Anaesthesia for ambulatory surgery

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First out patient surgical facility was established by *WALLACE REED,* an anesthesiologist.

Establishment of SAMBA in 1984

10 % in the past

70 % at present

What could be the reason?

- Rapid , short acting anesthetics , analgesics & muscle relaxants
- Minimally invasive surgical techniques
- Cost effectiveness.

BENEFITS OF AMBULATORY SURGERY

Patient preference

No dependence on hospital bed availability

More flexible scheduling of surgeries

Lesser morbidity and mortality

Lower incidence of infection

Lower incidence of respiratory complications

Higher volume of patients

Lower overall procedural costs

Shorter surgical waiting lists

FACILITY DESIGN

HOSPITAL INTEGRATED

Patients managed in the same surgical facility as IP

HOSPITAL BASED

Separate surgical facility within a hospital

FREESTANDING

Surgical & diagnostic facility associated with the hospital but in separate building

OFFICE-BASED

Facilities in conjunction with physicians' offices

DESIGN (CONTD…)

Quality standards set either by Government regulations or by private organisations such as AAAHC

ASA Guidelines

PATIENT SELECTION CRITERIA

ASA status: I ,II, III (& even some IV)

Duration of surgery < 90mnts(upto3–4 hrs!!!)

Risk minimisation by stabilisation of medical conditions 3 months prior to sx.

Not an exclusion criteria anymore…

Extremes of age

Susceptibility to malignant hyperthermia

BMI > 40 kg / m2

Procedures Suitable for Ambulatory Surgery

Dental -Extraction, restoration, facial fractures

Dermatology -Excision of skin lesions

General -Biopsy, endoscopy, excision of masses, hemorrhoidectomy, herniorrhaphy, laparoscopic cholecystectomy, adrenalectomy, splenectomy, varicose vein surgery

Gynecology -Cone biopsy, dilatation and curettage, hysteroscopy, diagnostic laparoscopy, laparoscopic tubal ligations, uterine polypectomy, vaginal hysterectomy

Ophthalmology -Cataract extraction, chalazion excision, nasolacrimal duct probing, strabismus repair, tonometry

Orthopedic

Anterior cruciate repair, knee arthroscopy, shoulder reconstructions, bunionectomy, carpal tunnel release, closed reduction, hardware removal, manipulation under anesthesia and minimally invasive hip replacements

Otolaryngology

Adenoidectomy, laryngoscopy, mastoidectomy, myringotomy, polypectomy, rhinoplasty, tonsillectomy, tympanoplasty

Pain clinic

Chemical sympathectomy, epidural injection, nerve blocks

Plastic surgery

Basal cell cancer excision, cleft lip repair, liposuction, mammoplasty (reductions and augmentations), otoplasty, scar revision, septorhinoplasty, skin graft

Urology

Bladder surgery, circumcision, cystoscopy, lithotripsy, orchiectomy, prostate biopsy, vasovasostomy, laparoscopic nephrectomy and prostatectomy

CONTRAINDICATIONS

1. Potentially lifethreatening c/c illnesses
2. Morbid Obesity complicated by symptomatic cardiorespiratory problems
3. Multiple c/c centrally active drug therapies or drug abuses
4. Ex-premature infants< 60 weeks post conceptual age requiring general endotracheal anesthesia

5. No responsible adult at home to care for the patient on the evening after surgery

PRE-OP ASSESSMENT

The triad : History (86 %), physical examination (6 %) , lab testing (8 %)

Telephone interview by a trained nurse/visit to clinic

Computerised questionnaire

Identified medical problems and abnormal lab investigations reviewed by an anesthesiologist.

Pre-op visit 1-2 weeks prior to Surgery

AIMS OF PAE

To identify patients with concurrent medical problems requiring further diagnostic evaluation or active Rx before elective surgery.

To identify patients with specific anesthetic concerns & be prepared to prevent the complications.

To advice patients to continue chronic medications

Some common concerns

1.URTI

- ✓ *Adults* : ideal to wait for 6 weeks
- ✓ *Children* : can proceed with sx if
- ❖ Normal appetite
- ❖ No fever
- ❖ No tachypnoea
- ❖ No toxic appearance

2.NPO Guidelines (ASA Guidelines)

- ✓ 6 hrs for light meal
- ✓ 2 hrs for clear fluids (coffee & tea)
- ❑ *Due to short t1/2 of clear fluids in stomach , residual gastric volume after 2 hours is less in patients taking small amount of clear fluids than in fasted patients*
- ❑ *Except for patients with delayed gastric emptying , prolonged fasting not justified*

