically the internal mammary artery the lungs and its blood vessels can be taken as the organic contents situated in this particular marma area. A penetrating trauma to these structure may give rise to haemothorax and ultimately leads to death.

4. Apalapa Marma

It is situated below the Amskuta (shoulder joint) and above the sides or lateral aspects of the chest (in the axilla), transforms rakta into pus and proves fatal on getting injury. According to Acharya Dalhana it is sira marms.

According to Vagabhatta this marma is situated in bet. The pristavamsam and uras. The location of this marma is at superior lateral part of the chest towards the axilla below the acromio-clavicular joint. The chances of collection of pus due to sepsis which is dangerous to the life in the course of time. Axillary artery and vein situated at upper margin of the pectoralis major in adjuscent to the axilla.

5. Apartambha Marma

It is situated on both sides of uras (chest). There are 2 air carrying channels and injury to these fills the chest with air and results in death due to kapha and dysponea.

This marma according to modern anatomical structures it corresponds with the principle bronchus one on either side of the chest, through which all is conducted to the lungs. If both the bronchi are taken as vatavaha sira, injury to it may fill up the chest cavity with air - gives rise to cough and dyspnoea and finally leads to death.

- According to Vagbhatta and injury to this marma is likely to fill up the kostha with blood.

MARMAS OF THE ABDOMEN

According to Ayurveda, the Udar (abdominal area) is also one of the most important kosthas of the body and contains maximum koshthangas which play vital part in the process of digestion, detoxication, excretion, urination, defaecation and parturition.

Anatomically the abdomen is situated from the diaphragm to the base of the pelvis. It contains the greater parts of the digestive and urogenital systems. In addition, it also contains the spleen, suprarenal glands and numerous lymphnodes, vessels and nerves.

- Acharya Sushruta has taken the marmas situated under area of the body separately.

S.No.	Name	No. of Marma	Nature	Extent or area	Consequences
1.	Guda	One	Mansa (Sushruta)	4 Angula	Sadyahpranhar
			Dhamani (Vagbhatta)		
2.	Vasti	One	Snayu marma	4 Angula	Sadyahpranhar
3.	Nabhi	One	Sira marma	4 Angula	Sadyahpranhar

1. Guda Marma

It is attached to the sthulantra and serves as the passage of vata and mala. An injury to this marma results immediate death. Adhar Guda can be taken as guda marma. This is that region where haemorrhoids are present. If severe bleeding takes place which may cause death. It is lectodermal part and even smallest abrasion may cause severe pain.

The guda marma is consider as a region of anal conal which may produce sudden shock and even death on trauma. The function like pravahini, visurjini and samvarini are carried by internal sphincter.

2. Vasti Marms

It is situated with in the kati and has less mansa, rakta and performs the function of reservoir of using injury to this marma results in immediate death, except a wound formed during extraction of a calculus. A calculus wounds proves fatal if it is present on both side.

Vasti marma is one of the Tri marma as described by Charaka. Charaka has given great importance to this marma just like hridaya and siras (head). In this opinion, it is the reservoir of urine, situated between sthoolantra and guda, muska (testes), sevani (phrenum) and ducts that carry semen and urine. Injury to this marma may cause the obstruction of vata, urine and mala, pain in the groin, penis, and bladder, kundala, udavarta, gulma, bradhna, vatasthila, upastanibha and gripping pain in the navel, abdomen, anus and the buttocks.

"स्नायुमर्मेदं चतुरङगुलं सद्योपधाति च ।" (डलहण)

According to Acharya Dalhana, it is a snayu marma, 4 angulas and it proves fatal on getting injured.

It is urinary bladder where the urine is stored after filtration. The urinary bladder is in close contact of the peritoneum. When it get injured it may rupture and the urine may enter to peritoneal cavity and causes peritonitis.

Thus peritonitis may prove fatal in case of vasti marma injury. An injury to this marma as a whole endanagers life immediately, which may be due to tearing of the wall of the base of the bladder and its consequent complications or to shock by stimulation of the vesical and hypgastric nerve plexus and the nerves in the wall of bladder.

There may be pelvic cellulitis if the urine leaks down in the pelvic area. If the vesical stone is to be removed out by the surgical operation one has to be very much cautions to perform the lateral cystotomy as chances of leaking of the urine leading to many complication with surrounding visceras are there. This is the reason the Maharishi Sushruta has clearly that "उभयेतो भिन्ने न जीवति"। means the lateral cystotomy on either side of the urinary bladder in extremely dangerous and likely to take way the life of person.

Keeping these facts in view, the anatomical structures the urinary bladder along the ureter and hypogastric plexus should be taken as contents of this marma.

3. Nabhi Marma

"पक्वामाश्योर्मध्ये सिराप्रभवा नाभिनमि, तत्रापि सद्योमरणम्।" (सु. शा. ६/२६)

According to Sushruta it is situated in between the Pakwasaya (colon) and Amashaya (stomach) and has also designated the site of origin of Siras and injury to this marma results in immediate death.

According to Acharya Dalhana it is sira marma having sadya pranhar consequences and covering the area of 4 angula.

It is also mentioned in 7th chapter of Sushruta. Sharir sthana that nabhi is the site of origin of siras. This description belongs to the fatal life. After birth there is so much relation between nabhi and sira. It is true that important anatomical structures are behind the nabhi in the abdomen. In case of injury at nabhi, these important structures are damaged and death may follow due to shock.

If an injury is made by some piercing instrument, the faecal matter from large intestine enter in the abdominal cavity leading to peritonitis, which may lead to death. The abdomen may be considered as a whole marma sthana because injury to any region in abdominal cavity will cause death.

