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EDITORIAL

The 16th Volume is now in our hand. Till date 30 issues are published regularly with scientific research papers and news of our society. Sangyaharan Shodh has been registered and assigned ISSN no.2278-8166.Now Journal is indexed in Index Copernicus. Our Association celebrated Sangyaharan Day on 6th February 2013 at B.H.U., Pune and Udupi .A C.M.E. on Mnitoring Devices was organized by the Department of Sangyaharan, I.M.S., B.H.U., Varanasi.

Department of Sangyaharan is going to start a New Course on `Ayurvedic Pain Management` for Foreighners in the Faculty of Ayurved, I.M.S., B.H.U., VARANASI from the Academic session July 2013.The Department of Sangyaharan; Banaras Hindu University has been able to start two new courses within one year of its creation.

But we have to cross several hurdles in the way. The country Law needs some amendmentes in its ageold Health Policy. I pray to all of you to struggle for it to pave the way by your personal efforts to convince the Policy Makers in favor of integration.

Congratulations to all the A.A.I.M. Members for these achievements.

JAI HIND JAI SANGYAHARAN JAY AYURVED

Devendra Nath Pande, Chief Editor-Professor & Head, Deptt. Of Sangyaharan,

I.M.S., B.H.U., Varanasi.

Lox (Lignocaine)

Anawin (Bupivacaine)

REGIONAL ANAESTHETICS

Fent (Fentanyl)

Supridol (Tramadol)

Riddof (Pentazocine)

Myorelex (Succinyl)

Neovec (Vecuronium)

Neocuron (Pancuronium)

ANALGESICS

Nex (Naloxone)

MUSCLE RELAXANTS

Myostigmin (Neostigmine)

OPIOID ANTAGONIST

REVERSAL AGENTS

Thiosol (Thiopentone)

Aneket (Ketamine)

Hypnothane (Halothane)

Sofane (Isoflurane)

INDUCTION AGENTS

INHALATION AGENTS

Mezolam (Midazolam)

Neomit (Ondansetron)

Tropine (Atropine)

Pyrolate (Glycopyrrolate)

PREMEDICANTS

ANTICHOLINERGICS

NEON

Offers

WIDER CHOICE

Role of Ozone Therapy in Pain full Osteoarthritis of Knee Joint

Bhaskar Maurya,** ****Rohit Agrawal

Degenerative disease of the joint is also known as osteoarthritis. It is characterized by pain in joints that are responsible for weight-bearing and joints that are overused. Often times "wear-and-tear" degrades cartilage faster than the joint repair mechanisms. Osteoarthritis of the hip and knee is now known to no be an inevitable part of aging nor of running. The pathology of osteoarthritis is not confined to the cartilage, but in fact involves loss of cartilage, soft-tissue swelling, and formation of bone spurs. In order to prevent or to treat osteoarthritis, sometimes we need to slow down the breakdown of the cartilage, but the vast majority of cases require speeding of the joint repair mechanisms. Conventional treatments include weight loss to reduce pressure on weight-bearing joints, physical therapy to strengthen the muscles that stabilize a joint, and pain relief medications.

Dietary therapy may include antioxidants, vitamin D, and cartilage precursors such as glucosamine sulfate and chondroitin sulfate. Glucosamine and chondroitin sulfate are the "building blocks" of cartilage and increased intake may help with the repair at the joint level. Taking the sulfate form of glucosamine is important. Hyaluronic acid is a substance secreted by the cartilage cells of the knee, and helps to give the joint fluid a slippery quality. Injections of this fluid into the knee may help with pain and decrease the damage in osteoarthritis.

Prolotherapy is an excellent therapy for osteoarthritis, although it is still considered by mainstream medicine to be experimental or alternative. The basic mechanism of prolotherapy is simple. A natural medication is injected into the affected tendons, ligaments, or joint spaces, which leads to local inflammation. Cartilage growth factors are released in the joint space, such as transforming growth factor, with subsequent strengthening of the joint structure. Usually ozone is injected into the joint spaces and into affected muscles, although occasionally natural medications such as Traumeel and Zeel are used at the tendons and ligaments.Soft tissue injuries to the joints often start the development of degenerative joint conditions. If the ligaments and tendons that cross a joint are weakened, then the joint itself must sustain more pressure from gravity and joint motion. Cartilage can then be worn down more quickly than usual, and repair mechanisms may not be able to keep up. Prolotherapy with ozone can reverse this weakening and relieve the pressure and pain on the joint.

Prolotherapy, used in the joint space, can also improve deposition of new cartilage. Since prolotherapy treats the root degenerative causes of joint , it is extremely useful for a variety of painful conditions. Orthopedic medicine is one of the most satisfying aspects of a naturopathic practice, as physicians can get excellent permanent results that often save patients from having extensive surgical procedures done. Traditionally, there have been two ways in which our naturopathic medical skills have contributed to this field: firstly there are natural pharmaceuticals that decrease pain, inflammation, and promote healing, and secondly there are interventional methods that stimulate the body's own regenerative and healing mechanisms.

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Everyone is already well-versed in the familiar uses of bromelain, Wobenzyme, glucosamine sulfate, copper, and such nutrients in the use of injury recovery and slowing of degenerative disease. There has also recently been an increased interest by both conventional physicians and naturopathic doctors in the use of regenerative therapies such as prolotherapy that, through stimulation of various growth factors, result in permanent improvements in pain through the deposition of collagen and cartilage.

Traditionally, strong proliferants and sclerosants had been used such as phenol and sodium morrhuate. Many physicians are leaning towards hypertonic dextrose (>10%) as a proliferant, as this has been shown to be one of the safest. Recently the use of ozone gas as a proliferant has been used with great ease and success. This has shown to be an excellent alternative and very versatile tool, as being a gas the rapid diffusion through the tissues somewhat lessens the number of injections per session necessary. It is also usually less painful to the patient. Ozone used in major autohemotherapy has definite effects on energy production, through the increase of 2, 3 DPG and also the stimulation of the citric acid cycle with the increase in delivery of NAD and NADPH to the mitochondria. 2,3 DPG is necessary for the unloading of oxygen at the tissues, and the increased delivery of mitochondrial substrates ensures that sufficient ATP is formed. It is possible that this effect is partly to explain the excellent results of the use of ozone in orthopedic medicine. With increased stimulation of ATP production, the healing process initiated by prolotherapy with ozone is more likely to be successful in relief of pain.

The use of ozone in prolotherapy (or Prolozone for short) is extremely versatile. It has been most useful in osteoarthritic knees; chronic low back pain, rotator cuff tears, ankle sprains (especially chronic cases that have progressively become weakened), SI joint dysfunction, and myofascial trigger points. The general dosage of ozone used is 20-30 ug/ml, at a total volume dependent on the joint or tissue size. Usually the area is pretreated with a solution consisting of procaine 2%, Traumeel or Zeel, and B12. The homeopathics and the procaine are usually in a 1:1 ratio, and B12 1-2 mls total is added. Once the solution is injected, the needle is stabilized with a hemostat, the syringe filled with the ozone is loaded, and subsequently the injection is completed. A few cases below illustrate typical cases.

In general, osteoarthritic knees can be treated very successfully. It is a very simple injection technique that involves a medial approach into the knee capsule. Generally, 5 cc of the pre-treatment solution is injected, and then 10 cc's of the ozone gas is injected. There is usually a sensation of "full-ness" to the patient, and later in the day there may be some significant pain. However, there is usually also significant relief after the first few treatments, and even patients who have had no relief with NSAIDS and were candidates for surgery respond remarkable well, early. This has made OA of the knees one of the most rewarding conditions to treat.

Ksharasutra application in Partial rectal prolapsed patient: Modified thiersch's operation

Kumar Mahesh*, Singh Lakshman**

Abstract – Gudabhramsha is a common anorectal disorder (ARD) described in Ayurveda in which rectum and anal canal protruded outside through anus on straining, walking, coughing, during defecation, micturition etc (Nirgacchatigudamvahi- Sushruta nidana 13). Its description in Ayurveda is found since ancient classic & is correlated with prolapsed of rectum. The term prolapse means "a falling or dropping down of an organ or internal part, such as the rectum or uterus etc**."** It is of two types partial & complete. In partial rectal prolapsed patient, the condition is initial & may easily cured if proper attention is given at earlier. As partial rectal prolapse is a preliminary stage of disease and anushastrakarma has been described for sukumaar (e.g.children) & person belonging to heensatva (low tolerance). Ksharakarma is one of the important tool to treat such type of person. Ksharasutra technique has got encouraging results with low morbidity, cost effective and can be treated as OPD procedure. It is a modified form of Thiersch operation in which ksharasutra are applied rather than stainless steel wire, thread etc. to prevent recurrence, with minimum complicatio & better result. The objective of this study is to see the result of ksharasutra application in partial rectal prolapse patient in form of modified Thiersch's operation to achieving control of prolapsed, to restore the continence, to prevent constipation. The study was done on 8 cases of partial prolapsed from OPD/IPD of Anorectal (2011-2012) OPD, SSH, BHU Varanasi.

Keywords - Gudabhramsha, prolapsed rectum, Modified Thiersch operation, ksharasutra.

Background – The term "Gudabhramsa" is made up of 2 words "The Guda" & 'Bhramsa". Guda denotes anorectal site of body & bhramsa have meaning of displacement of an entity from its normal position. So literally the gudabhramsa is a disease in which displacement of guda from its normal position either part of rectal wall or whole rectal wall prolapsed through anal opening. Charaka cited as complication of Samshodhan chikitsa as Vibhramsa (C.Si 6/29). Susruta illustrate the details of Gudabhramsa in "Kshudra roga" chapter. Vagbhatta describe its management in the context of "Atisara Cikitsa" as a complication of atisara. It is a circumferential descent of the bowel through the anus. If this involves only mucous membrane, the conditions said to be one of incomplete or mucosal prolapsed (<3.75 cm), if the entire thickness of the rectal wall is extruded the term complete prolapse or procidentia is used. Gudabhramsha occur either with bowel movements, independently or with defecation and mostly retracts spontaneously. In more advanced cases rectal prolapses may occur while standing, walking, coughing and so greatly interfere with the patient's quality of life. Mostly occur in extreme of life (in children & old age persons) as mucosal variety being commonest in young children, whereas complete prolapse is found chiefly in elderly patients, but may occur in any age**.** Partial prolapse easily repositioned by finger or self reduced after defecation. If this condition not treated then complete rectal prolapsed comes. So encircling of ksharasutra around the anal opening in partial rectal prolapsed prevents protrusion. Ksharasutra plays role as chemical & mechanical agent.

Material & Methods : All the 8 patient with partial rectal prolapsed were registered who were fulfilling the criteria of diagnosis, irrespective of the age, sex, caste & religion, from outdoor and indoor of anorectal clinic/shalya OPD, S.S.Hospital, IMS, BHU Varanasi from January

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2011- December 2011. Inclusion criteria are partial rectal prolapsed while exclusion criteria are complete rectal prolapsed, diabetic etc complicated diseases. The criteria of selection of cases was based on the symptoms presented by the patient in accordance to the description of Sushruta samhita(Nirgacchatigudamvahi- Sushruta nidana 13) confirmed by local examination, per rectal examination & thorough history taking & differentiate with rectosigmoid intussusceptions, third degree piles, large rectal polyp etc.

Selection of drugs & method of Ksharasutra application – As per experience of previous cases of partial rectal prolapsed are cured after ksharasutra application, prepared in the departmental lab. In Partial rectal Prolapse various conservative treatment are advised as digital reposition of the partial prolapsed, attention of bowel habit, avoiding straining at stool, control of diarrhoea, dietetic improvement in case of malnutrition etc. When the conservative measures fail, this single **Modified Thiersch operation** is applied to succeed in partial prolapse in any age group. The preparation of patient are Pre operative written & well explained Consent, part preparation, enema, inj. T.T. one amp IM, Xylocain sensitivity test, Position – Lithotomy . Anesthesia – Local Anesthesia. The operative steps includes - 1. Local infiltration with 2 % xylocaine with adrenaline around the external anal orifice 2. *A stab incision* is made at 12'clock about 1 inch above the external anal verge. 3. *Insertion of Kshirsutra* from stab incision at 12'clock to 6'clock with the help of long curved probe. 4. *Insertion of Kshirsutra on the opposite side.* 5. Tightening & Assessment of ksharasutra around the anal canal. 6. A knot is tied at the 6 o'clock position. 7. Complete cure after removal of ksharasutra after 15th day. Criteria for assessment on the basis of symptoms as complete relief, improved, unchanged.

Observation & Results

Table – Showing improvement

Complete relief	6
Improved	1
Unchanged	1

Table – Showing complications

Wound infection	2
No complication	6

Discussion - Various surgical procedures are recommended for rectal prolapse need abdominal approach, well equipped Operation Theater, trained surgeons etc. but none of them proved 100% satisfactory results. As circumferential application of ksharasutra was done, the mechanism of action of Modified Theirsch' operation is justified in 2 ways firstly- by ksharasutra mechanically support the rectum and anal canal & prevent the prolapsed, secondly -stimulating a inflammatory reaction in the surrounding of anal canal and sphincters leading to development of ring of fibrosis, reinforcing the anal sphincters. It involves minimal degree of

surgical trauma, can be performed under local anesthesia, on OPD basis & in rural area also. If failure comes across or complications happen it can be easily undone by removing the ksharasutra. In this study out of 8 cases , 6 cases achieved complete cure from the prolapsed. Remaining 2 cases one has got moderate collection of hematoma thereby ksharasutra removed next day, hematoma drained & got further recurrence. Another one patient got abscess formation 10th day of operation then thread was removed and it got fractional control on earlier prolapsed.

Conclusion – Application of ksharasutra in partial prolapsed patients is useful as it causes inflammatory process as soon as ksharasutra is applied there by lead to fibrosis and prevent to further descending of rectum.

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(S. Ci. 20/61, A.H.Ci 9/52).

Pre-operative anxiety – its major concern, risk factors and strategies for prevention

Dr. Hridoy Kumar Das, ** Dr.Hemant D. Toshikhane, *** Dr. S.V. Emmi, * Dr. Kishore K. Hullatti**

Abstract:

Preoperative anxiety is a challenging concept in the preoperative care of patients. Most patients awaiting elective surgery experience anxiety and it is widely accepted as an expected response.[25] Anxiety is described as an unpleasant state of uneasiness or tension, which may be associated with abnormal hemodynamic as a consequence of sympathetic, parasympathetic, and endocrine stimulation. It begins as soon as the surgical procedure is planned and increases to maximal intensity at the moment of entering the hospital [26]

Key word: Anxiety**,** Pharmacological therapy, anxiolytic.

Major concerns:

A study of the most common preoperative fears surrounding surgery in patients preoperatively, are some interesting findings as postoperative pain, not remaining asleep during the procedure a long wait for the operation sickness and vomiting , appearing foolish , not awakening from anesthesia , and fear of injections were the most common concerns. **[28]**

Risk factors:

There are several risk factors for preoperative anxiety. These include history of cancer, psychiatric disorders, self-perception, depression, trait-anxiety level, pain, history of smoking, extent of the proposed surgery, female gender, level of education, and physical status according to ASA.**[5]** Higher levels of anxiety in females is observed significantly. Similar finding have also been reported in the literature, **[29]** while some other investigators demonstrated the lack of gender effect. **[12, 30]** Patients who had previous surgical experience would be less anxious than patients waiting for surgery for the first time. However, patients awaiting surgery under general anesthesia were significantly more anxious as compared to spinal anesthesia.

Strategies for prevention:

According to different studies interventions to reduce preoperative anxiety include various methods as pharmacological therapy,**[31]** provision of information,**[12]** distraction, attention focusing, and relaxation procedures like music therapies .**[32]**

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Hence, this study reviewing different researches is aimed at summarizing and highlighting the importance of preoperative anxiety management mentioning its concerns, risk factors and strategies for prevention.

Introduction:

Preoperative anxiety is a challenging concept in the preoperative care of patients. Most patients awaiting elective surgery experience anxiety and it is widely accepted as an expected response.[25] Anxiety is described as an unpleasant state of uneasiness or tension, which may be associated with abnormal hemodynamics as a consequence of sympathetic, parasympathetic, and endocrine stimulation. It begins as soon as the surgical procedure is planned and increases to maximal intensity at the moment of entering the hospital. [26] Anxiety is an individual experience and it is a concept that is difficult to describe with words. No matter how major or minor an operation is, it tends to raise a certain level of anxiety in every patient [1],which is called as preoperative anxiety. Hospitalization for surgical procedure can be experienced as a threat or stressor and may produce anxiety in patients. Anxiety occurs in the preoperative phase as the patients anticipate an unknown event with potential pain and changes in body image, as well as increased dependency on family and other life changes [2.] Although some of the patients know in advance that they are going to be treated by an operation, they cannot help feeling worried, anxious, and nervous about the upcoming surgical treatment. There are several types of anxiety disorders (panic attacks, generalized anxiety disorder, mixture of anxiety-depressive disorders); however, the one that is present in the patient undergoing anesthesia for a surgical procedure is a psychological and physical discomfort that arises from the sense of immediate danger and is characterized by a widespread fear, which can range from anxiety to panic. It can actually be a constitutional characteristic of the patient's personality **[10].** Previous studies have shown that in subjects who are undergoing surgery, anxiety is present up to at least a week before the procedure**[11]**. Other factors associated with the presence of anxiety include type of surgery, fear of the hospital environment and quality of medical care provided**[5]**.

Incidences of preoperative anxiety have been reported in11% to 80% of adult patients. Consequently, there has been a growing interest in the possible influences of preoperative anxiety on the course and outcomes of surgical treatments, as well as in the study of anxiety-reducing interventions [5.] Most surgeons postpone operations in cases with high anxiety **[6]**. Therefore, the importance of anxiety in surgery patients shows the necessity of its prevention.

Consequences of preoperative anxiety:

In adults, several cohort studies have been conducted to explore the relationship between preoperative anxiety and postoperative outcomes such as pain, analgesic use, and return to normal activities. Although inconsistent and marked by many methodological problems, collected findings from published studies suggest that the postoperative recovery process is more painful, slower, and more complicated in patients with high levels of preoperative anxiety.**[3, 4]** Anxiety in surgical patients can increase the need for anesthesia, which increases anesthetic risk.**[7]** Furthermore, anxiety has been shown to increase postoperative pain medication

requirements, which can affect postoperative recovery, for example, by slowing respirations, which increases pulmonary risks; decreasing activity, which increases risk of thrombosis; and increasing risk of bowel upset[7,8] . Anxiety also plays a role in increasing the risk of infection and decreasing the immune system response.[9]

Risk factors:

There are several risk factors for preoperative anxiety. These include history of cancer, psychiatric disorders, self-perception, depression, trait-anxiety level, pain, history of smoking, extent of the proposed surgery, female gender, level of education, and physical status according to ASA.[5] Higher levels of anxiety in females is observed significantly. Similar finding have also been reported in the literature, [29] while some other investigators demonstrated the lack of gender effect. [12, 30] Patients who had previous surgical experience would be less anxious than patients waiting for surgery for the first time. However, patients awaiting surgery under general anesthesia were significantly more anxious as compared to spinal anesthesia. Sleep time was another factor associated with anxiety, 3 to 4 hour sleep before surgery seems to be a protective factor for the development of anxiety.

Major concerns:

A study of the most common preoperative fears surrounding surgery in patients preoperatively, are some interesting findings as postoperative pain, not remaining asleep during the procedure a long wait for the operation sickness and vomiting , appearing foolish , not awakening from anesthesia , and fear of injections were the most common concerns. [28]A very important point in which several authors agree is that it represents a lack of adequate and timely information to patients during the pre-anesthetic consultation for those who will undergo surgery, being able to decrease patient anxiety. In this regard, a study by Kiyohara et al. [12] found that patients receiving better preanaesthetic information during the visit with the anesthesiologist showed reduced rates of anxiety compared to those who did not receive it. In this same study, educational level, and gender of patients did not influence a greater degree of anxiety.[12] Similar to that reported in other studies, the degree of education was not found to have any influence on the development of anxiety in most patients studied. However, it is noteworthy that in patients with a high educational level it is observed a higher percentage of preoperative anxiety. Moreover, females appears to be a generator of risk up to five times more in relation to males.[13]

Strategies for prevention:

Once prevention is concern for preoperative anxiety, the prerequisites are preoperative visit by anesthesiologist for proper information, adequate measurement of the anxiety, relaxation techniques and intervention with pharmacological preparation as anxiolytic drugs. Some other modalities are also got importance such distraction, attention focusing and music therapies as prevention.

