ANAESTHESIA FOR AWAKE CRANIOTOMY



DR. BHAGWATI PRASAD DEWANGAN
CONSULTANT ANAESTHESIOLOGIST
FOPJHRC, RAIGARH



AWAKE CRANIOTOMY

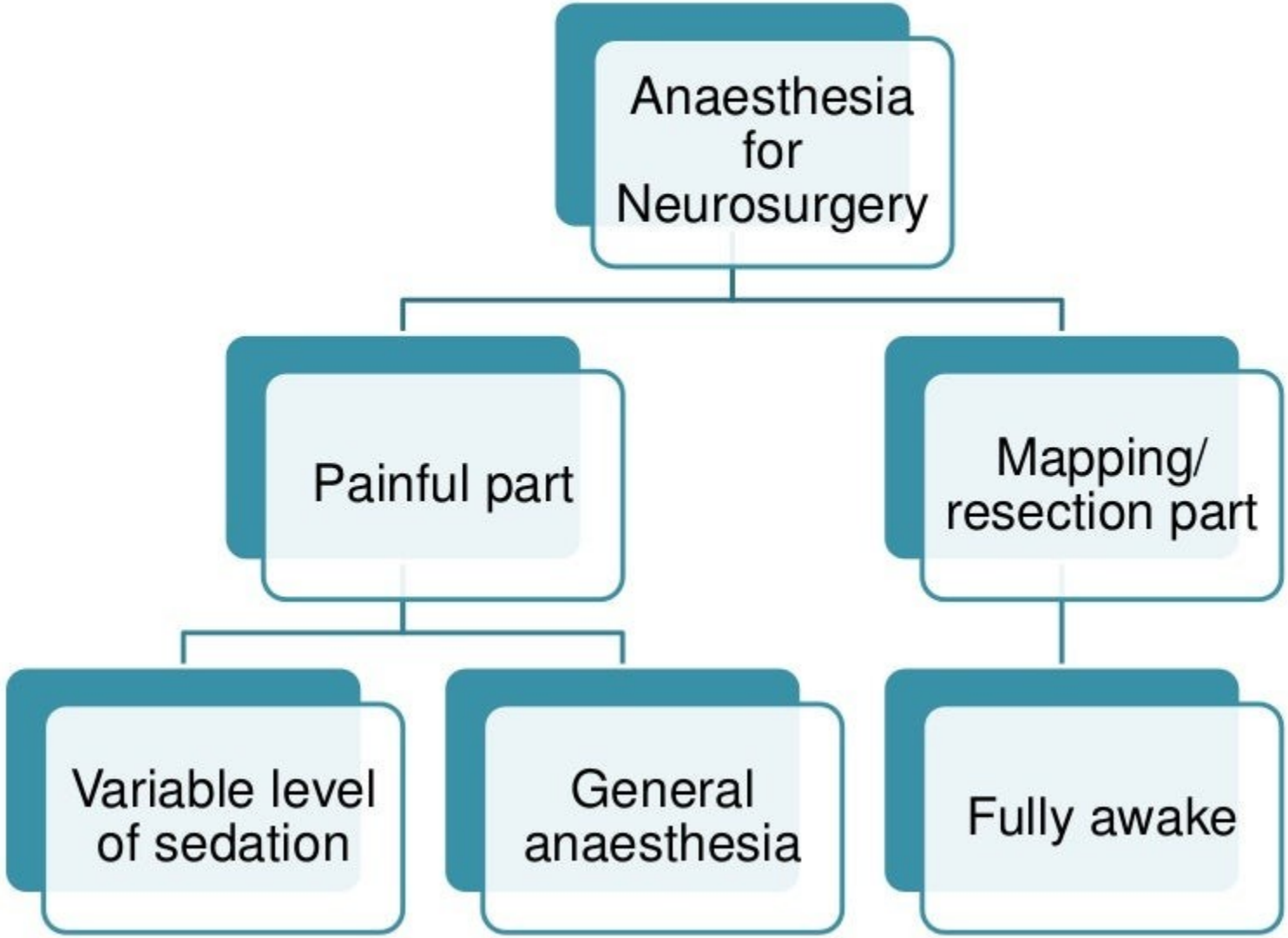
INTRODUCTION

Awake craniotomy – it is an important technique used in neurosurgery where patient remains awake in all or in some part of surgery.

