ANAESTHESIA IN VARIOUS DISEASES: AN AYURVEDIC AND MODERN REVIEW

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ABSTRACT

Pain is main restricting factor in surgery. To overcome this limitation both Ayurveda and Modern Medicine developed pre operative, intra operative and post operative care for surgery. Though sandnyaharana term is not clearly described in Ayurveda the stages of anesthesia are similarly described as mada (delirium), murcha (unconsciousness), sanyasa (coma). These conditions are well described and stages, symptoms, etiopathogenesis and management is given. In Ayurveda it is advised to perform surgery full stomach in majority of diseases however in some diseases it is advised to keep patient empty stomach (NBM). Madkari dravyas, sandnyaharan and sandnyasthapan dravyas are described which may have potential to maintain anesthesia during surgery but lack of research, standardization of dose, study mode of action and government support causes some limitations on use of these medicines. In modern science anesthesia is well developed independent branch now. The whole procedure of anesthesia is modified according to various diseases and conditions. This review is done to collaborate anesthesia management according to various diseases in ayurveda as well as modern science.

KEYWORDS: Sandnyaharan, mada, murcha, sanyasa, madakari, anesthesia.

INTRODUCTION

Ayurveda, the science of life has focusd on preventive as well as curative aspect of life. Sushrut Samhita is one of the precious literature of ayurveda which is mostly concerned with the surgical conditions has also described briefly about anaesthesia. He mentioned Sandnyaharan as poorva karma though anaesthesia is not much explained by ayurveda literature it is well developed indipendant branch in modern science. Every patient should be
examined before operation whether he is fit for anaesthesia or not. He must enquire for 1) Cough 2) sputum lesion 3) Dyspnoea 4) Orthopnea etc. He should also examined for 1) Anaemia 2) Jaundice 3) Any cardiac lesion 4) Pitting oedema 5) Any lung lesion 6) Pathological liver kidney etc.

Aims and Objectives

1. To review the literature regarding sandhyarohana in ayurveda and modern medicine
2. To Focus on assessment of Pre Operative Patients condition and associated diseases and anaesthesia management accordingly.
3. To discuss drug of choice according disease in both literature.

In General, Contrary to modern medicine it is said by Aacharya Sushruta That the patient must be full Stomach before surgery. Explanation is given behind this that patient will not enter in shock after full stomach. As anaesthetic drug for habitual drinker strong madya should be used prior to surgery so that the patient will not feel the pain of sharp instruments used for surgery.

Diseases in which surgery should be performed in emptystomach (NBM):
1) Mudhagarbha (bridge presentation),
2) Udar (Ascites),
3) Arsha (Haemorrhoids),
4) Ashmari (Renal Calculus),
5) Bhagandara (fistula)
6) Mukharoga (Throat diseases)

From above conditions we can observe that 1) most of the above diseases are related to 1) Annavaha stratas, 2) Some are related to Agnimandya 3) Udan vayu dushti 4) Some are related to Apan Vaayudushti.

In this article efforts have been made to discuss modern anaesthesia in these conditions and some other conditions.

Obsteric anesthecia (Including mudhgarbha)

Most of the patients come for LSCS.
Patient should always considered as full stomach. Endotracheal intubation is preferred over laryngeal mask. There is increased sensitivity to both regional and general anesthesia.
Chances of epidural venous puncture are increased. Chances of high spinal are increased. Requires 30% less dose as compared to non-pregnant woman.

Anesthesia for spontaneous vaginal delivery:- Pethidine is most commonly used opioid for analgesia. For regional anesthesia spinal and epidural anesthesia is used. Ropivacaine is the local anesthetic of choice followed by Bupivacaine for epidural anesthesia. For S.A., single shot of diluted LA or opioid provide effective analgesia.

Anesthesia for cesarion section:- For SA 5% Bupivacaine is the drug of choice with addition of fentanyl or sufentanil. Safer drugs for epidural are chloroprocaine or lidocaine. Currently GA is only indicated for emergency situation. Thiopental is used for induction and succinylcholine as muscle relaxant.

Hepatobiliary disease (Including udar)
Effect of anesthetic agents on hepatic function should be considered. Volatile agents tend to decrease hepatic blood flow. Maximum reduction is seen with halothane. Sevoflurane and desflurane are drug of choice. Intravenous anesthetics like Etomidate and thiopental reduce hepatic blood flow. Ketamine has not much impact while propofol increases hepatic blood flow.