It is necessary to evaluate and prevent anxiety in all patients who will undergo an anesthetic-surgical procedure. There are various scales that can be used such as the DASS (Depression, Anxiety and Stress Scale), [14] the STAI (State-Trait Anxiety Inventory questionnaire),[15] the

Visual Analogue Scale of Anxiety, [16] the Taylor anxiety scale (Inventory of Situations and Responses of Anxiety) or Hamilton, [17] and more recently the Amsterdam Preoperative Anxiety and Information Scale (APAIS) [18] designed and used by Moerman et al.[19,20] It is known that the visit from the anesthesiologist is sometimes more effective than pharmacological medication to relieve preoperative anxiety.[21] It is also true that patients' premedication causes sedation and amnesia, which leads to improved patient cooperation. This results in a satisfied patient with the treatment and care provided by the healthcare team.[17, 2] In public healthcare institutions it is not a daily practice of the anesthesiologist to provide detailed information to the patients. Most of the time, the pre-anesthetic consultation is reduced to a technical and medical evaluation. In those studies that investigated patients who received details of the anesthetic technique and the drugs that they would be administered, there were beneficial changes demonstrated in anxiety levels postoperatively.[17] Pain is a complex and multidimensional symptom, determined not only by tissue damage and nociception, but also by personal beliefs, previous pain experience, psychological factors specific to the individual, and environmental and personal problems. Patients with high levels of anxiety are particularly vulnerable to pain after their surgery, with an increase in the use of analgesics, resulting in a negative experience for the patient during the perioperative period.[5] It is vital for the anesthesiologist to identify the factors that influence their patient's anxiety. As mentioned above, nowadays anxiety has been poorly explored by anesthesiologists as a contributing factor for perioperative complications.[24] Despite this, fear and anxiety are part of the experience of each surgical patient.[22] In previous studies it has been mentioned that there is a direct relationship between anxiety and pain perception, showing that women experience more anxiety than men (principally in D&C, breast surgery, chest surgery and otorhinolaryngology.[25] The anesthesiologist must use indirect measures to be able to assess whether the patient is anxious, such as an increase in cardiovascular activity (tachycardia, hypertension, arrhythmias), increased oxygen consumption with vasoconstriction of the peripheral blood vessels, reduction in digestive functions, dilated pupils, increased sweat gland activity, piloerection, increased pulmonary secretions, biochemical changes and alterations of blood clotting. Other clinical data that show an extreme amount of anxiety are trembling, beating pulse, sweaty palms, feeling of "butterflies" fluttering in the abdomen, pharyngeal constriction, attentive facial expressions and dry mouth.[13,18]

Current management of anxiety involves using medical interventions, such as administering midazolam before surgery, and using effective communication strategies[7]. Kain et al[33] evaluated family-centered preparation for surgery and it showed a significantly better result. Music therapy is an intervention that has also shown effectiveness in reducing preoperative anxiety.

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New Prospects of Treatment of Medical and Surgical Diseases- Bloodletting

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Abstract- Blood is highly important component for living beings. It is also important for circulation of metabolic products in our body. Sushruta has elaborately described it as a half of the therapeutic measure for various medical and surgical diseases. Bloodletting is indicated for those diseases, which are not easy to complete cure. By the process of bloodletting we try to remove the inflammatory mediators from the site, which are responsible for progression of disease. Hence, blood acts as a vector for removal of them from the body.

Key Words- Blood, metabolic product, Bloodletting, inflammatory mediators.

Introduction- Sushruta has described bloodletting as one of the treatment procedure in Panchkarma. As per the Sushruta the vitiated Dosha (inflammatory mediator) of the body can be eliminated by bloodletting. He says that bloodletting is half of therapeutic management (Shalya Chikitsardha) for various surgical diseases. Along with Surgical some medical diseases can also be treated by bloodletting. It is highly effective procedure for many skin diseases. Bloodletting can be performed by five methods viz. Siravedha, Prakshana, Jalauka, Shringa and Alabu.

Mechanism of action- Various methods are used for bloodletting having their specific importance. It will resolve the pathology of many diseases, which are more or less related with blood circulation of particular site. It acts with the concept of capillary action and pressure exerted on the particular surface.

Creating a negative pressure at a surface, which are supplied by ramifying capillaries, will open up closed one or collapse, which are excessively supplied with blood circulation.

After keenly observation of diseases pathology treated by bloodletting, we find that most of the pathogenesis takes place due to-

1. Excess and abnormal function of mucus gland.

2. Fast multiplication of abnormal skin layer.

3. Collection of some inflammatory mediator in interstitial space, which are not drains through the veins and lymphatic channels.

As per the Sushruta sharira Sthana-

voxk<+s tykSdk% L;kRizPNUuka fif.Mrs fgre~A

f'kjk·¯O;kids jDrs J`¯kykcw Rofp fLFkrsAA 8@26

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voxk<+s tykSdk% L;kr - In those diseases, where extravasations and collection of fluid and blood in interstitial space. The collected material can remove from their via Jalauka. Jalauka adheres on particular surface and exert negative pressure by their sucking action. The negative pressure will clean that site by removal of impure blood along with inflammatory mediator and inflammatory waits product. These inflammatory mediators are responsible for maintaining or progression of disease. After removal of inflammatory mediators along with impure blood by jalauka, will inhibits the progression of disease .eg.- Abscess in Ist and IInd stage, cellulites, Inflammed and thromboses pile mass.

izPNUuka fif.Mrs fgre - Prakshana can be performed on those sites, where channel are blocked either due to suppression of blood supply or suppression of blood and lymphatic drainage. Prakshana causes revascularization of the tissue and cleaning of the channels so that part will regain the function.eg.- Alopecia.

f'kjk·¯O;kids jDrs- As per the Anatomy every part of the body has been supplied by blood through vascular channels. Blood is responsible for supply of nutrition to the tissue through the arteries and drainage of metabolic waist products from the site through veins and lymphatic. The whole vascular system is divided in many vascular segments. Each segment of the body has their own artery, vein and lymphatic. These all are connected through various collaterals. The segment is connected through central circulation by major blood vessels. Any pathology happens in a particular segment that will alter the metabolism of there. This will causes collection of inflammatory mediators at that site. These inflammatory mediators' further progress the disease and at last complete manifestation of the disease take place.

By the Siravedha, we punctured the segmental vein of particular segment. Blood start to ooze through the punctured vein, along with inflammatory mediators collected at disease site. After removal of inflammatory mediators disease pacifies and patient improves. eg.- Sciatica.

J`¯kykcw Rofp fLFkr - If any pathology involves locally on the skin. We can remove the disease responsible chemical mediators from the local site by Shringa and Alabu. Shringa and Alabu are creating negative pressure on the surface and suck the chemical mediator along with blood from the site. After removal of chemical mediator from the site disease will pacifies.eg.- Eczema, Psoriasis, Vitiligo.

Importance of bloodletting- Person regularly performing bloodletting in autumn (Sarad) season are never be diseased with skin problem, diseases manifested with nodular pathology and swelling, blood related disorders.

Proper time for bloodletting- bloodletting should be done in cloudless day in the rainy season, a cool day during the summer, and at noon in the winter season (Hemanta).

Contraindication-

Persons- Bloodletting should be avoided to an infant, old man, a parched man, fatigued and emaciated with Kshata-kshina, a person of timid or coward disposition, a person used up with

excessive drinking or sexual enjoyments or tired with troubles of long journey, and intoxicated person, pregnent women. A patient who been treated with virechana, vamana or with anuvasana and asthapana vasti. A man who has passed a sleepless night, impotent or emaciated person, an enceinte, fasting.

Diseases- cough, asthma, high fever, phthisis, convulsions, hemiplasia, thirst, epilepsy, oedema, anemia, bleeding piles, ascitis, and tuberculosis.

Condition of veins- Incisions should not be made into those veins, which are not fit for opening, or into the fit ones, if invisible. It should be the same with those, which cannot be properly ligatured or even, if ligatured cannot be raised up.

Season- Blood leating should not be performed in extremely cold or hot, cloudy or windy day.

Bloodletting is forbidden without necessity or in a healthy person.

Pre operative procedure of blood leating (Poorvakarma)- The patient should be duly fomented (sveda) and oileted (Sneha) with oily preparations. A liquid and slime food (Pichhilanna) or antidotal to the Dosha, Yavagu should be given to patient at first. Then at the proper season (i.e., not in the rainy or winter season etc.) the patient made to sit or lie down and the part to be incised upon should be bound, neither too loosely nor too tightly with the tourniquet.

Position of patient (Yantrana Vidhi) :

For head- The patient whose vein is to be operated upon should be made seated on a stool to the height of an Arm. He should keep his legs in a drawn up contracted posture resting his elbows on his knee-joints the hands with his two thumbs closed in his fists placed on his sternocliedo mastoid muscles. Then having cast binding linen on the two closed fists thus placed on the neck. surgeon should ask another man from the back side of the patient take hold of the two ends of the cloth with his left hand having the turned upward, and then ask him to tie up with his right hand bandage round the part, neither too loosely nor too tightly, so as to raise the vein and to press the bandage round the for a good out-flow of blood. Then surgeon should perform operation in the desired spot, the patient having been previously asked to sit with his mouth full of air. This proceeding should adopt in opening any vein of the head, to save those which situated in the cavity of the mouth.

For lower limb-In the case of opening a vein (Sira) in the leg, the affected leg, should be placed on a level ground, while the other leg should be held in somewhat contracted posture, at a little higher place. The affected leg should be bound with a piece of linen below its knee-joint and pressed with the hands down to the ankle. A ligature should be tied four fingers above the region to be incised upon, after the vein should be opened.

For upper limb- In the case of opening a vein (Sira) in the arms, the patient should be asked to sit easily and fixedly with his two thumbs closed in his fists. A ligature should be tied four fingers above the part to be incised upon and the vein is opened in the aforesaid manner. The

knee-joint and the elbow should be held in a contracted or drawn up posture at the time of opening a vein in case of Grdhrasi (Sciatica) and Visvachi, respectively.

For Trunk- The patient should hold the back raised up and expanded and his head and shoulders bent down at the time of opening a vein in the back, shoulder and hips. He should hold his head thrust back and his chest and body expanded at the time of opening a vein in the chest or in the abdomen. He shall embrace his own body with his arms at the time of opening a vein in his sides.

For genital organ-The penis should be drawn downward (i.e., in flaccid state) on a similar occasion in that region.

For Mouth- The tongue should be raised up to the roof of the mouth and its fore-part supported by teeth at the time of opening a vein in its under-surface. The patient should be told to keep his mouth fully open at the time of opening a vein in the gums or in the palate.

Similarly a Surgeon should devise proper and adequate means for the purpose of raising up a Sira (vein) and determine the nature of the bandage to be used therein according to the exigencies of each case.

Depth of Incision and instrument- An incision to the depth of a barley-corn should be made with a Vrihimukha instrument (into a vein situated) in the muscular part of the body, whereas the instrument should be thrust only half of that depth or to the depth of a vrihi seed in other places. An incision over a bone should be made with the Kutharika (small surgical axe) to the half depth of barley-corn.

Characteristics of proper bloodletting- A well and successfully pierced vein bleeds in streams and spontaneously stopped after a time while. Person feels lightness, loss of pain, pacification disease and inlightment of mind.

Characteristics of improper bloodletting- Person complains for Itching, swelling, redness, burning sensation, pus formation and pain at disease site.

Blood does not flow out from an incision made into a vein of an unconscious, much frightened, and tired or a thirsty patient. An incision of a vein without proper bandaging and rising up is attended with a similar result.

Amount of blood letting- Bleeding to the quantity of a prastha (650ml) measure should be deemed sufficient for a strong and adult patient, stuffed with a large quantity of the deranged Doshas in the body. But this amount is much as per now persons having body built. For amount of blood leating, we have to care strength of person and disease both. Practically as per strength of person, we can do blood leating maximum up to 80ml.

Post operative measures of bloodletting (Pashatkarma)- After blood leating, surgeon have to care for digestion power of the person. Patient has to give light food neither too hot nor too cold, so that digestion power will increase.

Complication of Excess Bloodletting- Patient complains tamp over fore head, blackout, features of glaucoma, diminished vision, emaciation, convulsion, hamiplasia, loss of function of related organ, excess thirst, burning sensation, hikka, cough, breathlessness, anemia and even death. These complications are mainly due to transient ischemic attack or due to hypoxia of the related organ.

Conclusion- On practically bloodletting is highly effective procedure for treatment of various medical and surgical diseases. This procedure of treatment removes inflammatory mediators from the site and permanently disease pacifies. But this procedure should be highly selective for disease and patient, because Sushruta says, that "Blood is life".

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Clinical investigation:
Comparative study of cost effectiveness and recovery profile between Propofol, Sevoflurane and Propofol with Sevoflurane in Indian population.

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Abstract: Propofol and sevoflurane is anesthetic agent routinely used for induction and maintenance of anesthesia. In this study we compare the cost, hemodynamic parameter and recovery profile of these two agents. Sixty patients of American Society of Anaesthesiologist (ASA) I/II, age 18-60 yrs, scheduled for open cholycstectomy, were admitted to this prospective randomized study within a period of 1st January 2008 to 31st April 2009 and divided into three groups. Group P- induction and maintenance of anesthesia was done with propofol. Group, P/S- anesthesia was induce with propofol and maintained on low flow Sevoflurane. Group S- both induction and maintenance was done with sevoflurane. Cost analysis, hemodynamic parameter & recovery profile were compared between these groups. Cost of induction of anaessthesia was highest in Group S. Cost of maintenance of anaesthesia and total costs of anesthesia were highest in Group P and lowest in Group S. Hemodynamic parameter was more stable in Group S during induction, maintenance and postoperatively. Mean time of extubation was earlier in Group S than Group P or Group P/S. Postoperative complications were more in Group S but statically insignificant. We conclude that sevoflurane appears to be better anesthetic agents as compare to propofol because of more cost effectiveness, lesser hemodynamic alteration, and earlier extubation and early follow of verbal commands than Propofol.

Key words: Cost effectiveness, Propofol, Sevoflurane, Anaesthesia

INTRODUCTION

Clinical and economical factors that are important to consider when selecting anesthesia.[1, 2] The main goal in patient care, i.e. effective treatment, must be achieved by a rational use of restricted resources at a maximum degree of effectiveness. In our hospital most of patients belongs to rural area, of poor socioeconomic status and no financial support provided by hospital. This study may be helpful to find out more economical anesthetic agent. The consumption and cost of an inhalational agent depend on fresh gas flow, vapor setting, and duration of anesthesia. [3, 4] When choosing an anesthetic agent, the price of 1ml liquid anesthetic is an important factor. However, the overall cost-effectiveness analysis must balance the cost of the agent with its pharmacodynamic advantages such as more rapid recovery from anesthesia. Propofol and sevoflurane are well established anesthetic agents for smooth induction, maintenance and quick recovery.

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Material & Methods: After approval from institute's ethical committee and written informed consent from patients, this prospective, randomized and controlled study was conducted. The present study consisted of 60 adults (18-60 yrs), ASA physical status I and II, of either sex, undergoing open cholycystectomy surgery. The study was conducted over a period of 1st January 2008 to 31st April 2009. The patients with pre-existing renal, hepatic or cardiovascular diseases or allergy to any of the drugs were excluded from the study.

The patients were randomly assigned into 3 equal groups (20 patients in each group) with the help of a computer generated random numbers. Group (P): induce and maintained with propofol (Fresofol-fresenius kabi India), Group (P/S): induce with Propofol and maintained with Sevoflurane (Sevorane-Abbot Laboratories, U.S.A), Group (S): induce and maintained with Sevoflurane. All patients were premedicated with tab alprazolam 0.5 mg the night before surgery and again at 6AM with sips of water. Baseline heart rate (HR), mean arterial blood pressure(MABP), oxygen saturation (SpO2), temperature(T) and Bispectral Index (BIS) were recorded. An intravenous access was established by 18 G cannula on the dorsum of nondominant hand. Just before induction, patients in all groups were given Ondansatron 0.10 mg/kg and butorphanol 0.03mg/kg intravenously (i.v). All patients were preoxygenated at a flow rate of 5 liter/min for about 3 minutes. In Group P, anesthesia was induced with propofol (1-2.5 mg/kg) intravenously until disappearance of verbal response and maintained with continuous infusion of propofol (50-150 microgram/kg/min) intravenously , In Group P/S, induced with propofol (1-2.5 mg/kg), and maintained with sevoflurane (1-3% of dial conc.). In Group S, anesthesia was induced with sevoflurane (8%) and was maintained on sevoflurane. All patients were intubated with vecuronium 0.12mg/kg and maintained with 50% nitrous oxide (N2O) + 50% oxygen (O2), vecuronium 0.01mg/kg. In all groups fresh gas flow (FGF) were kept 2 liter/min during maintenance of anesthesia. In all patients anesthesia were titrated according to BiSpectral Index (BIS) value and maintain a BIS value of 50-60 throughout anesthesia. At the end of surgery the muscle relaxant was reversed with a combination of Neostigmine 0.05mg/kg and glycopyrrolate 0.01mg/kg and Patients were extubated as soon as they resumed adequate tidal volume.

All patients were observed for Cost analysis, Heart rate(HR), Mean arterial blood pressure(MABP) Inhalational gas anesthetic analysis includes [FiO_2(fraction of inspired Oxygen), FiAA (fraction of inspired anesthetic agent), FetAA (fraction of end tidal anesthetic agent)] , Total duration of surgery, Time from termination of anesthetic to extubation, and Time from termination of anesthetic to following of verbal commands. After extubation patients were observed in post operative recovery room for Emergence agitation, Hemodynamic parameter, postoperative nausea and vomiting (PONV), and postoperative shivering.

The Cost analysis consists of consumption of anesthetic agent and costs of disposable items e.g. syringes, pressure monitoring line (PM line) etc. For the same patient, syringes and drugs were reused whenever additional drug doses were required. Drugs, materials and personal resources common to all groups (endotracheal tube, vecuronium etc) were not considered. The cost for the periods of the different sevoflurane setting were calculated according to the formula described by Weiskopf and Eger[3] and Rosenberg et al.[4]

$$\text{Cost} = \frac{P \times F \times T \times M \times C}{2.412 \times d}$$

Where P is the vaporizer setting (%), F is the fresh gas flow (L/min), T is the duration of sevoflurane administration (min), M is the molecular weight of sevoflurane (= 200), C is the cost (rupees per ml) of sevoflurane and d is the density of sevoflurane (= 1.52 gm/ml). The prices of each period were added to obtain the total costs of sevoflurane. The various

parameters studied during observation period were compared using Student's t-test for parametric variables and Chi square test for nonparametric variables. The critical value of 'p' indicating the probability of significant difference was taken as <0.05 for comparison.

Results

There was no difference in all the groups as regards to age, sex, weight and height distribution (Table 1) (P>0.05). The cost of induction were highest in Group S and lowest in Group P (p<0.001). Cost of maintenance of anesthesia and Total costs of anesthesia including cost of wasted drugs and disposable items was highest in Group P and lowest in Group S (p<0.001). Highest cost of anesthesia was in Group P and lowest in Group P/S if we exclude cost of disposable items (p<0.001). Costs of disposable items were highest in Group P and lowest in Group S (p<0.001). (Table2A). Intergroup comparison of costs shows statically significant difference between three groups (Table2B). There was significant fall in heart rate and blood pressure from baseline value after induction of anesthesia in all three groups (p<0.001) (Table3, 4) but less in Group S. After intubation there was transient increase in heart rate and blood pressure from base line value in all the three groups and statically significant (p<0.001). Postoperatively there was no significant change in heart rate and blood pressure except in Group P in which remain at lower level up to 30-60min (p<0.01).

Intergroup comparison of mean extubation time shows statically significant difference between Group P and Group P/S or Group S (p<0.001) (Table4). Intergroup comparison of mean times to fallow verbal commands shows statically significant difference between Group P and Group P/S or Group S (p<0.001)(Table 5) .There was no statically significant difference in post operative shivering, nausea and vomiting in between three groups.

Table 1: Demographic profile (Mean ±S.D)

Parameter	Group P (n =20)	Group P/S (n =20)	Group S (n =20)
Age (year)	46.20±7.36	42.00±8.72	43.36±7.93
Sex (M / F)	9:11	9:11	10:10
Body weight (kg)	53.30±7.07	53.35±10.06	58.00±10.06
Duration of anesthesia (min)	66.50±16.86	66.25±14.94	65.00±18.02

Table2A: Cost analysis (in Rs.)

Parameter	Group P (n =20)	Group p/S (n =20)	Group S (n =20)
Induction	86.39±10.15	106.73±9.06	159.51±0.00
Maintenance	378.09±101.52	268.67±61.61	247.50±74.86
Cost of anesthesia	464.49±108.10	375.40±66.47	407.01±74.86
Total cost including wastage of drug	602.85±82.42	501.77±61.61	407.01±74.86
Cost of disposable items	119.10±0.00	8.10±0.00	0.00

Table2B: Inter-Group Comparison of costs in terms of t and p-value

Parameter	Gp P vs. Gp P/S		Gp P vs. Gp S		Gp P/s vs. Gp S	
	t-value	p-value	t-value	p-value	t-value	p-value
Induction	6.683	<0.001	32.19	<0.001	26.04	<0.001
Maintenance	4.121	<0.001	5.639	<0.001	2.090	<0.05
Cost of anaesthesia	3.139	<0.01	2.923	<0.01	3.190	<0.01
Total cost including wastage of drug	4.393	<0.001	-	-	-	-

Table 3: Mean Heart rate (per minute) at different time intervals and their comparison with baseline.