3.Anxiety

- ✓ Non pharmacological preparation
- ❖ Family centered therapy
- ❖ Relaxation therapy
- ✓ Pharmacological preparation
- ❖ BDZ :diazepam,midazolam,lorazepam
- ❖ Alpha 2 agonists :clonidine,dexmeditomidine
- ❖ Beta blockers : atenolol, esmolol

4.PONV

Pharmacologic Techniques

Nonpharmacologic Techniques

PONV (CONTD…)

Pharmacologic Techniques

- ➢ Butyrophenones –droperidol- dexamethasone
- ➢ Phenothiazines -prochlorperazine
- ➢ Antihistamines –dimenhydrinate, hydroxyzine
- ➢ Anticholinergics –atropine, glycopyrrolate, TDS
- ➢ Serotonin Antagonists –ondensetron,palanosetron

- Neurokinin-1 Antagonists- aprepitant

PONV (CONTD…)

Nonpharmacologic Techniques

- ✓ Acupuncture,
- ✓ Acupressure – Korean hand acupressure superior to ondansetron!!!
- ✓ TENS at the P-6 acupoint

5.Post op pain

Opioid (Narcotic) Analgesics

- ✓ Anesthetic sparing-minimize hemodynamic response
- ✓ PONV, urinary retention -delay discharge

Non opioid analgesics

- ❖ Surgical bleeding-gastric mucosal & renal tubal toxicity
- ❖ a "fixed" dosing schedule beginning in the preoperative period and extending into the post discharge period.
- ❖ addition of dexamethasone to a COX-2 inhibitor leads to improvement in postoperative analgesia

6. Aspiration pneumonitis

Routine prophylaxis no longer recommended

Prophylaxis is only for pregnancy , scleroderma, hiatal hernia , nasogastric tube , diabetes , morbid obesity

Rapid acting PPI less effective than ranitidine

- **CHOICE OF ANESTHESIA**
- What are the important considerations in choosing an anesthetic technique?

1. Quality

2. Safety
3. Efficiency
4. Cost of drugs and equipment.

The ideal outpatient anesthetic should have

1. Rapid and smooth onset of action
2. Intraop amnesia and analgesia
3. Provide optimal surgical conditions
4. Adequate muscle relaxation
5. Short recovery period
6. No adverse effects in post discharge period.

Same basic equipment needed as inpatient surgery for drug delivery, resuscitation & monitoring.

Standard intra operative monitoring includes

1. ECG
2. Blood pressure cuff
3. Temperature probe
4. Capnograph
5. Pulse oximeter
6. Neuromuscular monitor if NDMR used.
7. Cerebral monitor may be useful.

Types of anesthesia:

General anesthesia

Regional anesthesia

- *Spinal*
- *Epidural*
- *CSE*
- *IVRA*
- *Peripheral nerve blocks*

Local infiltration techniques

MAC

GENERAL ANESTHESIA

Most widely used technique

Airway Management:

1. *Face mask (with or wthout an airway)*
2. *Endotracheal intubation*
3. *Laryngeal Mask Airway (LMA)*
4. *Other supra glottic airway devices like COPA*

LMA

Introduced in 1983 as an alternative to tracheal intubation & face mask

Fewer desaturation episodes, intra op airway manipulations and fewer difficulties in maintaining a patent airway

No need for direct visualisation or neuro muscular blockers

Spontaneous ventilation possible

Well tolerated with all volatile anesthetics

Incidence of post op sore throat after ambulatory sx

- LMA : 18%
- ETT : 45 %

- FACE MASK : 3 %

Anesthetic drugs for GA

Rapid acting IV inducing agents

Maintenance with volatile anesthetics with or without N2O

TIVA with propofol & remifentanil / alfentanil

BARBITURATES

Thiopental

- 3- 6 mg/ kg
- Rapid onset
- Short acting
- Hang over effect

Methohexital

- Shorter emergence time
- Pain on injection
- Involuntary muscle movement
- Hiccups

BENZODIAZEPINES

Midazolam

- 0.2 – 0.4 mg / kg iv
- Slower onset
- Prolonged recovery
- Antagonism with flumazenil
- Recurrence of sedation with flumazenil

ETOMIDATE

Induction 0.2 – 0.3 mg/ kg

Maintenance 1- 3 mg / mt

Faster recovery than thio

Pain on injection

High incidence of PONV

Myoclonic movts

Transient adreno cortical suppression

KETAMINE

Sedatve analgesic

Prominent psycho mimetic effect

Higher incidence of PONV

Less side effects with S(+) isomer

Decreased emergence reaction with pre med with mdz or concomitant proofol

PROPOFOL

Fastest recovery

Fewer peri op side effects (hiccups, nausea, vomiting)

Pain on injection

Sensation seeking tendency

INHALED ANAESTHETICS

Rapid onset

Rapid recovery

Halothane & isoflurane replaced by sevo & desflurane

Higher incidence of emergence delirium with sevo in peads , Rx : single dose of propofol 1 mg / kg at the end of sx

More frequent PONV in the early recovery period than with propofol

OPIOID ANALGESICS

To suppress autonomic responses to tracheal intubation and noxious stimuli

Reduce dosage requirements for anesthetics, thereby decreasing recovery times

Decrease the pain on injection and involuntary motor activity associated with methohexital,etomidate,propofol.