By above description, the anatonical structures found in the nabhi area along with the rectus abdomines muscles, the abdominal organs like duodenum, colon, small instenstine and coeliac artery or superior mesentric artery can be accounted getting affected in injuries of the Nabhi Marma.

By ancient scientists it is sira marma, so it may be consider as the underneath blood vessels whether artery or vein and the nerve plexus. If Nabhi is considered only as umbilicus then it can not satisfy the characteristic of marmas.

If trauma occurred either by blunt or penetrating to the above mentioned anatonical structures, the chances of extravasation of blood, resulting to generalised peritonitis and ultimately death. Blunt injury may also give rise the symptoms of crush injury in between impact of the trauma and vertebral column behind, leading to haematoma and haemorrhage and thus endangering the life.

However in the view of the important vital organs situated in the abdominal cavity, the abdomen is considered as a vulnerable area and care should be taken to prevent the structures underneath getting injured from the outside trauma.

So it is concluded that marma described by Sushruta and the other schools of India, still deserve an great deal of exploration. In the view of surgical and therapeutic approaches in the light of modern anatomical concepts it is very helpful.

Abbreviation

सु. शा. – सुश्रुत शारीस्थान

Drug Manufacturing and their Standardisation

JHA C.B.*

All the matters in the universe are consisted with Panch Mahabhuta ("Sarvam Dravyam Panchbhautikam"). Not a single material available in the universe which not to have their medicinal utility ("Nanaushadhibhutam Jagati Kinchita Dravyam Upalabhyate").

All the material have certain medicinal value. Body, Doshas, Diseases, Diet and medicine, these all consisted with Panch Mahabhuta. Selection and uses of medicine are based on the thoughts of Doshas and diseases accordingly. According to Charaka the drug comes on the second position under the four important factors of treatment (Chatuspada of Chikitsa) each factor have their own four qualities. According to that following four qualities are mentioned for a successful medicine. These are following:

(a) Sufficient quantity (Bahuta).
(b) Mature and acceptable for processing (Yogyata).
(c) Ability to make their various final forms. (Anekvidha Kalpana).
(d) Potent and able to eliminate the diseases in respect of Rasa, Guna, Virya and Vipaka (Dravya Sampata).

The above qualities are considerable for a genuine and standard raw material. As such these can not be applied. These material needs certain pharmaceutical processing. With the proper processing, raw materials converted in to a suitable forms, which can be used for internal or external purposes.

Herbs are much frequent in therapeutics since very beginning. Mineral origin of material contains various impurities, causes untoward and toxic effects. Later with the development of shodhana and Marana like pharmaceutical procedures metals and minerals were came frequent in therapeutics.

Ayurvedic pharmaceutics were based on certain fundamental principles. As mentioned in Charaka that samskaras are responsible for inducing and improving medicinal qualities in the drug ("Somskaro hi gunautaradhanam Uchyate").

IMPORTANT PHARMACEUTICAL PROCESSING

1. Contact with liquids (Toya Sannikarsh)
2. Contact with fire (Agnisannikarsh)
3. Purification (Shauch Shodhana)
4. Grinding or Chuning (Marthana)
5. Habitat (Dosh)
6. Time or Season (Kal)

* Head, Department of Rasa Shastra, Institute of Medical Sciences, Banaras Hindu University, Varanasi – 221 005, India.

7. Flavouring or Fumigation (Vasana)
8. Grinding with vegetable extractives (Bhavana)
9. Time duration (Kal Prakarsh)
10. Vessel (Patra)
11. Combination (Samyoga)
12. Separation (Vibhag)
13. Weights and Measures (Man)

With the application of above those procedures a enumerous preparations can be produced.

In Ayurveda, drug manufacturing branch it known as Bhaishajya Kalpana. Bhaishajya Kalpana Consists of two words. Word 'Bhaishajya' denotes the meaning that which removes the fear of diseases, (Rog Bhayam Jayaniti Beshajam)" Or by which a physician is treating the patient for eradication of diseases are known as Bheshaja. In simple word 'Bheshaja' means drug or medicament. Word kalpana denotes the meaning "to prepare". To make a raw material suitable for application in different forms is known as kalpana. Prior to administration a raw material is being treated with various pharmaceutical procedures and techniques to give various final forms like churana, Vati, Bhasma, Parpati etc. In simple term we can say it is 'Drug Manufacturing'. Not only drugs various Dietic preparations are also included in to it. Because the diet have also a supportive role for the elimination of diseases.

According to Charaka, if a medicine having qualities like-list dose, quick effectiveness, effective on many doshas, produces a feeling of well being. Light in digestion. Pleasant in taste etc. are considered for a good medicine.

