

Anaesthesia for the Obese Parturient Plan A... Plan B... Plan C !

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Head of the Dept.

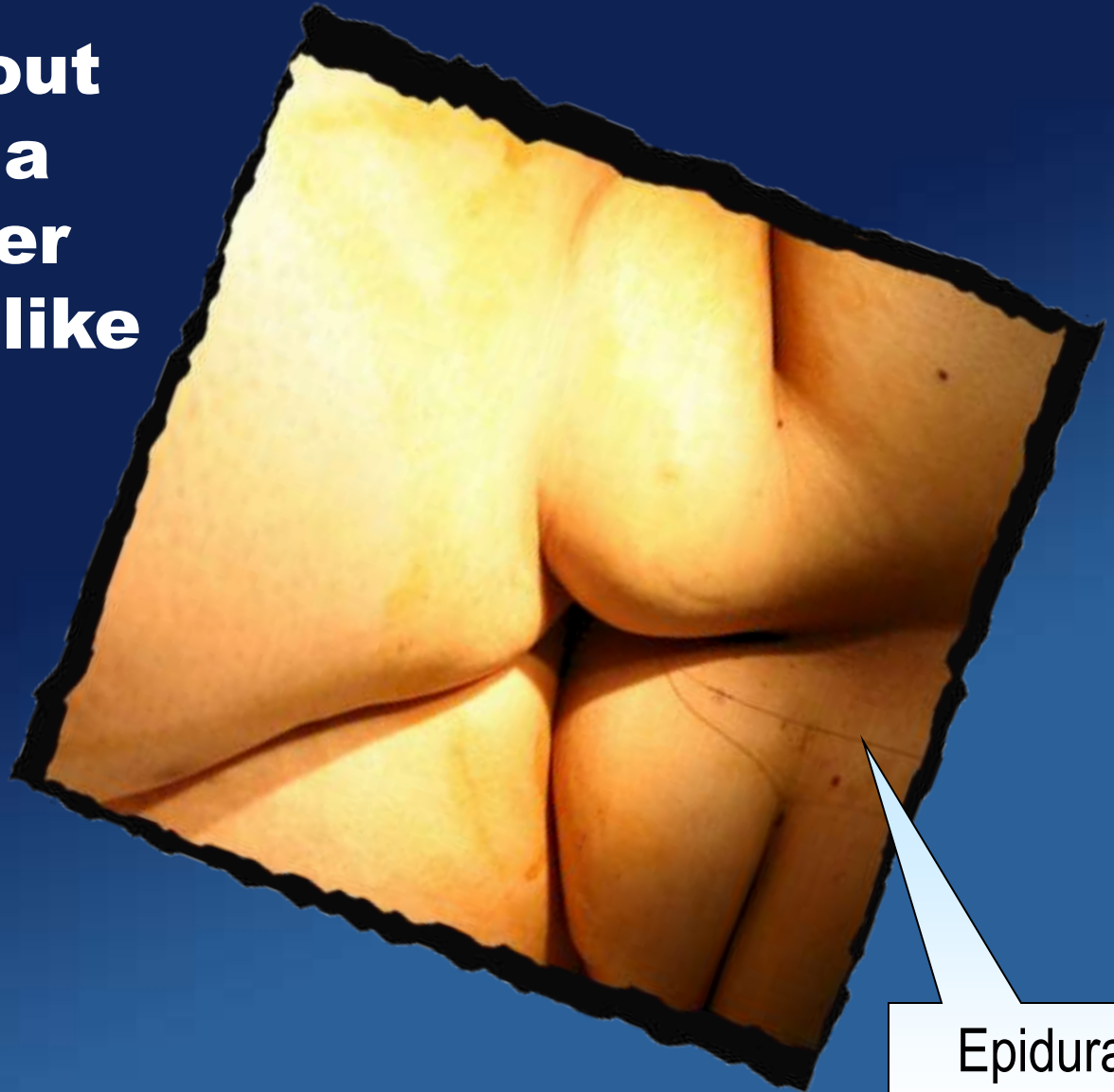
Anaesthesia, Pain & Critical Care



PRERNA ANAESTHESIA AND
CRITICAL CARE SERVICES

FERNANDEZ
HOSPITAL

**We talk about
Anesthesia
for a Mother
with a back like
this**



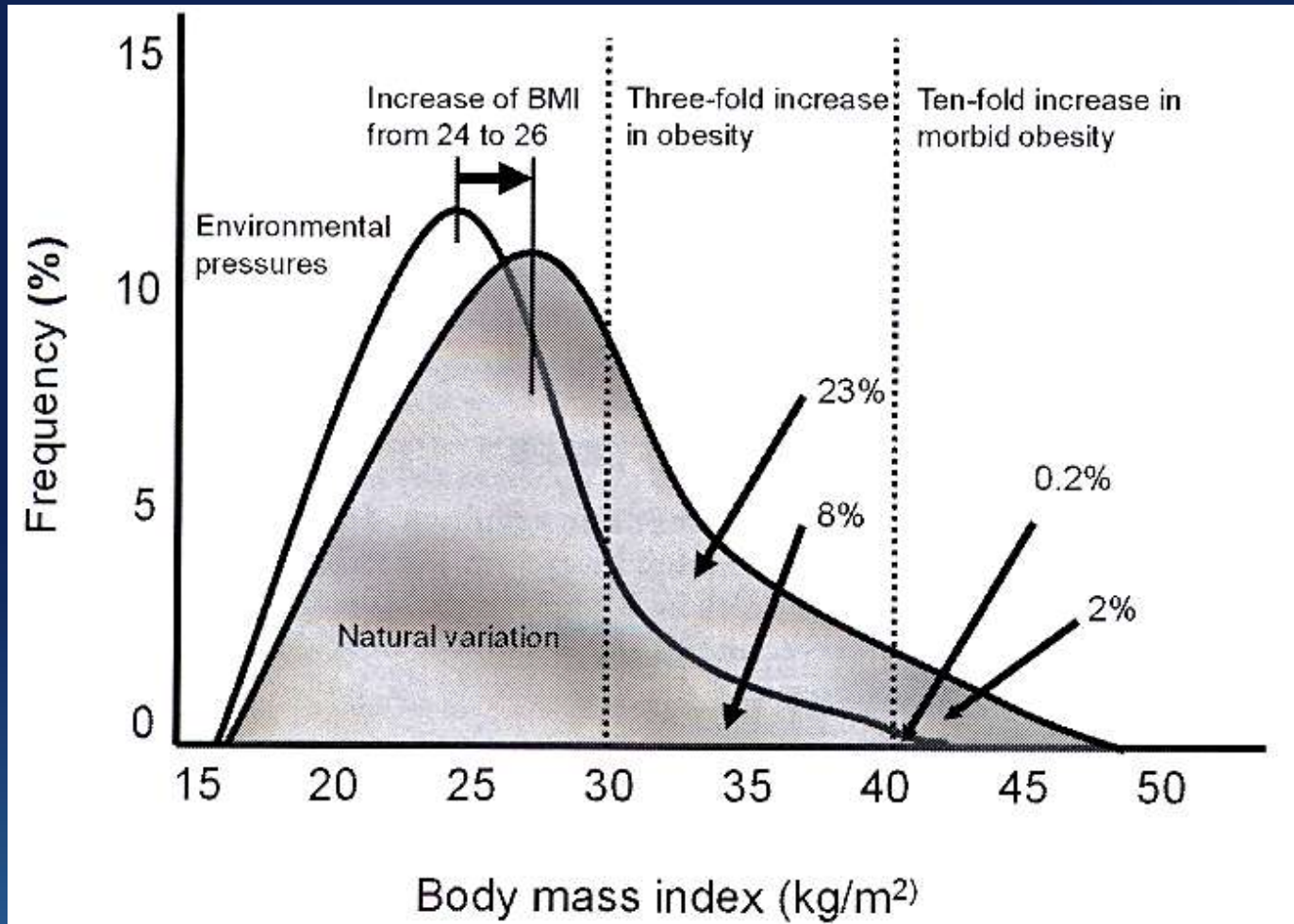
Epidural
Catheter

Defining Obesity

- Obesity : $> 20\%$ ideal body weight
- Morbid Obesity : Ideal weight $\times 2$
- Broca Index
- BMI > 30 : Obesity, > 40 : Morbid Obesity

Dewan DM, The obese parturient. Obstetric Anesthesia: The Complicated Patient, 2nd ed. Philadelphia, FA Davis, 1988:468.

Extent of the Problem



35 years, Primigravida, 167cm, 138 kg, BMI 54

- 33 weeks, Shopping Mall
- Sudden headache and blindness
- Rushed to Hospital
- BP : 200 / 130 mm, Vomits
- Imminent eclampsia



An Epidemic...

Alarming Consequences !

- Obesity is present in 35% of maternal deaths
 - United Kingdom, CEMACH 2000-2002
- Doubling in the prevalence of obesity
 - Maternity hospitals in the UK
- All maternal mortalities, 2003-2005
 - have obesity as a contributing factors

Maternal Deaths and Obesity

- Obesity risk factor in 12 of 15 anesthesia related deaths in Michigan between 1972 to 1984
- Failed intubation leading cause of death
 - Pulmonary embolisation

Saving Mother's Lives: Reviewing Maternal Deaths - 2003-2005

- Post-operative Respiratory Failure in a Obese Asthmatic parturient
- Drug Error
- Anatomical Compromise /
Management of pregnant Obese patient

Fernandez Hospital, Hyderabad

One Year Statistics

The total births in 2007
4524

Number of subjects for
analysis = **3270**

Exclusions :
late booking, referral, unbooked, multifetal = 1013
Incomplete data = 228