Time interval	Group P (Mean HR)	Group P/S (Mean HR)	Group S (Mean HR)
Baseline	80.80±8.65	77.25±6.50	79.90±8.77
After induction	75.60±9.69 (p<0.05)	72.80±5.70 (p<0.05)	76.15±8.65 (p<0.05)
After intubation	89.30±7.71 (p<0.05)	88.30±7.80 (p<0.05)	89.65±8.64 (p<0.05)
After extubation at 5 min.	79.80±8.51 (p>0.05)	77.90±9.03 (p>0.05)	80.65±7.74 (p>0.05)
30 min.	78.94±7.99 (p<0.05)	78.55±10.49 (p>0.05)	79.11±11.43 (p>0.05)
60 min.	79.42±8.02 (p>0.05)	76.25±8.58 (p>0.05)	80.31±10.27 (p>0.05)

Table 4: Mean arterial pressure (mmHg) at different time intervals and their comparison with baseline

Time interval	Group P (mmHg)	Group P/S (mmHg)	Group S (mmHg)
Baseline	90.50±5.43	92.35±4.23	92.00±5.01
After induction	85.70±4.76 (p<0.05)	87.50±3.84 (p<0.05)	89.50±5.13 (p<0.05)
After intubation	94.80±3.87 (p<0.05)	94.50±3.23 (p<0.05)	95.85±4.06 (p<0.05)
After extubation at 5 min.	88.80±6.12 (p<0.05)	89.75±5.06 (<0.05)	90.00±4.44 (p<0.05)
30 min.	87.05±5.93 (p<0.05)	90.65±5.62 (p>0.05)	90.11±4.64 (p>0.05)
60 min.	88.35±5.41 (p<0.05)	91.25±5.91 (p>0.05)	90.31±4.96 (p>0.05)

Table5:Comparison of mean extubation time, mean time to follow verbal commands, PONV, postoperative shivering and emergence agitation in three groups

Parameter	Group P (n =20)	Group p/s (n =20)	Group S (n =20)
Mean extubation time (min)	9.04±1.24	6.74±0.84	6.44±0.71
Mean time to follow verbal commands (min)	11.88±1.30	8.26±1.02	7.87±0.83
No. of patient with PONV	3(15%)	4(20%)	4(20%)
No. with shivering	1(5%)	2(10%)	1(5%)
No. with emergence agitation	0(0%)	2(10%)	3(15%)

Discussion

We observed a significant difference in cost and recovery profile between three groups. Propofol and sevoflurane is well established agent both for induction and maintenance of anaesthesia. Lower cost of induction in Group P was due to residual drug were used during maintenance of anesthesia in same patients. In Group S, higher cost of induction was due to cost of sevoflurane used for priming of anesthesia circuit and high fresh gas glow(FGF) used during induction period. In Group P higher cost of maintenance was due to higher cost of disposable items. Increase Total cost in Group P (and to a lesser extent in Group P/S) was a result of wastage of unused drugs and Costs of disposable items (e.g. Pressure monitoring line and syringes).

Tang and colleagues[5] (1999), found that propofol/ propofol-N2O were cheapest kind of anesthesia, followed by propofol/sevoflurane-N2O and sevoflurane/sevoflurane-N2O. This opposite result to our finding may be due to exclusion of costs of disposable items or wasted drug in this study. Smith and colleagues[6] (1999), results were opposite to above study. The sevoflurane/sevoflurane group was nearly as inexpensive as the propofol/sevoflurane, but propofol/ propofol group was much more expensive.

Significant fall in heart rate and blood pressure from baseline value in propofol induction group(Group P and Group P/S), propofol maintenance group(Group P) and

postoperatively in Group P may be due to more sympathetic cut down and direct cardiac depressant action of propofol. Uger *et at*[7] (2006), found that sevoflurane dose not affect heart rate similar to our finding during maintenance of anesthesia. Ogawa *et al*[8] (2006), found that both sevoflurane and propofol causes decrease in heart rate during induction similar to our finding. Takeda *et al*[9](2002) , have suggested that use of sevoflurane for inducing deliberate hypotension in particular surgeries owing to its rapid onset, better hemodynamic control and farter recovery as compared to other agents. While we found hypotension produced by sevoflurane was only at high % of dial cons. but not during maintenance of anesthesia. Thwaites *et al*[10] undertook a randomized, double blind comparison of 8% sevoflurane and propofol on 102 day case patients and found more hypotension with propofol during maintenance. This finding supports our observation.

Shorter mean time to extubation in Group S or Group P/S may be due to rapid elimination of sevoflurane. Contrary to this, Hocker *et al*[11] found that propofol had a shorter extubation time. The differences in observation were probably due to differing duration of surgical procedures and differing number of patients. Another study conducted by Arar *et al* [12], in geriatric patient's fond no difference between sevoflurane and propofol as regards extubation times and other emergence characteristics. The selection of patients of only 65 years and above could have blunted the difference between the two groups. Michael *et al*[13], they reported that inhalation induction with sevoflurane was dramatically prolonged with increase age.

Mean time to follow verbal commands was significantly less in Group S or Group P/S may be due to less sedation by sevoflurane than propofol. The patients thus regained consciousness earlier in sevoflurane maintenance group than propofol infusion group. Peduto *et al*[14],have stated that sevoflurane turned out to be a better anesthetic agent in terms of early emergence and lesser sedation in their trial on maintenance and recovery with sevoflurane and propofol in day case surgeries. Robinson *et al*[15], found that the patients maintained on sevoflurane anesthesia responded to commands 3-4 minutes earlier.

Patients were observed for any episode of nausea, vomiting and shivering for a period of two hours after surgery. There was no significant association between three groups. Cohen et a[16]l similarly found no difference in vomiting in their study groups. However, Yazbeck[17], reported a lesser incidence of PONV with propofol than sevoflurane. Caverni et al[18], compared sevoflurane and propofol in patients undergoing long term craniofacial surgeries. They did not find any difference in postoperative morbidity, including shivering in between the groups.

Thus we conclude that sevoflurane appears to be better anesthetic agents as compare to propofol because- Overall it is more cost effective than propofol, fall in HR and MABP after induction was less and postoperatively blood pressure reverts back to preoperative value earlier, patients could be extubated earlier and were also able to follow verbal commands earlier than propofol.

However, no definite opinion can be given due to a relatively small number of patients studied. It is apparent that differences in anesthetist's technique, and or differences in patient education and cooperation can have considerable influence on the conduction of a vital capacity

induction technique. The cost effectiveness of sevoflurane used either for induction and maintenance of anesthesia or for maintenance only, warrants further investigation.

Appendix

Cost of 1% propofol (20ml) = Rs. 225
(50ml)= Rs. 450

Cost of pressure monitoring line (PM line)= Rs. 81

Cost of syringes (50ml) =Rs. 30
(10 ml) =Rs. 8.10

Cost of sevoflurane (250ml) =Rs.7500

(Rs - Indian National Rupees)

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A clinical study on Leech Application in chronic ulcer

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Abstract- Hirudotherapy has a long history of its journey from our samhitas and egyptians to the modern world as a part of Bio-therapy. A little work has been done on physiological and biochemical assessment during leech application. In present work 45 patients were selected and a study was done to see the efficacy of leech application in the management of Vrana (wound) and to access physiological and biochemical parameters during leech applications.
It is found that Leech has been very effective in the management of chronic ulcer. The unit healing time was found better in leech treated group. There is hardly any toxic effect upon renal function as BU and Sr. Creatinine remained within normal limit after treatment. Physiological analysis also shows that there is no any alteration noticed during and after leech application. So in nutshell leech can be applied safely in cases of non healing ulcer.
KeyWords – leech, chronic ulcer, physiological analysis, biochemical parameters.

Introduction: For the management of the wound our ancestors tried and experimented with plants and animals which were available in their surroundings. To achieve good approximation, early healing, acceptable scar, without complications, Acharya Sushruta has elaboratively explained sixty types of procedures, among those 'Visravana' of 'Raktamokshana' is one of them. According to our ancient literature, raktavisravan is very effective in case of dushta vrana or chronic non healing ulcer. As written:

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Why leech, to treat chronic ulcers, why not other measures of bloodletting. In Ayurvedic literature Jalaukawacharana is briefly described for the management of Vrana specially in the case of Vishayukta Vrana. Many researchers have been done on Jalaukawacharana in the different diseases. The results suggested that Jalaukawacharana reduces the inflammatory process and it is beneficial in the cases of healing of wound. Jalouka has Pittahara property and it removes dooshita Rakta form local area and promotes Dushtavrana to attain Shuddha, and Roohyamana phases by its Shodhana property and it can be use where shalya karma is contraindicated. Inspite of these, there are sufficient evidences that its saliva contains many advantageous alkaloids, some of them act as an anticoagulant, thrombolytic, local anesthetic, antibacterial; anti inflammatory and antiviral also. Which are probably helpful in wound healing at one or another phases.

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Leech application has been described as an ideal treatment for chronic non-healing ulcers, and they reduce swelling, redness and pain as has been reported by Vagbhata in Ashtanga Hridaya.

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- (A.H.Ut. 25/25-26)

On the basis of observations of previous workers and our esteemed Acharyas, we have selected this therapy for management of chronic ulcer.

Material and methods-

Selection of patient- the patients having chronic ulcer(of 5-65yrs age group) were selected from shalya OPD and IPD, S.S. Hospital, BHU. All the patients suffering from debilitating diseases, anemia, malignancy, AIDS, bleeding disorders were excluded from the study.

After taking proper history of the patients, systemic examination was done and the local examination of ulcer was recorded.

Method-

Pre-operative (Purva Karma)- In this leeches were kept in the mixture of turmeric powder and water for 2 min, followed by in fresh water.

Operative (Pradhana karma) - Before doing leech application probe of pulseoxymeter was connected to the patients finger. All the 4 parameter were recorded, like PR, BP, RR, SPO_2.Then patient's wound was cleaned thoroughly with plain water or normal saline and adequate numbers of leeches were applied to the general area of maximal congestion. All 4 parameters were recorded again during the procedure and after the detachment of leeches.

Post operative (Pashchat karma) – leeches were removed from the site by sprinkling of turmeric powder. Blood from the leeches was removed by slowly and gentle squeezing them from tail to mouth and wound was cleaned with normal saline and dressing was done.

Criteria for Assessment

1. Clinical features
   A. Pain
   B. Discharge
   C. Slough
2. Measurement of wound

Linear measurement – Length, Width, Area

Unit healing time

Symptoms and signs and their characters were noted at subsequent intervals i.e.0, 7, 15, 21, 30th day …

Criteria for assessing clinical features

Pain (Evaluated on 0-3 Scale)

Pain	**Scoring**
No pain	0
Mild pain & No analgesic required	1
Moderate pain	2
Severe pain Analgesic required	3

Discharge (Evaluated on 0-3 Scale)

Discharge	**Scoring**
No discharge	0
Serious discharge < 2 ml	1
Seropurulent discharge <5 ml	2
Purulent discharge >5 ml	3

Slough (Evaluated on 0-5 Scale)

Slough	**Scoring**
No slough	0
20% wound surface covered with slough	1
40% wound surface covered with slough	2
60% wound surface covered with slough	3
80% wound surface covered with slough	4
100% wound surface covered with slough	5

Wound Size Measurements

The most common wound measurements are the SA length and SA width. The SA length and width of the wound are measured from wound edge to wound edge. The greatest length and greatest width method of measurement means that the wound is measured across the diameter of the greatest length and the greatest width. Then the length is multiplied by the width, which gives the estimated square area of the wound or SA. This measurement inflates the site area of the wound. The product results in a single number that can be easily monitored for change in site. These two dimensions are always measured and may be the only measurement recorded. Less frequently measured are undermining tunnels and depth.

Measurement of Wound Depth

Wound depth is defined as distance from the visible skin surface to the wound bed. Insert a cotton-tipped applicator perpendicular to the wound edge. Hold stick of applicator with fingers at wound skin surface edge.

Holding this position on the applicator stick, place applicator stick along a centimeter-ruled edge. Record for each position. These depth measurements may or may not be at the deepest area. A separate measurement may be taken and noted at the deepest area.

b) Unit Healing Time-Unit healing time was calculated from the total number of days during treatment divided by initial area – last area of wound in sq. cm. so it can be represented as

$$\textbf{UHT} = \frac{\text{Total number of days taken during treatment}}{\text{Initial area – last area of wound (in sq. cm.)}}$$

Plan of study- Present study was carried out in 45 cases of chronic ulcer. All cases were randomly divided in three groups containing equal number of patient i.e.15 in each group1, **2** and **3.**

Group 1- Treated with systemic use of antibiotic (according to culture and sensitivity) and local dressing with betadine(5%)

Group 2- Treated by Leech application and dressing with neem taila.

Group 3- Treated by Leech application and dressing with normal saline.

Observation and results- Observation of clinical criterias - pain, discharge and slough revealed that all are reduced significantly after treatment, unit healing time is better in leech treated group. In hematological study - hemoglobin level slightly increases in group **A** while reduced in group **B** and **C** after treatment. Statistical analysis revealed non significant result. Mean TLC significantly decreased after treatment in all the three groups. Intergroup comparison was not significant before as well as after treatment. In all the three groups ESR was decreased after treatment. But between the group comparisons were not significant .BU, Sr Cr, FBS all these remained within normal limit after treatment and between the group comparison also shows insignificant result. All the four parameters of physiological analysis i.e. PR, BP, RR, SPO2 remained unchanged after treatment.(Table1-16)

HAEMATOLOGICAL

Table No. 1. Statistical Analysis of Haemoglobin%-

Group	Hb% (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	10.28±1.64	11.41±0.82	-1.13±1.71 t=2.56 p<0.05 (S)
Group 2	11.75±1.34	11.67±1.34	.073±0.534 t=0.53 p>0.05 (NS)
Group 3	11.65±1.45	11.51±1.23	0.14±0.43 t=1.26 p>0.05 (NS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=2.69 p<0.05 (S)	t=0.64 p>0.05 (NS)	
Grp1 vs Grp3	t=2.44 p<0.05 (S)	t=0.26, p>0.05 (NS)	
Grp2 vsGrp3	t=0.18 p>0.05 (NS)	t=0.34 p>0.05 (NS)	

BT- before treatment, AT- after treatment

Table No. 2. Statistical Analysis of TLC

Group	TLC ($\times 10^3$/cumm) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	7.71±1.62	6.63±0.94	1.09±1.13 t=3.74 p<0.01 (HS)
Group 2	7.55±1.46	6.29±0.69	1.26±1.07 t=4.55 p<0.01 (HS)
Group 3	7.53±1.76	6.25±0.57	1.28±1.41 t=3.52 p<0.01 (HS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=0.28 p>0.05 (NS)	t=0.29 p>0.05 NSs)	
Grp1 vs Grp3	t=0.29 p>0.05 (NS)	t=1.08 p>0.05 (NS)	
Grp2 vs Grp3	t=0.03 p>0.05(NS)	t=0.45 p>0.05 (NS)	

Table No. 3. Statistical analysis of Fasting Blood Sugar

Group	FBS (mg/dl) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	75.61±7.71	93.6±12.03	76.84±4.36 t=2.19 p>0.05 (NS)
Group 2	74.03±1.278	92.4±10.45	71.41±3.55 t=1. 93 p>0.05 (NS)
Group 3	78.93±1.26	89.2±10.22	71.85±3.67 t=1.98 p>0.05 (NS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=0.34 p>0.05 (NS)	t=0.29 p>0.05 (NS)	
Grp1 vs Grp3	t=0.40 p>0.05 (NS)	t=1.08 p>0.05 (NS)	
Grp2 vs Grp3	t=0.07 p>0.05 (NS)	t=0.85 p>0.05 (NS)	

Table No. 4. Statistical analysis of Blood Urea

Group	BU (mg/dl) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	23.60±3.87	22.80±3.36	0.8±1.47 t=2.1 p=0.05
Group 2	24.13±4.17	23.33±3.52	0.8±1.47 t=2.1 p=0.05
Group 3	22.53±2.2	22.00±2.51	0.53±1.59 t=1.29 p>0.05 (NS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=0.36 p>0.05 (NS)	t=0.42 p>0.05 (NS)	
Grp1 vs Grp3	t=0.93 p>0.05 (NS)	t=0.73 p>0.05 (NS)	
Grp2 vs Grp3	t=1.31 p>0.05 (NS)	t=1.19 p>0.05 (NS)	

Table No. 5. Statistical analysis of Serum Creatinine

Group	Sr Cr (mg/dl) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	1.11±0.12	1.04±0.09	0.07±0.08 t=3.16 p<0.05 (S)
Group 2	1.07±0.14	1.02±0.12	0.05±0.09 t=2.26 p<0.05 (S)
Group 3	1.08±0.16	1.01±0.14	0.07±0.07 t=3.57 p<0.05 (S)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=0.69 p≥0.05 (NS)	t=0.51 p≥0.05 (NS)	
Grp1 vs Grp3	t=0.53 p≥0.05 (NS)	t=0.63 p≥0.05 (NS)	
Grp2 vs Grp3	t=0.12 p≥0.05 (NS)	t=0.14 p≥0.05 (NS)	

Table No. 6. Statistical analysis of ESR

Group	ESR (cu mm in 1st hr) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	27.8±8.89	23.47±5.37	4.33±4.65 t=3.61 p<0.01 (HS)
Group 2	28.4±6.01	22.27±2.81	6.13±4.93 t=4.82 p<0.01 (HS)
Group 3	27.33±6.26	23.33±3.08	4.00±4.21 t=3.68 p<0.01 (HS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=0.22 p>0.05 (NS)	t=0.002 p>0.05 (NS)	
Grp1 vs Grp3	t=0.17 p>0.05 (NS)	t=0.08 p>0.05 (NS)	
Grp2 vs Grp3	t=0.48 p>0.05 (NS)	t=0.99 p>0.05 (NS)	

Table No. 7. Statistical analysis of Pulse Rate

Group	PR (Per min.) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	80.80±3.19	80.13±3.58	0.67±1.45 t=1.78 p>0.05 (NS)
Group 2	79.33±4.45	79.60±4.49	0.27±0.7 t=1.47 p>0.05 (NS)
Group 3	86.13±4.1	79.73±4.13	0.4±0.83 t=1.87 p>0.05 (NS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=1.04 p>0.05 (NS)	t=0.36 p>0.05 (NS)	
Grp1 vs Grp3	t=0.5 p>0.05 (NS)	t=0.28 p>0.05 (NS)	
Grp2 vs Grp3	t=0.51 p>0.05 (NS)	t=0.09 p>0.05 (NS)	

No. 8. Statistical analysis of Blood Pressure (Systolic)

Group	BP (Systolic) (mm Hg) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	120.60±7.9	120.4±7.79	0.27±1.67 t=0.62 p>0.05 (NS)
Group 2	121.2±9.00	121.47±8.77	-2.67±1.67 t=-0.62 p>0.05 (NS)
Group 3	122.93±5.39	121.33±5.27	1.60±2.17 t=2.86 p>0.05 (NS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=0.13 p>0.05 (NS)	t=0.35 p>0.05 (NS)	
Grp1 vs Grp3	t=0.66 p>0.05 (NS)	t=0.38 p>0.05 (NS)	
Grp2 vs Grp3	t=0.64 p>0.05 (NS)	t=0.05 p>0.05 (NS)	

Table No. 9. Statistical analysis of Blood Pressure (Diastolic)

Group	BP (Diastolic) (mm Hg) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	79.07±4.33	78.93±4.65	0.13±0.92 t=0.56 p>0.05 (NS)
Group 2	80.67±6.26	80.0±4.81	0.67±1.63 t=1.58 p>0.05 (NS)
Group 3	80.80±5.11	79.87±4.81	0.93±2.91 t=1.24 p>0.05 (NS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=0.81 p>0.05 (NS)	t=0.58 p>0.05 (NS)	
Grp1 vs Grp3	t=1.01 p>0.05 (NS)	t=0.54 p>0.05 (NS)	
Grp2 vs Grp3	t=0.06 p>0.05 (NS)	t=0.07 p>0.05 (NS)	

Table No. 10. Statistical analysis of Respiratory Rate

Group	RR (Per min.) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	18.93±2.6	19.47±2.06	0.53±1.19 t=2.09 p>0.05 (NS)
Group 2	18.40±2.53	18.4±2.53	0
Group 3	19.2±2.24	119.87±2.20	0.67±1.23 t=-2.09 p>0.05 (NS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=0.57 p>0.05 (NS)	t=1.27 p>0.05 (NS)	
Grp1 vs Grp3	t=0.30 p>0.05 (NS)	t=0.51 p>0.05 (NS)	
Grp2 vs Grp3	t=0.92 p>0.05 (NS)	t=1.69 p>0.05 (NS)	

Table No. 11. Statistical analysis of SPO_2

Group	SPO_2 (%) (Mean±SD)		Within the group comparison Paired t test
	BT	AT	
Group 1	98.53±0.52	98.6±0.63	t=1.0 p>0.05 (NS)
Group 2	98.40±0.51	98.53±0.52	t=1.47 p>0.05 (NS)
Group 3	98.33±0.49	99.33±0.49	t =1.87 p>0.05 (NS)
Between the group comparison unpaired t test			
Grp1 vs Grp2	t=0.71 p>0.05 (NS)	t=0.32 p>0.05 (NS)	
Grp1 vs Grp3	t=2.48 p<0.05 (S)	t=2.05 p>0.05 (NS)	
Grp2 vs Grp3	t=1.87 p>0.05 (NS))	t=1.95 p>0.05 (NS)	

Table No. 12. Statistical analysis of pain in groups

Group	Pain Mean±SD					Within the group comparison Wilcoxan signed rank test BTvs F_4
	BT	F_1	F_2	F_3	F_4	
Group 1	2.67 ±0.49	2.40 ±.51	1.80 ±0.56	1.33 ±0.49	0.87 ±0.64	z=3.62 p<0.01 (HS)
Group 2	2.67±0.49	1.67±0.49	1.27±0.59	0.53±0.52	0.33±0.49	z=3.54 p<0.01 (HS)
Group 3	2.60±0.51	1.60±0.51	1.27±0.46	0.47±0.52	0.27±0.46	z=3.54 p<0.01 (HS)
Between the group comparison unpaired t test						
Grp1 vs Grp2	t=0.00 p>0.05 (NS)	t=4.04 p<0.01 (HS)	t=2.53 p<0.05 (S)	t=4.36 p<0.01 (HS)	t=2.57 p<0.05 (S)	
Grp1 vs Grp3	t=0.37 p>0.05 (NS)	t=4.33 p<0.01 (HS)	t=2.85 p<0.05 (S)	t=4.72 p<0.01 (HS)	t=2.95 p<0.05 (S)	
Grp2 vs Grp3	t=0.37 p>0.05 (NS)	t=0.37 p>0.05 (NS)	t=0.00 p>0.05 (NS)	t=0.35 p>0.05 (NS)	t=0.39 p>0.05 (NS)	

BT - Before treatment; F_1 – First follow up; F_2 – Second follow up; F_3 – Third follow up

Table No. 13. Statistical analysis of discharge in groups

Group	Discharge Mean±SD					Within the group comparison Wilcoxan signed rank test BTvs F_4
	BT	**F1**	**F2**	**F3**	**F4**	
Group 1	2.8±0.41	2.47±0.52	1.8±0.41	1.33±0.49	0.80±0.41	z=3.87 p<0.01 (HS)
Group 2	2.53±0.52	1.53±0.52	1.0±0.38	0.40±0.51	0.07±0.26	z=3.51 p<0.01 (HS)
Group 3	2.87±0.35	1.87±0.35	0.93±0.46	0.60±0.51	0.00±0.00	z=3.69 p<0.01 (HS)
Between the group comparison unpaired t test						
Grp1 vs Grp2	t=1.56 p>0.05 (NS)	t=4.95 p<0.01 (HS)	t=5.53 p<0.01 (HS)	t=5.14 p<0.01 (HS)	t=5.8 2 p<0.01 (HS)	
Grp1 vs Grp3	t=0.048 p>0.05 (NS)	t=3.72 p<0.01 (HS)	t=5.44 p<0.01 (HS)	t=4.04 p<0.01 (HS)	t=7.48 p<0.01 (HS)	
Grp2 vs Grp3	t=2.07 p>0.05 (NS)	t=2.06 p>0.05 (NS)	t=0.44 p>0.05 (NS)	t=1.08 p>0.05 (NS)	t=1.00 p>0.05 (NS)	

Discharge – No-0, Serous 2-5 ml-1, Seropurulent >5 ml - 2, Purulent, offensive odour > 5 ml - 3.

