

Standard Operating Procedures Anesthesia

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Abbreviations

ASA	American Society of Anesthesiologists
ASA PS	American Society of Anesthesiologist Physical Status
COPD	Chronic Obstructive Pulmonary Disease
CSSD	Central Sterile Supply Department
GA	General Anesthesia
HCP	Healthcare Professional
ICU	Intensive Care Unit
IV	Intravenous
LMA	Laryngeal Mask Airway
MS	Medical Superintendent
NPO	Nothing Per Oral
OT	Operation Theatre
PACU	Post Anesthesia Care Unit
SOP	Standard Operating Procedures
TB	Tuberculosis
WHO	World Health Organization

1. Anesthesia Policy and Procedures

All hospitals should follow the policies and procedures for indications, the type of anesthesia and procedure regarding Pre-Anesthesia evaluation, assessment of an anesthesia risk and its scoring. Documentation required during anesthesia, recording of any complication, Post-Anesthesia monitoring requirements, Discharge from Post-Anesthesia/Post-Operative Care (recovery room).

1.1 Pre Anesthesia Assessment

Pre Anesthesia Assessment is a patient assessment done by Anesthesiologist before the scheduled surgery where physical examination, history-taking and review of diagnostic investigations, and referrals to other departments for further evaluation are done, when necessary.

1.1.1 Purpose:

1. To prepare and assess patient before surgery.
2. To do the necessary investigations and consultation prior to surgery.
3. To plan Anesthetic technique and perioperative care
4. To support parenteral nutrition in some cases of tumors. .
5. To prepare blood and its component needed for some surgeries.
6. To help boost the morale of the patient to reduce anxiety and facilitate conduct of anesthesia.
7. To Inform and educate the patient about anesthesia, perioperative care and pain management.
8. To obtain consent for anesthesia.
9. To determine and minimize risk factors for anesthesia.

1.1.2 Procedure:

1. Only qualified Anesthesiologist can do Pre-Anesthesia assessment.
2. Pre-Anesthesia assessment of the patient is carried out a day before the scheduled day of operation.
3. Pre-Anesthesia assessment and documentation shall be performed according to the guidelines (Basic Standards for Pre-Anesthesia care described by the American Society of Anesthesiologist)
4. The Pre-Anesthetic assessment may even be carried out prior to admission in case of elective surgeries if required.
5. An appropriate time should be chosen for Pre-Anesthesia assessment before the scheduled surgery to allow adequate preparation of the patient. This also applies to day surgery patients.
6. The Pre-Anesthesia assessment should be performed by the Anesthetist who will conduct the anesthesia .
7. An anesthesia plan for the patient is prepared on the basis of the Pre-anesthesia assessment and the same is documented

8. The anesthesia plan depicts the type of anesthesia (local, general, epidural etc.), monitoring and plan for postoperative analgesia etc.

9. Pre-Operative medication may be prescribed to facilitate the Anesthetic management. The patient's current medication should be reviewed and continued when necessary.

1.1.3 Anesthesia Physical Classification System:

1. The anesthesia risk assessment is a compulsory part of safe anesthesia practice.

2. In assessing risk factors and optimizing the patient for anesthesia and surgery, the Anesthetist may need to consider the nature and urgency of the surgery, social and economic factors, or any financial constraints that might have an effect on the patient care. It is imperative that the Anesthetist be knowledgeable and well-informed to make a balanced judgment with regard to the benefit-risk ratio of anesthesia and surgery for the high-risk patient. In such cases, risks associated with anesthesia should be discussed with the surgeon and conveyed to the patient and/or the attendant of the patient. It should also be documented in the consent form and the patient's case notes.

3. Anesthesia Physical Classification System is a way to evaluate a patient's sickness or physical state before selecting the appropriate anesthetic.

1.1.3.1 ASA PS Classification System from the American Society of Anesthesiologist:

ASA PS I

- Normal healthy patient with no systemic disease.
- No organic, physiologic, or psychiatric disturbance; excludes the very young and very old; healthy with good exercise tolerance

ASA PS II

- Patients with mild to moderate systemic disease
- No functional limitations; has a well-controlled disease of one body system; controlled hypertension or diabetes without systemic effects, cigarette smoking without chronic obstructive pulmonary disease (COPD); mild obesity, pregnancy.

ASA PS III

- Patients with severe systemic disease with functional limitation that is non incapacitating
- Has a controlled disease of more than one body system or one major system; no immediate danger of death; controlled congestive heart failure (CHF), stable angina, old heart attack, poorly controlled hypertension, morbid obesity, chronic renal failure; bronchospastic disease with intermittent symptoms

ASA PS IV

- Patients with severe systemic disease that is incapacitating and life threatening.
- Has at least one severe disease that is poorly controlled or at end stage; possible risk of death; unstable angina, symptomatic COPD, symptomatic CHF, Hepato-Renal failure

ASA PS V

- Moribund patients not expected to survive for 24 hours or without surgery.
- imminent risk of death; Multi Organ failure, sepsis syndrome with hemodynamic instability, hypothermia, poorly controlled coagulopathy

ASA PS VI

- A declared brain-dead patient whose organs are being removed for donor purposes

E

- Patient requires emergency surgery (An emergency is defined as existing when delay in treatment of the patient would lead to a significant increase in the threat to life or body part i.e appendectomy, D & C for uncontrolled bleeding)

1.2 Informed Consent

1.2.1 Purpose:

To establish guidelines in securing Informed Consent from patient and his/her attendant or any other person designated through the process of law in order to protect patient against unsanctioned practice and to protect hospital against claims of negligence.