Fernandez Hospital

Year 2007, n = 3270

**53% of our mothers were
either overweight
or obese**

19% had BMI > 30



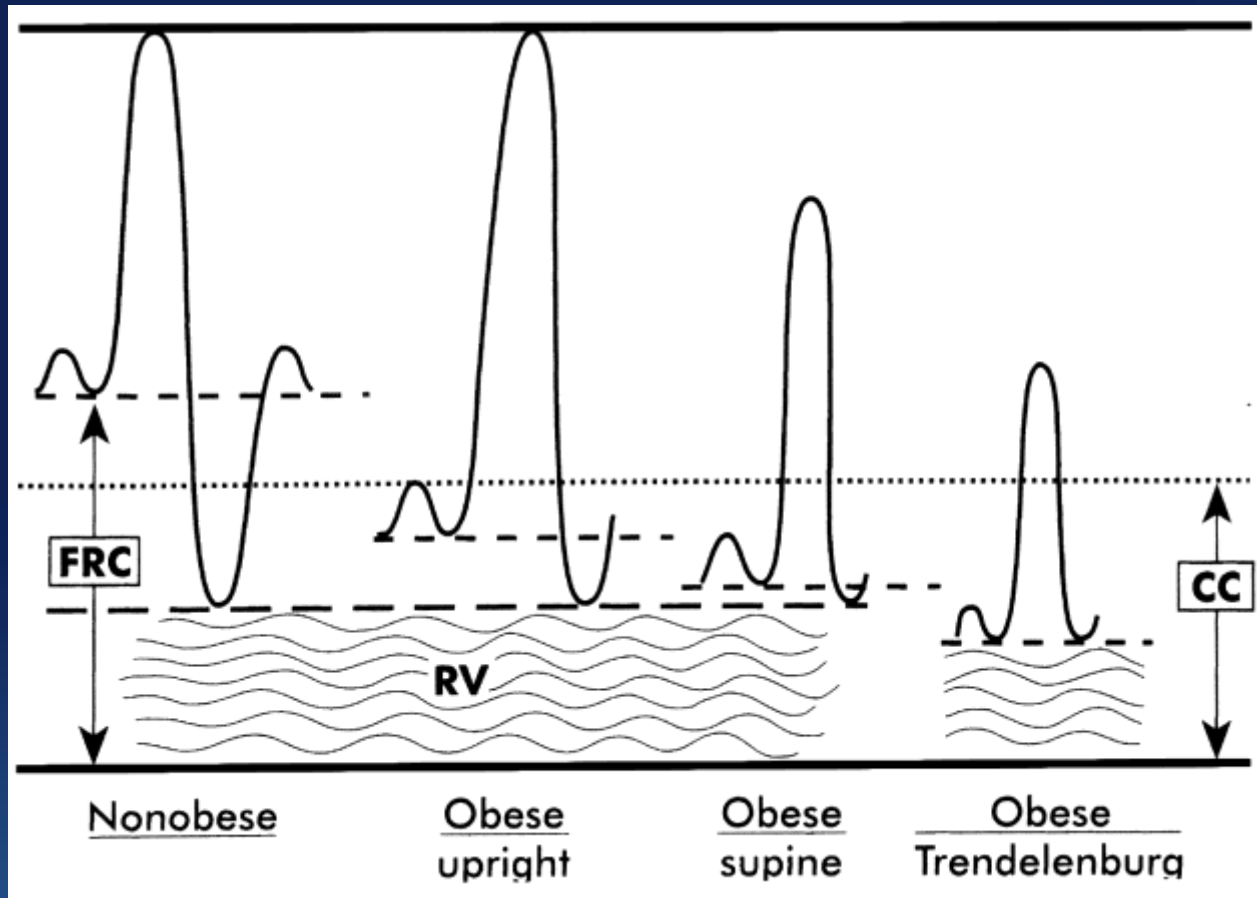
Patho-physiological Changes



Pulmonary Changes

- Increased
 - O_2 consumption
 - CO_2 production
 - Minute Ventilation
- Reduced
 - Chest wall compliance
 - Functional Residual Capacity
 - Residual Volume

Position and Lung Volume



Anesthesia and the Obese Patient. Philadelphia, FA Davis 1082:26

Pickwickian Syndrome

OHS

- 8% of obese patients
- Alveolar hypoventilation, somnolence
- Hypoxemia, hypercarbia
- Polycythemia, pulmonary HTN
- Right ventricular failure

Patho-physiological Changes



Cardiovascular Changes

- Blood flow - adipose tissue
 - 2 -3 ml/min/100 g
- Morbid obesity
 - 50% mild HTN
 - 5-10% severe HTN
- Doubling of incidence of CAD

Patho-physiological Changes



Cardiovascular Changes

- Increased
 - Afterload and preload
 - Left ventricular end diastolic
- LV hypertrophy
- Pulmonary hypertension
- Airway obstruction
- Hypoxemia - \uparrow PAP or PAOP

Patho-physiological Changes

Endocrine and Metabolic Changes

- Adult onset diabetes
- Gestational Diabetes
- Raised Triglycerides / Ischemic Heart Disease

Patho-physiological Changes

Gastrointestinal Changes

- Increased
 - Intra-gastric pressures
 - Intra-abdominal pressures
 - Hiatus Hernia
- Decreased
 - Esophageal sphincter tone
- Strong correlation between BMI and reflux symptoms
 - Odds ratio 6.3 for women with BMI > 35

Patho-physiological Changes

- 80% : gastric pH < 2.5
- 86% : gastric volume > 25 mL
- 75% : risk of aspiration pneumonitis

Combination of pregnancy and obesity increases the risk of aspiration pneumonitis

Obesity and the Airway



- Chin to chest distance
- Cervical spine
- Atlanto-occipital joint
- Displacement of larynx
- Adiposity

Effect of Obesity on Outcomes of Pregnancy

**Anaesthesia for the
obese parturient**

September 2008

Comparison of maternal, peripartum and neonatal characteristics and outcomes according to BMI category (n=11252)*