Anesthetic management preoperative considerations
LFT should be done along with routine investigations. All patients with liver disease should be presumed to have coagulopathy unless proven otherwise. Coagulopathy associated to this can only be treated with fresh frozen plasma. Sedatives should not be used in patients with coagulopathy. Elective surgery should be postponed in patients with acute hepatitis until its resolution.

Perioperative considerations
Renal diseases (Including ashmari)
Volatile agents toxic to kidney-methoxyflurane, sevoflurane. Desflurane is agent of choice. Iv agents-propofol reduces GFR. opioids and barbiturates have minimal effects on renal physiology. Ketamine preserve renal function during hemorrhageic hypovolemia. agents who pharmacokinetics remains unaltered are propofol, ketamine, thiopentone, remifentanil. Muscle relaxant- Indicated-cisatracurium and atracurium. Contraindicated- succinylcholine (when serum K is more than 5mEq/L.).

Preoperative- Patient on hemodialysis should undergo dialysis 24 hrs prior to elective surgery. antihypertensive drug must be continued.

Premedication- Sedatives are avoided due to unexpectedly high sensitivity of these patients to CNS drepressant drugs.

Perioperative considerations
Anesthesia-GA preferred over regional. Induction- any agent in reduced dose. etomidate is preferred in haemoynamically unstable patients.

Anesthesia for throat surgery (Including mukhroga) tonsillectomy
Tonsillectomy and adenoidectomy involve sharing of airway and possess a potentisal for blood contamination of the lower airway both of these procedures almost always performed under GA with nasal or oral intubation. In preanaesthetic evaluation identification of loose teeth, bleeding disorder, anemia and active respiratory tract infection. Active RTI increases the risk of bleeding and laryngospasm sosurgery should be postponed for at least 4 weeks.

Post operative care- patient should be kept in left lateral or tonsil position to drain out blood and secretions through mouth.

Laryngeal procedures
These operations are unique as both anesthesiologist and surgeon have to utilize the same anatomic field.

Preoperative evaluation-anesthesiologist must assess the size, mobility and location of the lesion and its impact on airway management.

Thyroid disorders hypothyroidism anesthetic considerations
Patient should be euthyroid before elective surgery. In patients with neck swelling tracheal
deviation should be assessed. **Choice of anesthesia**- both GA and regional. **Premedication**- Avoid sedatives. Aspiration prophylaxis (metoclopramide)

All patients should receive their usual dose of thyroid medication in the morning of surgery.

**Intraoperative management**

Induction done by ketamine (sympathetic stimulating property) as these patients are prone to hypotension. Postoperative care-patient should remain intubated until fully awake as recovery is delayed. NSAIDS are preferred over opioids for postoperative pain.

**Hypothyroidism anesthetic consideration**

Preoperative- Antithyroid Medication and Beta-adrenergic antagonists are continued till the morning of surgery.

Premedication-Diazepam, Fentanyl for sedation. Choice of anesthesia-both GA and Regional can be used. Nerve blocks are preferred. Intraoperative-induction- thiopentone (as it possesses antithyroid property) Contraindicated ketamine, pancuronium (increases BP and HR)

**Adrenal gland**

**Hypercortisolism-(cushing’s syndrome)**

Anesthetic considerations-Goal is to avoid stress induced steroid release. Anesthesia- GA is preferred over regional due to presence of vertebral body collapse and muscle weakness. **Induction**- by eutamidate. Goal is to ensure adequate steroid replacement therapy during the perioperative period.

Arsha and Bhagandara can be considered under diseases of GIT and specific considerations are not given for management of these diseases except that spinal anesthesia is preferred in these diseases.

Here are some other conditions which are not clearly described in Ayurveda but carry great importance in modern science.

**Anaesthesia in CVDHypertension**

Premedication-Medazolam (axiolytic agent). Antihypertensive agents should be continued as
per schedule and can be given with a small sip of water on the day of surgery. Choice of anaesthesia- GA, regional nerve blocks (these patients show exaggerated hypotension after spinal or epidural anaesthesia.

Choice of drugs-Inducing agent Propofol, barbiturates, benzodizipines. Contraindicated-Ketamine (Sympathetic stimulation causes marked hypertension). Muscle relaxants-Vecuronium (Due to its cardiac stability) and all agents except pancuronium(increase BP). Postoperative management- Post operative HTN is common. Drugs -HTN with tachycarida-Labetalol. HTN with bradycardia- Nicardipine.