Informed Consent – Permission granted in full knowledge of proposed treatment, procedure or act of care with possible risks and benefits which is given by a patient to a doctor.

1.2.2 Responsibility:

Anaesthetist, Anaesthesia Staff, Charge Nurse

1.2.3 Procedure:

1) Consent for the use of anaesthesia must be obtained from all patients planned for surgery in which anaesthesia is in use.

2) Consent shall be written in language that the patient understands.

3) The patient and/or his/her attendant or any other person authorized through the process of law are educated on the risks, benefits, and alternatives of anesthesia by the Anesthesiologist. This is separate from the surgery consent. Prior to the administration of anesthesia, the patient/his/her attendant is informed about the planned anesthetic procedure, risk and benefits involved etc. An informed consent is obtained from the patient by the concerned Anesthetist.

4) Consent may only be given by a person competent enough to do so.

5) All persons are presumed to be competent to give consent, unless there are justifiable grounds for believing otherwise. A judgment that the patient is incapable of giving consent must be supported by appropriate evidence, such as that of:

- a. Very young age
- b. Lack of mental capacity
- c. Unconsciousness
- d. Presence of sedative medication.

6) If patient is minor or incapable of giving Informed Consent, the substitute consent-giver should sign the consent form which may be

- a. A decision-maker duly appointed by the patient at such a time that he/she was competent. Ideally this appointment will be in writing and witnessed.

b. The legal guardian who may either be an individual or an agency can sign the consent document.

c. An adult relative who has had substantial personal involvement with the patient in the preceding 12 months can sign the consent forms. The sequence of priority is: Spouse, Father, Mother, Brother, Sister

d. Friends cannot give or withhold consent for the performance of an emergency medical treatment/procedure

7) If no attendant is present for a non-competent patient to give consent, the Deputy Medical Superintendent and the Assistant Medical Superintendent must be informed. The treatment can only proceed if it has been established that the treatment is in patient's best interests, is consistent with the SOPs on the same subject. This must also include efforts on part of the concerned officials and HCPs to ascertain that if the patient was competent to do so, he/she would have given consent to the particular procedure which is being executed. The HCPs will also have justifiable grounds to believe that any further delay in the matter will pose serious threat to patient's welfare or health. In such circumstances, all efforts should be made to seek legal advice and, if necessary, arrange for a legal guardian or substitute consent giver. In either case, appropriate legal advice must be sought.

8) In emergency situation where immediate intervention is necessary to preserve life or prevent serious harm, it may not be possible or sensible to obtain full consent. In such cases, there must be provision of information and discussion of the treatment undertaken with the patient, or his/her attendants or other persons appointed through the process of law, as soon as possible, like

a) There is immediate threat to life or health.

b) Treatment cannot be delayed.

c) The patient is not capable of giving Informed Consent.

d) For minors, the person legally capable of consenting on behalf of the minor is not available.

9) In instances where a language barrier inhibits the ability of a healthcare provider to seek consent, it is needed to arrange for a translator/interpreter.

10) It must be recognized that the patient can withdraw the given consent at a later stage which must be respected (e.g. during multiple attempts at regional blockade).

11) If the consent is obtained by telephone two nurses should monitor the call and sign the form which will be signed later by the patient's legal representative on arrival at the hospital. The call may be recorded on an electrical device if possible

12) On duty doctor or nurse must document the fact that all attempts were made to contact a substitute consent giver in the medical record of the patient.

13) In ideal conditions, the Informed Consent should be obtained by the Anaesthesiologist who will be conducting anaesthesia.

14) Charge nurse/ Anaesthesia technician is responsible to ensure that consent is completely filled up with correct data duly signed by the patient, witnessed by a relative and anaesthetist

1.2.4 Documentation of Consent

1) The extent of documentation may vary but it is wise to record significant details of the consent as part of the patient's notes, including reference to the discussion of relevant material risks and the agreement by the patient to undergo the treatment.

2) First of all, fill up the required data i.e. Patient name, Registration number etc.

3) It is primary responsibility of Anesthetist to fill up and to explain the name of anesthesia to be given, complications, risks, benefits and alternatives of anesthesia.

4) Obtain the signature of patient with relative and treating doctor as witnesses:

a) If the Patient uses thumb-mark, identify which hand side (left or right thumb)

b) If a relative signs on behalf of the patient, identify relation to the patient.

5) It is the responsibility of ward nurse and OT staff to countercheck the Informed Consent of anesthesia

a) To verify patient information

b) To ascertain signatories as required

c) To verify correct patient for which consent has been taken.

1.3 Anesthesia Plan

1.3.1 Purpose:

To determine the appropriate anesthetic approach.

1.3.2 Responsibility:

Anesthesiologist

1.3.3 Procedure:

1. The plan must include mentioning the pre-medications, type of anesthesia i.e. GA, regional or local, the drugs to be used for induction and the drug to be used for maintenance.
2. It should also mention about other concomitant medications and IV fluids, special monitoring requirements with appropriate and anticipated post-anesthesia care. However, Anesthesia professionals should be responsive to the condition of the patient on the Operation Table and any changes made in the anesthesia plan must be documented with justification.
3. The pre-anesthesia assessment identifies any risks and determines the appropriate anesthetic approach (for example, a patient with multiple back injuries or surgeries might not be a safe candidate for a spinal anesthesia or a patient with chronic obstructive pulmonary disease might not be a safe candidate for inhalation anesthesia).