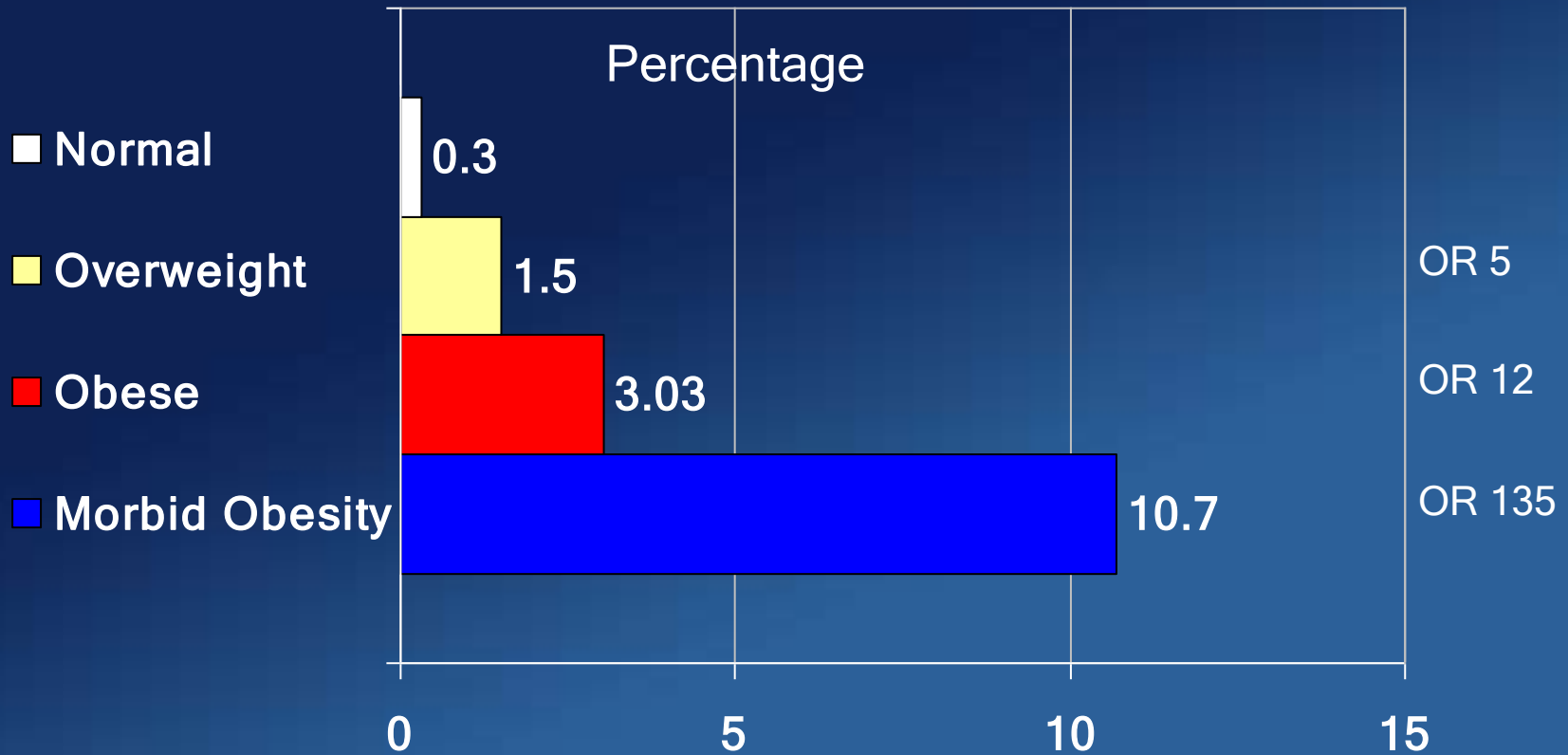
Maternal outcomes	BMI category (kg/m²)				<i>P</i>
	Normal (20.01-25) (n=6443)	Overweight (25.01-30) (n=2882)	Obese (30.01-40) (n=1679)	Morbidly obese (>40) (n=248)	
Hypertensive disorders of pregnancy (%)	2.4	5.6	9.1	14.5	<0.001
Gestational diabetes (%)	1.2	2.0	3.3	8.9	<0.001
Type 2 diabetes mellitus (%)	0	0.6	1.4	2.8	<0.001
Chronic hypertension (%)	0.5	1.2	3.0	6.9	<0.001

Callaway Lk, et al. The prevalence and impact of overweight and obesity in an Australian obstetric population. MJA 2006;184(2):56-59.

Comparison of maternal, peripartum and neonatal characteristics and outcomes according to BMI category (n=11252)*

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Maternal outcomes					
Peripartum outcomes					
Spontaneous vaginal delivery (%)	68.6	63.7	59.0	53.2	<0.001
Assisted vaginal delivery (%)	9.1	6.8	5.8	4.0	<0.001
Caesarean section (%)	22.3	29.5	35.2	42.7	<0.001