MISNOMER ?? – as patients may not remain awake during complete surgery.



Cont.


Anaesthesia for Neurosurgery
Painful part
Mapping/ resection part
Variable level of sedation
General anaesthesia
Fully awake

INDICATIONS

1. Brain tumor excision from eloquent cortex.
2. Epilepsy surgery
3. Deep brain stimulation surgery
4. Less commonly, mycotic aneurysms and arterio-venous malformations near critical brain areas.

ANAESTHETIC CONTRAINDICATIONS

Absolute

- Patient refusal
- Inability to lay still for any length of time
- Inability to cooperate , eg. confusion

Relative

- Patient cough
- Learning difficulties
- Inability to lay flat
- Patient anxiety
- Language barriers
- OSA
- Young age

PATIENT PREPARATION

1. **Detailed information** – both written and verbal (procedure and anaesthetic risk involved)

2. **Theatre visit by patient** – familiarizing with environment and instrument.

3. **Neuropsychologist reference** – to evaluate the lesion involving speech and languauge centres and their baseline responses to picture cards

THEATRE PREPARATION

1. EQUIPMENT	• PROPERLY CHEQUED
2. OPERATING TABLE	• COMFORTABLE FOR LYING IN ONE POSITION FOR SEVERAL HOURS
3.TEMPERATURE	• COMFORTABLE TO PATIENT

CONT.

4. THEATRE LAYOUT

- Anaesthesiologist should be able to see both monitors and patient's face
- (Diagram given in next slide)