1.4 Pre-Induction Re-Evaluation

1.4.1 Purpose:

1. To re-evaluate patients immediately before the induction of anesthesia.
2. To compare the findings and management plan in the formal Pre-Anesthesia assessment with the immediate pre-operative anesthesia assessment.
3. To assess the status prior to surgery

1.4.2 Responsibility:

Anesthesiologist

1.4.3 Procedure:

1. This is essentially a Pre-Induction Assessment and is done by the Anesthetist on OT table just before the induction of anesthesia. Any planned changes to the anesthesia plan shall be documented. When anesthesia must be provided on an urgent basis, the Pre-Anesthesia assessment may be performed immediately following one another, or simultaneously, and is documented separately.

2. The Pre-Anesthesia Re-Evaluation SOPs include;

- a) Review of the medical history, including anesthesia, drug and allergy history.
- b) Interview and examination of the patient.
- c) Notation of anesthesia risk according to established standards of practice
- d) Identification of potential anesthesia problems, particularly those that may suggest potential complications or contra-indications to the planned procedure (e.g., difficult airway, ongoing infection, limited intravascular access).
- e) Additional Pre-Anesthesia evaluation, if applicable and as required in accordance with standard practice prior to administering anesthesia (e.g., stress tests, additional specialist consultation).
- f) Development of the plan for the patient's anesthesia care, including the type of medications for induction, maintenance and post-operative care and discussion with the patient (or patient's representative) of the risks and benefits of the delivery of anesthesia.
- g) The patient's evaluation or re-evaluation must be performed and documented within 48 hours prior to the delivery of first dose of medication(s) given for the purpose of inducing anesthesia for surgery or a procedure requiring anesthesia services.

1.5 Monitoring In Anesthesia

1.5.1 Purpose:

To monitor the patient status during anesthesia

1.5.2 Responsibility:

Anesthesiologist, Anesthesia Technologist

1.5.3 Procedure:

1. The following parameters need to be monitored and recorded on the Monitoring Sheet

a) Heart Rate

b) Cardiac Rhythm

c) Respiratory Rate

d) Arterial Blood Pressure

e) Oxygen Saturation

f) End Tidal CO₂

g) Airway security and Patency

h) Level of anesthesia

i) Evaluation of circulatory function

j) Temperature (in case clinically significant changes in body temperature are intended, anticipated or suspected)

2. In case of regional anesthesia, instead of end tidal carbon dioxide, the adequacy of ventilation shall be evaluated by continual observation of qualitative clinical signs.

3. The anesthesiologist shall be present throughout the procedure. In addition, certain other parameters may be monitored on a case-to-case basis.

4. The cardiac rhythm may be monitored on a monitor during the procedure, and the rhythm as well as rhythm abnormalities shall be documented.

5. The time based events, any unusual events occurring during the administration of anesthesia and the status of the patient at the conclusion of anesthesia are recorded.

6. Anesthesia Staff also documents the techniques used, dosage of all drugs and agents used, type and amount of all fluids administered, including blood and blood products in anesthesia record sheet.

1.5.4 Basic Anesthetic Monitoring

1. These standards apply to all anesthesia care although, in emergency circumstances, appropriate life support measures take precedence.
2. These standards may be exceeded at any time based on the judgment of the responsible Anesthetist.
3. They are intended to encourage quality patient care, but observing them cannot guarantee any specific patient outcome.
4. They are subject to revision from time to time, as warranted by the evolution of technology and practice.
5. They apply to all general Anesthetic, regional Anesthetic and monitored anesthesia care.
6. This set of standards address only the issue of basic Anesthetic monitoring, which is one component of anesthesia care.
7. In certain rare or unusual circumstances, some of these methods of monitoring may be clinically impractical, and appropriate use of the described monitoring methods may fail to detect untoward clinical developments.
8. Brief interruptions of continual monitoring may be unavoidable.
9. These standards are not intended for application to the care of the obstetrical patient in labor or in the conduct of pain management.

1.5.4.1 Standard-1

1. Due to the rapid changes in patient status during anesthesia, the Anesthetist/qualified anesthesia personnel shall be continuously present throughout the conduct of all general anesthesia and regional anesthesia, monitor the patient and provide anesthesia care.
2. In the event that there is a direct known hazard, e.g., radiation to the anesthesia personnel which might require intermittent remote observation of the patient, some provision for monitoring the patient must be made.
3. In the event that an emergency requires the temporary absence of the person primarily responsible for the anesthetic, the best judgment of the Anesthetist will be exercised in comparing the emergency with the anaesthetized patient's condition and in the selection of the person left responsible for the anesthetic during the temporary absence.

1.5.4.2 Standard-2

During all anesthetics, the patient's oxygenation, ventilation, circulation and temperature shall be continually evaluated.

1. Oxygenation

a) Objective

To ensure adequate oxygen concentration in the inspired gas and the blood, during all Anesthetic.

b) Measuring

i. Inspired gas: During every administration of general anesthesia using an anesthesia machine, the concentration of oxygen in the patient breathing system shall be measured by an oxygen analyzer with a low oxygen concentration limit alarm in use.

ii. Blood oxygenation: During all anesthetics, a quantitative method of assessing oxygenation such as Pulse oximetry shall be employed. When the Pulse Oximeter is utilized, the variable pitch pulse tone and the low threshold alarm shall be audible to the Anesthetist or the anesthesia care team personnel. Adequate illumination and exposure of the patient are necessary to assess color.