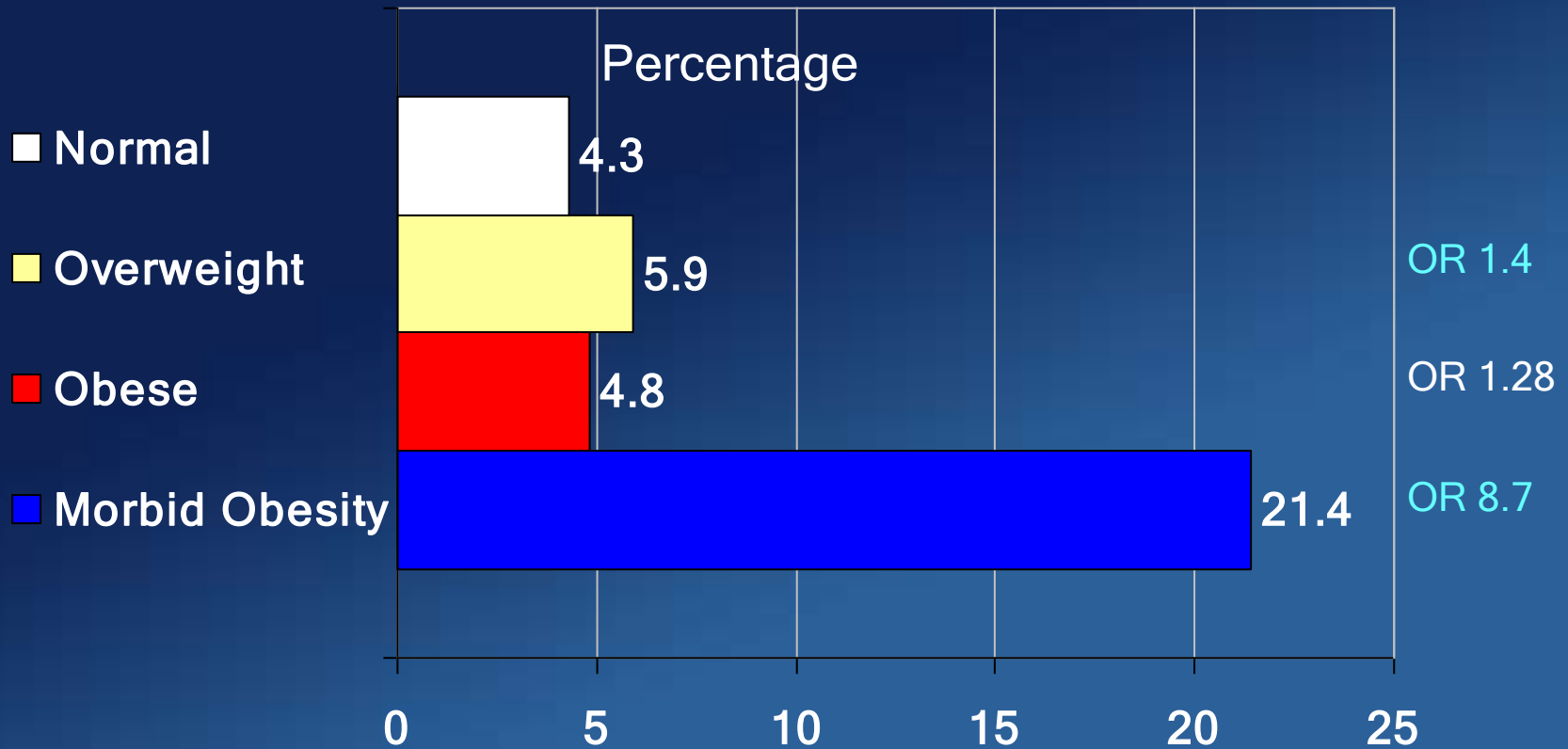
Callaway Lk, et al. The prevalence and impact of overweight and obesity in an Australian obstetric population. MJA 2006;184(2):56-59.