Table No. 14. Statistical analysis of Slough in groups

Group	**Slough Mean±SD**					**Within the group comparison Wilcoxan signed rank test BTvs F_4**
	BT	**F1**	**F2**	**F3**	**F4**	
Group 1	4.0±0.66	3.27±0.46	2.6±0.51	2.0±0.38	1.27±0.59	z=3.47 p<0.01 (HS)
Group 2	4.33±0.49	2.87±0.74	1.8±0.78	0.73±0.59	0.27±0.46	z=3.46 p<0.01 (HS)
Group 3	4.27±0.46	3.0±0.66	1.87±0.74	0.87±0.74	0.20±0.41	z=3.77 p<0.01 (HS)
Between the group comparison unpaired t test						
Grp1 vs Grp2	t=1.58 p>0.05 (NS)	t=1.78 p>0.05 (NS)	t=3.35 p<0.05 (S)	t=6.97 p<0.01 (HS)	t=5.18 p<0.01 (HS)	
Grp1 vs Grp3	t=1.29 p>0.05 (NS)	t=1.29 p>0.05 (NS)	t=3.16 p<0.05 (S)	t=5.26 p<0.01 (HS)	t=5.71 p<0.01 (HS)	
Grp2 vs Grp3	t=0.39 p>0.05 (NS)	t=0.52 p>0.05 (NS)	t=0.24 p>0.05 (NS)	t=0.54 p>0.05 (NS)	t=0.42 p>0.05 (NS)	

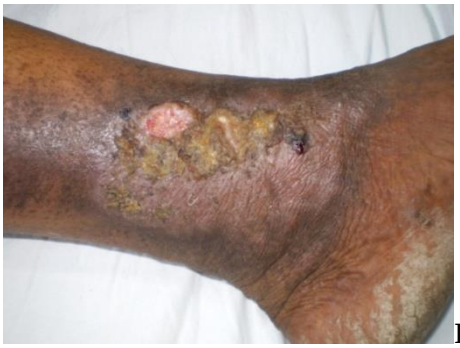
Table No. 15. Statistical analysis of surface area in groups

Groups	SA (cm2) Mean±SD		Within the group comparison Wilkoxan signed rank test
	BT	AT	
Group 1	44.01±59.70	11.43±31.24	z=3.41 p<0.01 (HS)
Group 2	21.79±20.12	0.95±1.04	z=3.41 p<0.01 (HS)
Group 3	18.54±14.66	0.68±0.54	z=3.41 p<0.01 (HS)
Between the group comparison Mann Whitney test			
Grp1 vs Grp2	z=1.18 p>0.05 (NS)	z=2.44 p<0.05 (S)	
Grp1 vs Grp3	z=1.59 p>0.05 (NS)	z=2.64 p<0.05 (S)	

Grp2 vs Grp3	z=0.08 p>0.05 (NS)	z=0.32 p>0.05 (NS)	

.Table No. 16. Statistical analysis of Unit healing time

Groups	UHT (days/sq.cm.) Mean±SD
Group 1	2.18±0.56
Group 2	1.76±0.35
Group 3	1.66±0.44
Between the group comparison independent sample t test	
Grp1 vs Grp2	t=2.42 p<0.05 (S)
Grp1 vs Grp3	t=2.86 p<0.05 (S)
Grp2 vs Grp3	t=0.75 p>0.05 (NS)



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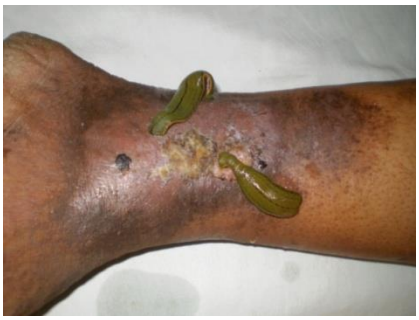

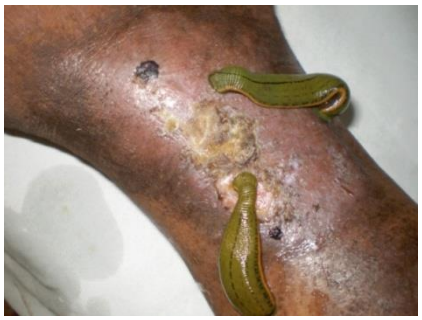

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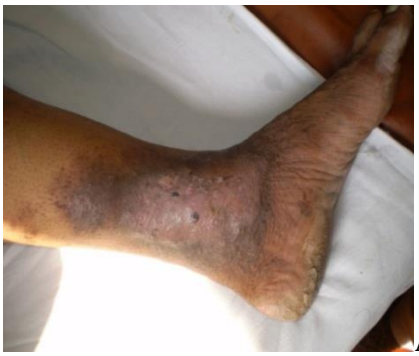

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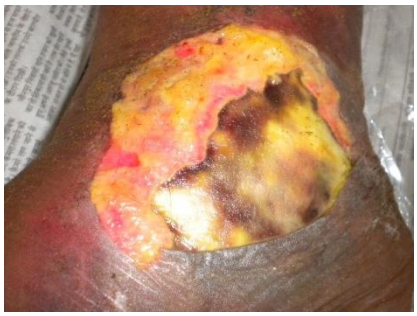

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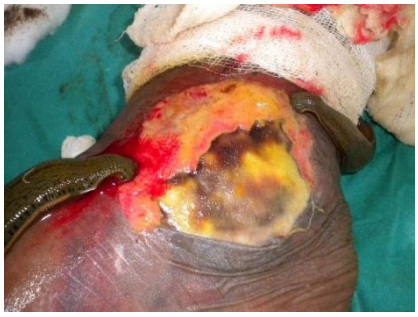

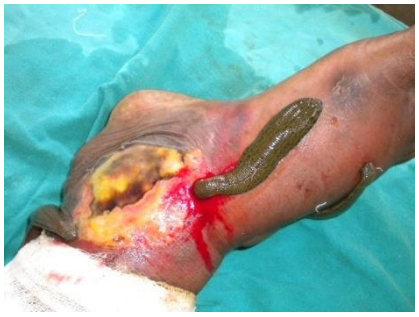

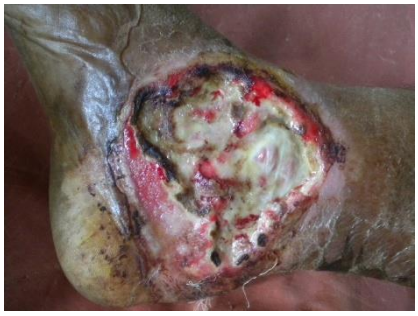

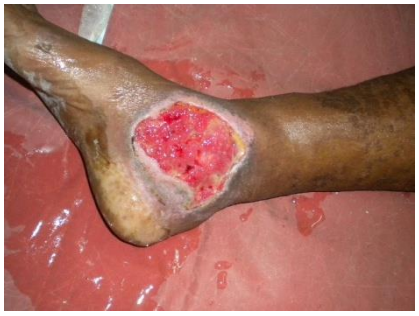

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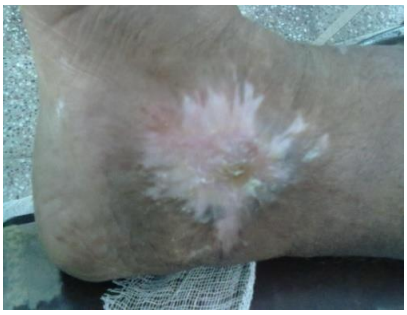
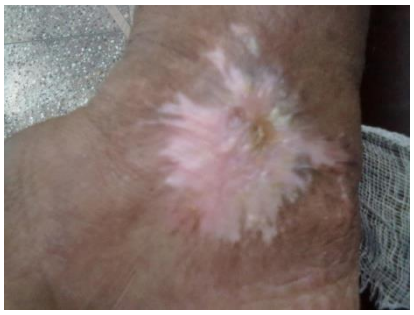

After treatment

Discussion- Present study shows –
The *pain significantly reduced in group 2* and *3* earlier than group1. This evidence is supporting the statement of Acharya Vagbhatta i.e.It may be due to shophhar, dahahar property and anti-inflammatory properties of leech.
Decrease in discharge in Group 2 and 3 in comparison to group 1. This might be because of *anti-bacterial effect* and *anti-inflammatory activity* of leech therapy .
Slough was also peel off easily and earlier in treated group instead of group-1; it shows the shodhan property of the leech. At 3rd follow-up group 3rd showed better result, it may be due to *shodhana* and *krimighna* property of neem.
Surface area of wound was also significantly reduced in group 2 and 3 in comparison to group 1; it proves ropana property of trial drugs .
Hirudin is known to act at different points in the coagulation cascade, there by preventing blood from clotting by inhibiting conversion of firbrinogen to fibrin. It is also known to inhibit platelet aggregation, which further contributes to the process, effect of Hirudin, is that it helps in procollagen hydroxylation and improves the quality of collagen (mature collagen). Procollagen easily degrades by enzymatic means, so it does not provide any mechanical strength to the wound tissue. In addition to this, it also has antiseptic qualities.
Hyaluronidase, which breaks down hyaluronic acid the bonding material of connective tissue, thus fastening the flow of blood and fluids from affected areas. So Jalaukavacharana helps to re-establish blood flow to the bite site by means of a vasodilatation.
Jalaukavacharana provided *significant relief in pain.* This may be due to saliva of medicinal leech, hirudin blocks the action of thrombin and it doesn't promote the transition of fibrinogen into fibrin. It blocks an initial attachment of thrombocytes and completely suppresses their aggregation by this there will be continuous flow of blood which relieves local pressure which is the cause for pain in local site. It also has anesthetic action' this finding is supported by the study of Michalsel et al 2003 conducted in Germany.
There are also other proteins present in leech saliva which are said to exhibit analgesic effect and reduce numbness. Leech saliva also contains several other bio-active substances including prostaglandins, vasodilators, anesthetics and proteins like calin, apyrase hyaluronidase, egline, destabliase, piyavit kollaginase etc.witch are having vaso-dilating, anticoagulant, anesthetic, thrombolytic, antibiotic, analgesic, and anti-inflammatory properties.
By virtue of these agents, *leech therapy is helpful in wound healing*. Perhaps due to suction of vitiated blood it reduces microbial load from the local area, decreases the oedema from the removal of exudates, improves local oxygenation by enhancing the blood flow at local area due to removal of debris and dilution of blood clot. It reduces congestion in case of inflammatory discoloration and in case of venous ulcers probably it has prevented lysis of RBC's in tissue plane by removing the collection of that site. The using of leeches promotes the local immunity as well, and other than this it has antibacterial effect, early wound healing and anti

inflammatory effect. Previous research in the department (Mishra et al.) also shows that it promotes wound healing because it enhances collagen deposition, fibroblast proliferation, and neo-vascularisation, which are the basic factors during the process of wound healing.

ConclusionLeech has been found very effective in the management of chronic ulcer. The unit healing time was found better in leech treated group.

There is no any toxic effect observed upon renal function as BU and Sr Cr remained within normal limit after treatment.

Physiological analysis also shows that there is no any alteration noticed during and after leech application.

So in nutshell leech can be applied safely in cases of non healing ulcer.

The therapy is cost effective, it does not create any burden over poor patients. So the therapy can be included in rural health programme.

CONSIDERATION OF GURVADI GUNA IN SHARIRA - A REVIEW

*Dr.Murlidhar Paliwal, **Prof. K.N. Dwivedi,

ABSTRACT: Ayurveda, the science of life, is eternal system of medicine. It is serving the living beings since time immemorial and becoming popular day by day due to its unique fundamental doctrines like- dosha, dhatu-upadhatu, ojas, agni, srotas, panchmahabhuta, shatpadartha, swabhavoparamvad, karyakaranvad and so on. Shatpadartha comprises of Samanya, vishesha, guna, dravya, karma and samavaya is very important fundamental in the prevention and promotion of health as well as cure of diseases. Guna is one of the shatpadartha which is considered cause devoid of actions and inseparably attached with dravya i.e. substance. Guna are numerous like- gurvadi guna, paradi guna, adhyatmik guna and vaisheshik guna out of which twenty gurvadi guna are of greater importance in daily life. Either it is the matter of diet or medicine physicians consider gurvadi guna of the same and then advise to use. Even our body and its different parts possess gurvadi guna as everything is panchabhautik in nature. Our body is panchabhautik and the gurvadi guna are also panchabhautik. Acharya Charak has stated these gurvadi guna as sharira dhatu guna in Sharirsthan of his text which shows the significance of these gunas in maintenance of health. Appropriate use of Medicine and diet considering the gurvadi guna of structural and functional unit of the body leads to Dhatusamya i.e. equilibrium of body issues. Vatadi dosha, dhatu-upadhatu, mala, ojas, and agni of body is discussed in terms of gurvadi guna in the text in very detail. Gurvadi guna are considered in Sharira, nidana and chikitsa in Ayurveda. This review paper is mainly concerned with consideration of gurvadi guna in sharira in Charaka-Samhita, Sushrut-Samhita and Ashtanga-Sangraha.

Keywords: - Dosha, dhatu, ojas, agni, prakriti, gurvadi guna.

INTRODUCTION

Ayurveda, the science of life, is eternal system of medicine1. It is serving the living beings since time immemorial and becoming popular day by day due to its unique fundamental doctrines like- dosha, dhatu-upadhatu, ojas, agni, srotas, panchmahabhuta, shatpadartha, swabhavoparamvad, karyakaranvad and so on.

Shatpadartha comprises of Samanya, vishesha, guna, dravya, karma and samavaya2 is very important fundamental in the prevention and promotion of health as well as cure of diseases. Guna is one of the shatpadartha which is considered cause devoid of actions and inseparably attached with dravya3 i.e. substance. Guna are numerous like- gurvadi guna, paradi guna, adhyatmik guna and vaisheshik guna4 out of which twenty gurvadi guna are of greater importance in daily life5. Either it is the matter of diet or medicine physicians consider gurvadi guna of the same and then advise to use. Even our body and its different parts possess gurvadi guna as everything is panchabhautik in nature. Our body is panchabhautik and the gurvadi guna are also panchabhautik. Acharya Charak has stated these gurvadi guna as sharira dhatu guna in Sharirsthan of his text which shows the significance of these gunas in maintenance of health. Appropriate use of Medicine and diet considering the gurvadi guna of structural and functional unit of the body leads to Dhatusamya i.e. equilibrium of body issues. Vatadi dosha, dhatu-upadhatu, mala, ojas, prakriti and agni of body is discussed in terms of gurvadi guna in text in very detail. This review paper is mainly concerned with consideration of gurvadi guna in sharira in Charaka-Samhita, Sushrut-Samhita and Ashtanga-Sangraha.

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AIMS AND OBJECTS OF THE STUDY

This study being literary in nature, the aims and objects are as follows-
To understand and interpret the concept of gurvadi guna in sharira
To establish its utility in prophylaxis and treatment

MATERIAL AND METHODS

Charaka-Samhita, Sushrut-Samhita and Ashtanga-Sangraha are studied verse to verse and chapter to chapter for this review paper as these are considered most authentic classics in Ayurveda. Matter related to gurvadi guna in sharira is recorded, compiled and interpreted in scientific way through these major classics.

CONSIDERATION OF GURVADI GUNA IN SHARIRA

These gurvadi guna are present in medicines and dietary substances as well as in different entities of the human body, that's why Acharya Charaka has quoted these gurvadi guna as sharira-dhatu guna in sharira-sthana of his text. According to the 'Samanya-Vishesha' theory of Ayurveda; medicines and diet by virtue of guna increases the entity of the body which is similar in properties and decreases that one which possess opposite property. Sharira is considered the "adhikarana" in Ayurveda for which different treatment modalities are mentioned. Everything in the universe is Panchabhautika either it is human body or medicines or diet.
Panchamahabhuta or five basic elements which are the root causes of every creation, are of two types i.e. Guru and laghu. So consideration of the gurvadi guna in human body is logical and essential to maintain 'dhatusamya'. The entities of the body like-dosha, dhatu, ojas, and different body parts possess the gurvadi guna.
Vata dosha possess ruksha, shita, laghu, sukshma, vishada, khara, daruna and chala attributes according to Charaka6 where as Sushruta accept ruksha,shita,laghu and khara attributes of Vata dosha7. Acharya Charaka described sasneha, ushna,tikshna,drava and sara guna in Pitta dosha8 where as Sushruta accept ushna, tikshna and drava guna of Pitta9 and Vagbhata discussed sasneha, tikshna, ushna, ,laghu, sara and drava guna of Pitta10. Kapha dosha possess guru,shita,mridu,snigdha,sthira and pichchhila guna as per Acharya Charaka11 where as Sushruta discussed guru,snigdha,pichchhila and shita guna of kapha dosha12 and Vagbhata mentioned snigdha,shita,guru,manda,shlakshna and sthira guna of kapha dosha13. The rakta, mansa, meda, asthi, majja and shukra dhatus are more guru in progressive order14. Again the meat etc. of the physically active animals is lighter than those who are inactive or idle ones15. Rakta or shonita is anushnashita, snigdha and guru as per the view of Sushruta16. Drava and laghu guna of rakta is due to the jala and akasha mahabhuta respectively17.Shukra dhatu is considered drava and snigdha in Sushrut-Samhita18. Shira is heavier than the flesh of skandha, skandha is heavier than kati, kati is heavier than prishtha and thereafter sakthi. The meat of the middle part of the body is generally guru in all animals. Again the meat of the upper part of male and lower part of females is considered guru.19.Tesicles,skin,penis,pelvis,kidneys,liver and rectum-these are heavier than flesh and also the trunk and (muscles attached to) bones20 . As regards sex, generally the meat of male animals is heavier than that of female ones. In their own class, those of big size are heavy than small size21. Ojas, an essence of all the seven dhatus is said to have guru, shita, mridu, shlakshna, sthira, pichchhila and snigdha guna out of twenty gurvadi guna22. The agni is considered on the basis of gurvadi guna in the form of mandagni and tikshnagni23.In the context of prakriti, Vata prakriti purusha is supposed to have ruksha sharira and swara, intolerance to cold, Pitta prakriti purusha are ushnadveshi, Mridu kesha, shmasru and loma, tikshna parakarami and tikshnagni where as Shleshma prakriti purusha are supposed to have snigdha and shlakshna anga, sthira sharira, snigdha chhavi24 etc. Acharya Vagbhata has discussed about the optimum qualities of the human body as having snigdha(unctuous) skin-hairs-hand-teeth- voice, sthira (firm) sense organs-motor organs-skin-nails-hairs-lateral sides, shlakshna(smooth) palate-tongue and soshma (warm) palate-lower extremities-abdomen-expiration25. Sushruta says that by using the sneha of medas shira turns

into snayu. In this process mridupaka of shira and khara paka of snayu is accepted26. Paittika shira are considered ushna, kaphaj shira as shita and sthira and rohini shira as natyushnashita27. In vagbhat vatavaha shira is said to be the Sukshma, pittavaha as ushna, kaphavaha as snigdha,shita,sthira and shuddha raktavaha is said to be the snigdha28. Vigile causes rukshata and day sleep leads to snigdhata as per the opinion of Acharya Charak and others.The persons who are snigdhabhoji can have exercise half of their body strength in winter and spring season while manda exercise (less exercise) in other season29.Vyayam is said best to produce firmness in the body30.Gurvadi guna are considered according to age also as childhood is considered as having sneha and mardav in the body parts31. Purush is said to be the snehasar and his prana also considered snehabhuyishtha by Acharya Sushruta32.