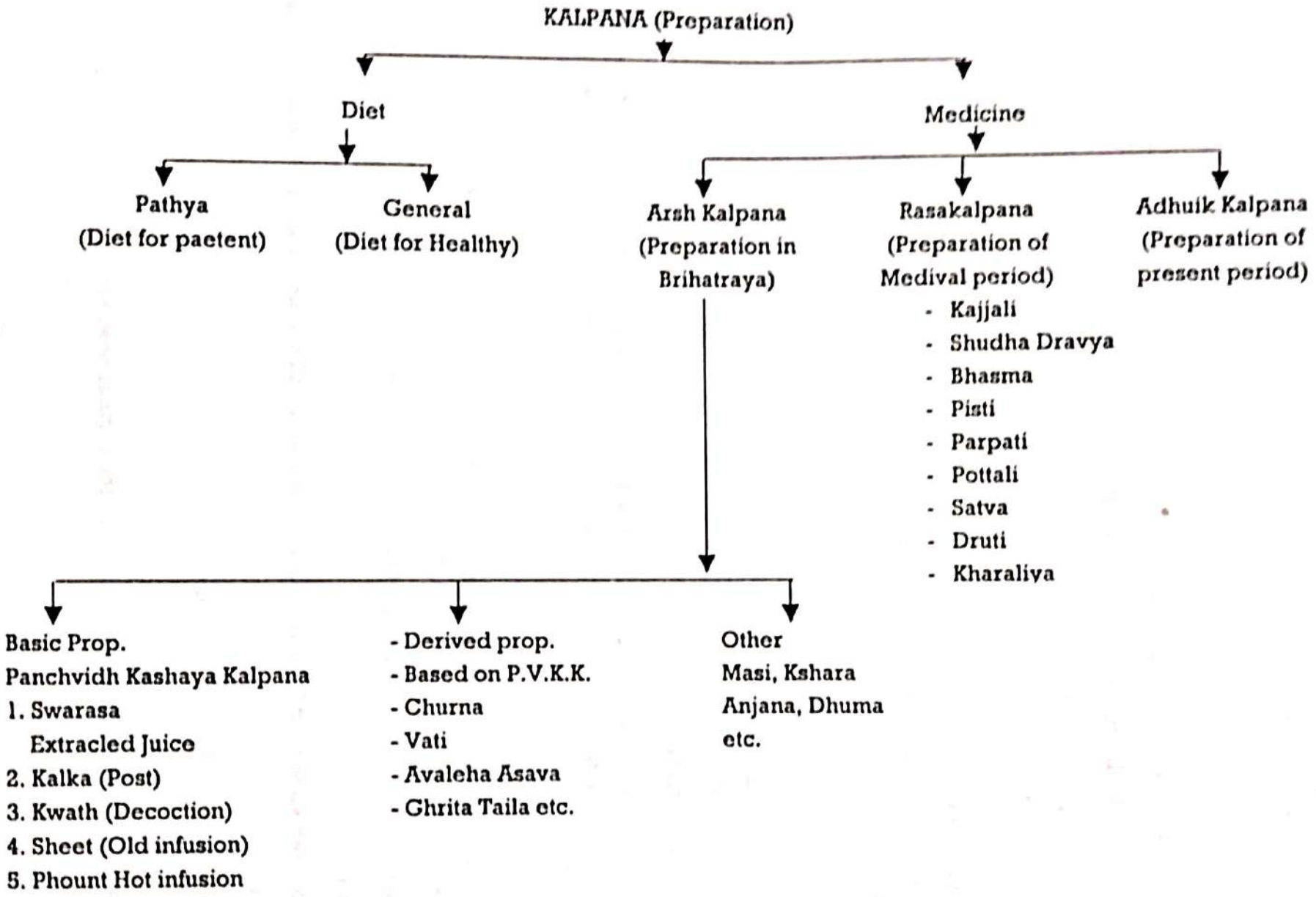
Preparations may be classified in the following way :

KALPANA (Preparation)

Annexure (A)

PROCEDURE INVOLVE IN ABOVE PREPARATION

1. Shodhan (Physical and Chemical purification) Cleaning, Washing, Separation of adulterants.
2. Swedana (Boiling with liquids).
3. Mardana (wet and dry trituration/grinding) and Bhavana.
4. Galana (Filtering).
5. Bharjana (Roasting)
6. Pachana (Cooking or different system of heating).


KALPANA (Preparation)
Diet
Medicine
Pathya
(Diet for paetent)
General
(Diet for Healthy)
Arsh Kalpana
(Preparation in
Brihatraya)
Rasakalpana
(Preparation of
Medival period)
- Kajjali
- Shudha Dravya
- Bhasma
- Pisti
- Parpati
- Pottali
- Satva
- Druti
- Kharaliya
Adhuik Kalpana
(Preparation of
present period)
Basic Prop.
Panchvidh Kashaya Kalpana
1. Swarasa
Extracled Juice
2. Kalka (Post)
3. Kwath (Decoction)
4. Sheet (Old infusion)
5. Phount Hot infusion
- Derived prop.
- Based on P.V.K.K.
- Churna
- Vati
- Avaleha Asava
- Ghrita Taila etc.
Other
Masi, Kshara
Anjana, Dhuma
etc.

7. Patana (Distillation and sublimation).
8. Manthana (Churning)
9. Shoshana (Drying)
10. Churnikarana (Powdering)
11. Sandhana (Fermenting)
12. Pidana etc. (Squeezing)

CONTROL TECHNIQUES APPLIED FOR VARIOUS PREPARATION

There is some control techniques (Parameters) applied for the detection of final stage during the process. Neither less nor ever processing is desirable. If so the product may be spoiled. Few examples of control technique are following :

In Asavarista

During the fermentation process if a burning match stick put inside the fermenting pot stick will observe off indicates the liberation of CO_2 gas, if not so is indication of fermentation.

In Avaleha

Sink in water, pressing through finger appears finger impression, appearance of appropriate odour, test and colour.

In Ghrit and Taila

Residue kalka should be non sticky and sound less burning on fire, appearance of colour, odour and test in oil and ghee. Appearance of freth in oil and disappearance of freth in Ghee.

In Bhasmas

Rekhapurnatwa, interring of bhasma in the pourse of the finger, floating on the water surface (waritaratwa). Lustureness (Nischandratwa).

Absence of the free metals (Nirutha and Apunarbhava)

Parpati

Molten up to mud flake should be break producing sound 'Cut', flake not to be bend.

Pottali

Production of metallic sound on light hammering.

Druti

A drop of druti should be floating on the surface of water.

The above characteristics of products are indicating the final stage of the products which is under processing. If this state was ignored or sincerely not observe then the product will spoil. Hence the careful observation during the process is highly essential.