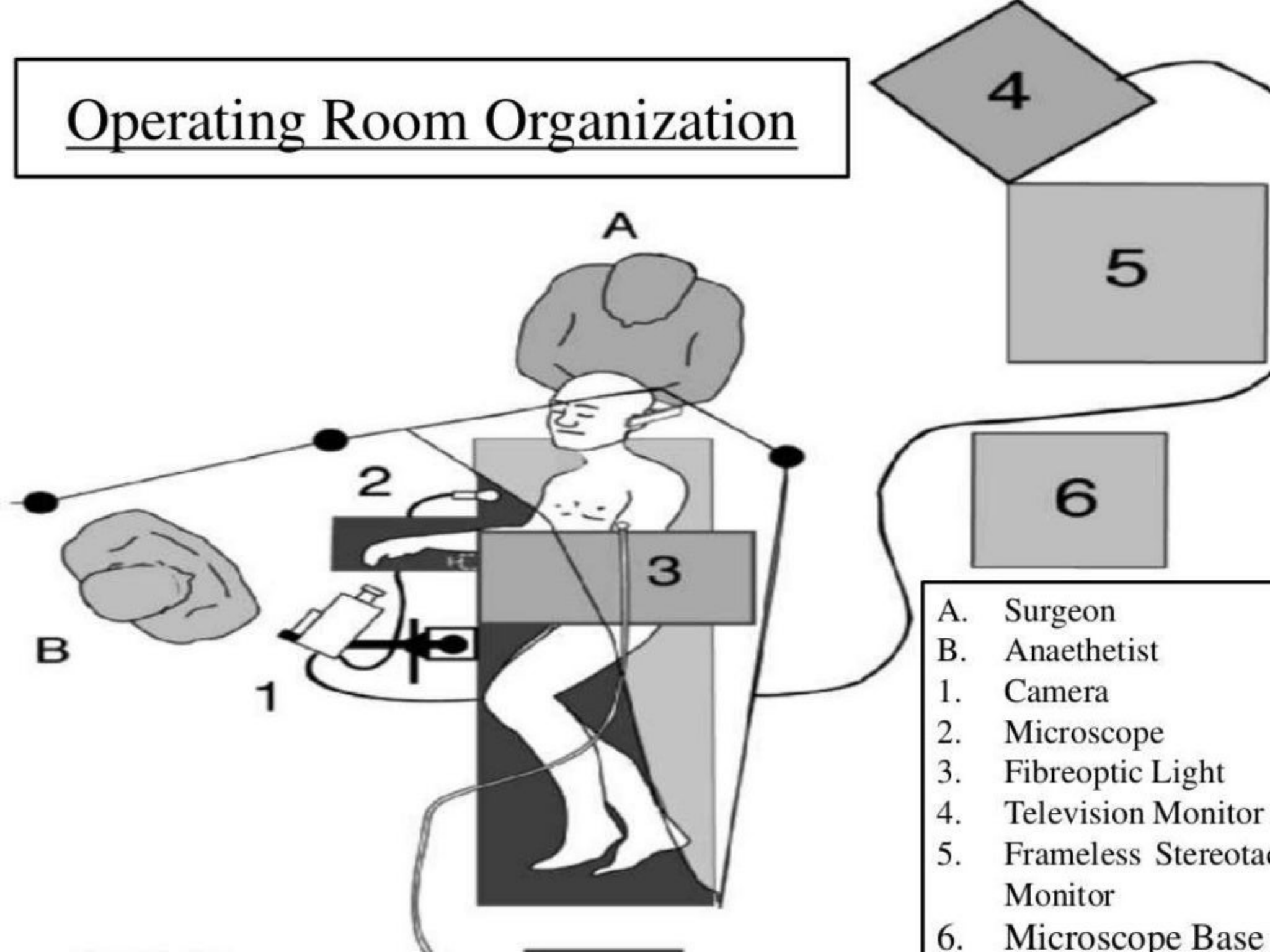
5. STAFF MEMBER

- Minimum
- To allay anxiety of patient

6. STERILE DRAPES

- Must not encroach over patient's face
- May cause patient claustrophobic and may cause difficulty in communication.

Operating Room Organization



A. Surgeon
B. Anaethetist
1. Camera
2. Microscope
3. Fibreoptic Light
4. Television Monitor
5. Frameless Stereotac
   Monitor
6. Microscope Base

GENERAL ANAESTHETIC PRINCIPLES

1. Large bore iv canula/ central line / arterial line.

2. Premedication – not common. Depends on anaesthesiologist and patient's condition

3. Acid reflux prophylaxis

4. Anticonvulsants

Cont.

5. ASA standard monitors – **ECG, NIBP, SPO2**

6. Special monitors – **BIS** (BISPECTRAL INDEX MONITOR) or **Entropy monitor** to monitor intraoperative awareness.

7. **Capnography –** to monitor co2 level in GA or just to simply confirm ventilation in sedated patient.

8. Urinary catherization – may cause discomfort to the patient.

9. If not catheterized , judicious use of fluids must be considered.

Cont.