The trend of odds was also highly significant, p value 0.0000

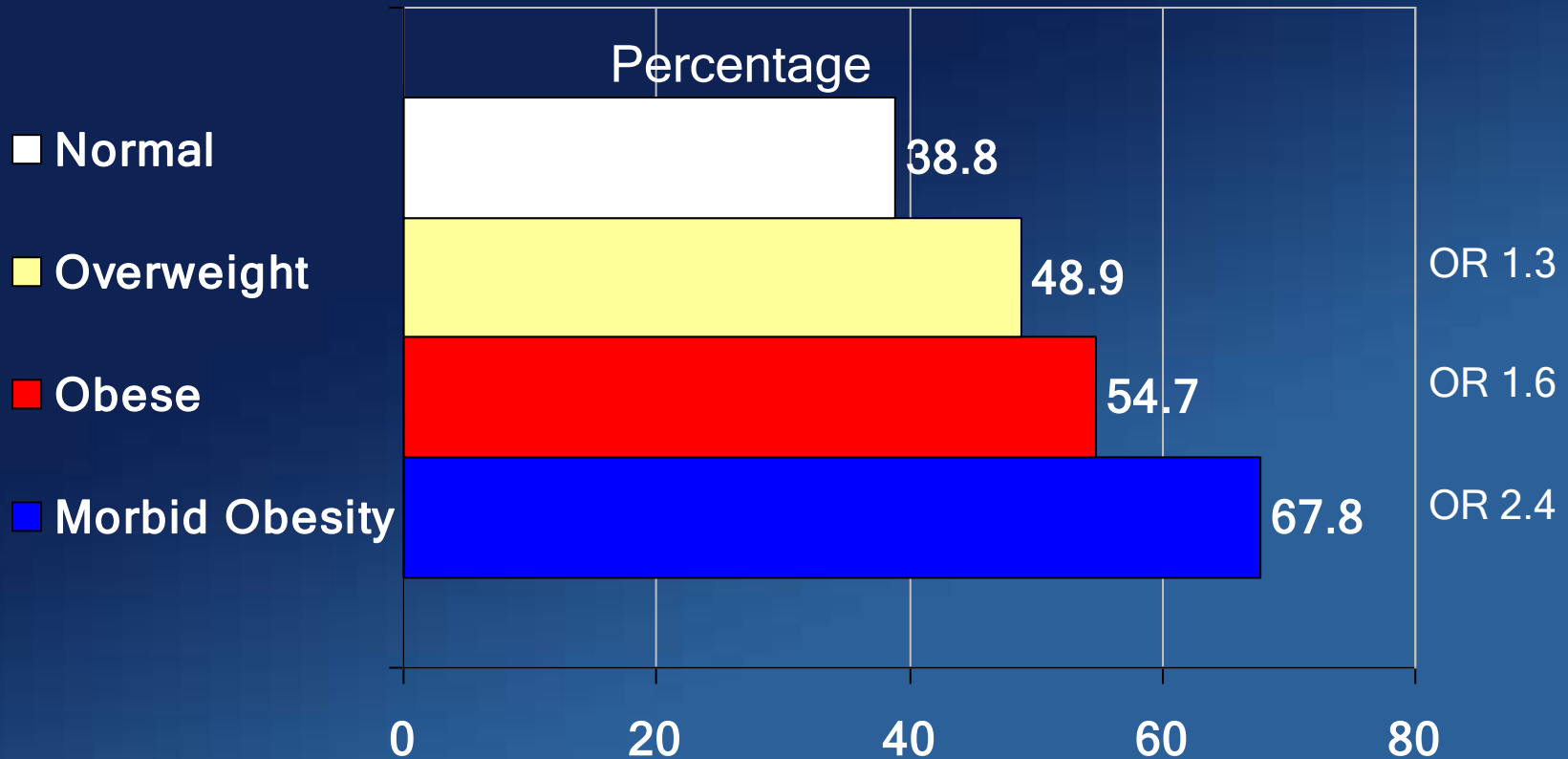
Medical Disorders

Severe Pre eclampsia



The trend of odds was also significant, p value 0.03

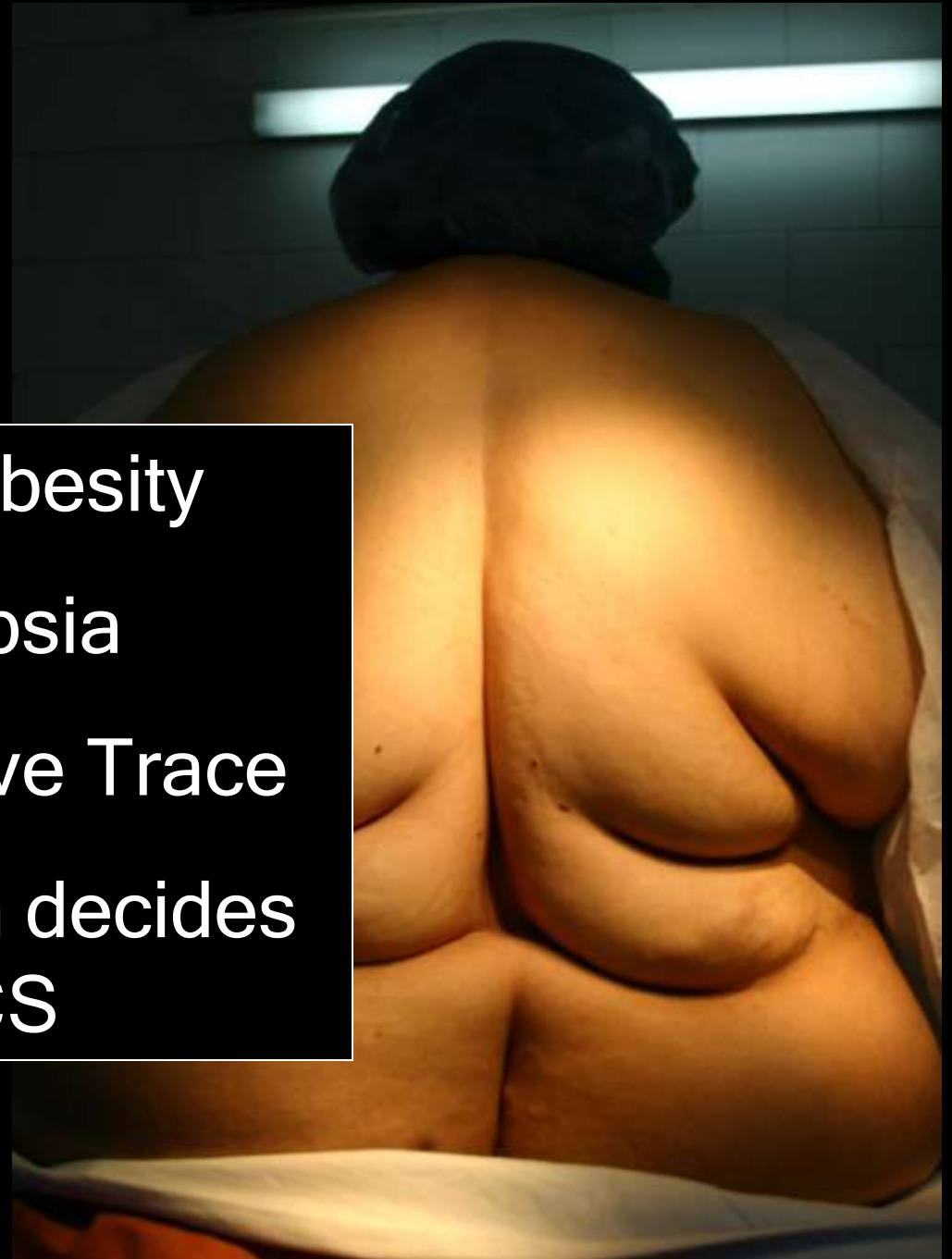
Caesarean Section Rate



The trend of odds was also significant, p value, chi2

Back to Our Mother

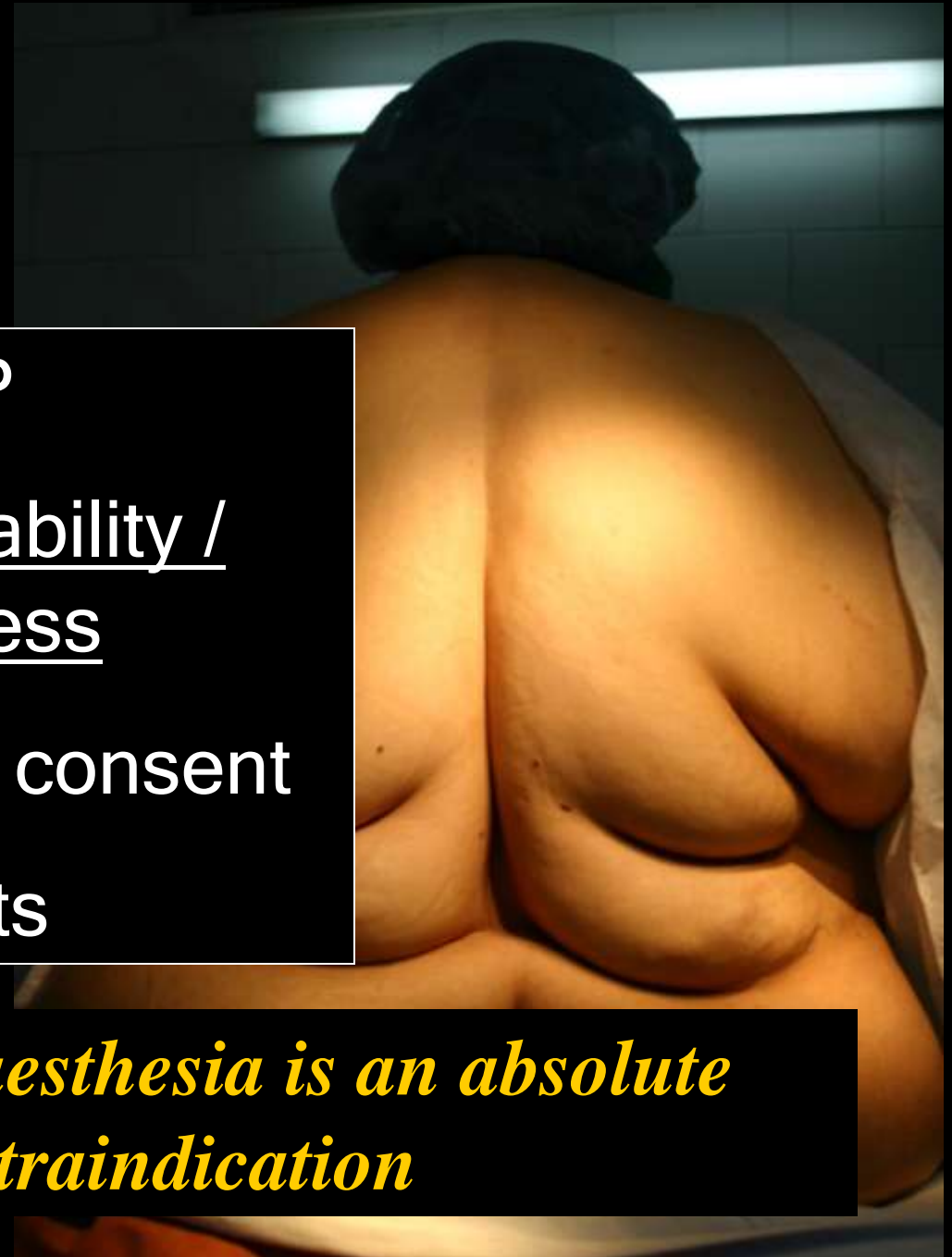
- Morbid Obesity
 - Eclampsia
- Non Reactive Trace
- Obstetrician decides for a CS



Back to Our Mother

- Class I HELLP
- Post-ictal irritability / Restlessness
- Stabilization / consent
- Blood products

Regional Anaesthesia is an absolute contraindication



PLAN-A

- **General Anaesthesia**
 - Plan multimodal acid aspiration prophylaxis
 - Awake topical laryngoscopy
 - FOB / ENT backup
 - Crico-thyrotomy standby

Obesity - Difficult Airway - Pregnancy

- DMV
- Difficult Laryngoscopy and Intubation
- Ramped position / Troop Position
- Preoxygenation: 8 FVC Breaths / 3' min
- ? CPAP / BiPAP during Pre-oxygenation
- ? RSI
- ? Role of Sellick's Manoeuvre
- Extubation / ? NIV: Post-extubation