OPIOIDS contd….

Fentanyl, Alfentanil,Sufentanil,Remifentanil- rapid onset, shorter duration ,faster emergence and recovery.

With morphine and its older congeners,motion induced emesis is a concern in ambulatory setting

Opioid induced rigidity and respiratory depression treated with incremental doses of naloxone and small doses of succinyl choline

MUSCLE RELAXANTS

Superficial OP surgical procedures do not require muscle relaxants

Succinyl choline – commonly used muscle relaxant to facilitate tracheal intubation.

Use of short acting non depolarizing muscle relaxants like mivacurium allows spontaneous reversal of neuromuscular blockade

Availability of sugammadex should allow for rapid reversal even from deep block when a steroid based muscle relaxant is used.

ANTAGONIST [REVERSAL DRUGS]

Useful in facilitating the reversal process

Beware of “rebound” agonist effect when the duration of action of the antagonist [naloxone,flumazenil]is shorter than the agonist.

Intermediate acting neuromuscular drugs reversed with neostigmine or edrophonium in combination with an anticholinergic drug – increased incidence of PONV

PAEDIATRIC CONSIDERATIONS

Preoperative sedation

1. Oral midazolam 0.25 – 0.75mg /kg
2. Rectal etomidate 6mg/kg
3. Rectal ketamine 5 to 10 mg/kg
4. IM ketamine 2 to 4 mg/kg

   > 5mg/kg –delayed recovery

REGIONAL ANESTHESIA

Though regional anesthesia offers advantages over general anesthesia with respect to speed of early recovery,time until discharge from the ambulatory surgery unit was no different for the two groups

Common postoperative side effects of GA like nausea ,vomiting, dizziness, lethargy can be minimized with regional techniques

More effective analgesia in the early postoperative period

With ultrasound techniques improved success rates in obese patients

SPINAL AND EPIDURAL ANAESTHETIC TECHNIQUES

Simplest and most reliable regional anesthetic technique

Residual effect contribute to delayed ambulation, dizziness, urinary retention and impaired balance

As compared with conventional intrathecal doses of local anesthetics,MINI-DOSE Lignocaine [10-30 mg], bupivacaine [3.5-7mg], ropivacaine [5-10 mg]combined with 10-25 mcg fentanyl or 5-10mg sufentanil-faster recovery of sensory and motor function

MINIDOSE spinal technique recovery comparable to MAC

Full motor recovery before discharge

PDPH less with smaller gauge needle

Better to follow patients with telephone calls to ensure that they haven't developed headache.

Headache not responding to bed rest and oral hydration- instruct patients to return to hospital for IV Caffeine therapy or epidural blood patch

CAUDAL BLOCK

Commonly used in children

A supplement to GA

For post op pain

Bupivacaine 0.175 - 0.25 %

Ropivacaine 0.2 %

Safe maximal dose 2.5 mg/ kg

Commom additives : opioids , clonidine , ketamine , neostigmine

Better pain control ,

Intravenous Regional Anesthesia

Short superficial surgical procedures (<60 minutes) limited to a single extremity

Ropivacaine vs. lignocaine

Adjuvants – ketorolac 15 mg, clonidine 1 µg/kg, dexmedetomidine 0.5 µg/kg, gabapentin 1.2 mg, dexamethasone 8 mg.

More cost effective than GA

Peripheral nerve blocks

Shorter discharge time

Improved analgesia

Improved intra op cardio vascular stability

Reduced need for opioid analgesics

More patient satisfaction & mobility

- ❖ Continuous peri neural techniques can be administered at home after discharge

Brachial plexus block (axillary , sub clavicular or inter scalene)

3 – in – 1 block

Superficial & deep cervical plexus blocks

Local infiltration techniques

Simplest & safest approach to reduce post op pain

Must be a component of all ambulatory anesthetic techniques

Adequate analgesia for superficial procedures

Better patient comfort with combined local + iv sedation

MAC

ASA defines:

Instances in which an anesthesiologist has been requested to provide specific anesthesia services to a particular patient undergoing a planned procedure, in connection with which a patient receives local anaesthesia or in some instances no anesthesia at all.