After the complication of process product should be kept in suitable container and place with proper sealing and labeling.

Label should contains the following informations :

1. Name of the drug
2. References
3. Net weight
4. Contents
5. Indication
6. Dose
7. Adjuvants
8. Way of administration
9. Contra indication
10. Manufacturing date
11. Expiry date
12. Batch No.
13. Manufacturing Lic. No.
14. Pharmaceutical manufacturers name

STANDARDISATION OF AYURVEDIC PRODUCTS

Due to lack of scientific standards production of standard Ayurvedic products is very difficult.

For the standardisation of Ayurvedic products following factors are important and needs standardisation on three level i.e.

(a) Raw material standardisation
(b) Process standardisation
(c) Product standardisation

STANDARDISATION OF RAW MATERIAL

For the standardisation of any product standardisation of basic and starting material is essential. If the starting material will be spurious or substandard, then the production of standard products could not be possible. Hence the following factors for the starting material are essential and should be keep in consideration, i.e.,

1. Identification – Stored raw material should be identify properly on the basis of structural and chemical study.
2. Sufficient in quantity.

3. Uniform in quality.
4. Mature in respect of their active constituents.
5. Ability to present their various final forms.

PROCESS STANDARDISATION

Heating, Boiling, Roasting, frying, sublimation, Fermentation etc. are the important pharmaceutical procedures. Temperature, time vessel, place etc. are also an influencing factors which generate and to keep the quality safe of the drugs. Hence during the process application of standard technique along with control parameters are highly essential, through which the final stage could be easily determined and to prevent the less or ever processing which is not desirable (Nesto nyunadhikah pakah supakwam hitamaushadham).

PRODUCT STANDARDISATION

For the evaluation of standards of final product it should be evaluated on the following levels :

(a) Physical evaluation for the product characterization, spectral, Atomic absorption, I.R., Metallography etc.
(b) Qualitative and quantitative chemical evaluation of products.
(c) Biological evaluation on the level of
   - Pharmacological
   - Bio-chemical
   - Histopathological
(d) Clinical evaluation

For the chemical evaluation of herbal and herbomineral products the following parameters should be applied.

1. Orgeneleptic properties
2. Loss on drying at 100°C
3. Ash content in percent w/w
4. Acid insoluble Ash% w/w
5. Water soluble extractives.
6. Alcohol soluble extractives.
7. Study of TLC Pattern for alkaloid and steroid etc.
8. Assay for metals/Minerals as per the ingredients.
9. Identification of main constituents of the formulation.
10. Resin content (For guggulu preparation).
11. Disintegration time.
12. Refractive index at 40°C for Ghee and Oil.
13. Acid value.

14. Saponification value.
15. Iodine value.
16. Alcohol percentage.
17. pH Value.
18. Total solid content
19. Reducing and non-reducing sugars.
20. Specific gravity.
21. Phytochemical studies.
22. Acid insoluble acid content.
23. GLC (Gas liquid chromatography).
24. Analysis of volatile principles for arkas.
25. Fat content.
26. Assay for potassium and sodium for Kshara.
27. Alcohol solubility.

Role of Blood and its Components in Wound Healing

THAKRAL K.K.*

Ever since the dawn of humanity the first problem it had to face was wound healing because the new born had to be separated from the placenta in the womb. The cutting of the cord resulted in wound and bleeding and so an inherent relation exists between the two. As the civilization developed different scientific fields progressed and so the medicine. The period of specialization came and Ayurveda was divided into Eight different branches including Shalya and Shalakya. The surgeons working in this field always felt the importance of healing of wound as early as possible.

By the time of Sushruta, definition of wound based on its initial effect as well as on the basis of its resultant scar had been developed.

व्रण गात्र विचूर्णने, व्रणयतिति व्रण: ।। सु.चि. १

The solution of the continuity of the skin is known as wound.

वृणोति यस्मात् रुढ़ेऽपि व्रण वस्तु न नंश्यति ।
आदेह धारणन्तास्मांहव्रण, इत्युच्यते बुधौ ।। सु.सू २१/४०

A scar is present as a resultant which exists till life.

A clear differentiation between a Dusht Vrana (Septic Wound), Shudh Vrana (A Clean or Aseptic Wound), Roohyaman Vrana (a Wound that is healing without any complication or obstruction whatsoever) and Roodha Vrana (A Healed Wound) had been made and Sushruta has very clearly defined these entities.

दुष्ट व्रण

पूतिगन्धान् विवर्णाञ्च बहुासावान्महारुज: ।
व्रणान्शुद्धान् विज्ञाय शोधनै: समुपाचरेत ।। च.चि. २५

शुद्ध व्रण

त्रिमिर्दोषैर वाक्रान्त श्यावौष्ठ: पिडकी सम: ।
अवेदनो निरश्रावो व्रण: शुद्ध इहोच्यते ।।

रुह्यमान व्रण

कपोत वर्ण प्रतिमा यस्यान्ता: क्लेदवर्जिता: ।
स्थिराञ्चपिटिकावन्तो रोहतिति तमदिशेत ।।

रुढ़ व्रण

रुढ़वर्त्मानम ग्रन्थिमशूनमरुजं व्रणम् ।
त्वक् सवर्ण समतलं सम्यग्रूढं विनिर्दिशेत ।। सु.सू.२३

* B.A.M.M.S. (L.U.); D.Ay.M. (B.H.U.); FICA (U.S.A.); FAIM
Ex-Director, Directorate of Indian Medicine, U.P., Lucknow

Based on his acute observation of all different type of wounds Sushruta concluded :