2. Ventilation

a) Objective

To ensure adequate ventilation of the patient during all anesthetics.

b) Methods

i. Every patient receiving general anesthesia shall have the adequacy of ventilation continually evaluated. Qualitative clinical signs such as chest excursion, observation of the reservoir breathing bag and auscultation of breath sounds are useful. Continual monitoring for the presence of expired carbon dioxide shall be performed unless invalidated by the nature of the patient, procedure or equipment. Quantitative monitoring of the volume of expired gas is strongly encouraged.

ii. When an endotracheal tube or laryngeal mask is inserted, its correct positioning must be verified by clinical assessment and by identification of carbon dioxide in the expired gas. Continual end tidal carbon dioxide analysis, in use from the time of endotracheal tube/laryngeal mask placement, until Extubation / Removal or initiating transfer to a post-operative care location, shall be performed using a quantitative method such as capnography, capnometry or mass spectroscopy. When capnography or capnometry is utilized, the end tidal carbon dioxide alarm shall be audible to the Anesthetist or the anesthesia care team personnel.

iii. When ventilation is controlled by a mechanical ventilator, a device that is capable of detecting disconnection of components of the breathing system, the device shall remain in continuous use. The device must give an audible signal when its alarm threshold is exceeded.

iv. During regional anesthesia (with no sedation) or local anesthesia (with no sedation), the adequacy of ventilation shall be evaluated by continual observation of qualitative clinical signs. During moderate or deep sedation, the adequacy of ventilation shall be evaluated by continual observation of qualitative clinical signs and monitoring for the presence of exhaled carbon dioxide unless precluded or invalidated by the nature of the patient, procedure, or equipment.

3. Circulation

a) Objective

To ensure the adequacy of the patient's circulatory function during all anesthetics.

b) Methods

i. Every patient receiving anesthesia shall have the electrocardiogram continuously displayed from the beginning of anesthesia until preparing to leave the anaesthetizing location.

ii. Every patient receiving anesthesia shall have his/her arterial blood pressure and heart rate determined and evaluated at least every five minutes.

iii. Every patient receiving general anesthesia shall have, in addition to the above, circulatory function continually evaluated by at least one of the following: palpation of a pulse, auscultation of heart sounds, monitoring of a tracing of intra-arterial pressure, ultrasound peripheral pulse monitoring or pulse plethysmography/oximetry.

4. Body Temperature

a) Objective

To aid in the maintenance of appropriate body temperature during all anesthesia.

b) Methods

i. Every patient receiving anesthesia shall have their temperature monitored when clinically significant changes in body temperature are anticipated or suspected.

ii. Under extenuating circumstances, the responsible Anesthetist may waive some of the predetermined requirements. It is recommended that when this is done, it should be so stated (including the reasons) in a note in the patient's medical record.

1.6 Identity of the Patient

1.6.1 Purpose:

1. To ensure Patient safety by preventing surgery on the wrong patient.
2. To ensure that the identity of the patient has been established before the administration of anesthesia.

1.6.2 Responsibility:

Anesthesiologist, Anesthesia Technologist, Anesthesia Technician.

1.6.3 Procedure:

1. The following Standard Practices must be complied

- a) Banding
- b) Identification from file record
- c) The Patient should have at least two corroborating patient-identifiers as evidence to confirm identity. The use of multiple patient identifiers helps improve the reliability of the patient identification process.

2. Patient identifiers include:

- a) Name
- b) Medical Registration number
- c) National Identity Number
- d) Date of birth
- e) Identity Mark on face

The patient's bed number should not be used as a patient identifier at hospital. Bed numbers are not person-specific identifiers, since patients can be moved from bed to bed.

1.7 Post-Anesthesia Monitoring

1.7.1 Purpose:

1. To ensure continuity of care from the intra-operative phase to the immediate postoperative phase.
2. To prevent complications that may arise during recovery period
3. To provide appropriate management to post-operative period

1.7.2 Responsibility:

Anesthesiologist, Anesthesia Technologist, Recovery Room Nurse

1.7.3 Procedure:

1. This shall be done in the recovery area/OT and includes monitoring of vitals till the patient recovers completely from anesthesia and shall be done by an Anesthetist. If the patient's condition is unstable and he/she requires ICU care, the same shall be monitored there. All patients who have received general anesthesia, regional anesthesia or monitored anesthesia care receive appropriate post-anesthesia management.

2. Post-Anesthesia Care Unit or PACU, is important.

3. It is an area attached to OT, designed to provide care for patients recovering from anesthesia, whether it be general anesthesia, regional anesthesia, or local anesthesia.

4. The essential activities of PACU staff include:

- a) Monitoring vital signs (heart Rate, blood pressure, temperature and respiratory rate)
- b) Managing Post-operative pain
- c) Treating symptoms of post-operative nausea and vomiting
- d) Treating post-anesthesia shivering
- e) Monitoring surgical site(s) for excessive bleeding, discharge, swelling, hematoma, redness etc.