DISCUSSION

When we talk about utility of gurvadi guna in sharira, it comes to our mind that why gurvadi guna should be considered in sharira. On the basis of above mentioned facts it becomes clear that Gurvadi gunas are considered in every aspect of sharira and are basic criteria to discuss the normal or abnormal conditions. Either it is the dosha or the dushya, the mala or the ojas, the prakriti or the sara, the nidra or the jagarana, the linga (gender-wise body) or the body physique, the stanya or the artava, the vaya or the agni, the sattvadi mahaguna or the panchamahabhuta and so on. Everything is discussed in terms of the Gurvadi Guna in Ayurveda. The view of Acharya Charaka, Sushruta and Vagbhata is almost similar regarding gurvadi guna of dosha, dhatu, mala, sara, prakriti, agni, mahabhuta etc. Because these guna are present in body and its different parts, are called as "sharira dhatu guna" by Acharya Charak. Our body, diet, life style and medicines possess gurvadi guna. These gunas if properly considered have pivot role in the prevention and promotion of diseases as well as treatment procedures either it is shodhana or shamana.

CONCLUSION

On the base of above discussion it can be stated that guna are numerous out of which twenty gurvadi guna are of greater importance in daily life. Our body, diet, life style and medicines possess gurvadi guna. Gurvadi guna are called as "sharira dhatu guna" by Acharya Charak. All the three major Samhitas namely Charaka-Samhita, Sushruta-Samhita and Ashtanga-Sangraha laid proper emphasis on the gurvadi guna and its relation with sharira. Vatadi dosha, dhatu-upadhatu, mala, ojas, prakriti and agni of body is discussed in terms of gurvadi guna in text in very detail. Considering the gurvadi guna of sharira, a physician can advise appropriate diet and medicine and Dhatusamya can be maintained which is the only aim of Ayurveda.

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Positional Hazards In Practise of Anaesthesia

*** Satish Bhagat ** Vimal Kumar ***Pandey K.K.**

Abstract : There are so many factors which influence monitoring of anaesthesia and many a times can create difficult situations.Stress of surgical intervention and anaesthetic drug/technique itself produce a lot of nuerohumeral alteration which all together impact on monitoring as well as recovery from anaesthesia. Other factors like age,conture(built up of the patient) ,metabolic disorders,status of nourishment(fluid and electrolyte balance),hormonal imbalance and psychological status also influence monitoring and outcome in practice of anaesthesia.No doubt with the advancement of science and technology surgical procedure has become easier even in odd surgical posture of the patient but in such circumstances many serious vital changes may take place which in turn leads to difficult monitoring .The system more effective are cardiorespiratory,hepatorenal and neurohumeral to be taken into proper consideration.Sometimes neuromuscular trauma may also lead to unwanted complication.Matter in detail will be discussed and presented.

Key Words- Supine, Trendelenburg , Lithotomy ,lateral Decubitus , Prone and Sitting posture.

Success of many surgical procedure depends upon certain things of which satisfactory exposing the surgical area is one.This exposure many a times promotes to keep a patient in different position,position normal as well as abnormal.Operating team sometimes place a patient in a position that would be restricted or refused by the patient if he is conscious.

Proper positioning of a patient in operating room is the critical responsibility of anaesthetist. The sequelae of improper positioning may be temporarily discomforting ,permanently disabling or may cause death of the patient.

The different positions given to patient and their consequences on physiology as well as anatomical structure will be discussed one by one.

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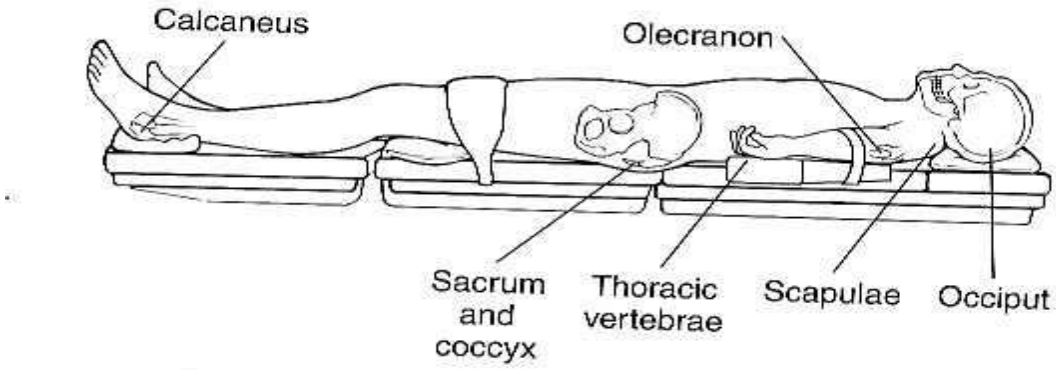
1.Supine Position:-

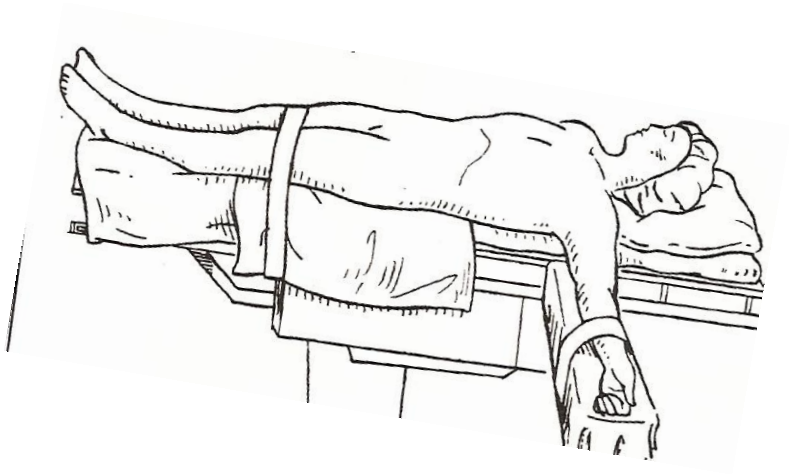


This is the most common position for surgery.As all the body is close to the level of heart haemodynamic reserve is best maintained.Several variation of supine positions are used.

a.**Lawn Chair Position**:- This position is achieved by flexing hips and knees .It reduces stress on back,hips and knees ,this facilitate venous drainage from lower extremity.It decrease xiphoid to pubic distance which reduces the tension on abdominal musculature.

b.**Frog Leg Position**:- This position is used to allow proper access to perineum ,medial thighs ,genitilia ,rectum.it is achieved by flexing hips and knees and hips are externally rotated with soles of feet facing each other.

c.**Trendelenburg Position**:-

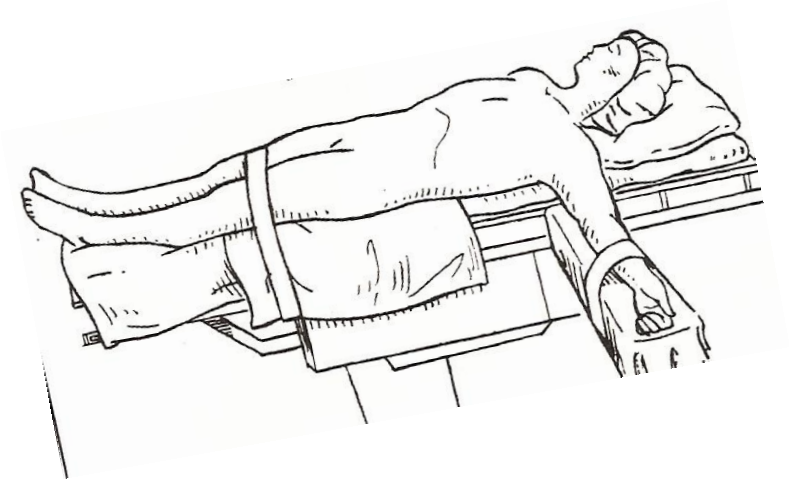


This is simply tilting head down of a supine patient.Very much used to increase venous return during hypotension ,to improve exposure during abdominal and laparoscopic surgery and during central line placement to prevent air emboli.

This positions increases central,venous ,intracranial and intraocular pressure.Swelling of the face ,conjunctiva,larynx and tongue with increased potential post operative upper airway obstruction may occur after prolonged exposure of this position.

Functional residual capacity and pulmonary compliance is decreased due to patient are at increased risk of pulmonary aspiration of gastric content.

d.**Reverse Trendelenburg**:-



Preferred for upper abdominal surgeries .It may cause hypotension due to decreased venous return.Head above heart reduces perfusion pressure to brain and should be taken in consideration.

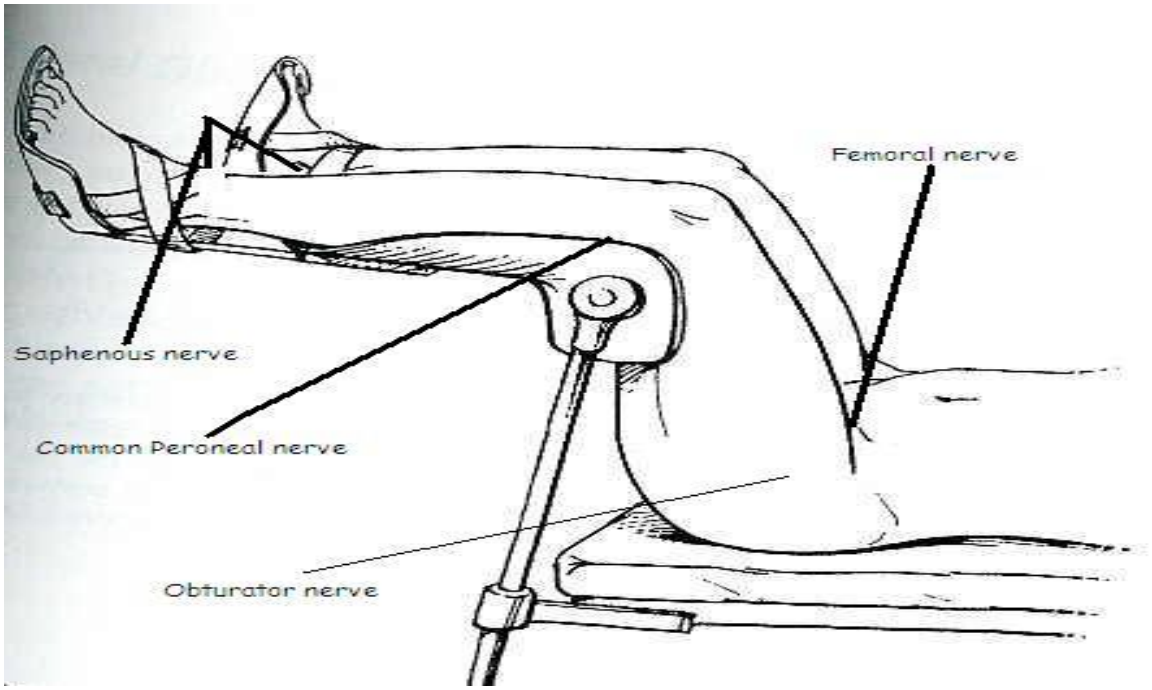
Although complex arterial ,venous ,and cardiac physiological response may blunt the effects of positional changes,still few degree head up or ead down are sufficient to cause significant cardiovascular changes as compensatory mechanism are blunted by anaesthesia. Following are the some complication of supine position -

1. Pressure alopecia due to ischemic hair follicle is related to prolonged immobilization of head.

2 .Backache is caused due to tone of the paraspinous musculature is lost during general anaesthesia with muscle relaxation or neuraxial block.Tissue that are overlying all bony bony prominences such as heels and sacrum may get tissue ischemia due to contact pressure.

3 .Peripheral neuropathy ulnar neuropathy is the most common lesion.

2.Lithotomy:

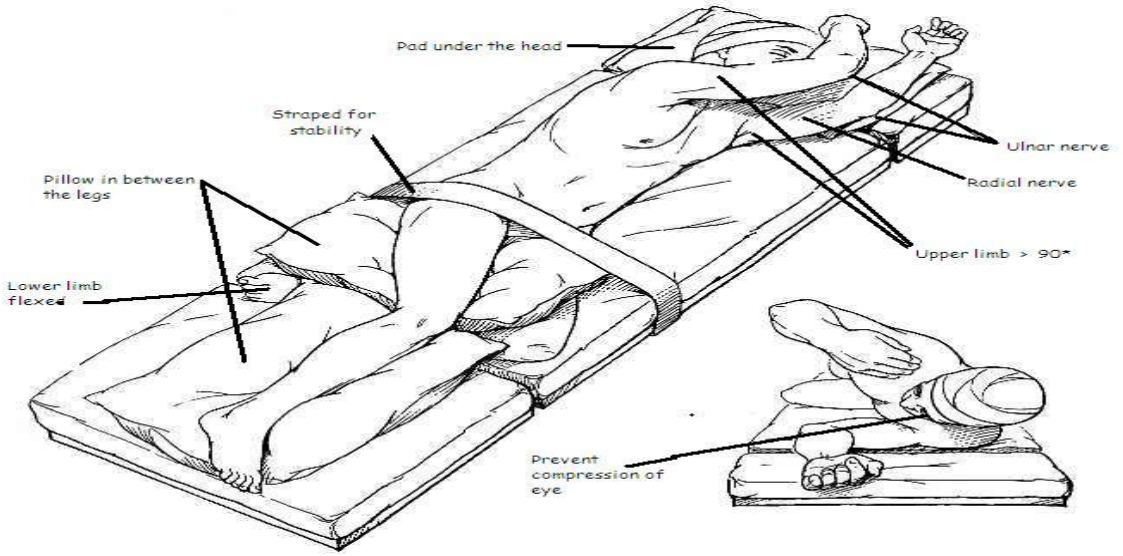


It is frequently used during gynaecologic, rectal and urologic surgeries.Taking and withdrawing a patient in lithotomy position requires coordinated positioning of lower extremities by two assistant to avoid torsion of lumbar spine.

This position cause significant physiologic changes.Elevated legs cause increase in preload ,causing a transient increase in cardiac output and to a lesser extent,cerebral venous and intracranial pressure in otherwise healthy patient.

The cephalad displaced diaphragm due to abdominal viscera reduces lung compliance and potentially resulting decreased tidal volume.In case of obese or patient with large intraabdominal mass abdominal pressure may increase significantly enough to obstruct venous return to heart.Peroneal nerve is the most common lower extremity neuropathy in lithotomy position.Lower compartment syndrome is very rare complication associated with lithotomy position.

3.Lateral Decubitus Position:



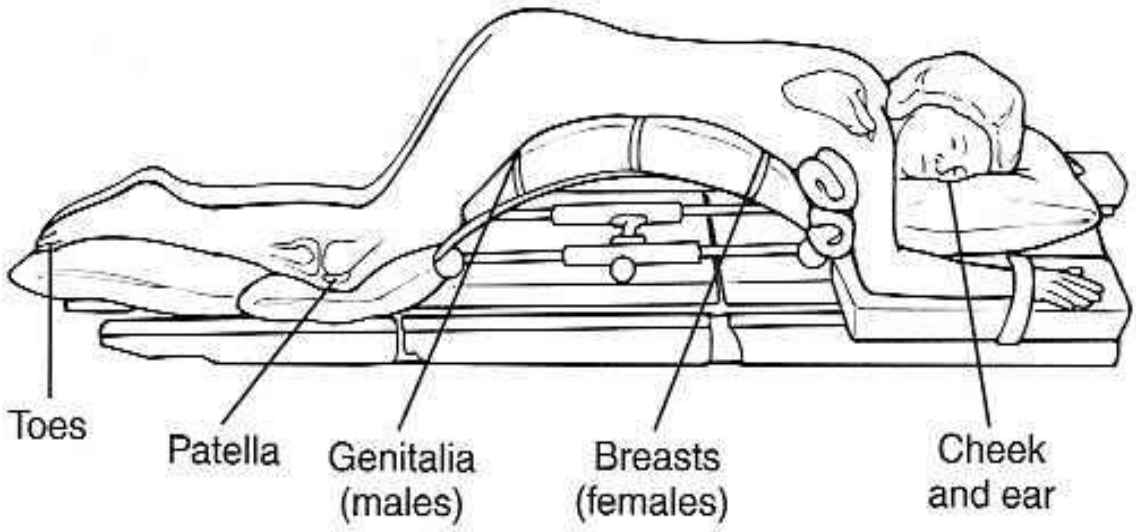
This is frequently used for surgery involving the thorax retroperitoneal structure or hip.

The excessive lateral rotation of the neck and stretching may cause injury to brachial plexus.Brachial plexus of dependent arm may also get injured due compression.The arterial pulsation and blood presure monitoring in dependent arm should be checked for early detection of compression to axilary neurovascular structure and hypotension.Vascular compression and venous engorgement in the dependent arm may alter the pulse oximetry reading, a low saturation reading reflects compromised circulation.

When a kidney rest position is used a pillow must be properly placed under the dependent iliac crest to prevent inadvertent compression of inferior vena cava.

In patients who are mechanically ventilated the combination of lateral weight of mediastinum and disproportionate cephalad pressure of abdominal decrease compliance of dependent lung and favours ventilation of nondependent lung.Pulmonary blood flow to underventilated dependent lung increases because of effect of gravity,consequently ventilation perfusion matching worsens potentially affecting alveolar ventilation and gas exchange.

4. Prone position:

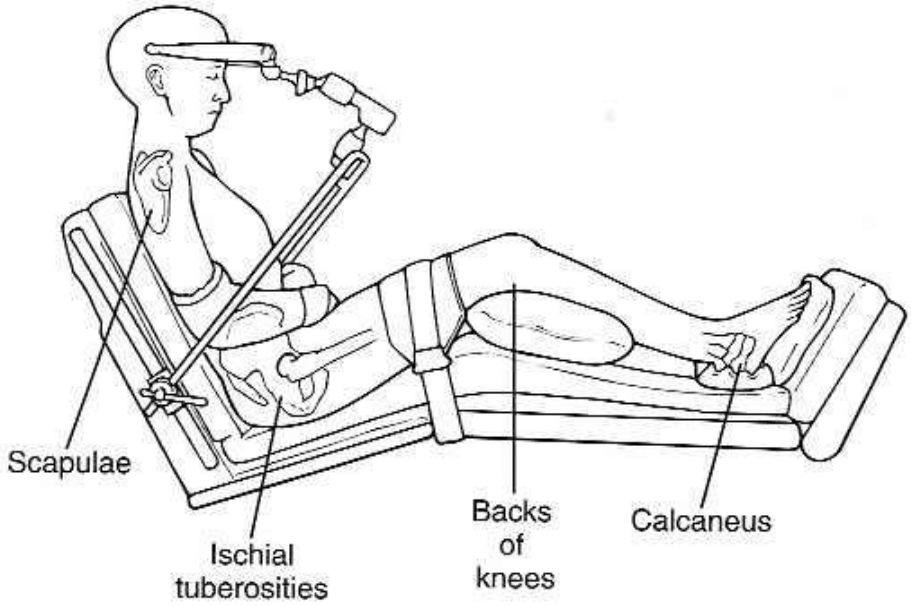


Prone or ventral decubitus position is used primarily for surgeries to the posterior fossa of skull ,posterior spine ,the buttocks and perirectal area and lower extremities.Pulmonary function may be superior to supine or lateral decubitus position if there is no significant abdominal pressure and the patient is properly positioned.

Positioning of head is the issue of concern in this position.In patients with cervical arthritis or cerebrovascular disease lateral rotation of neck may compromise carotid or vertebral arterial blood flow jugular venous drainage.Accidental extubation and perioperative loss is serious issue to concern in this position.

External pressure on the abdomen may push the diaphragm cephalad ,decreasing functional residual capacity and pulmonary compliance and increasing peak airway pressure.Abdominal pressure may impede venous return through compression of inferior vena cava.Pendulous structures(eg male genitilia ,and female breast)should be clear of compression.

5.SittingPosition:



It is infrequently used due to perception of risk from venous and paradoxical air embolism ,but as it offers advantages to surgeon in approaching the posterior cervical spine and posterior fossa.This position provides excellent surgical exposure ,decreased blood in the operative field and reduced perioperative blood loss.The main advantages to the anaesthesia provider are superior accesss to the airway, reduced facial swelling and improved ventilation particularly in obese patient.

The arms getting pulled by gravity hence must supported to the point of slight elevation of the shoulders to traction on shoulder muscle and potential stretching of upper extremity neurovascular structure.Patients are prone to hypotension episodes due to pooling of blood into lower body under general anaesthesia.Excessive cervical flexion has a number of adverse consequences,it can impede both arterial and venous blood flow causing hypoperfusion or venous congestion of brain ,it may also cause obstruction of endotracheal tube.Due to elevation surgical field above the heart and inability of the dural venous sinuses to collapse because of their bony attachment ,the risk of venous air embolism is constant concern.Arrhythmia ,desaturation, pulmonary hypertension ,circulatory compromise or cardiac arrest may occur if sufficient quantities are entrained.If the foramen ovale is patent even small amount of air may result in stroke or myocardial infarction due to paradoxical embolism.