षणमूलो ऽष्ट परिग्राहीं पंच लक्षण लक्षित: ।
षष्टया विधानैर्निर्दिष्टै श्चतुर्भि: साध्यते व्रण: ॥ सु.चि. १/१३४

that a wound is caused by Six factors i.e. Vata, Pitta, Kapha, Rakta, Sannipata and Aagantuja. It has eight seats in the body i.e. Twacha (Skin), Mamsa (Muscles), Sira (Arteries and Veins) Snayu (Nerves, Tendons and Ligaments), Sandhi (Joints), Asthi (Bones), Koshtha (Cavities and Hollow Organs) and Marma (Vital Points). Five different type of signs and symptoms which are due to vitiation of Vata, Pitta, Kapha, Sannipata and due to injury (Aagantuja) are seen. Raktaj vrana has the sign and symptoms of Pittaja. There are Sixty procedures for the management of wounds which have been classified into Preoperative, Operative and postoperative techniques. Four essentials for the healing of wounds i.e. Vaidya, Patient, Nursing attendant and Aushdhi (Medicine) have also been described.

This knowledge was used in developing Suturing techniques in the healing of Sadya Vrana and so the idea of Primary Healing in aseptic wounds was developed. Also the Plastic Surgery was developed. The observation that the Sadyah Vrana gets infected after a period of about 7 days led to the development of various Sterilization and Aseptic techniques.

Then came the dark period in the history of India. Foreign attacks led to the withering of political stability and to the complete stoppage of the progress of Surgery in India. The Surgical Philosophy in an organized manner was available in the form of Sushruta Samhita. But by this time no organized details of Aseptic surgery were available in any foreign country.

With the time west became powerful and rich. The surgeons of those countries were facing the problem of wound healing. However, a glance at surgical history of the west reveals that some of most fundamental advances have coincided with sudden new insights into the reparative mechanisms. The surgeons such as de Chauliac, Pare and Lister struggled to separate the fact of sepsis from the fact of Normal Repair. Though it had been recognized occasionally that reunion of two cut edges of tissue could occur without evidence of abnormal inflammation or infection. Such an event was so unpredictable that surgeons incorporated local infection and extreme scarring into their concept of normal repair. When "Laudable Pus" appeared, eventual repair was expected. When cleanliness became an ideal and the microbial theory became a fact, workers such as Semmelweis, Lister and others advanced a concept so important that it literally made modern surgery possible. They realized that sepsis and repair were separate phenomenal. They learned to expect repair without sepsis.

Here I am proud to say that India had developed this idea long back during the period of Sushruta.

Today, refinements in aseptic technique, the introduction of antibiotics and improvement in surgical techniques, make primary repair by far the rule rather than the exception. Repair is not simply the surgeons ally. Repair is his concern, his lifeline.

The surgeons approach to the understanding of the complex series of events occurring the instant of injury has developed a lot and perhaps even control the forces of repair is now within the grasp of every surgeon. This has become possible because of the availability of microscope and such other instruments.

When tissue is disrupted, vessels are injured, cells are broken and platelets and collagen intermingle and interact. The complement cascade is initiated and the local microvasculature soon shows that the injury has been sensed. Injured vessels thrombose. Near by vessels, especially the venules, soon dilate. Platelets and white cells begin to stick to the endothelial lining and the leukocytes migrate between the endothelial cells and into the area of injury. Within a few hours, the edge of the injured area is infiltrated with granulocytes and macrophages. Within a few days, fibroblasts become visible. These fibroblasts gradually replace the majority of white cells, and as they do, the momentum of collagen synthesis increases. If a wound is primary closed, it begins to gain strength through collagenous links by about the third post injury day. Neovascularization is a constant feature of repair because of the needs of inflammation and repair. By the third day or fourth day, beginnings of a new circulation can be seen bridging the wound space of a primary wound and in open wounds a roseate hue can be seen where the first new vessels are appearing. The process ultimately proceeds to repair and scar formation.

During all this period blood and its components are playing their different roles.

But, two mysteries of repair have always been and continue to be i.e. (1) what in the injury stimulates repair and (2) how does the wound recognize that repair is no longer needed – that is, why does healing stop ?

The role of blood and its components was assayed in rabbit cornea to investigate the capacity of autologous Plasma, Serum, blood clot, platelets, platelet free Fibrin, Granulocytes, Macrophages, to initiate angiogenesis, fibroplasias, collagen synthesis.

Results

Thrombin activated platelets, Fibrin and endotoxin activated Macrophages produced angiogenesis, fibroplasias and collagen synthesis twice more than the controls.

Neuromuscular Blocking Drugs

GOEL R.K.*

Curare is a generic term for various South American arrow poisons. It has been used for centuries by the American Indians along the Amazon and Orinoco Rivers and in other parts of that continent for killing wild animals used for food, death results from paralysis of skeletal muscles.

Following the pioneering work of the scientist - explorer Von Humboldt, in 1805, the botanical sources of curare became the object of much field search. The Curare comes from various species of stretchers. The first trial of curare for promoting muscular relaxation in general anaesthesia was reported by Griffith and Johnson in 1942. The significant advantage of obtaining the desired degree of muscular relaxation without the use of dangerously high concentrations of anaesthetic became recognized over the next decade.

NEUROMUSCULAR TRANSMISSION AND MUSCLE CONDUCTION

Axonal conduction

At rest the interior of the typical mammalian axon is approximately 70 mV negative to the exterior. K^+ is in higher concentration in the axoplasm as compared to extracellular fluid and resting axonal membrane is relatively permeable to it. On the other hand, Na^+ and Cl^- ions are present in higher concentration extracellularly and resting axonal membrane is relatively impermeable to it. These ionic gradients are maintained by an energy dependant active transport or pump, which involves Na^+, K^+ ATPase.