5. The following signs should be evaluated and their levels of stability should be verified with anesthesiologist.

- a) Blood Pressure
- b) Pulse Rate
- c) Respiratory Status
- d) Oxygen Saturation

- e) Hemodynamic status
 - f) Level of consciousness
 - g) Pain
6. Recovery unit staff should conduct comprehensive assessment post-operatively and this would be documented accordingly
7. Hydration status and actual fluid losses should be monitored and recorded:
- a) Urine
 - b) Blood
 - c) Gastric secretions
 - d) Oral feedings, if indicated
8. Patient should be maintained on NPO until further orders by anesthesiologist.
9. Post-operative management should be initiated in the recovery unit
- a) All injectable medications
 - b) Intravenous fluid infusions and blood transfusions
 - c) Analgesics and post-operative pain management
10. Barring any serious complications, most patients will be kept in PACU only for a few hours and will be allowed to return home or to other departments.
11. A patient will be accompanied by one of the anesthesia personnel who has complete knowledge of the patient's condition. He/she will continuously assess and monitor the patient during the transportation process and provide healthcare services appropriate to patient's medical condition.
12. The patient is re-evaluated on arrival in the PACU and this re-evaluation report is verbally conveyed to the concerned PACU nurse by the accompanying anesthesia personnel.
13. The patient's status on arrival in the PACU shall be documented.
14. Information concerning the pre-operative condition and the surgical/anesthetic course shall be transmitted to the PACU nurse.
15. Until the PACU nurse assumes charge of the patient and accepts the responsibility of patient care in writing, the accompanying member of the Anesthesia Department will remain with the patient in PACU. The patient's condition shall be evaluated continually in the PACU.

16. This re-evaluation will be done keeping in mind the medical condition of the patient. Particular attention should be paid to monitoring oxygenation, ventilation, circulation, level of consciousness and temperature. During recovery from all anesthetics, a quantitative method of assessing oxygenation such as pulse oximetry shall be employed in the initial phase of recovery. This is not intended for application during the recovery of the obstetrical patient in whom regional anesthesia was used for labor and vaginal delivery.

17. The patient's stay in the PACU shall be accurately documented and a report to this effect will be kept for reference. In PACU, the use of an appropriate scoring system will be encouraged for each patient on admission, at appropriate intervals prior to discharge and at the time of discharge.

18. The Anesthesiologist will be responsible for general medical supervision of the patient in the PACU.

19. A physician capable of handling complications and performing cardiopulmonary resuscitation will be present at all times in PACU.

20. The patient will be discharged from PACU on the advice of the physician appointed in PACU.

21. The discharge criteria of the patient must be approved by the Anesthesia Department. They may vary depending upon whether the patient is discharged to a hospital ward, to the ICU, or to home.

22. In the absence of the physician responsible for the discharge, the PACU nurse shall determine that the patient meets the discharge criteria. The name of the physician accepting responsibility for the discharge shall be noted in the record.

1.8 Discharge from PACU

1.8.1 Purpose:

To discharge the patient from recovery room after fulfilling the defined criteria.

1.8.2 Responsibility:

Anesthesiologist, Recovery Nurse

1.8.3 Procedure:

1. Every Recovery room should have well-defined criteria for the discharge of patients to the general ward or other clinical areas.
2. If the discharge criteria are not achieved, the patient should be retained in the recovery room and the Anesthesiologist will be informed.
3. As long as there is any patient in the recovery room, the availability of Anesthesiologist in the unit is mandatory.
4. In case there are doubts about patient's recovery to sufficiently validate discharge criteria, or problems have been encountered during patient's recovery period, the Anesthesiologist who administered the anesthesia must assess the patient. In his/her absence, the patient may be assessed by another Anesthesiologist who has been deputed to the recovery room. After medical re-evaluation, if the patient still does not meet discharge criteria, he/she should be moved to ICU.
5. The following criteria must be fulfilled:
 - a) The patient is fully conscious without excessive stimulation, able to maintain a clear airway and exhibits protective airway reflexes.
 - b) Respiration and oxygenation are satisfactory.
 - c) The cardiovascular system is stable with no unexplained cardiac irregularity or persistent bleeding. The specific values of pulse and blood pressure should approximate to normal pre-operative values or be at an acceptable level commensurate with the planned postoperative care. Peripheral perfusion should be adequate.
 - d) Pain and Emesis should be controlled and suitable analgesic and anti-emetic regimens prescribed.
 - e) Temperature should be within acceptable limits. Patients should not be returned to the ward if significant hypothermia is present.
 - f) Oxygen and intravenous therapy, if appropriate, should be prescribed. Keeping in view these guidelines criteria for patient shifting from PACU (post anesthesia care unit) to ward is based on Aldrete score.

6. Obtain transfer order from anesthesia. Prepare for the following:

- a) Explain to the patient that he/she will be transferred back to ward.
- b) Check vital signs
- c) Disconnect from Cardiac Monitor
- d) Empty Urine bags. Record in intake output sheet.
- e) Check Laboratory result of any investigation done.

1.9 SOPs for Handing Over to Ward staff

1. Patients should be transferred to the ward accompanied by a suitably trained member of staff.
2. Endorse patient to receiving nurse with patient file, pre and post op investigations and specimens (if present)
3. Ward nurse must ensure that Operation Notes and post-op orders are documented in patient file.
4. Receiving nurse must sign in recovery room nursing record.

2. Proper Storage and Handling of Anesthetic Agents

This Anesthesia Unit policy and procedure covers the regulations and practices on the proper storage and handling of anesthetic agents.

2.1 Definitions:

Anesthetic Agents substances, chemical or gas, use to induce anesthesia.

Inhalants a gas or liquid with a vapor pressure that is big enough to produce General Anaesthesia when inhaled.