Some Common Nerve Injuries During Various Surgical Postures:

Peripheral nerve injury:

It is serious perioperative complication and a significant source of professional liabilty.Injuries occur when peripheral nerves are subjected to compression stretch ,ischemia,metabolic

derangements,direct trauma/laceration during surgery.Because sensation is blocked by unconsciousness or regional anesthesia,early warning symptoms of pain with normal spontaneous repositioning are absent.

a. Ulnar Nerve:

The ulnar nerve lies in superficial position at elbow.Although the incidence is low,the morbidity associated with ulnar neuropathy can be severe.The neuropathy,if permanent ,results in the inability to abduct or oppose the fifth finger ,diminished sensation in the fourth and fifth finger and eventual atrophy of the intrinsic muscle of hand creating a "claw-like"hand..The most ulnar damage were associated with general anaesthesia.The ulnar neuropathy is mostly premodinant in male,as males have a more developed and thickened flexor retinaculum with less protective adipose tissue and larger tubercle of the coronoid process that can predispose to nerve compression in the cubital tunnel.

b. Brachial Plexus:

The brachial plexus is susceptible to injury from stretching or compression due to its long superficial course in the axilla between two points of fixation,the vertebra and axillary fascia ,in association with the mobile clavicle and humerus.Injuries most commonoly associated with arm abduction greater than 90 degrees ,lateral rotation of the head ,assymetrical retraction of the sternum for internal mammary dissection during cardiac surgery and direct trauma.

c. Other Upper Extremity Nerves:

Radial nerve can be injured from direct pressure as it traverse the spinal groove humerus in the lower third of the arm.The injury often manifests as wrist drop with an inability to abduct the thumb or extend the metacarpophalangeal joints.Isolated median nerve injury most often occurs during the insertion of intravenous needle into the antecubital fossa in anesthetized patient where the nerve is adjacent to the medial cubital and basilica veins.Patients with this injury are unable to oppose the first and fifth digits and have decreased sensation over the palmar surface of lateral ½ .

d. Lower Extremity Nerves:

Injury to the sciatic and common peroneal nerves occur most often in the lithotomy position.Because of its fixation between the sciatic notch and the neck of the fibula the sciatic nerve can be stretched with external rotation of the leg.Most often patients who suffers injury complain foot drop and the inability to extend the toes in dorsal direction or evert the foot.

Injury to the femoral or obtuator nerves generally occurs during lower abdominal surgical procedures with excessive retraction.The obturator nerve can also be injured during a difficult forcep delivery or by excessive flexion of the hip,decreased extension of the knee,or loss of sensation over the superior aspect of the thigh and medial/anteromedial side of the leg.

Perioperative Eye Injury And Visual Loss:

Perioperative eye injuries are a source of significant morbidity and liability.Corneal abrasion continues to the most common type of perioperative eye injury and is associated with direct trauma to the cornea from facemask ,surgical drapes,or other foreign objects.Corneal abrasion can also be associated with decreased basal tear production or swelling of the dependent eye in patients in the prone positons.

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The holistic approach to the treatment of Shoola Roga

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Abstract: Shoola Roga has been described in Ayurvedic Classics, as a painful abdominal disease without any obvious localized swelling. Ayurvedic texts have mentioned that Shoola and Sanyasa are the diseases which may suddenly or rapidly develop and later on can turn into morbid and grave conditions. Therefore immediate and total management of shoola roga is necessary in medical world.

Key word: Shoola , Koshtha , Avipakaj , Vit shoola

Introduction: Shoola Roga has been described in Ayurvedic Classics, as a painful abdominal disease without any obvious localized swelling. The associate one or more clinical feature are vomiting, constipation, dysuria, cessation of flatus, meteorism, fever, anorexia, semi unconsciousness, vertigo, burning sensation, heaviness/ fullness in abdomen, clammy skin and difficulty in breathing. The site as described in Ayurvedic texts is koshtha in beween Hridaya and Vasti.

Sushruta and kashyapa samhita have described mainly four type of Shoola roga viz. vataja, pittaja, kaphaja and sannipataja. Madhava Nidan, Sharangadhar Samhita, Bhavaprakash, Harit Samhita, Yogaratnakar and Bangsen have mentioned more i.e. dwandwaja and Amaja shoola etc. Sushruta has elaborately described seven more types of shoola roga viz. Vit shoola, Kukshishoola, Hrid shoola, Parshwa shoola, Vastishoola, Mutrashoola and Avipakaja Shoola according to Mala, Dhatu, Aayatana and condition of Agni involved.

Sushruta has described that vitiated or provoked Vata is the principle causative factor of all types of shoola Roga and it may increase the severity of the disease suddenly or rapidly and shoola can turn into morbid and grave. Therefore, the treatment of Shoola Roga should be started immediately to control and normalize the vitiated Vata.[1] The principles of treatment can be broadly classified into (a) Medical treatment and (b) Surgical treatment.

(A)MEDICAL MANAGEMENT OF SHOOLA ROGA

Various medical measures discussed by Ayurvedic classics are mainly to normalize the Vata dosha in all types of Shoola. In addition some other therapies are also mentioned accordingly concerned to counteract the associated kapha and/or pitta in other types of shoola. These therapies include general Sanshodhana and Samshaman therapy. It comprise some specific therapeutic procedures also, such as Lekhana karma by internal administration of Kshar. Ayurvedic texts have described a general formula for the treatment of the Shoola. These include Vamana (emesis), Langhana (fasting), Swedana (sudation), Pachana (digestives), Phalavarti (suppositories), Kshara (medicated alkalies), Churna (powder of drugs) and Gutika (pills) remedies.[2] The important remedies are described as follows.

Snehana

Swedana should always be done after snehana procedure.[3] Two types of shehana has been mentioned in Ayurvedic literatures (i) External Snehan – it should be done by external application of oil , specially done in Vatika Shoola but also done in kaphaja[4] and Kukshi Shoola.[5] (ii) Internal snehana should be done by internal use of sesame oil and draksha

decoction in vatika shoola [6] . Whereas in paittika shoola it should be done by internal use of sesame oil with sugar [7,] and ghrita drinking [8,.]

Swedana

It is especially mentioned in management of vatika and kaphaja shoola [9] . Two types of swedana is indicated, unctuous for vatika shoola and non unctuous swedana for kaphaja shoola. In vatika shoola unctuous and hot swedana should be done by irrigation, liniment payasa, pinda, krishara, meat piece, pishita utkarika [10] , soil bag [11], gutika [12], at pain site. Unctuous sudation, irrigation, avagahana are done in kukshi shoola [13].

In kaphaja shoola warm and non unctuous sudation is indicated at site of shoola [14] . In Vitshoola also sudation is recommended [15]. Sudation could not be done in paittika shoola.

Vamana

Emesis is specially indicated in kaphaja shoola [16]. But it is indicated in vatika and paittika shoola [17], kukshi shoola, vit Shoola and avipakaja Shoola also [18.]. This procedure can be performed by the use of katu rasa drugs for kaphaj dosha and madhura rasa drug for pitta dosha removal. But it is contraindicated in parshwa shoola [19]. Emetic solution should be used cold in paittika shoola whereas warm in kaphaja shoola [20].

Virechana

Virechana procedure (purgation) is especially indicated in paittika shoola although it could be used in other shoola also [21]. Purgation should be performed by use of trivritta powder and triphala powder in paitttika, [22] whereas by use of bach, hingu sauvarcchala, indrayana and abhaya in kukshi shoola, [23] triphala, trivritta and draksh in vitshoola [24].

Basti

Vitiated or provoked vata is the chief causative factor of Shoola Roga and basti is an important therapy for treatment of vitiated vata 25 . Therefore it is an important remedy in the management of Shoola. In Vatika Shoola, asthapana basti of bacha, pippali and oil etc. 26 and anuvasana basti of Narain tail, Prasarini tail and Phala tail 27 is indicated.

Ayurvedist have recommended basti procedure in kaphaja shoola 28 , vit Shoola 29, kukshi Shoola 30, parshwa shoola 31 and vasti Shoola 32 also.

Shirovirechana

It is specially advised in kaphaja Shoola [33]. Jyotismati, Shigru etc. are recommended for Shirovirechan [34].

Langhana

Langhana is particularly indicated in Kaphaja Shoola [35]. It can be employed in paitikka shoola also, but cannot be used in hunger pain of vatika Shoola.

Pachana

Under the term off pachana therapy, the drugs listed are helpful in digestion of ingested food substances e.g. Sunthi, Chitraka etc.

Yavagu It is specially indicated in kaphaja shoola. Yavagu is advocated to aggravate the "Agni" .Such yavagu should be medicated with panchakola powder. [36] Sushruta has advised the use of ushna virya drugs like pippali and shringabera etc.[37] in preparation of yavagu.

Kshara

Ayurvedic classics have recommended the internal use of kshara for Kshapana karma [38]. It has property of lekhana karma also. [39] it is specially indicated for kaphaja shoola. Kshara may be prepared and used as instructed here (i) pippali, swarjika, yavakshara, chitraka and sevya are mixed together and burned all. The ash should be used with warm water. [40] (ii) roasted gram flour, salt, chitraka, bacha, and ghrita are burned in a pot upon the fire. This kshara should be used with rice water. (iii) Internal used of Aranda kshara with panchmoola or barley decoction[41.] (iv) The pieces of white pumpkin burned in a pot upon the fire. This kshara two gram is used with same amount of dry ginger powder, in all types of shoola.[42]

Phalavarti

Suppository is indicated in associated constipation, meteorism and borborygmus conditions. Phalavarti is prepared by shatapushpa, bacha, kushtha, pippali, madanaphala, saindhava and sarshapa. All these ingredients are mixed together and are prepared in powder from. This powder is mixed with hot water, oil, cow's urine, honey, amla and kanji to make it one thumb thick spindle shaped, and lastly it is dried. Such suppository should be introduced into the anus and consequence will be defecation. [43]

Smokes

Chakradatta has described the external use of medicated smoke in body surface. The medicated smoke is produced by burning of mixture off mustard oil and roasted gram flour. This smoke is applied directly upon the external surface of patient's body but is avoided for inhalation. During the management ,the body should be covered by a blanket [44].

Lepa

Local embrocations are mentioned in different Ayurvedic texts in relation to Vatika Shoola. Warm lepa i.e. embrocation is done on the site of pain or on a particular site. Three liniments have been mentioned by Ayurvedist (i) liniment of madanphala and kanji. It should be applied in umbilicus region [45.] (ii) Embrocate of asaphoetida, gingelly oil and cow's urine. It is also umbilicus region (iii) Liniment of rajika, shigru and cow's whey. This liniment should be applied on site of pain. [46]

Cold remedy or Sponging

It has been advised by various Ayurvedic pioneers preferably for paittika shoola. Cold sponging should be done at site of pain. It may be performed by application of a pot filled with cold water. Pot should be made up of mani, sphatika, gold, silver copper or bell metal. [47] A banana leaf should be kept on pain site .[48.] Sushruta has advised to use the cold wind, cold bath and cold climate. [49] Kashyapa has indicated the use of garland made up of white flowers as of kunda, lily, white lotus etc. Further he has said that patients should be kept in a cold room. The lotus leaves should be spread on bed and irrigated with sandal wood water. [50] If patients feels excessive thirst and burning sensation, the persons should use peya of barley and honey.[51] Kashyapa has advocated internal use of sesame oil with sugar. [52] Sushruta has advised to take parushaka, mridwika, khajura and substance of water origin as lotus root, water chestnut etc. with sugar. [52]

Warm Fomentation

It is specially recommended in kaphaja shoola, at the site of pain. It should be non unctuous and may be performed by hot sand bag or hot bricks. [54]

Swarasa, Kalka, Decoction

Sushruta has advised a decoction to drink for all types of Shoola sufferer. He has mentioned that patients should use this decoction instead off water [55]. Various decoction, swarasa (external juice) and kalka are advised by Ayurvedic pioneers.[56]

Churna

Churan are the fine powder of drugs. Various churna formulations have been mentioned by various Ayurvrdic pioneers according to Dosha. Dhatu and Mala involvement . [56]

Gudika

Gudika or pills are small ball form of fine powder off drugs made in water. Oil, ghrita and honey etc. most probably these gudikas are indicated after sanshodhama chikitsa. [56]

Bhasma, Avaleha

Bhasma as Mriga shringa with cow's ghrita is indicated in Harid Shoola. [57] Many other bhasmas are also indicated in Shoola. Some Avaleha as narikelakhanda etc. are also advised in Shoola roga. [56]

DrugsSushruta and other Ayurvedic classics have been mentioned mainly sheeta virya, madhur ras and vata pittashamaka drugs for Paittika Shoola. Whereas Ushna Virya Katu ras and Kapha vata Shamaka drugs have been advised for kaphaha and Vataja Shoola.

(B) SURGICAL MANAGEMENT OF SHOOLA ROGA

None of the Ayurvedic classics has mentioned the surgical treatment of Shoola. Only one reference is found regarding parasurgical procedure in the management of Shoola. Bloodletting procedure, in between flank of chest axilla and breast, has mentioned in the treatment of Parshwa Shoola. [58]

HARMFUL REGIMEN IN SHOOLA ROGA

Night awaking, coitus, excessive exercise, suppression of urges, worry, anger, incompatible diets, unusual diets, very cold and heavy substances, alcohol drinking, pulses, excess salt and katu rasa substances are harmful. [59]

BENEFICIAL REGIMEN IN SHOOLA ROGA

General- Day time sleeping, [60] langhana, swedana, vamana, virechana, bastikarma, pachana, laghu substance, patola, karvellaka, vastuka, shigru, common salt, garlic, one year old rice, castor oil, cow's urine, hot water, lemon juice, kshara, kushtha, gruel of roasted barley, warm milk, broth of wild animals meat, varuni, ripe mango, draksha, kapittha, hingu, satahwa, shunthi, priyal, launga are beneficial for the patients of Shoola [61].

Dietary in Vataja Shoola

Trivritta herb fried in fat, warm food, chirabilba leaves fried in oil should be given [62] . Sushruta has advised fatty food as Ghritapura etc. and thereafter drinking of Varuni to the non unctuous patients.[63] Fatty broth of flying bird's ,meat of broth of wild and burrowing animal meat. [64]

Dietary in Paittika Shoola

Dry cakes of molasses, barley, milk, ghrita, purgatives, meat or broth of wild animals. Sushruta has advised to use the foods containing pitta relieving rasas. Broth of meat eater's animal or wild animals with sugar should be used. [65] But avoid hot substances. [66]

Dietary In Kaphaja Shoola

Honey, honey's vinegar, food substances made up of wheat, barley, shalidhanya, arishta, non unctuous and katu rasa drugs. [67]

ABBREVIATIONS

Ashtanga Sangraha, AH- Ashtanga Hridaya, B- Bhava Prakasha (Chikitsa Sthana, Chapter-30), Ba- Bangasen Samhita (Shooladhikar), BR- Bhaishajya Ratnawali (Chapterr-30), C-Charaka Samhita, CD- Chakradatta (Chapter-26), K-Kashyapa Samhita (Khilla Sthana, Chapter-18), S-Sushruta Samhita (Uttartantra, Chapter-42), Si-Sidhha Sthana, Su-Sutra sthana, Y-Yoga Ratnakar (Shoola Chikitsa).

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4. S. 75
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6. And 7. K. 33
8. CD. 23
9. S. 75, CD.2
10. S. 89, K. 75, B. 42, BR.2
11. B. 37
12. B. 38, 39, Y. CD. 21
13. S. 131
14. S. 75, 110
15. S. 140
16. S. 109
17. CD. 1, 24
18. S. 126, 140
19. A. Su. 27
20. S. 104, 109, CD. 24, K. 11,

15, 16, 17, Y.
22. Y.
24. S. 140
26. K. 49, 50
28. K. 16, 17
30. S. 130
32. K. 50
34. C. Su. 4/13
36. CD. 42
38. S. 75
40. S. 116, 117
42. B. 58
44. CD. 85, BR. 59
46. Y.
48. K. 13
50. K. 13, 14
52. K. 33
54. S. 110
56. S., K., CD., B., BR. Y., Ba.
58. AH. Su. 27/13
60. Sushruta Samhita Sharir 4/48
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64. S. 91
66. S. 104
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35. K. 16, 17
37. S. 110
39. A. Su. 39
41. K. 31, 32
43. K. 43-45
45. B. 40
47. S. 105, K. 12, BR. 23
49. S. 104, BR. 23
51. CD. 26
53. S. 108
55. S. 112-115, B. 41
57. CD. 73
59. CD. 86, Y., BR. 282, 283
61. Y., Br. 279-281
63. S. 102, 103
65. S. 106, 107
67. CD. 41, B. 53, BR. 34

MANAGMENT OF BENIGN PROSTATIC HYPERPLASIA-AN AYURVEDIC APPROACH

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ABSTRACT: Efficacy of *Vasti* therapy an *Ayurvedic* therapeutic procedure was studied in 75 patients of Benign Prostatic Hyperplasia (BPH). The treatment was given for 21 days and then effect was assesses clinically and objectively. Objective observations include determination of size (weight) of prostate and residual urine in urinary bladder by ultrasonography, estimation of blood urea, serum creatinine and routine, microscopic and microbiological of urine.

After the therapy in 70.67% of 75 patients, the size of prostate was found regressed and in 82.14% of 56 patients, the residual urine volume was decreased along with other objective and subjective improvement.

KEY WORDS: Benign Prostatic Hyperplasia, Vasti, Ultrasonographic evaluation.

INTRODUCTION: The Benign Prostatic Hyperplasia (BPH) is one of the commonest problems amongst obstructive uropathies affecting large population of elderly community. Although this disorder is almost universal among aging men, its etiopathogenesis is poorly understood. Consequently, no constant reliable medical therapy without complication is acceptable so far and surgery is the only remedy with lot of complication. In ayurvedic system of medicine vatastheela a types of mutraghata (obstructive urogpathies) closely resembles with Benign Prostatic Hyperplasia on the basis of clinical feature and is supposed to be a result of vitiation of apana vayu (a type of vata dosha) and the Vasti Chikitsa is considered as the treatment par excellence for vatika disease.

The present clinical study is a comprehensive evaluation of Vasti Chikitsa on Beingn Prostatic Hyperplasia by using the ultrasonographic technique and response of Vasti Chikitsa is assessed in terms of prostatic size (weight) along with the amount of residual urine before and after the treatment in addition to clinical observations and laboratory findings.

MATERIAL AND METHODS: The present study was conducted on 75 patients of BPH, presenting with or without indwelling catheter along with different symptoms of prostatism, in the Department of Shalya-Shalakya, S.S. Hospital, BHU, Varanasi. The patients were selected by clinical examination of urine with culture study along with other investigations.

GRADING OF THE ENLARGEMENT OF PROSTAT

Grade I : Weight of prostate was upto 29 gms.
Grade II: Weight of prostate was in the range of 30-59 gms.
Grade III : Weight of prostate was in the range of 60-89 gms.
Grade IV : Weight of prostate was more than 90 gms.

METHOD OF TREATMENT: The patients were treated with Ayurvedic modalities as following and results are assessed after 21 days of treatment.

(A) Preparation of Patients:

Shatasakara Churna or Triphala Churna3-6 gms HS for 3-5 days in normotensive and hypertensive patients, respectively before starting the therapy.

(B) Samsodhana Chikitsa :

Abhyanga (massage) on suprapubic and lumbosacral region with Narayana taila for 15-20 minutes daily before giving vasti.
Nadi-Sweda (Steam fomentation) following Abhyanga on the same region with the stream of Dashmoola kwatha for 10-15 minutes before application of vasti.
Vasti (Retention Enema)
Anuvasana Vasti : Narayana taila (50 ml) on alternate days.
Niruha Vasti : Narayana taila (20ml) + Dashmoola Kwatha (150 ml) on alternate days.

(C) Samshamana Chikitsa :

Varuna Kwatha : 50 ml, twice daily orally.
Sudha Kupeelu - 125 mg with honey followed by a cup of milk twice daily orally to normotensive patients.

FOLLOW-UP

All patients were asked to attend the hospital at monthly intervals initially and than at interval of three months. Clinical examinations and laboratory investigations were performed during the follow-up period. During follow-up period patients were given Varuna-Kawtha 50 ml twice in a day. Follow-up assessment of patients was done from six months to two years and an even more.

OBSERVATION AND RESULTS

To start with blood urea and serum creatinine level was normal in 53% and 87% cases, respectively. The per cent of patients having normal level of urea and creatinine was increased to 76% and 93% after treatment, respectively. Similarity after treatement, the number of patients having albumin, pus cells, RBC crystals and epithelial cells were decreased. Before treatment, the bacteturia was observed in 44% patients and after the treatment the number of patients with bacteruria was decreased to 7% only.

ULTRASONOGRAPHIC STUDY

Changes in Weight of Prostate : The size of prostate was determined and weight was calculated. Comparative study of before treatment and after treatment value of prostatic weight revealed reduction in size (weight) of prostate after the therapy). The reduction in weight of prostate was not uniform. In few cases increase in weight was also observed. For the convenience of analysis the changes in weight were assessed in three categories viz. significant reduction, insignificant reduction and increase in weight. After therapy, when the reduction in weight was more than 10 gms it was termed as Significant Reduction and when the reduction in weight was less than 10 gms, it was considered as Insignificant Reduction while increase in the weight of prostate irrespective of degree of advancement in weight, in few cases, were regarded as Increase in weight.

The number of patients having significant, insignificant reduction and increase in weight varied from grade to grade (Table 1). After treatment, out of 75 patients, 70.67% patients showed significant reduction in weight of prostate and in 12% patients there was insignificant reduction of weight while in 17.33% patients weight was increased.