The standard of care for patients receiving MAC should be the same as for patients undergoing general or regional anesthesia and includes preoperative assessment, intraoperative monitoring, and postoperative recovery care

MAC (CONTD…)

Drugs

- ✓ *Barbiturates*
- ✓ *Benzodiazepines*
- ✓ *Ketamine*
- ✓ *Propofol*
- ✓ *Ketorolac*
- ✓ *Short acting opioids*

Delivery systems

- ❖ *Intermittent boluses*

- *Variable rate infusion*
- *Target controlled infusion*
- *Patient controlled sedation*

MAC (CONTD…)

ADVANTAGES OVER GA

- ✓ Less time in operative room
- ✓ Higher degree of" awakeness "on the evening of the day of surgery
- ✓ Decreased postoperative pain and sorethroat
- ✓ Enhanced turnover of cases
- ✓ Improved operating room efficiency

MAC (CONTD…)

Alpha 2 agonists

- Clonidine
- Dexmeditomidine (faster recovery by reversal with specific alpha 2 antagonist *atipamezole*)

ASA Guidelines for office based surgical facilities

Employment of appropriately trained and credentialed anesthesia personnel

Availability of properly maintained anesthesia equipment appropriate to the anesthesia care being provided

As complete documentation of the care provided as that required at other surgical sites

Use of standard monitoring equipment according to the ASA policies and guidelines

Provision of a PACU or recovery area that is staffed by appropriately trained nursing personnel and provision of specific discharge instructions

Availability of emergency equipment (e.g., airway equipment, cardiac resuscitation)

Establishment of a written plan for emergency transport of patients to a site that provides more comprehensive care should an untoward event or complication occur that requires more extensive monitoring or overnight admission of the patient

Maintenance and documentation of a quality assurance program

Establishment of a continuing education program for physicians and other facility personnel

Safety standards that cannot be jeopardized for patient convenience or cost savings

Discharge Criteria

Early recovery is the time interval during which patients emerge from anesthesia, recover control of their protective reflexes, and resume early motor activity –Aldrete score – operating room

Intermediate recovery- recovery room -begin to ambulate, drink fluids, void, and prepare for discharge

Late recovery period starts when the patient is discharged home and continues until complete functional recovery is achieved and the patient is able to resume normal activities of daily living

Modified postanesthesia Discharge Scoring System

Vitals signs

2 : Within 20 % of preoperative value

1 : 20-40 %of the preoperative value

0 : 40 % of the preoperative value

Ambulation

2 :Steady gait / no dizziness

1 : With assistance

0: No ambulation / dizziness

Nausea and vomiting

2 : Minimal

1 : Moderate

0 : Severe

Pain

2 : Minimal

1 : Moderate

0 : Severe

Surgical bleeding

2 : Minimal

1 : Moderate

0 : Severe

Aldrete Score-Post anesthesia recovery score

Activity, respiration,circulation, consciousness, o2 saturation

Fast-track criteria for PACU Bypass Score

Activity

2 : Moves all extrimities on command.

1 : Some weakness in movement of extrimities

0 : Unable to voluntarily move extrimities

Respiration

2 : Able to breathe deeply

1 : Tachypneic with good cough

0 : Dyspneic with poor cough

Hemodynamic stability

2 : BP < 15% variation from baseline MAP value

1 : 15-30 % of baseline MAP

0 : >30 % below the baseline MAP

Consciousness:

2 : Awake and oriented

1 : Arousable with minimal stimulation

0 : Responsive only to tactile stimuli

Oxygen Saturation

2 : SPO2 > 90 % in room air

1 : Supplemental O2 required

0 : SPO2 < 90 % even with supplement O2

Post Op Pain Assessment

2 : None/Mild discomfort

1 : Moderate – severe pain controlled with iv analgesics

0 : Persistent/ severe pain

Post Op Emetic Symptoms

2 : None/ Mild N&V. No active vomiting

1 : Transient vomiting or retching

0 : Persistent moderate to severe nausea/ vomiting

Maximum score required is 12.

No score <1 for any criteria

To summarize

- An *optimal anesthetic technique* would provide

1. Excellent operating conditions
2. Rapid fast track recovery without postoperative side effects.
3. Optimal operating room efficiency
4. An earlier discharge home.

- Select the best anesthetic technique after individually assessing each surgical procedure.
- Consider the impact of the anesthetic on the perioperative period.
- And last but not the least, consider patient satisfaction.

THANK YOU…