10. Prophylactic antibiotics

11. Anti- emetics – ondansetron , cyclizine and dexamethasone.

12. Continue usual medications eg. Antihypertensives, steroids, antiepileptics etc

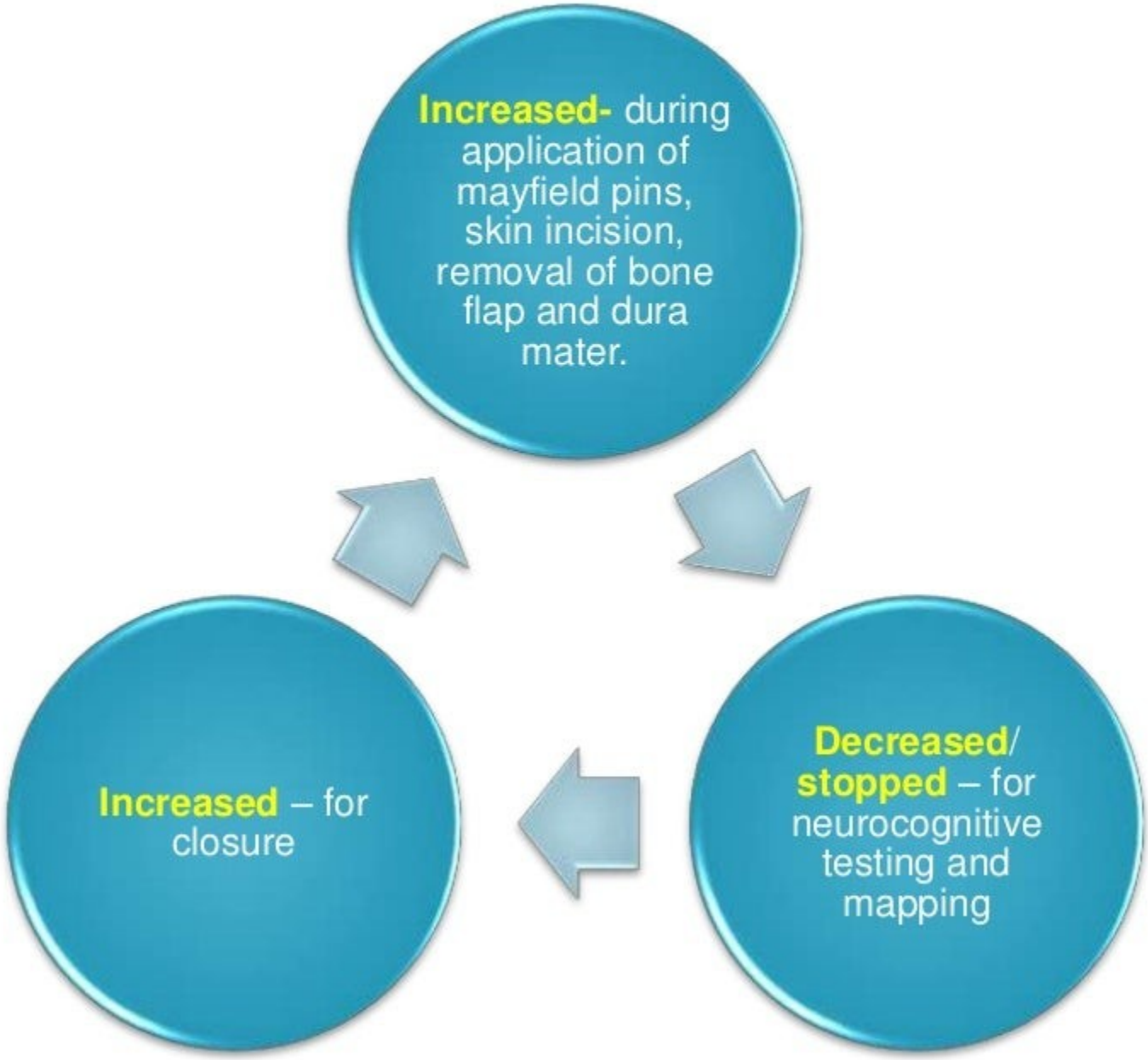
13. Analgesia- paracetamol > NSAIDS

ANAESTHETIC TECHNIQUES



AWAKE THROUGHOUT

Aim- to vary level of sedation according to stage of surgery



RISKS

If **excess sedation-** airway obstruction, hypoxia, hypercapnia and increased intracranial pressure .

If **inadequate sedation-** uncomfortable and anxious



ADVANTAGES

- Avoidance of airway manipulation and its inherent risks
- Decreased nausea and vomiting
- Postoperative early recovery



DRUGS USED

- Propofol and remifentanil target control infusion
- Clonidine infusion
- Dexmedetomidine infusion
- Others- benzodiazepines, droperidol, fentanyl etc

SLEEP –AWAKE – SLEEP TECHNIQUE

This technique involves induction of **general anaesthesia** and control of airway with either **supraglottic airway device** or **intubation**

At the start of surgery – general anaesthesia is given and patient is intubated

When neurocognitive testing and intra-operative mapping is needed, anaesthesia is reduced and airway device is removed.

After the resection is complete – again general anaesthesia can be given and airway device can be reinserted.

ADVANTAGES

1. Control of ventilation and hence control of co2 concentration.

2. Prevent airway obstruction and hypoventilation

3. Facilitates greater depth of anaesthesia.



DRUGS USED

Often same as awake anaesthesia.