In response to depolarization to a threshold level, nerve impulse is initiated at the local region of membrane leading to rapid increase is Na^+ permeability through voltage sensitivity Na^+ channel and rapid depolarization from the resting potential, which continue to a positive overshort. The second phase results from the rapid inactivation at the Na^+ channel and delayed opening of a K^+ channel which permits outword movement of K^+ to terminate the depolarization.

The transmembrane ionic currents produce local currents around the axon and escalation of an adjacent portion of the axonal membrane leading to propagation of the action potential. In myelinated filose, permeability changes occur only at the nodes of Ranvier, thus causing a rapidly progressing type of jumping or salutatory conduction.

JUNCTIONAL TRANSMISSION

The arrival of the action potential at the axonal terminals initiate a series of events that trigger release of acetylcholine at neuromuscular junction. The combination of ACh

* Professor, Department of Pharmacology, Institute of Medical Sciences, Banaras Hindu University, Varanasi - 221 005.

with nicotinic cholinergic receptor at the external surface of post junctional membrane induces an immediate marked increase in permeability of cations. The intrinsic channels charge for about 1 millisecond and during this interval Na^+ ions transverse the channel leading to formation of EPP (end plate potential) which triggers the muscle action potential and contraction of muscle.

DRUG CAN BLOCK NEUROMUSCULAR TRANSMISSION IN THREE MAIN WAYS

Drugs that inhibit ACh synthesis

The rate limiting process in the synthesis of ACh appears to be transport of choline into the nerve terminal. **Hemicholinuric** acts as a competitive inhibitor of choline uptake but itself not taken up **triethylcholine** also blocks choline uptake but itself taken up and forms acetyl triethylcholine which is stored and released as a false transmitter. **Vesamicol** acts by blocking ACh transport into synaptic vesicles.

Drugs that inhibit ACh release

Acetylcholine release by a nerve impulse involves the entry of calcium ions into the nerve terminal. The increase in Ca^{++}, increase the rate of exolytic events within the terminal. **Local anaesthetics** by inhibiting impulse well cause neuromuscular stock. Agents that inhibit Ca^{++} entry have similar effect (**Mg^{++}, aminoglycoside** but not Ca^{++} channel blockers). β bungarotoxin, botalinum toxin act specifically to inhibit acetylcholine release.

Drugs that act post synaptically

Non-depolarizing blocking agents

In 1856, Claude Bernard showed that curare causes paralysis by slowing neuromuscular transmission, rather than by abolishing nerve conduction or muscle contractility. Curare is a mixture of naturally occurring alkaloids found in various South American plants and used as arrow poisons by Indians, structure of tubocuranine was elucidated in 1925 and introduced into clinical practice in early 1949.

MECHANISM OF ACTION

(a) **At low doses** - combine with nicotinic receptor and present binding of ACh thus preventing depolarization of muscle cell membrane and muscular contraction. Competitive blockers, action overcome by increasing ACh concentration using cholinesterase inhibitors.

(b) **At high doses** – blocks the ion channel of the end plate leads tc further weakening of neuromuscular transmission and reduce the ability of acetyl cholinesterase inhibitors to reverse the actions of non-depolarizing muscle relaxants.

CHEMISTRY AND SAR

Classification

I. According to duration of action

- Long acting - d. tubo curarine, metocurine, pancuronium
- Intermediate - Atracurium, vecuronium, rocuronium
- Short acting - Mivacurium

II. According to chemical native

		Side effects
• Natural alkaloid -	d. tubocurarim (long) and alcuronuim	Histamine release, gangion blockade vagotypic
• Benzyl ISO quinolinium -	Doxacurium (long)	
	Mivacurium (short)	
	Atracurium (intermediate)	
	Metocurire (long)	
• Ammoniosteroid -	Pancuronium (long)	No Hist release, vagel blockade and tachycardia
	Peper curorium (long)	
	Rocurunium (intermediate)	
	Vecuronium (intermediate)	Less Hist. release and ganglion blockade

Actions

Small, rapids contracting muscles of face, eyes and fingers are affected first, followed by limbs, neck and trunk, then intercostal muscles and lastly the diaphragm.

Pharmacokinetics

I.V. administration, minimal oral absorption, poor or no penetration into cell membrane, cell or BBB or placental. Many drugs are not metabolized, excreted as such in urine or redistributed.

1. Excreted in urine unchanged - tabocurarin, pancuranium, pepercuranium doxa and maocurire.
2. Atricuruim - degraded and hydrolyzed
3. Amino steroids - vecuronium and rocuronaim deacelylated and excreted in bile.

Adverse effects

Histamine release, ganglion blockade, vagolytic action etc.

Drug interaction

1. AChE - Antagonise the blocking effect of non depolarizers competitively.
2. Halogenated hydrocarbons e.g. Halothane enhance NM blockade by exerting stabilizing action at NMJ.
3. Aminoglycoside antibiotics - Gentamycin/tetramycin inhibit ACh release by competing with Ca^{++} and then increased NMB activity of tubocurarin.
4. Ca^{++} channel blockers - increased NMB activity of tubo.

Therapeutic uses

As adjuvant drugs in anaesthesia during surgery to relax skeletal muscle.

DEPOLARIZING BLOCKING AGENTS

Tetanic fade - is a term used to describe the failure of muscle tension to be maintained during a brief period of nerve stimulation at a frequency high enough to produce a fused tetanus (50 Hz). Normal muscle - Tetanic fade is very slight.