Table 1
Number of cases having Significant Reduction (>10gm)
Insignificant Reduction (> 10gm) and increased in Weight after therapy

Grade	Total No. of Patients No. of Cases (%)	Significant Reduction No. of Cases (%)	Insignificant Reduction No. of Cases (%)	Increase in weight No. of Cases (%)
Grade I	28(37.33)	19(67.85)	3(10.71)	6(11.42)
Grade II	36(48.00)	27(75.00)	6(16.66)	3(08.33)
Grade III	09(12.00)	7(77.77)	-	2(22.22)
Grade IV	02(02.66)	-	-	2(100.00)
Total	75(100)	53(70.67)	9(12)	13(17.33)

The differences between mean weight of prostate, before and after the treatment, were calculated in each categories of each grade and then mean percentage of the significant reduction, insignificant reduction and increase in weight were calculated. In significant weight reduction category (>10gm) the mean percentage of reduction was maximum in 75% cases of grade II and was slightly higher than grade I (68.0%) and grade II (67%) (Table 2).

Table 2
Percentage of Significant Reduction in Weight (> 10gm) in each grade

Grade	No. of Cases	Mean wt. in gms (B.T.)	Mean wt. in gms (A.T.)	Reduction wet. in gms (B.T.-A.T.)	Mean % of reduction
Grade I	19(67.85)	27.37	15.78	11.59	42.34
Grade II	27(75.00)	42.78	23.08	19.70	46.04
Grade III	07(77.77)	65.13	43.13	22.99	35.30
Grade IV	-	-	-	-	-

Changes in Residual Urine: The residual urine volume before the after the treatment was estimated by ultrasonography. Before the treatment 8 (11%) patients were incapable of voiding the urine, the residual urine could not been estimated in these patients. Whereas, in (15%) patients the residual urine, before and after the treatment was negligible. Thus, these patients were not included in the comparative study of residual urine. Effect of therapy on residual urine was variable in 46 (82%) patients, out of 56 of the residual urine was decreased while in 10 (18%) patients it was found increased also (Table 3). **Table 3**
Number of cases having Decreased and Increased Residual urine after therapy

Grade	No. of Patients (%)	Decreased Residual Urine No. of Cases (%)	Increased Residual Urine No. of Cases (%)
Grade I	19(33.92)	15(78.92)	4(21.05)
Grade II	28(50.00)	24(85.71)	4(14.28)

Grade III	7(12.50)	6(85.71)	1(14.28)
Grade IV	2(3.57)	1(50.00)	1 (50.00)
Total	56 (100.00)	46 (82.14)	10(17.85)

After taking the difference between mean residual urine before and after the treatment, the mean percentage of changes in residual urine in each grade was calculated (Table 4). The maximum mean percentage of decrease was observed in 24 patients of grade II.

Table 4
Percentage of Decrease in Residual Urine after the therapy in each grade

Grade	No. of Cases	Mean residual urine (in ml) B.T.	Mean residual urine (in ml) A.T.	Decrease in residual urine (in ml) B.T.	Mean % of decreased residual urine
Grade I	15(78.94)	120.78	60.32	60.46	50.05
Grade II	24(85.71)	230.19	73.24	156.95	68.18
Grade III	06(85.71)	241.24	117.13	124.11	51.44
Grade IV	01(50.00)	599.00	499.00	99.40	16.59

Objectively, results are assessed in terms of reduction in prostate weight (> 10 gm) only were regarded as Relieved while the patients having insignificant weight reduction and increase in weight were considered as Not Relieved while the patients having insignificant weight reduction and increase in weight were considered as Not Relieved. Thus, the total number of relieved patients, out of 75 (100%) was 53 (69.33 %) and the non-relieved patients were 23 (30.66%). (Table 5)

Table 5
Number of Relieved and Not-relieved patients after treatment in each grade

Grade	Total No. of Cases (%)	No. of Relieved patients (%)	No. of Non-Relieved Patients (%)
Grade I	28 (37.33)	19 (67.85)	9 (32.14)
Grade II	36 (48.00)	27(75.00)	9 (25.00)
Grade III	09 (12.00)	07 (77.77)	2 (22.22)
Grade IV	02 (02.66)	-	2 (100.00)
Total	75 (100.00)	53 (70.67)	22 (29.23)

DISCUSSION: In Ayurvedic system of medicine Vasti Karma (retention enema) is the best and first line of treatment for Vatika disorders. Although the vasti medicaments may come out after some time of administration but its active components gests absorbed and circulated in the body through Srotas (Channels) with the help of apana, udana and vyana vayu in the same manner like the water sprinkled at the root of tree reaches to all parts. So, per rectal

administration, the medicaments are absorbed in the villi of the rectal mucosa and then through the external and internal haemorrhoidal vessels come into systemic circulation.

Now it is well established fact that growth of prostate gland is under the control of serum testosterone concentration (androgenic stimulation). Moreover, reduction in prostatic size along with the regression of prostatic eipthelium has been reported after the treatment and Naferlin accetate, a LHRH against and androgen deprivation. So, it is possible that after administration of vasti (medicaments), the active components of vasti are absorbed and come into the systemic circulation and may have anti-androgenic activity so that no persistent androgenic stimulation is available to the prostate for its growth and consequently the prostate is regressed as evident from our observation of reduction in the size of prostate.

The decrease in residual urine might be due to decrease in prostatic obstruction but it is now established that the high residual urine volume is not caused by enlarged prostate itself, rather it is a sign of abnormality of bladder function. This view is consistent with that of Turner-Warwic et.al that residual urine is a sign of bladder failure, secondary to outlet obstruction leading to compensatory hypertrophy of detrusor muscle fibers of urinary bladder.

The decrease in residual urine volume by this unique ayurvedic therapy suggest revitalization of neuromuscular control of urinary bladder. Probably, application of vasti acts on urinary bladder wall and initiates the stretch reflex resulting in the contraction of hypertrophied muscle. On the other hand, the active components of medicaments are absorbed through rectal mucosa and might stimulate the sacral parasympathetic nerve endings to release more acetylcholine; by which sphincters get relaxed and smooth muscle of bladder contract with increased muscular tone and thus the amount of residual urine is reduced significantly.

Besides the above, the oral medication used in this therapy also produces their effects on smooth muscle contraction. Chopera et.al reported that Varuna is efficacious in neuro-muscular hypotonic and atonic conditions of the urinary bladder. Another drug, Shuddha kupilu churna is also a well-known convulsant in day-to-day practice and in therapeutic does it is used to improve the tonicity of smooth muscles including that of urinary bladder.

With the above consideration it can be inferred that the employed non-surgical ayurvedic therapy-Vasti Karma is effective in the management of BPH as proved by reduction in prostate size as well as decrease in residual urine along with clinical improvement. Further scientific evaluations on this therapy are required to be carried out.

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Historical review article

The cardinal SPEARHEAD of plastic surgery - Sushruta

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Abstract

Sushruta, one of the earliest surgeons of the recorded history (600 B.C.) is believed to be the first individual to describe plastic surgery. Sushruta who lived nearly 150 years before Hippocrates vividly described the basic principles of plastic surgery in his famous ancient treatise 'Sushruta Samhita'[1,2] in 600 B.C. 'Sushruta Samhita is the oldest treatise dealing with surgery in the world indicates that he was the first surgeon to perform plastic surgical operations. This paper presents a historical window into various contributions of Sushruta to plastic surgery and allied fields which were described in 'Sushruta Samhita' more than 2500 millennia ago.

Keywords: Sushruta, Indian Rhinoplasty method

Introduction - Although many people consider Plastic Surgery as a relatively new specialty, the origin of the plastic surgery had his roots more than 4000 years old in India, back to the Indus River Civilization. The mythico-religious shlokas (hymns) associated with this civilization were compiled in Sanskrit language between 3000 and 1000 B.C. in the form of Vedas, the oldest sacred books of the Hindu religion. This era is referred to as the Vedic period (5000 years B.C) in Indian history during which the the four *Vedas*, namely the *Rigveda*, the *Samaveda,* the *Yajurveda*, and the *Atharvaveda* were compiled. All the four Vedas are in the form of shlokas (hymns), verses, incantations and rites in Sanskrit language.[3] '*Sushruta Samhita'* is believed to be a part of *Atharvaveda*.[4]

'*Sushruta Samhita'*(Sushruta's compendium), which describes the ancient tradition of surgery in Indian medicine is considered as one of the most brilliant gems in Indian medical literature. This treatise contains detailed descriptions of teachings and practice of the great ancient surgeon Sushruta which has considerable surgical knowledge of relevance even today.

The '*Sushruta Samhita'* contains the major surgical text of the Vedas and is considered to be the most advanced compilation of surgical practices of its time. '*Sushruta Samhita'*comprises not only the teaching regarding the plastic surgery but contains composite teachings of the surgery and all the allied branches including midwifery and making it a comprehensive treatise on the entire medical discipline. Sushruta believed that knowledge of both surgery and medicine are essential to constitute a good doctor who otherwise "is like a bird with only one wing." In fact, Sushruta emphasized in his text that unless one possesses enough knowledge of relevant sister branches of learning, one cannot attain proficiency in one's own subject of study. According to Sushruta, "Any one, who wishes to acquire a thorough knowledge of anatomy, must prepare a dead body and carefully observe and examine all its parts". The method of study was to submerge the body in water and allow it to decompose followed by examination of the decomposing body at intervals to study structures, layer by layer, as they got exposed following decomposition. *The most important point to note here is that the dissection was performed without using knife.*

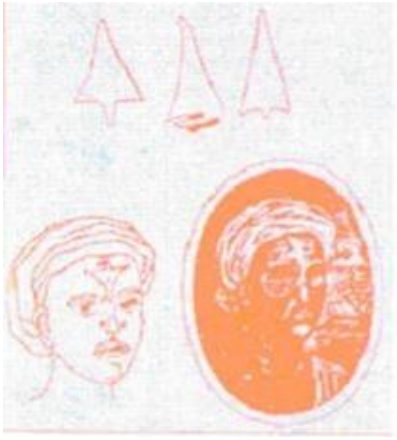
The followers of Sushruta were called as Sushruta's. The new student was expected to study for several years. Before starting his training he had to take a solemn oath, which can be compared to that of Hippocrates.[9,10] He taught the surgical skills to his students on various experimental modules, for instance, incision on food articlesi.e. YOGYA (like watermelon,

gourd, cucumber etc.), probing on worm eaten wood, preceding present day workshops by more than 2600 years.

This master literature remained preserved for many centuries exclusively in the Sanskrit language which prevented the dissemination of the knowledge to the west and other parts of the world. Later the original text was lost and the present extant one is believed to be a revision by the Buddhist scholar Vasubandhu (circa AD 360-350). In the eighth century A.D., *'Sushruta Samhita'* was translated into Arabic as Kitab-Shaw Shoon-a-Hindi and Kitab-i-Susrud. The translation of *'Sushruta Samhita'* was ordered by the Caliph Mansur (A.D.753 -774).[11] One of the most important documents in connection with ancient Indian medicine is the Bower Manuscript, a birch-bark medical treatise discovered in Kuchar (in Eastern Turkistan), dated around AD 450 and is housed in the Oxford University library.[12] The first European translation of *'Sushruta Samhita'* was published by Hessler in Latin and into German by Muller in the early 19th century. The first complete English translation was done by Kaviraj Kunja Lal Bhishagratna in three volumes in 1907 at Calcutta.[1]

All the basic principles of plastic surgery like planning, precision, haemostasis and perfection find an important place in Sushruta's writings on this subject.Sushruta described various reconstructive methods or different types of defects like release of the skin for covering small defects, rotation of the flaps to make up for the partial loss and pedicle flaps for covering complete loss of skin from an area.[14]

One of the great highlight of Sushruta's surgery was the operation of Rhinoplasty. The making of a new nose captured the imagination of the medical world and brought him fame as the originator of plastic surgery.[1] The famous Indian Rhinoplasty (reproduced in the October 1794 issue of the Gentleman's Magazine of London) is a modification of the ancient Rhinoplasty described by Sushruta in 600 B.C.[15]***Even today pedicle forehead flap is referred to as the "Indian flap".***



Ackernecht has aptly observed -"There is little doubt that plastic surgery in Europe which flourished in medieval Italy is a direct descendant of classical Indian surgery".[5, 16]

In describing the method of Rhinoplasty (Nasika-sandhana) Sushruta says [17]:

"The portion of the nose to be covered should be first measured with a leaf. Then a piece of skin of the required size should be dissected from the living skin of the cheek, and turned back to cover the nose, keeping a small pedicle attached to the cheek. The part of the nose to which the skin is to be attached should be made raw by cutting the nasal stump with a knife. The physician then should place the skin on the nose and stitch the two parts swiftly, keeping the skin properly elevated by inserting two tubes of eranda (the castor-oil plant) in the

position of the nostrils, so that the new nose gets proper shape. The skin thus properly adjusted, it should then be sprinkled with a powder of liquorice, red sandal-wood and barberry plant. Finally, it should be covered with cotton, and clean sesame oil should be constantly applied. When the skin has united and granulated, if the nose is too short or too long, the middle of the flap should be divided and an endeavor made to enlarge or shorten it." (SS.1.16).

Speculations have been raised as how, in the absence of anesthetics, the Indian surgeons carried out such major operations. Sushruta writes that "Madya" should be used before operation to produce insensibility to pain." He again remarks: "The patient who has been fed, does not faint, and he who is rendered intoxicated, does not feel the pain of the operation."

Sushruta considered surgery the first and foremost branch of medicine and stated[1,3]: "Surgery has the superior advantage of producing instantaneous effects by means of surgical instruments and appliances. Hence, it is the highest in value of all the medical tantras. It is eternal and a source of infinite piety, imports fame and opens the gates of Heaven to its votaries. It prolongs the duration of human existence on earth and helps men in successfully fulfilling their missions and earning a decent competence in life." He warns that improper intervention with surgical maneuver due either to ignorance of the progress of the disease-process, greed for money or lack of judgment, lead only to complications. Sushruta's general advice to physicians would certainly apply to doctors in any age and anywhere in the world, ''A surgeon who has set out on this path should have witnessed operations. He must be licensed by the king. He should be clean and keep his nails and hair short. He should be cheerful, well-spoken and honest''.

The genius of Sushruta prompted eminent surgeon Whipple to declare - "All in all, Sushruta must be considered the greatest surgeon of the premedieval period."[18] Rhazes repeatedly quoted Sushruta as the foremost authority in surgery.[13]

The Sushruta's contribution in the field of Plastic Surgery can be enumerated as follows [2,5,10,11,14,17]:

Rhinoplasty

Classification of mutilated ear lobe defects and techniques for repair of torn ear lobes (15 different types of otoplasties)

Cheek flap for reconstruction of absent ear lobe.

Repair of accidental lip injuries and congenital cleft lip.

Piercing children's ear lobe with a needle or awl.

Use of suture materials of bark, tendon, hair and silk.

Needles of bronze or bone (circular, two finger-breadths wide and straight, triangular bodied, three finger - breadths wide)

Classification of burns into four degrees and explaining the effect of heat stroke, frostbite, and lightening injuries[14].

Fourteen types of bandaging capable of covering almost all the regions of the body and different methods of dressings with various medicaments.

Use of *Madya* to dull the pain of surgical incisions.

Described 20 varieties of sharp instruments *(sastra) and 101 types of blunt instruments (yantra) and their handling techniques.

Systematic dissection of cadavers.

Advocated the practice of mock operations on inanimate objects such as watermelons, clay plots and reeds.

Use of *Jalauka* to keep wounds free of blood clots.
A code of ethics for teachers as well as students, e.g*****"should have an edge so fine that it should divide the hairs on the skin."
The Sushruta's contributions to allied fields are: [2, 3, 5,10,11,14]
Surgical demonstration of techniques of making incisions, probing, extraction of foreign bodies, alkali and thermal cauterization, tooth extraction, excisions, trocars for draining abscess draining hydrocele and ascitic fluid.
Described removal of the prostate gland, urethral stricture dilatation, vesiculo-lithotomy, hernia surgery, caesarian section, management of haemorrhoids, fistulae, laparotomy and management of intestinal obstruction, perforated intestines, accidental perforation of the abdomen with protrusion of omentum.
Classified details of the six types of dislocations, twelve varieties of fractures and classification of the bones and their reaction to the injuries.
Principles of fracture management, viz- traction, manipulation, appositions and stabilization including some measures of rehabilitation and fitting of prosthetics.
Description of method of stitching the intestines by using ant-heads as stitching material.
Dissection and study of anatomy of human body.
Introduction of *Madya*to dull the pain of surgical incisions.
Enumeration of 1120 illnesses and recommended diagnosis by inspection, palpation and auscultation.

Conclusion - Sushruta took surgery in medieval India to admirable heights and that era was later regarded as '*The Golden Age of Surgery'* in ancient India .Because of his numerous seminal contributions to the science and art of surgery in India, he is regarded as the 'Father of Surgery' and the 'Father of Plastic Surgery'.
In "The source book of plastic surgery'', Frank McDowell aptly described Sushruta as follows[19]: "Through all of Sushruta's flowery language, incantations and irrelevancies, there shines the unmistakable picture of a great surgeon. Undaunted by his failures, unimpressed by his successes, he sought the truth unceasingly and passed it on to those who followed. He attacked disease and deformity definitively, with reasoned and logical methods. When the path did not exist, he made one."

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MEDICO LEGAL ASPECTS OF ANAESTHESIA PRACTICE

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Abstract: Anaesthesiology is a high risk specialty. However the public at large are not aware of the risks involved in anaesthesia. Under such circumstances, when something goes wrong, the patient or his relatives react in a hostile manner towards the anaesthesiologist and many a times they land up in a police station or court to seek redressal. In this paper am trying to explore in detail about medico legal aspects in anaesthesia practice.

Keywords: Anaesthesia, negligence, duty, Res ipsa loquitur**,** consent, contributory negligence.

After introduction of Consumer Protection Act and bringing medical profession under it, there has been a sudden spurt of interest in the medical negligence matters. But, slowly people are realizing that it is not easy to get compensation through court unless there is a strong evidence of negligence.

However it must be realized that CPA applies only the existing law and has not introduced any new law. Only difference is that since Consumer courts deal only with consumer complaints they can decide them faster. At the same time the access to consumer courts is inexpensive.

Services rendered free are not covered by CPA. However if the payment is made by a third party on behalf of the patient (though patient himself does not pay for it), such services come under CPA. Anaesthesiologist even if not hired by the patient directly (i.e. hired by surgeon or nursing home) is liable to pay compensation under CPA.

In a criminal case, the aggrieved party files a complaint against the anaesthesiologist in a police station which then investigates the case and the Government prosecutes the concerned anaesthesiologist. This happens only when the offense is of a serious nature. The idea of judicial proceedings in criminal cases is to punish the anaesthesiologist concerned for the lapse on his part. Complainant does not get any compensation in criminal cases.

In a civil case the aggrieved party itself approaches the court to seek compensation for the harm caused by the action of the anaesthesiologist. These cases can go to the common courts or to one of the consumer courts.

After introduction of Consumer Protection Act (CPA), most of the cases relating to Medical Negligence go to the consumer courts. The reasons for this are the inexpensive and simple procedure and speedy disposal of the cases in these courts.

Grounds for action: Almost always the patient or his relative blames the Anaesthesiologist on grounds of negligence

Ingredients of negligence: To be successful in a suit for medical negligence, the patient (plaintiff) has to prove four things:

Duty: that the anaesthesiologist owed him or her a duty.

Breach of Duty: That the anaesthesiologist failed to fulfill his or her duty.

Damages: That actual damage resulted because of the acts of the anaesthesiologist.

Causation: That a reasonably close causal relationship exists between the anaesthesiologist's acts and the resultant injury.

Duty

When the patient is seen preoperatively and the Anaesthesiologist agrees to provide anaesthesia care for the patient, a duty to the patient has been established. A breach of any of these duties gives a right of action for negligence to the patient. In addition to their own acts,

Anaesthesiologists are responsible for those they supervise and who are employed by the hospital.

The practitioner must bring to his task a reasonable degree of skill and knowledge and must exercise a reasonable degree of care. Every case has its peculiar circumstances. The standard has to be applied with reference to those facts and circumstances under which the Anaesthesiologist was practicing at the time in question. Just as the various cardiac, respiratory, hematological and other aspects of a patient's condition affect the medical care and treatment to be rendered, all aspects of patient's condition, the nature of the procedure, the availability of the equipment etc. must be taken into consideration in applying the standard of care and evaluating the potential legal liability of an anaesthesiologist.

Inexperience

Inexperience is no defense. The patient is entitled to receive all the care and skill, which fully qualified and well experienced Anaesthesiologist would possess and use. Delegation of responsibility to a junior with knowledge that the junior was incapable of performing his duties properly will amount to negligence.

Failure to intubate a patient is not negligence where the hospital authority had weighed up the risks and disadvantages, which might occur as a result.

Qualifications and Experience

A person having studied one particular system of medicine cannot possibly claim deep and complete knowledge about the drugs of other system of medicine. A person who does not have the knowledge of a particular system of medicine but practices in that system is a quack. Where a person is guilty of negligence per se, no proof is needed.

Keeping up to date

Professional practices may change over time so that what was accepted as the correct procedure is no longer considered respectable or responsible. When a practice becomes outdated so much so as to be considered negligence is difficult to say.

However, once the risk associated with an old procedure becomes generally known, so that it can be said that an ordinary and reasonably competent practitioner would have changed his practice, it will be negligent to continue with that procedure.