1. Propofol + remifentanil followed by inhalational anaesthetic.

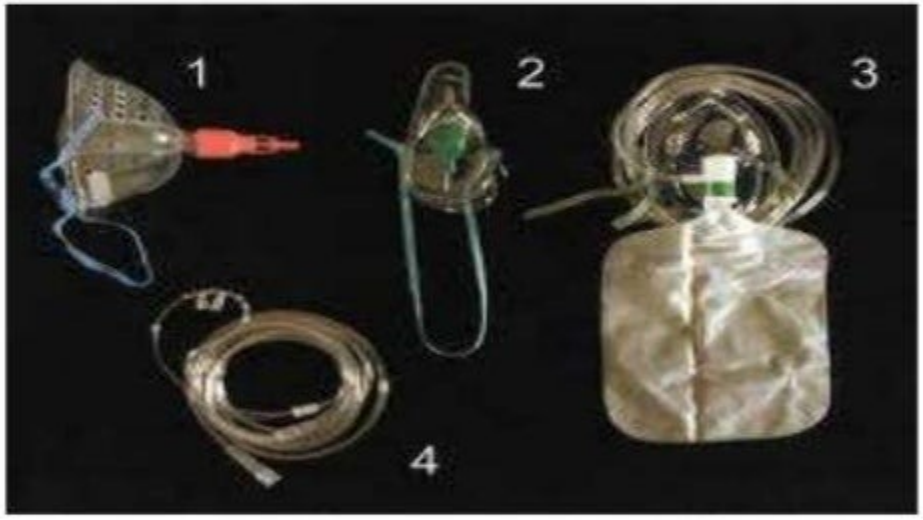
2. Dexmedetomidine infusion

AIRWAY MANAGEMENT

1. Mc- Standard LMA (Laryngeal Mask Airway)
2. Proseal LMA – advantages of gastric port and high pressure seal.
3. Supreme LMA – integral bite block
4. I-GEL – rigidity
5. Intubation with endotracheal tube

Airway Devices

Monitored Anesthesia Care





Asleep-Awake-Asleep







ANALGESIA

Patient tolerance of an awake craniotomy depends on effective analgesia of the surgical field.

Cannot rely purely on sedation and anaesthesia alone.

Scalp block – provides haemodynamic stability and decreases the stress response to painful stimuli.

Cont.

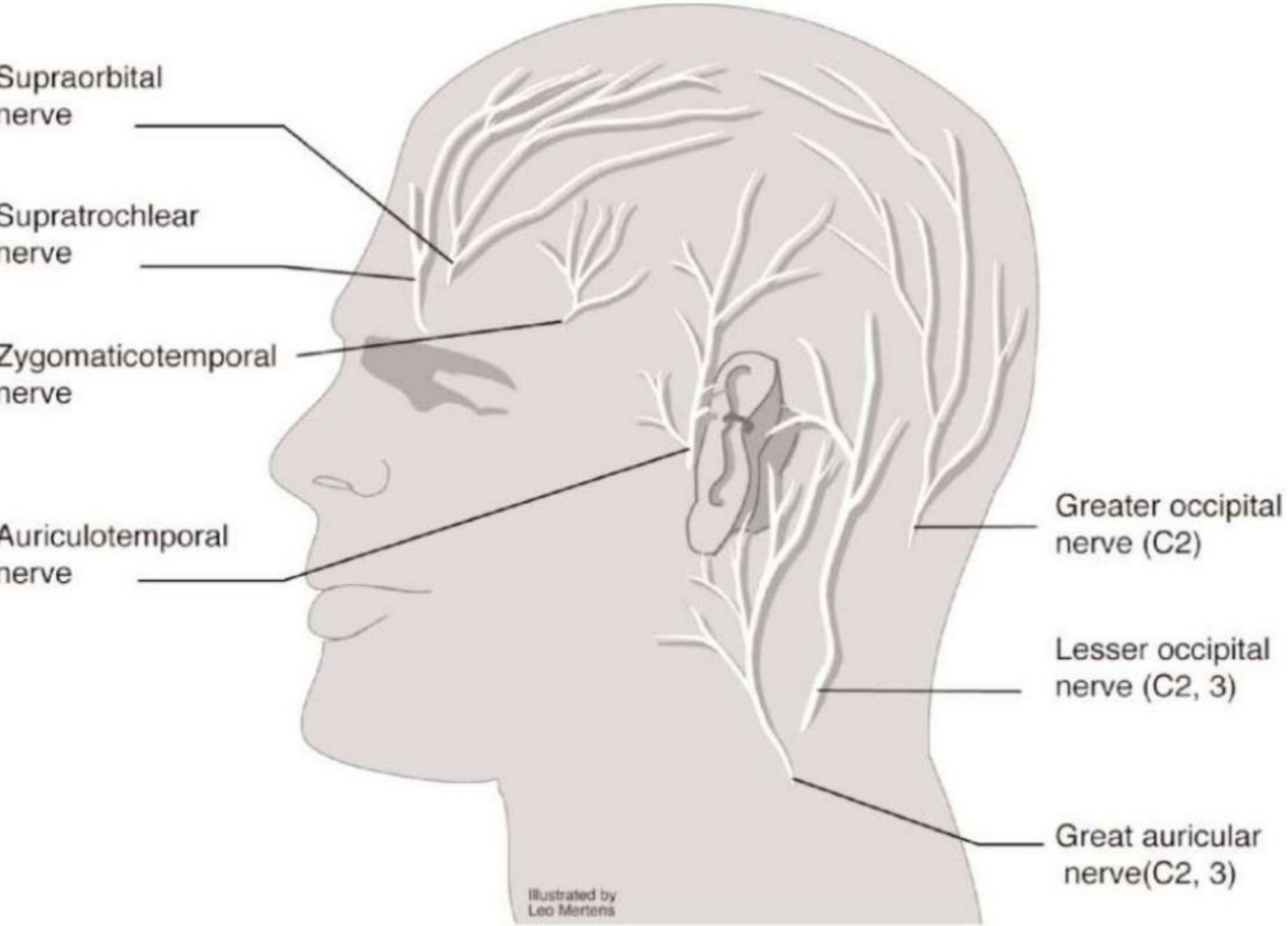
Scalp block – infiltrating local anaesthetic to 7 nerves on either side. This is an anatomical block.