Intravenous Anesthesia A compound that produces a state of anesthesia, amnesia and analgesia when administered intravenously.

Local Anesthesia compound that when applied directly into the mucous membrane or injected into the nerves, produce loss of sensation by inhibiting nerve excitation and conduction.

Neuroleptanalgesics a combination of short-acting synthetic opioids; when administered to the patient, causes drowsiness but elicits responses to verbal commands although analgesia is profound.

2.2 Purpose:

1. To maintain potency of anesthetic agents.
2. To prevent misuse.
3. To provide safety and security of stocks of anesthetic agents. To regulate system of issuance and replenishment.

2.3 Responsibilities:

Anesthesiologist, Anesthesia Technologist, OT Incharge, Head Nurse

2.4 Procedure:

1. Storage security should be provided for all anesthetic agents.
2. Inhalants should be kept inside the refrigerator.
 - a. Sevoflurane
 - b. isoflurane
3. Muscle relaxants should be kept inside the refrigerator.
 - a. suxamethonium
 - b. atracurium

c. other short intermediate or long acting muscles relaxants

4. All intravenous anesthesia agents should be stored in a dry place at room temperature in a safe vault.

a. Fentanyl

b. Pethidine

c. Morphine

d. Dormicum

e. Thiopental

f. Ketamine

g. Heavy Marcaine

5. A staff that prepares the medication should be the one to administer and label it.

6. All emergency medicines should be immediately available during the course of an anesthetic. They should be adequately labeled, and disposed of appropriately if not used.

3. Equipment

3.1 Essential Equipment

Continuousflow anesthetic machine - used to provide a measured and continuous supply of gases (oxygen, nitrous oxide, etc.), mixed with a required concentration of anesthetic vapor to the patient at a required pressure and rate;

Anesthetic vaporizers - vaporizes the anesthetic

Oxygen mask - to deliver oxygen and/or to administer aerosolized medications

Nasal oxygen set - to deliver oxygen

Guedel airways - hard part of the airway maintenance that connects the mouth part to the pharyngeal part

Yankauer suction tip and suction machine - Suction catheters used to remove secretions from the mouth, oropharynx, trachea and bronchi

Peripheral venous catheter

Water & sand weight bag

Artificial resuscitator (Bag valve mask) - manual ventilation

Bain circuit - respiratory maintenance circuit

Laryngoscope - used to view larynx including the vocal cords, the glottis, etc.

Endotracheal tube - a tube introduced into the patient's trachea to maintain a patient to ensure that air reaches the lungs for respiration

Laryngeal mask airway (LMA) - a less stimulating alternative to an endotracheal tube

Endoscope- to look inside the larynx, trachea, bronchi

Eschmann stylet or Gum elastic bougie - a flexible device introduced through the mouth during some intubation procedures; if the stylet is in the trachea, while passing in, gives a sensation of bumps and then finally stops going in at a point, it indicates that it was gliding over tracheal rings and has stopped at one of the bronchi (the patient may even cough during this time); if it goes into the esophagus, it will not bump and neither will it stop going in; used to judge where the endotracheal tube has gone in

HEPA Filter - to filter out dust particles from the gas being given to the patient

Hypodermic needle - for injections, infusions, etc.

Tuohy needle - for epidural catheter insertion

Spinal needle - used for puncturing the spinal canal for injection of medications in spinal anesthesia

Epidural catheter - used to administer medications into the epidural space

Syringe - to inject medications

Mucus sucker - to aspirate any fluid specially mucus from the respiratory passage

Defibrillator - For defibrillation and cardio-version of dysrhythmias

Tracheostomy Tube - For difficult ventilation and for prolonged ventilation

3.2 Departmental Maintenance

- Daily Cleaning of exterior
- Ensuring pipes and connectors do not leak.
- Replacement of fuse in electrically operated units if one blows out.
- Ensure that all the scheduled tasks and periodic maintenances are up-to-date.

3.3 Biomedical Repair and Maintenance

All electro medical/bio medical equipment needs to be regularly maintained and calibrated to ensure that proper output is achieved. Bio-Medical Engineer will be mainly responsible for the repair and smooth functioning of hospital equipment.

3.3.1 Bio-Medical Engineer

3.3.1.1 Responsibilities

1. equipment repair and maintenance
2. Ensure scheduled maintenance and calibration of electro-medical/bio-medical equipment.
3. Maintain all the records/repair/checkup history.
4. Installation, repair and maintenance of electro medical equipment
5. Evaluate the safety, efficiency and effectiveness of biomedical equipment
6. Train clinicians and other personal on the proper use of equipment
7. Any other duties assigned

4. Documenting and Monitoring of Adverse Anesthesia Events:

4.1 Purpose:

To document and monitor all such events for the purpose of taking corrective and preventive action. To define the processes for prevention, identification, reporting, disclosure, investigating, analyzing and managing adverse anesthesia events.

5. Infection Control Guidelines

5.1 Purpose:

1. To maintain sterility in the entire course of surgical procedure to prevent growth of microorganisms that causes infection of the operated site.
2. To observe sterile techniques in the performance of the surgical operation among all members of the operating team.
3. To prevent transfer of microorganisms to the operated site.
4. To prevent occurrence of infection on the surgical area.
5. To prevent transfer of infection from patient to staff, or vice versa.
6. To minimize infection having blood-borne pathogens from recognized and unrecognized sources.
7. To implement precautionary measures for infection that are communicable, hence prevention of transmission to other patient is attained.