**Ischemic heart disease**

Elective surgery must be deferred for at least 6 weeks following an acute MI or any other coronary intervention (angioplasty, percutaneous coronary intervention (PCI)). In patients with IHD, morbidity is directly portional to duration of surgery. If duration surgery more than 3 hours, then chances of re infarction increase significantly.

**Anesthetic management**

Preoperative Evaluation- Many authorities recommend withdrawal of ACE inhibitors 24 hours before major surgical procedure. Ejection fraction below 50% carries high risk. Choice of Anesthesia - GA. Epidural and other peripheral nerve blocks can be used safely with adrenaline free local anesthetic solution.

Perioperative Management- Short-acting benzodiazepines are administered night before surgery to allay anxiety. Anticholinergic agents (atropine or glyco pyrrolate) should be avoided. Technique and drug choice are same as that in hypertensive patient. In cases with severe IHD opioid induction is preferred. Desflurane less than 6% is the agent of choice be used safely, in fact isoflurane is the most commonly used volatile agent in cardiac patients. Hyperventilation must be avoided because hypocapnia constricts the coronary artery. Vecuronium(best), rocuronium, cisatracurium are the preferred muscle relaxant because of their minimal effect on heart rate.

Note: Halothane and ketamine are contraindicated in IHD patients.

The timing of tracheal extubation is extremely important as most perioperative MI occurs immediately after extubation. Emergence from anesthesia and/or weaning is usually
associated with an increased heart rate and BP. These hemodynamic alterations can precipitate MI. Beta-blocker or combined alpha and beta-blockers such as labetalol can reduce this hemodynamic alteration.

Postoperative Care- ECG monitoring as post op mi are silent.

**Congenital heart disease**- Ketamine is inducing agent of choice. Desflurane and Halothane are volatile agents of choice. N\textsubscript{2}O must be avoided as it increases PVR. Crying in perioperative period must be avoided as it may precipitate hypercynotic attacks.

**Respiratory diseases**

Pulmonary dysfunction is most common postoperative complication worldwide.

Preoperative considerations- all patients should undergo PFT. Any complaint of dyspnoea should be taken seriously and further evaluations should be done. Stop smoking 12-48 hrs prior though it takes weeks for full reversal of respiratory effects. Bronchodilators or steroids should be continued. benzodiazepines and opioids should be ovoided. RA is preferred but level of block should be below T8.

**Asthma**

Patients on long term steroids should be given supplemental dose.

Intraoperative management- GA by mask or RA is preffered. Intraoperative bronchospasm is treated by increasing the concentratonof aerosolized B adrenergic agonist.

**COPD**

General guidelines are same as earlier. Nitrous oxide is contraindicated in emphysematous patient with bullae.

**Tuberculosis**

Patient should be treated first with AKT.3 consecutive negative acid fast bacilli samples should be negative for elective surgery.

Disposable equipments should be used in emergency surgery in active cases.

**Respiratory tract infection (RTI)**

Postpone elective surgery for 6 weeks. Patient with occasional cough and only running nose can undergo elective surgery.
Haematologiacaal disorders

Anaemia-Most common coexisting condition in India

Preoperative preparation -Goal is to optimize the Hb level and find out the cause. Recently hb level of 8 gm/dl has been suggested as transfusion trigger by American association of blood bank; where as threshold of 7gm/dl was suggested by national institute of health consensus conference. Should be done at least 24 hrs prior to surgery.

Anaesthetic considerations-Avoid drug that can reduce cardiac output, Minimize surgical blood loss, Avoid hypothermia, hyperventilation. Contraindication-In megaloblastic anaemia-nitrous oxide should be avoided. In neurologic deficite-regional anaesthecia should be avoided.

1) Sickle cell anaemia

Preoperative- Anaemia should be corrected to target Hct of 30%.

Goal-To avoid any event that can lead to sickling crises. (hypoxia, dehydration, acidosis, hypothermia, stress, shock) Contraindicated-Torniquet should be avoided (not contraindicated) unless benefit outweighs risk as it produces local stasis, hypoxia, acidosis. IV regional anaesthecia or bier block is also avoided.