Local infiltration – to the pin sites and around dura mater

Ring block – requires large volume of local anaesthetic

1. increased risk of toxicity
2. doesnot provide anaesthesia deep to temporalis fascia




Supraorbital nerve
Supratrochlear nerve
Zygomaticotemporal nerve
Auriculotemporal nerve
Greater occipital nerve (C2)
Lesser occipital nerve (C2, 3)
Great auricular nerve(C2, 3)
Illustrated by Leo Mertens

COMPLICATIONS

Anaesthesia Related

- Airway Obstruction
- Hypoxia
- Hypercapnea
- Hypo/Hypertension
- Bradycardia/ Tachycardia
- Pulmonary Aspiration
- Nausea/Vomiting
- Local Anaesthesia Toxicity
- Convertion To GA

Surgery Related

- Focal/ Generalized Seizure
- Bleeding
- Brain Swelling
- Air Embolism
- Aphasia
- Convertion To GA

POSTOPERATIVE

1. Shifted to **neurosurgical icu** or **high dependency unit**

2. Close neurological monitoring – postoperative haematomas during first 6 hr

3. May require urgent repeat craniotomy

4. Most patients are in hospital for 1-2 days after surgery

5. Postop pain relief – after scalp block has worn off , may use paracetamol, codeine or other opioids.



CONCLUSION

There is increasing evidence that an awake craniotomy would be an appropriate choice for removal of all supratentorial tumors no-selectively.

It can maximize lesion resection, which can be linked to
1. improved survival rates and
2. low complication rates.

-New technologies are being developed to allow brain mapping
-New drugs are being developed for better anaesthesia which will play a significant role in near future.

Future of Awake Craniotomy



NDC 63323-285-10 278510

Naropin®

(ropivacaine HCl) Injection

0.2% (2 mg/mL)

For Infiltration, Nerve Block, and Epidural Administration Only.
Not for Intravenous Administration.

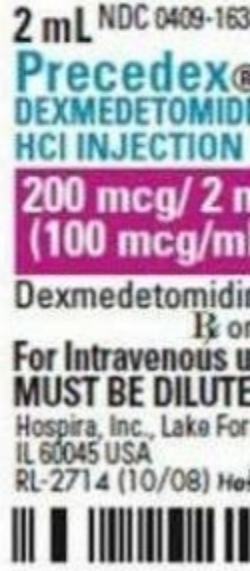
















THANK YOU