5.2 Responsibility:

Anesthesiologist, Anesthesia Technologist, Infection Control Nurse, OT Incharge, Head Nurse

5.3 Procedure:

1. Anesthesia department staff should follow all appropriate infection control measures.
2. All operating room staff should perform proper hand washing techniques before and after every procedure.
3. Traffic control in the operating theatres should be strictly observed.
 - a. Keep operating room closed as much as possible.
 - b. Keep number of personnel and conversation in the operating room to a minimum.
 - c. Transfers patient to the recovery room without crossing main traffic corridors.
4. Environment control should be strictly maintained.
 - a. Maintenance personnel ensure compliance with positive pressure ventilation and adequate air exchanges per hour.
 - b. Locates air intake away from any areas of bacterial contamination.
 - c. Installs hepa-filter (bacterial filter) for air filtration.
 - d. Maintains temperature level of 18-24 degree centigrade.

- e. Maintains humidity to 50-60%.
5. Disinfection and Sterilization processes should be done on all surgical instruments and equipment
 - a. Scrub nurse places all used instruments in a sterile receiver to be forwarded to the CSSD decontamination area.
 - b. Circulating nurse cleans and disinfects equipment used.
 - c. Housekeeping personnel performs after care of the operating room and support areas.
 6. Appropriate patient preparation should be done in accordance to Infection control guidelines
 - a. Skin preparation by shaving and scrubbing.
 - b. Application of sterile drapes on the operative site.
 7. Operating team should comply with strict aseptic techniques during the entire surgical procedures
 - a. Observe proper hand washing and surgical scrubbing.
 - b. Maintains sterility of the operating table.
 8. Protective barriers should be worn at all times which include sterile gloves, sterile gown, cap, mask and large sterile body drape etc.
 9. Disposable anesthesia patient care supplies should be used, whenever possible. Reusable items must be properly disinfected or steamed and sterilized prior to reuse.
 10. Anesthesia machine should be cleaned with anti-septic at the completion of each case and when soiled during a procedure.
 11. Patients with active airborne communicable diseases (MRSA, TB, Dengue etc) should be cared for and appropriately isolated, based on the specific organism suspected or diagnosed
 12. Standard precautions should be observed at all times and there should not be any direct contact with a patient's blood, body fluids and/or excretions.

6. Safety guidelines

Anesthesia is usually considered a high risk procedure since it can potentially lead to physiological changes which may cause morbidity or mortality.

6.1 Purpose:

To limit patient injury from a specific adverse event associated with anesthesia and to ensure that the causes of the event are identified so that a recurrence can be prevented.

6.2 Responsibility:

Anesthesiologist are responsible for patient safety during operations.

6.3 Procedure:

6.3.1 General Safety Strategies

1) Prepare Pre-operative Plan of care

- a) Do Preoperative anesthesia assessment
- b) Prepare Anesthesia plan to deal with possible crisis.
- c) Check Anesthesia machine monitors and other devices
- d) Check backup equipment
- e) Know the location of emergency supplies and equipment.
- f) All drugs should be clearly labelled. Ideally drugs should be drawn up and labelled by the anesthetists who administers them.

2) Develop Situational awareness

- a) Systemic approach must be used for scanning of machines, monitors, patient, surgical field and surroundings
- b) If one vital sign is abnormal, quickly assess the other vital signs

3) Verify Observations

- a) Cross-check observations
- b) Assess covarying variables
- c) Review it with a second person

4) Implement compensatory responses

a) If something happens wrong, first implementing time-buying measures. e.g., increase the fraction of inspired oxygen when oxygen saturation falls; administer intravenous fluids or vasopressors when hypotension occurs)

b) Search out any correctable primary cause and treat it possible.

5) Prepare for crisis

If there is any critical events happened (cardiac arrest, malignant hypothermia or difficult intubation), call for help early, then use accepted protocols for emergencies and resuscitation (e.g., advanced cardiac life support, malignant hyperthermia protocols)

6) Enhance teamwork;

communicate To enhance teamwork and communication, address surgeons and nurses early in the case by knowing names. Make requests and delegate tasks clearly and specifically by name.

7) Compensate for stressors

Reduce various stressors: noise, fatigue, interpersonal tension, etc. Optimize the work environment.

8) Recognize and address production pressures

Due to patient load in DHQs and THQs, anesthetist should not sacrifice patient safety in order to emphasize production. If there is no adequate preoperative evaluation, preparation, or monitoring, it is unsafe to anesthetize the patient.

9) Learn from close calls

Analysis and feedback of adverse events to identify and assess system problems.

6.3.2 Crucial errors to know and avoid

1) Airway Errors Patients receiving GA have no spontaneous respiration due to use of muscular relaxants, their respiration is controlled by machine via Endo-tracheal tube. So we must ensure oxygen supply and avoid Accidental Extubation during surgeries (esp. a prone surgery) and transport. Once it happens, it can cause severe hypoxia and directly threaten the patient life.

How to avoid:

a) Check the system and guarantee it to function well.

b) Verify an Endo-tracheal tube by auscultating for breath sounds bilaterally and by detecting end-tidal CO₂

c) Fix the tube solidly

d) Closely observe vital signs

2) Medication Errors

a) Administration of undiluted potassium by rapid intravenous infusion can cause ventricular fibrillation and cardiac arrest.

b) Neostigmine given without an anti-muscarinic drug can cause asystole, severe bradycardia and atrioventricular block and can be fatal.

c) Succinylcholine can cause severe hyperkalemia and dysrhythmias, may trigger malignant hyperthermia.

d) Medications to which a patient is allergic can cause anaphylaxis.

e) Administering the wrong blood can cause an incompatibility reaction that can be fatal.