2) Platelet disorders

Only 30k -50k/cumm normal functioning platelets are required for adequate clotting. 30k/cumm is pre requisite for minor procedures like lumbar puncture, catheter insertion. 80k/cumm count is required for major surgery. Platelet count below mentioned level transfusion is indicated.

Contraindicated- Regional anaesthesia is contraindicated when platelets are not available in emergency surgery. In GA laryngoscopy must be non traumatic.

3) Coagulation factor disorder-Heredity conditions

Preoperative evaluation-Activated partial thromboplastin time (APTT), prothrombin time (PT), INR in addition to routine investigation

Anesthesia considerations

Haemophilia A (defect in factor 8)- restore factor 8level to 40% of normal prior to surgery.

Haemophilialla B (defect in factor 9)- same as haemophilialla a Von willebrand disease (platelet function defect)-desmopressin is drug of choice.

Iatrogenic conditions-
Patients taking aspirin- aspirin should be stopped 7 days prior to major elective surgery. In emergency surgery 2-5 units of platelet concentrate brings platelet function to normal. For patients taking low dose aspirin 48 prior to surgery. (latest guidelines recommend continuation of low dose aspirin and clopidogrel in all surgical procedures except major orthopedic and neurosurgeries) Patients taking anticoagulants- stop 3 days prior to surgery so as to bring INR less than 1.5 can be resumed on postoperative day.

**Hepatobiliary diseases**

Effect of anesthetic agents on Hepatic function-volatile agents – these agents tend to decrease hepatic blood flow. Maximum reduction seen with halothane. Minimal effects with desflurane and sevoflurane.

IV anesthetists – ketamine has minimal impact. Propofol tend to increase total hepatic blood flow. Anesthetic management - Child - Pugh score is gold standard for evaluating hepatic reserve. Preoperative Considerationss- In addition to routine investigations patient should be assessed for LFT, Coagulation abnormalities – can be treated with FFP, cardiomyopathy, RFT, CNS manifestations – hepatic encephalopathy should always be treated preoperatively. Sedatives should not be used in patients with encephalopathy. Perioperative considerationss – Induction – Ketamine is preferred for stable patient, Ramifentanil is the most preferred opioid. Desflurane, Cisatracurium is MR of choice.

Perioperative fluid – Glucose containing fluids are preferred. RL and excessive crystalloids should be avoided. Precautions – avoid hypotension, maintain euglycemia, maintain urine output. Postoperative care – oxygen supplementation for 24 hrs.

**Biliary disorders preoperative considerations**

Bile salt deposition in sinoatrial node may lead to bradycardia and other conduction abnormalities so ECG is advised in all cases. High bilirubine increases postoperative renal failure also, so it is essential to maintain hydration.

**Intraoprtative considerations**

Biliary excreted drugs (vancuronium) show prolonged action and should be avoided. Agents dependant on renal elimination are preferable.

**Neuropsychiatric diseases-Epilepsy**

Preoperative considerationss- Anticonvulsant therapy must be continued till the morning of

Elective procedures should be avoided for at least 6 weeks following stroke.

Preoperative management- Most of these patients are on warfarin or antiplatelet therapy. Low dose aspirin and clopidogrel should be continued perioperatively. Intraoperative management – Goal is to maintain BP and glucose level close to their preoperative level because any episode of severe hypertension or hypotension increases the risk of stroke, thrombotic or haemorrhagic respectively.

Degenerative and Demyelinating diseases parkinsons disease

Anaesthetic considerations- Antiparkinsonian drugs should be continued till the morning of surgery, as abrupt withdrawal of levodopa can worsen the muscle rigidity and may interfere with ventilation.

Phenothiazines and metoclopramide may exacerbate symptoms. Diphenhydramine is preferred for premedication and intraoperative sedation in profound tremors.

Contraindicated- Halothane, ketamine and local anaesthetics containing epinephrine (Cardiac instability leads to arrhythmia). In GA Sch is contraindicated due to risk of hyperkalemia. Other regional techniques are safe. Increase in body temperature is avoided as increase in little as 0.5 degree celcius may completely block conduction in the demyelinated fibres.

Gullian – Berre syndrome

Anaesthetic considerations- It includes respiratory complications, exaggerated hypotensive and hypertensive response. Reports noted worsening of GBS after regional anesthesia, central neuraxial blocks are contraindicated. For GA all drugs except Sch can be used.

Psychiatric disorders depression

Antidepressant drugs are generally continued perioperatively.