Error of judgment

Lord Denning M.R. said "we must say and say it firmly, that, in a professional man, an error of judgment is not negligence.Indian courts have also held the same view. Wrong diagnosis is not deficiency in service. In the medical profession, as in others, there is room for differences of opinion and practice; and a court's preference of one body of opinion over another is no basis for a conclusion of negligence.

Mistake

Very often, in a claim for compensation arising, gross medical mistake will always result in finding of negligence. Use of a wrong drug or a wrong gas during anaesthesia will frequently lead to the imposition of liability and in some situations even the principle of res ipsa loquitur may be applied.

Degree of care must be proportionate with the magnitude of risk. For example, when an Anaesthesiologist was handling a dangerous substance which was known to be highly inflammable and he knew of the hazard arising from electrostatic sparks in an operating room, the degree of care required from him was proportionately high and he was bound to take special precaution to prevent injury to his patient.

Informed consent

one of these general duties is that of obtaining an informed consent. Consent may be written,

verbal or implied. Oral consent is just as valid, albeit harder to prove years after the fact, then written consent. Informed consent means shared decision-making. It means patients right to self-determination and autonomy. The extent of the requirement for disclosure of risk is subject to changing legal interpretations. Duty to disclose risk is not limitless, but it does extend to those risks that are reasonably likely to occur in any patient under the circumstances, and to those that are reasonably likely to occur in particular patients because of their condition.

There is no obligation to inform the patient about the risk of death from general anaesthesia.

Does the patient have sufficient mind to reasonably understand the condition, the nature and effect of the treatment proposed attendant risks in pursuing the treatment, and not pursuing the treatment.

The duty of a doctor is to explain to the patient what he intends to do and the implications of that action in a way, which a careful and responsible doctor would do, so that the consent given by the patient was, indeed, a real consent.

This duty to disclose sufficiently the risks involved must depend largely on the circumstances in each case. Thus, whilst it may be unnecessary or, perhaps, even a dis-service to warn a patient of any minimal risk, where an operation is either essential or advisable for the patient's medical welfare and continued good health, it may be otherwise, when the intended operation is not one, which is medically necessary but is totally elective, e.g. a sterilization operation.

Medicine is an inexact science. Presumption is that doctor would not give any warranty.

Records

Under the Indian laws a case based on medical negligence can be filed within three years of the occurrence of an incident. Under CPA this limitation is two years. Thus there is a time gap between the occurrence of an incident and the hearing of a case in the court. Court cannot rely on the memory of the parties to evaluate the evidence. More over court has no way to ascertain as to what happened within the four walls of the Operation Theatre. It has therefore to depend upon the records of the case maintained by the anaesthesiologist and the hospital. Anaesthesia record itself should be as accurate, complete and neat as possible.

The record was not considered proper when previous history of the patient was not recorded.

Court allows both parties to prove their case by means of producing evidence. This may include records, books, journals or expert witnesses.

Res ipsa loquitur

This legal phrase means "Things speak for themselves". It applies when the event which is complained of would not ordinarily happen in the absence of negligence. In such cases the burden of proof shifts from the complainant to the defendant. He has to prove that he was not negligent.

Use of a wrong drug or a wrong gas during anaesthesia will frequently lead to the imposition of liability and in some situations even the principle of res ipsa loquitur may be applied.

Where an explosion occurred during the course of administering anaesthetic to the patient when the technique had been frequently been used without any mishap.

Surgical mop left in the abdomen during LSCS under Spinal Anaesthesia.

Where surgery under general anesthetic, the plaintiff was taken to the recovery ward but

sustained brain damage caused by hypoxia for a four-to five minute period, which the Anaesthesiologist had failed to prevent, it was held to be negligent.

Doctrine of res ipsa loquitur was not applied in a case where globe was perforated in the course of giving a local block prior to cataract surgery.

In another case where a patient suffered permanent partial paralysis of legs following anaesthesia, the court said, "Medical science has not yet reached a stage where the law ought to presume that a patient must come out of an operation as well or better than he went into it."

Patient developed meningitis after spinal anaesthetic. Court found that anaesthetic was not contaminated and the staff had taken the usual precautions to disinfect themselves before the operation, it held the hospital was responsible for some fault in sterilization procedure.

Contributory negligence

The phrase means the failure by a person to use reasonable care for the safety of either himself or his property, so that he becomes blameworthy in part as an "author of his own wrong".

If patient does not follow doctor's advice, he can not blame doctors for the consequences.

Compensation not granted as the patient himself contributed to the development of deformity by not keeping the plaster for the duration suggested by the surgeon.

Government Hospitals

Government or Private Hospitals: Prior to 1995, consumer courts in some cases held that the Government Hospitals are not covered by the Consumer Protections Act.

However the Supreme Court in its judgment in IMA Vs. V. Shantha has clarified this point. In fact, CPA never differentiated between Government or private hospitals. It only said that CPA does not cover services provided free of charge. Since most of the Government hospitals provide services free of charge, they are not covered by the CPA. However, any hospital whether Government or private who collects charges from all or some of its patient is covered by the CPA after the Supreme Court Judgment. In these hospitals even the patients treated free of charge are entitled to move the Consumer Courts for compensation for any deficiency in service.

Question whether the fees charged by the doctor is excessive or reasonable does not constitute a consumer dispute.

Patient cannot complain about the anesthesiologist’s fee being excessive.

Prevention

If the rising tide of medical litigation and professional indemnity premiums are to be checked it is necessary for individual Anaesthesiologist to know and to follow the minimum standards expected of them by the public, their profession and the law.

The introduction of the ASA "Standards for Basic Intra-Operative Monitoring" was accompanied by a decrease in the number of anaesthesia-related liability claims. Improved monitoring, especially the greater use of pulse oxymetry and capnography, has undoubtedly contributed to the decrease in severe complications and the associated large awards.

The key factors in the prevention of patient injury are vigilance, up-to-date knowledge, and adequate monitoring. The practice of "defensive medicine" includes making of pre- and

postoperative rounds, developing good patient relationships, and maintaining up-to-date habits.

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PRODUCT PORTFOLIO

ACEROUZ-MR/P/SP	Aceclofenac + Paracetamol + Chlorzoxazone/Serratiopeptidase
CLAVAX-625	Amoxycillin + Clavulanic Acid
CLAVAX-D	Amoxycillin + Dicloxacillin
DELROZ-G	Diacerein + Glucosamine + MSM
EZY	Doxophylline
FEBAC-XT	Ferrous Ascorbate + Folic Acid + Zinc
MIZIT-250/500	Azithromycin
NOXI-P	Lornoxicam + Paracetamol
ROFIX-100/200	Cefixime Anhydrous
ROFIX-CV	Cefixime + Clavulanate Potassium
ROFIX-OX	Cefixime + Ofloxacin
ROFIX-AZ	Cefixime + Azithromycin
RONAC-S/SP/MR	Diclofenac Potassium + Serratiopeptidase /Chlorzoxazone/Paracetamol
RONAC-XL	Diclofenac Sodium + Paracetamol + Trypsin : Chymotrypsin
ROULAST-M	Montelukast + Levocetirizine
ROULET-DSR	Rabeprazole Sodium + Domperidone
ROULET-IT	Rabeprazole Sodium + Itopride Hydrochloride
ROUPAN-40/D/DSR	Pantoprazole + Domperidone
ROUPOD-CV 325	Cefpodoxime + Clavulanate Potassium
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TRICK-10	Cetirizine
X-FLAV	Flavoxate
ZECOBAL-G	Gabapentin + Methylcobalamin
ZECOBAL-P	Pregabalin + Methylcobalamin
ZELCAL	Calcium Carbonate 1000mg + Vit. D3
ZELCORT-6	Deflazacort
ZELFIX-250/500	Cefuroxime
ALMOR	Meropenem
CILAZEL	Imipenem + Cilastatin
CLAVAX 1.2	Amoxycillin + Clavulanic Acid
FEBAC-S 2.5/5ml	Ferric Hydroxide Complex With Sucrose
FOZAC	Cefoperazone Sodium + Sulbactam
MIZIT	Azithromycin
MPROZ	Methyl Prednisolone Sod. Succinate
MPROZ-A	Methyl Prednisolone Sod. Acetate
PIPZAR	Piperacillin + Tazobactam
ROCEF 250/500/1GM	Ceftriaxone
ROCEF-S 1.5/375/750	Ceftriaxone + Sulbactam
ROCEF-T	Ceftriaxone + Tazobactam
ROCYP	L-Ornithine-L-Aspartate
ROMIK-100/250/500	Amikacin
ROUPAN-IV	Pantoprazole Sodium
ROUVIT PLUS (Dispo. Pack)	M.cobalamin + P.doxine + Niacinamide
ROZID 250/1gm	Ceftazidime 250,1gm
ZACORT-100/200	Hydrocortisone Sodium Succinate
ZELCAL D3	Vitamin D3
ZELDAC-25/50	Nandrolone Decanoate (Dispo. Pack)
ZERTAN	Tranexamic Acid
GRAPZEL	Grapeseed Extracts + Multivitamin + Multiminerals
LYCOGEL	Lycopene + Multivitamin + Multiminerals
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ZECOBAL	Mecobalamin + Alpha Lipoic Acid + Pyridoxine HCl (Vit. B6)
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Anaesthesia for Renal Surgery

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Introduction

The kidney is one of the vital organs of the body. It has many functions, of which the main one is the filtration of plasma and excretion of waste products whilst maintaining water, osmolality, electrolyte and acid-base homeostasis. They secrete renin and have a role in the regulation of blood pressure and fluid balance, and also secrete erythropoietin.

Sympathetic innervation is from T8 to L1, via the coeliac and aorticorenal ganglia. Parasympathetic input is from the vagus nerve.

The ureters receive sympathetic innervation from T10 to L2, via the aorticorenal and superior and inferior hypogastric plexus. Their parasympathetic input is from S2 to S4. Nociceptive fibres travel with the sympathetics to T10 to L1 (kidneys) and T10 to L2 (ureters). Pain is therefore usually referred to the lower back, flank, ilioinguinal region and scrotum or labia. Finally, they have a major role in the metabolism and excretion of many drugs.

Pre-operative assessment

In addition to a routine anaesthetic assessment, particular attention must be paid to the renal function. Chronic renal failure often leads to hypertension, thought to be due to increased activity of the renin/ angiotensin system.Oedema may be due to proteinuria and hypoalbuminaemia.

Urinalysis is one of the most readily available, inexpensive and informative laboratory tests. Haematuria and the presence of casts, bacteria, white cells may be found on microscopy. Urinary specific gravity is an index of renal tubular function. The ability to excrete concentrated urine (specific gravity >1.030) indicates good tubular function, whereas urinary osmolality fixed at that of plasma (specific gravity 1.010) is indicative of renal disease. Proteinuria greater than 150mg per day is abnormal and usually indicates severe glomerular damage. However, it may also occur due to abnormally increased concentrations of plasma proteins. Glycosuria usually indicates the presence of diabetes mellitus. Plasma creatinine and urea concentrations provide good information about general kidney function. Creatinine clearance can also be used to specifically measure glomerular filtration rate (GFR).

If impaired renal function is suspected, serum electrolyte concentrations should be measured, however these usually remain normal until severe renal disease is present.
Other tests such as chest X-ray and ECG may be needed depending on the patient's symptoms, and on any other co-morbidities. All patients undergoing open or laparoscopic renal surgery should have blood taken for "group and save" or cross matching because of the risk of haemorrhage intra-operatively.
The patients condition should be optimised as far as possible prior to surgery. Hypertension should be well controlled with appropriate medication. Any urinary tract infection should be treated with appropriate antibiotics.For elective surgery, pre-operative iron or erythropoietin therapy may be used to increase haemoglobin levels. Patients with severe renal failure may have fluid and electrolyte disturbances. These should be corrected as far as possible, and dialysis may be used.
Diabetes mellitus is a common cause of renal problems, and an appropriate plan should be made for the management of such patients in the peri-operative period. Premedication may be used as necessary, and antacid prophylaxis should be considered in those with chronic renal failure.

Effects of drugs in patients with reduced renal function

The termination of action of most anaesthetic drugs is due to redistribution and metabolism, and is not dependant on renal excretion. Biotransformation of these drugs usually results in pharmacologically inactive forms of the parent compound which are water soluble and excreted in the urine. Accumulation of these products due to impaired renal excretion is not harmful.
Some drugs are eliminated unchanged in the urine. In particular non-depolarising muscle relaxants are largely excreted by the kidneys. The termination of action of a single small dose of such agents is by redistribution rather than excretion. However, when

maintenance doses are used, these should be smaller than for patients with normal renal function and the interval between doses should be increased. A clinical monitor of neuromuscular function, such as a train-of-four nerve stimulator should be used if available. Exceptions to this are atracurium and cisatracurium which are broken down by enzymatic ester hydrolysis and by nonenzymatic alkaline degradation (Hofmann elimination) to inactive products, and so are not dependant on renal excretion for their termination of action.

Succinylcholine (suxamethonium) is metabolised by pseudocholinesterase, and although levels of this enzyme are reduced in uraemia, values are rarely so low as to cause prolonged block. Succinylcholine administration does cause a rise in serum potassium, which may be dangerous in patients with severe renal impairment who already have an elevated potassium level. Renal excretion is also of major importance for the elimination of cholinesterase inhibitors (e.g. neostigmine) and their excretion is delayed in patients with impaired renal function to the same extent as non-depolarising muscle relaxants. Therefore, "recurarization" should not occur except for other reasons.

Other drugs which are largely excreted unchanged in the urine include atropine and glycopyrrolate, however a single dose will not cause clinical difficulties. Maintenance doses of digoxin must be reduced in proportion to the reduction in renal function, and blood levels are the most reliable guide to therapy.

Drugs which are extensively bound to albumin, such as many induction agents, will be affected by the reduction in albumin levels in uraemic patients. This results in an increase in the free fraction of the drug, and a reduction in the dose required to produce anaesthesia.

Inhaled anaesthetic agents are preferred for the maintenance of anaesthesia because their excretion is via the respiratory system, and so impaired kidney function will not alter the response to these agents. Enflurane and sevoflurane are both biotransformed to inorganic fluoride, although the plasma levels produced are below nephrotoxic levels. Isoflourane, halothane and in particular, desflurane are metabolised by the liver to a much lesser extent and so have no nephrotoxic potential.

Opioids are extensively metabolised in the liver, and therefore their pharmacokinetics and pharmacodynamics should be largely unaltered by renal disease. However, morphine and meperidine (pethidine) both have active metabolites which are excreted by the kidney and may accumulate in renal failure. Doses of these two drugs should therefore be reduced or limited.

Anaesthetic Goals:-

Intra-operative

General anaesthesia with muscle relaxation and intermittent positive pressure ventilation (IPPV) is usually used for open or laparoscopic renal surgery. Due to the position of the

patient and the increase in intra-abdominal pressure associated with laparoscopic surgery, endotracheal intubation is recommended. Induction of anaesthesia may be with intravenous or inhalational agents, and a rapid sequence induction should be used in those known to have autonomic neuropathy. Maintenance should be with inhalation agents, preferably halothane, isoflurane or desflurane. Atracurium is the non-depolarising muscle relaxant of choice in those with impaired renal function.

Large bore intravenous access is mandatory because of the risk of sudden haemorrhage. Any limb with a working arteriovenous fistula must not be used for intravenous infusions. In those who may progress to needing dialysis, forearm veins should be preserved for the creation of future fistulae and therefore not used for venous access.

Positioning

The full lateral position has profound effects on the respiratory system. Ventilation of the lower lung is decreased whilst its perfusion is increased resulting in a large ventilation perfusion mismatch. There are also decreases in thoracic compliance, tidal volume, vital capacity and functional residual capacity. These problems may be exacerbated by any pre-existing respiratory disease. Difficulty with low arterial oxygen saturations during the operation may be overcome by increasing the fraction of inspired oxygen, or applying a small amount of positive end expiratory pressure (PEEP). Postoperative atelectasis of the lower lung is not uncommon.

"Breaking" the table or using a kidney bridge may kink or compress the inferior vena cava, particularly in the right lateral position, causing a decrease in venous return and therefore cardiac output. Hepatic encroachment on the vena cava and mediastinal shift may further decrease venous return. Meticulous observation should be paid to cardiovascular parameters during patient positioning.

Neuropathies of the cervical plexus, brachial plexus and common peroneal nerves may occur in the lateral position due to stretching or compression of these nerves. Care should be taken to avoid excessive lateral stretching of the neck and both shoulders should be in a neutral position. The upper arm is usually placed on an arm support. All pressure points should be well padded. Any working arteriovenous fistulae should be wrapped to prevent inadvertent damage. A pillow is usually placed between the legs and the lower leg flexed.

Finally, the patient should be well secured on the table using back supports and strapping to ensure they do not roll or move position during surgery.

Monitoring

Routine monitoring of cardiovascular and respiratory parameters is particularly important because of the risks of problems occurring due to patient positioning. Invasive monitoring of blood pressure and central venous pressure may be used. This decision depends on the patient's pre-operative condition and on the risks of surgery.

Patients with end stage renal disease may benefit from central venous pressure monitoring to guide fluid requirements. However, central venous access may be difficult in those who have had previous haemodialysis lines inserted in the neck veins. Ultrasound guidance should be used in these patients if available. Excision of large renal masses may result in major haemorrhage and the use of invasive monitoring is recommended.

Renal surgery may take several hours and so attention must be paid to maintaining the patient's temperature as far as possible. Warmed intravenous fluids, warm blankets and heated mattresses may be used. The patient's temperature should be monitored if possible.

Fluid balance

Bowel preparation is usually given pre-operatively, which may cause patients to become dehydrated, particularly the elderly. Any patient with end stage renal disease who has had recent dialysis may likewise be fluid depleted pre-operatively. Appropriate fluid resuscitation must be given to any patients with signs of dehydration pre-operatively to avoid excessive hypotension at induction of anaesthesia. Otherwise, replacement fluids to compensate for pre-operative fasting and bowel preparation must be given early during surgery.

In addition to normal maintenance fluid requirements intra-operatively, evaporative losses from an open abdomen (10-30 mL/kg/h) and third space losses to bowel, omentum and retroperitoneum must be taken into account. Some blood loss is normal, and haemorrhage may occur at any time. Therefore fluid requirements intra-operatively are usually high.

Crystalloids are used for maintenance and third space losses. Potassium containing fluids should be avoided in those with impaired renal function. Colloid and packed red blood cells should be used for haemorrhage. Patients may have pre-existing chronic anaemia in which case they will tolerate less blood loss than those with higher haemoglobin levels. Other blood products such as fresh frozen plasma, cryoprecipitate and platelets may be required in the face of massive blood loss.

Urine output usually falls during surgery, but it can be used as a guide to fluid replacement. Postoperatively a urine output of 0.5-1.0 mL/kg/h should be the aim for those with normal renal function. Patients with impaired renal function are more problematic with regards to fluid balance. Anuric patients who are reliant on dialysis should ideally have strict attention paid to their fluid balance, and only have losses and maintenance requirements replaced. Dialysis may be used post-operatively if there is an element of fluid overload. Patients who have been recently haemodialysed are often relatively hypovolaemic.

Vasopressors and Antihypertensive agents:- Patients with renal disease are frequently hypertensive, and at increased risk of cardiovascular instability intra-operatively. Treatment of hypotension should first be directed at any obvious cause, such as haemorrhage. If vasopressor administration is necessary, direct α-adrenergic stimulating drugs, such as phenylephrine, can be used. Unfortunately these drugs cause the greatest reduction in renal perfusion. However β-adrenergic stimulating drugs, which maintain renal circulation, cause myocardial irritability and so should not be used. A dopamine infusion can also be administered.

Hypertension may be a problem, particularly if a bilateral nephrectomy is being carried out for uncontrolled hypertension. Sodium nitroprusside is contra-indicated in those with renal impairment as thiocyanate, its final metabolic product, will accumulate and is potentially toxic. Trimethaphan and nitroglycerin are rapidly metabolised and suitable for use in these cases. Hydralazine is a slower acting agent, but may be used for post-operative control of blood pressure. Approximately 15% of the drug is excreted unchanged in the urine, so care should be taken in those with end stage renal failure. Labetolol and esmolol are extensively metabolised and commonly used.

Post-operative pain relief

Open operations are associated with significant post-operative pain. Good analgesia is essential to allow effective coughing and early mobilisation and reduce the incidence of post-operative respiratory complications. Epidural analgesia is usually used unless contra-indicated. A low thoracic epidural catheter is usually used, and a block to about T8 is required for good analgesia. Continuous infusions of a mixture of low dose local anaesthetic and opioid provide the best pain relief, although intermittent boluses can also be used. Epidural catheters should be left indwelling for the minimum time possible, but may be used for up to 5 days after surgery, depending on patient requirements.

Fentanyl is a suitable drug for those with renal failure as it is largely metabolised in the liver. Morphine can be used with caution, and a reduction in both the dose and time interval between doses should be made for those with impaired renal function.

Patient controlled analgesia may be used, although opioid requirements are often low.

For all patients a multi-modal approach to analgesia should be used. Unfortunately non-steroidal anti-inflammatory drugs are relatively contra-indicated because of their

nephrotoxic potential. They may be considered post-operatively in those with normal renal function. Paracetamol is a very useful adjuvant agent and safe to use in renal impairment. Oral opioids may be used for moderate pain.

Summary

The patients pre-existing renal function and any other co-morbidities must be considered when planning anaesthesia for renal surgery. Invasive monitoring may be required. Positioning of the patient may lead to cardiovascular and respiratory changes. The possibility of major haemorrhage should always be remembered. Open operations on the kidney are painful and epidural analgesia should be used where possible.

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