How to avoid

a) Be familiar with the medication you use, know clearly its indications and contraindications

b) Administer the medication strictly according to instructions.

c) Know the patient's history of allergy

d) Cross-check blood type.

3) Procedure Errors

a) Inadvertent intravascular injection of local anesthetics during a nerve block can cause neurologic and cardiac toxicity, which can be fatal (especially with bupivacaine).

b) Avoidable epidural hematomas may develop when spinal or epidural anesthetics are performed in patients who have coagulopathies.

c) Air embolisms may occur during the placement or removal of central venous catheters and may cause significant hemodynamic instability (recumbent position can avoid it). How to avoid:

i. Adequate pre-operative evaluation of the patients.

ii. Manipulation according to standards and guidelines

iii. Vigilance

7. Medical record maintenance

7.1 Purpose:

To establish guidelines and the responsibility of anesthesia discipline who depend on the medical record as the primary tool for communicating information important to patient care.

7.2 Responsibility:

Anesthesiologist, Anesthesia Technologist, Anesthesia Technicians, OT Nurse

7.3 Procedure:

- 1) Preoperative assessment notes by the anesthesiologist must include the patient's age, sex, and previous anesthetic experiences and pertinent drug history basic physical condition, and risk rating.
- 2) Anaesthesia consent form must be documented for all patients planned for surgery in which anaesthesia is in use.
- 3) Intraoperative anesthesia notes must include monitoring of oxygen saturation and vitals of patient during procedure.
- 4) Post-operative anesthesia notes shall be recorded when the period of anesthesia surveillance has ended, the patient's condition is specified.
- 5) Medical records must be maintained for every individual who receives anesthesia.
- 6) Medical record of a particular patient is confidential and his/her right to privacy must be respected at all times.
- 7) Patient file containing all the medical records will remain in the custody of nursing staff during the entire stay of patient in DHQ Hospital.
- 8) Every authorized person shall request the nursing staff on duty for patient's file to endorse his/her entry.
- 9) The author of entry in medical records is identified through signatures, names & designation.
- 10) The author of entry must make sure that every entry fulfil the following criteria
 - a. Date of entry
 - b. Time of entry
 - c. Authenticated by his/her legible name, signature and designation
- 11) After the discharge/death/referral /admission of patient nursing staff on duty shall complete the medical record in all aspects and handover it to Medical Record Section
- 12) All entries must be legible, accurate, clinically relevant and authenticated



SURGICAL SAFETY CHECKLIST (FIRST EDITION)

Name : Age/Sex : RN : Room : Date :

Before induction of anaesthesia ▶▶▶▶

SIGN IN
<input type="checkbox"/> PATIENT HAS CONFIRMED ● IDENTITY ● SITE ● PROCEDURE ● CONSENT
<input type="checkbox"/> SITE MARKED/NOT APPLICABLE
<input type="checkbox"/> ANAESTHESIA SAFETY CHECK COMPLETED
<input type="checkbox"/> PULSE OXIMETER ON PATIENT AND FUNCTIONING
DOES PATIENT HAVE A: KNOWN ALLERGY? <input type="checkbox"/> NO <input type="checkbox"/> YES DIFFICULT AIRWAY/ASPIRATION RISK? <input type="checkbox"/> NO <input type="checkbox"/> YES, AND EQUIPMENT/ASSISTANCE AVAILABLE RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)? <input type="checkbox"/> NO <input type="checkbox"/> YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED

Before skin incision ▶▶▶▶▶▶▶▶▶▶

TIME OUT
<input type="checkbox"/> CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE
<input type="checkbox"/> SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM ● PATIENT ● SITE ● PROCEDURE
ANTICIPATED CRITICAL EVENTS <input type="checkbox"/> SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS? <input type="checkbox"/> ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS? <input type="checkbox"/> NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUE OR ANY CONCERNS?
HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES? <input type="checkbox"/> YES <input type="checkbox"/> NOT APPLICABLE IS ESSENTIAL IMAGING DISPLAYED? <input type="checkbox"/> YES <input type="checkbox"/> NOT APPLICABLE

Before patient leaves operating room

SIGN OUT
NURSE VERBALLY CONFIRMS WITH THE TEAM: <input type="checkbox"/> THE NAME OF THE PROCEDURE RECORDED <input type="checkbox"/> THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE) <input type="checkbox"/> HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME) <input type="checkbox"/> WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED
<input type="checkbox"/> SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

9. References

1. Basic Anesthesia Monitoring <http://www.caa-med.com/wp-content/uploads/2014/07/CAA-Policies-and-Procedures-PDF-7.14.pdf>
2. ASA physical classification <https://www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system>
3. Aldrete score https://www.researchgate.net/figure/PACU-recovery-and-discharge-scoring-modified-Aldretscore_tbl1_259781004
4. WHO Anesthesia safety checklist in annexure <https://www.who.int/surgery/publications/s15980e.pdf>
5. Safety guidelines <https://www.slideshare.net/sumizin/2-safety-in-anesthesia> Dr.Lin Cao department of anesthesia, Sun Yat- Sen University
6. Primary and Secondary Healthcare Department, Government of the Punjab. Standard operating procedures: anesthesia. Lahore: Project Management Unit; 2019.