These drugs increase the requirement of anaesthetic agents. Contraindicated- Pancuronium, ketamine, epinephrine containing local anesthetic solutions are avoided.
In patients receiving MAO inhibitors, halothane and opioids should be used cautiously as serious interactions have been reported like with meperidine, hyperthermia, seizures and coma.

**Mania**
Lithium is most frequently used drug which can produce diabetes insipidus and electrolyte disbalance. Sodium depletion can precipitate lithium toxicity. Sodium containing fluids should be administered and excessive diuresis should be avoided.

**Schizophrenia**
Drugs should be continued. Many antipsychotic drugs have sedative property hence dose of sedatives should be reduced. Ketamineis contraindicated (due to its psychotic effects.)

**Musculoskeletal diseases**
Myasthenia gravis-
Preoperative considerations- These patients may have respiratory and oropharyngeal weakness so pulmonary function test is necessary.As a rule patient must continue anticholinesterase medication even on the day of surgery. Choice of anesthesia- regional anesthesia is preferred over GA.

Intraoperative considerations- Induction done by propofol.

**Muscular dystrophies**
Duchenne’s muscular dystrophy is the most common and most severe form of muscular dystrophy.

**Anesthetic considerations**
In these cases gastric emptying time is prolonged, which increases the risk for aspiration. So aspiration prophylaxis should be taken in all cases. In GA, total IV anaesthesia is preferred. Muscular dystrophies are associated with malignant hyperthermia so all triggering agents are avoided. -succinylcholine and volatile agents are contraindicated.

**Malignant hyperthermia**- It is triggered by certain drugs used for anesthesia.

**Triggering factors**- Halothane, Enflurane, Isoflurane, Desflurane, Sevoflurane. Nitrous oxide is also a weak trigger

**Intraoperative management**- Regional anesthesia is preferred. Total IV anesthesia including
nondepolarizing muscle relaxants, opioid is safe alternative where regional anesthesia is not feasible.

**Endocrinial Diseases-Diabetes mellitus**

Preoperative evaluation-The presence of an autonomic neuropathy predisposes the patient to perioperative dysrhythmias, intraoperative hypotension, gastroparesis and hypoglycemia. Silent ischemia must be ruled out in patients with diabetic neuropathy.’stiff joint syndrome’ SJS is rare condition found in these patients ,may prohibit the proper extension of the neck making intubation difficult. Well controlled type 2 diabetics-continue their regular medicine. sulfonylureas and metformin should not be used in perioperative period. poorly controlled diabetes need insulin.

Blood sugar must be evaluated before anasthetizing patient. Major elective surgery should be postponed if plasma glucose is more than 270mg/dl.Even minor surgery should be postponed if plasma glucose is more than 400mg/dl.

Choice of anesthesia-GA is preferred. In presence of neuropathy SA is relatively contraindicated. Anesthetic management- Due to delayed gastric emptying all patients should be considered full stomach. Inducing agents-all except Ketamine (raises blood sugar).

Monitoring-ECG monitoring, special attention should be given to ST segment as diabetics are prone to ischemias which is the most common cause of death in these patients.

**DISCUSSION**

Surgery of any kind involves pain which restrict the surgeon from performing surgery without anaesthesia. Pain management is the main challenge since ancient time. The word anesthecia or sandnyaharan is not mentioned clearly in ayurveda however some madakari, shndnyaharan, sandnyasthapan dravyas are given. they act onCNS (buddhi) And most of the modern anesthetic drugs are derived from these basic ayurvedic drugs like opioid drugs are derived from ahiphen, sura (alcohol) have effect on pain management.some controversy is present between these two paths like NBM status in preoperative management. many drugs are described as madkari like ahifen, Bhanga. drugs for pain management like vacha, kadamb, padmak, chavya, pippali, pippalimula shulaprashaman gana. vedanasthapan gana-shal, kadamb, padmak, katphala, Shirish, mochrasa, ashok, tumb, vallur. research is required on these drugs and their anesthetic properties so that in future ayurveda system of anaesthecia
can be developed parallel to modern medicine. Lack of research.

CONCLUSION

Drugs which are available in ayurveda literature are seems to be potent only to achieve first 2 stages of anesthesia i.e. analgesia and delirium or narcosis. Also they can be only used as preoperative or postoperative medication. Collective work of researchers, scientists, ayurveda as well as modern pathy doctors is required to find a potent ayurvedic anesthetic agent.

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