NDMB - Marked, due to block of presynaptic nicotinic receptors which normally serve to sustain transmitter release during a tetanus

DMB - Fade does not occur

Mechanism

Phase I and II block

With repeated and continuous administration, the action of depolarizing drugs tend to change. The depolarizing NMB, succinylcholine, attaches to the nicotinic receptor to depolarize the function, remaining attached to the receptor for a relatively long time and providing a constant stimulation of the receptor. They first cause the domain of Na^{+} channel, leading to depolarization of receptor (Phase I) and transient twitching of the muscle (fasciculation) but confined binding of them renders the receptor incapable of transmitting further impulses. With time the continuous depolarization goes way to gradual repolarization as sodium channel closes or blocked. This causes a resistance to depolarization (Phase II) and a flaccid paralyses.

Initially, the block shows the physiological characteristics of depolarization block as described above (Phase I), but later on it takes on the properties associated with no non-depolarizing block (Phase II). Thus, the block becomes particles reversible by AChE, and begins to show titanic fade. It is due to receptor desensitization produced by the confirmed presence of the depolarizing drug.

Actions

Similar to NDBs, fasciculation followed by flaccidity and respiratory muscle to paralyse test.

Chemistry and Pharmacokinetics

Dicholine ester – succinylcholine, groom in, rapid onset, short duration of action. Useful when rapid endotracheal intubation is required during induction of anesthesia. Rapid hydrolysis by plasma cholinesterase. It is therefore usually goes by continuous infusion.

Adverse effects

(a) Bradycardia, preventable by atropine, probably due to a direct muscarinic action.

(b) **Potassium release** – In cases of muscle trauma/pain, increased K^+ release occurs from muscle which have seen paralysed by nerve injury. This increase occurs because of post-denervation spread of acetylcholine sensitivity and regions of the muscle fibre away from end plates, so that a much larger area of membrane is sensitive to suxamethonium, and the resulting hyperkalemia can be enough to cause ventricular dysarthymia or even cardiac arrest.

(c) **Increased Introocular presence** – due to contraction of extroocular muscle.

(d) Prolonged paralysis (abnormal plasma cholinesterase, use of AchE drug simultaneously competing substrate for plasma cholinesterase e.g., procaine, propionate).

(e) **Malignant hypothermia** – This is a rare congenital condition, determined by an autosomal dominant gene, which results in intense muscle spasm and a very sudden rise in body temperature when certain drugs are given. The biochemical cause is uncertain. The condition carries a very high mortality (about 69%) and is treated by administration of dantroline a drug that initiates muscle contraction by preventing Ca^{++} release from the sarcoplasmic reticulum.

Therapeutic uses

1. Adjuvant in surgical anaesthesia (decreasing risk of respiratory and cardiovascular depression.
2. To prevent trauma in electric shock therapy.
3. Correction of dislocation and alignment of fractures (use in various orthopaedic procedures).
4. Neuromuscular blocking agents of short duration are often employed to facilitate intubation with an endotracheal tube and to facilitate laryngoscopy, bronchoscopy and esophagoscopy.
5. Diagnostic uses:

6. Detection of pain due to nerve route compression mashed by painful spasm of muscles involved in protective splinting.
7. Diagnosis of myasthenia gravis.

PROCEEDINGS

SANGYAHARAN DAY OBSERVED BY A.A.I.M. (M.S.B.)

6th February 2001

Association of Anaesthetists of Indian Medicine (Maharashtra State Branch) had observed a Sandyaharan Day on 6th February 2001.

For this programme all members of State Branch, Office bearers of Central Council of A.A.I.M.; Postgraduate students from all over the Maharashtra, Teachers and Principals were invited.

Programme started with registration. About 110 doctors were present.

The Programme was arranged in N.I.M.A. Hall of Tilak Ayurved Mahavidyalaya, Pune. It was started at 2.30 p.m.

Dr. Shendye V.N. Gen. Secretary A.A.I.M. (M.S.B.) extended welcome speech. President of State Branch Dr. Marathe S.V., Patron Dr. A.B. Limaye Treasurer Dr. Borase N.V., Guest Speaker Dr. Deshpande A.M. and Dr. Nankar Yashwant were invited on the dias. He welcomed all deligates and dignitaries. Due to unavoidable reasons another guest speaker Dr. Kane Suresh could not come.

As per our tradition, programme was started with Dhanwantari Stawan and Poojan. Dhanwantari Poojam was made by Dr. marathe S.V. and Stawan was performed by Dr. Behere and Dr. Kulkarni. Dr. Shendye V.N. gave an information about the Association and its activities. He took a review of the programmes arranged in the year.

Dr. Borase N.V. made an introduction of guest speakers. Dr. Deshpande and Dr. Nankar. These dignitaries were felicitated at the hands of Dr. Marathe S.V. President of State Branch by giving momento, gift and floral bouquet.

Dr. Omkar Kajale was also felicitated at the hands of Dr. Marathe S.V. for receiving 'Late Ram Avatar Pande Best Paper Presentation Award' and the award sponsored by Emis Pharmaceutical in 4th National Conference of A.A.I.M. at Udupi Karnataka in November 2000.

Dr. Vijay Jadhav was also felicitated at the hands of Dr. Marathe S.V. for receiving 'Nagarjoon Award'.

After introduction and felicitation, President Dr. Marathe S.V. gave a presidential speech. In his speech he express his thoughts about intigration and necessity of research in the field of Indian Medicine for anaesthesia and pain.

Dr. Gujarathi N.C. Jt. Secretary State Branch proposed vote of thanks to guest speakers, participants, Principal of Tilak Mahavidyalaya and all members.

Dr. Shendye requested Dr. A.B. Limaye to conduct the lecture programme. Dr. Marathe felicitated Dr. Limaye with floral bouquet. Dr. Limaye took the chair and conduct the programme.

Dr. Deshpande A.M. gave a lecture on 'Outdoor Anaesthesia' The lecture lasted for one hour. In his speech he gave a detail information about necessity; importance and requirements of outdoor anaesthesia.

He suggested to remove the word 'Anaesthetist' from the name of Association and replace it with 'Anaesthesiologists'. He express the Anaesthetist means a technitian and assistant while 'Anaesthesioloigist' means a knowledgable person who is expert in anaesthesiology.

Dr. Nankar Yashwant gave a lecture on 'Pain Management' He runs pain clinic. He also gave an information about pain management. He explained different types of block anaesthesia, and its usefulness for the treatment of apin.

Participants get valuable information through these lectures and the programme was well accepted and appreciated by the deligates.

Chairman Dr. Limaye A.B. gave his remarks and the programme was concluded.

The programme was followed by snacks and tea.

Dr. Shendye V.N.
Gen. Secretary
A.A.I.M. (M.S.B.)

Workshop on 'C.C.P.R.' **B.H.U., Varanasi**

- Section of Sangyaharan, Department of Shalya Shalakya, Institute of Medical Sciences, Banaras Hindu University, Varanasi organized Two Workshops of 15 days each were also conducted on C.C.P.R. from 7th February 2001 to 9th March 2001.
- In the next session 2001-2002, Three Workshops on C.C.P.R. will be organized by Section of Sangyaharan from 6th February 2002. The interested persons should write to the Incharge, Section of Sangyaharan, Department of Shalya Shalakya, Institute of Medical Sciences, Banaras Hindu University, Varanasi before 31st December 2001.
- Registration Fee – Rs. 2000/-

District Branch of NIMA **Ghazipur**

- Inauguration of Ghazipur District Branch of NIMA was held on 17th June 2001 at Siddarth Motel under Chairmanship of District Magistrate of Ghazipur. The Superintendent of Police, Chief Medical Officer, District Hospital, Dr. Kailash Tripathi, NIMA U.P. State representative and Dr. D.N. Pande (Sr. Vice President, A.A.I.M.) were the guests on the occasion.

20-23rd Oct., 2001 **China**

- **Dalian City, People's Republic of China** National Conference of the Chinese Association for the Study of Pain (CASP) (IASP Chapter).
- ***Contact:*** Dr. Ji-sheng Han, Neuroscience Research Institute, Beijing University, 38 Xue Yuan Road, Beijing University, 38 Xue Yuan Road, Beijing, 100083, People's Republic of China; Fax: 86-10-8207-2207; Email: jishenghan@yahoo.com.

17-18th Nov. 2001 **Chandigarh**

- Bhargava Auditorium, PGIMER, first Biennial Workshop – Anaesthetic technique – Revisited
- ***Contact:*** Prof. P. Chari, Head, Department of Anaesthesia, PGIMER, Chandigarh–160012, Tel.: +91-172-747585 Ext. 206; Fax: +91-172-744401; Email: medinst@pgi.nic.in

3-7th Jan., 2002 **Lucknow**

- 89th Indian Science Congress on Health Care Education I.I.T., Lucknow.
- ***Contact:*** General Secretary, Indian Science Congress Association, 14, Dr. Viresh Guha Street, Kolkatta-17; Email: sca.assocn@genes.vsnl.net.in

19-20th Jan., 2002 **Sawantwadi (M.S.)**

- Vth National Conference of Association of Anaesthetists of Indian Medicine, Ayurveda College, Sawantwadi, (M.S.)
- ***Contact:*** Dr. R.K. Gupta, H.O.D. Shalya Shalakya, R.J.V.S. Ayurvedic Hospital, Sawantwadi - 416510; Tel.: 02363-72302.

1-2nd Feb., 2002 **Wardha**

- M.G.I.M.S., Sewagrams, Wardha; International Symposium on Ayurveda, Yoga and Naturopathy in the new Millennium.
- ***Contact:*** Dr. Ramesh Babu Devalla, Org. Secretary, Department of Ayurveda, M.G.I.M.S., Sewagram, Wardha - 442102; Tel.: (R) 91-7152-84143; Fax: 99-7152 – 84038; Email: rbdevalla@rediffmail.com

6th Feb. 2002 **Varanasi**

- Govt. Ayurvedic College, S.N.S. University, Varanasi.
- ***Contact:*** Dr. P.R. Mishra, Secretary, U.P. State Branch, A.A.I.M., Varanasi.

6th Feb., 2002 **Pune**

- Sangyaharan Day - Tilak Ayurveda College, Pune,
- ***Contact:*** Secretary, M.S. State Branch, A.A.I.M., Pune.

5-7th April, 2002 **Denmark**

- **Aalborg, Denmark** Annual Meeting of the Scandinavian Association for the Study of Pain (IASP Chapter).
- ***Info:*** Fax: 46-13-224438; Internet: www.mmedia.issasp/.

17-22nd Aug., 2002 **USA**

- **San Diego, California, USA** 10th World Congress On Pain, International Association for the Study of Pain.
- ***Info:*** 909 NE 43rd St, Suite 306, Seattle, WA – 98105, USA; Tel.: 206-547-6409; Fax: 206-547-1703; Internet: www.halcyon.com/iasp

OBITUARY

A.A.I.M. is deeply grieved on the sad demise of our Executive Member Dr. Ganga Sagar Shah, Begusarai (Bihar), Dr. C.M. Tiwari and Dr. S.S. Talvarkar, Vice-President, M.S. Branch.

May their souls rest into eternal peace!

SANGYAHARAN SHODH

An Official Journal of Bharatiya Sangyaharak Association (A.A.I.M.)

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I, Devendra Nath Pande, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-
Devendra Nath Pande
Signature of Publisher

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