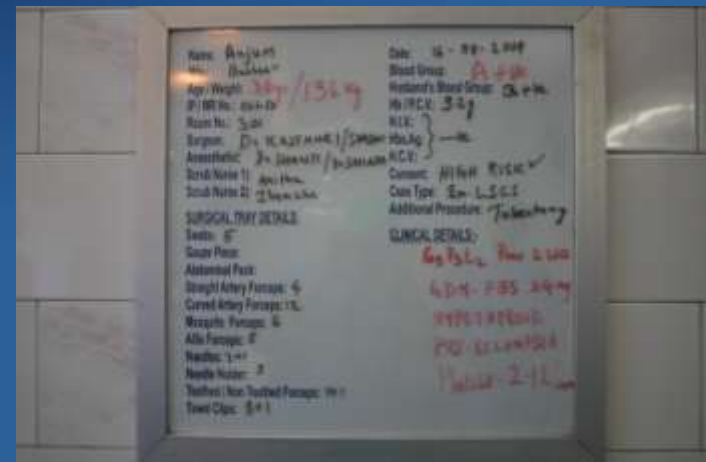
Obesity - Difficult Airway - Pregnancy

- Anticipation of difficult intubation
- Preparation
- Plan of Action

Preparation / Skilled Assistance



Preparation / Skilled Assistance



Preparation / Skilled Assistance



PLAN-A

- Monitoring including Et CO₂
- Pre oxygenation
- Propofol - Suxa (Rule out hyperkalemia)
- ? Sellick's maneuver / ? RSI
- Gentle IPPV / OPA

Positioning for Airway

- Raised head, neck and shoulders
- Straight line - sternal notch & external auditory meatus
- Reverse trendelenberg position

Positioning the patient



PLAN-A

- Cormack - Lehane Grade IV to Grade III
- BURP Maneuver
- Intubation aided with Bougie
- **6.5 ET tube**

PLAN-A

**Elective
Post Operative
Ventilation**

**What if you had
encountered situation of
'Cant Ventilate Cant Intubate'
(CVCI)**



PLAN-B

- Ab initio Awake FOB
- Elective tracheostomy
- If FOB not available
- Tracheostomy not possible

....Plan C

PLAN-C

- Local infiltration anaesthesia
- Rectus sheath block
- Vertical incision
- Infiltrate as you go

*YOU Prepare the solution,
0.75 – 1 % Xylocaine with
adrenaline*

33 years, Primigravida, 114 kg, BMI 47

- Severe Pre eclampsia, Hypothyroid, OSA
- 2 previous CS
- SpO₂ – 94% on room air
- 2- D Echo – reduced diastolic compliance
- Admitted at 35 weeks, accelerated HTN

PAC

- **Anasarca**
- **MP Grade IV**
- **Hoarseness acute onset**
- **TSH : normal**
- **ENT Consult; IDL**

IDL

- **Glottic opening : 4 mm**
- **Supra - glottic edema**
- **Nebulization**
- **Decided for LSCS - NCEPOD Class II**

Pre Eclampsia Profile

PT	20 / 14 sec
aPTT	40 / 28 sec
Platelets	79,000
Fibrinogen	246 mg

Pre Operative Counseling

Pro - con : GA Vs. Regional

- General anaesthesia
 - Tracheostomy : IPPV
 - Elective ventilation
- Regional anaesthesia
 - CSEA / CSA / Spinal / CLE
 - Hematoma incidence : 1 / 20,000

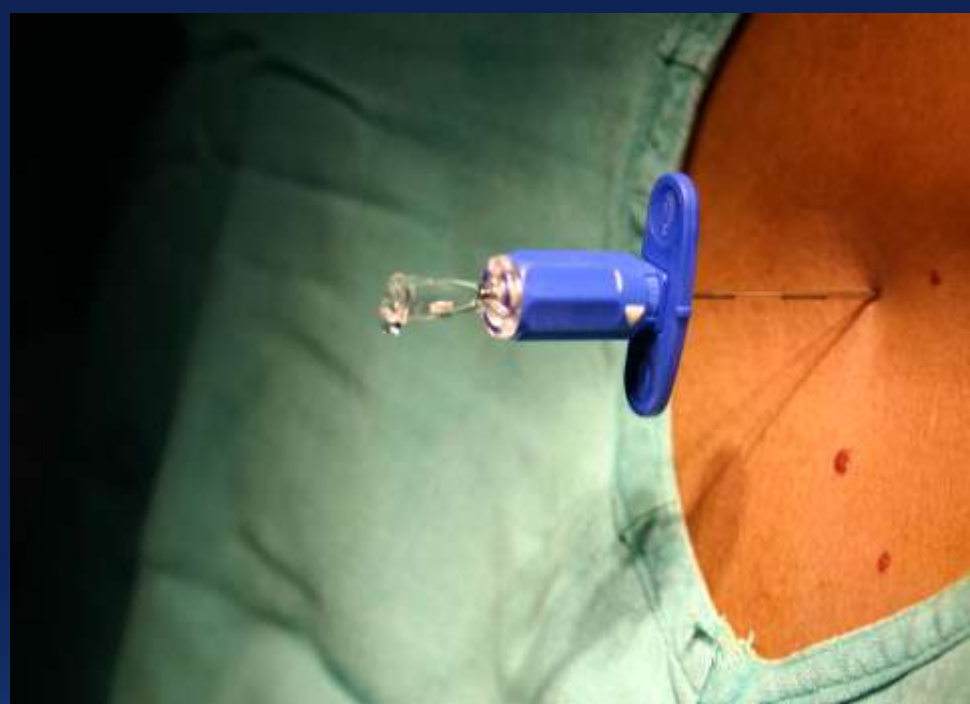
...Decided for Regional

PLAN-A

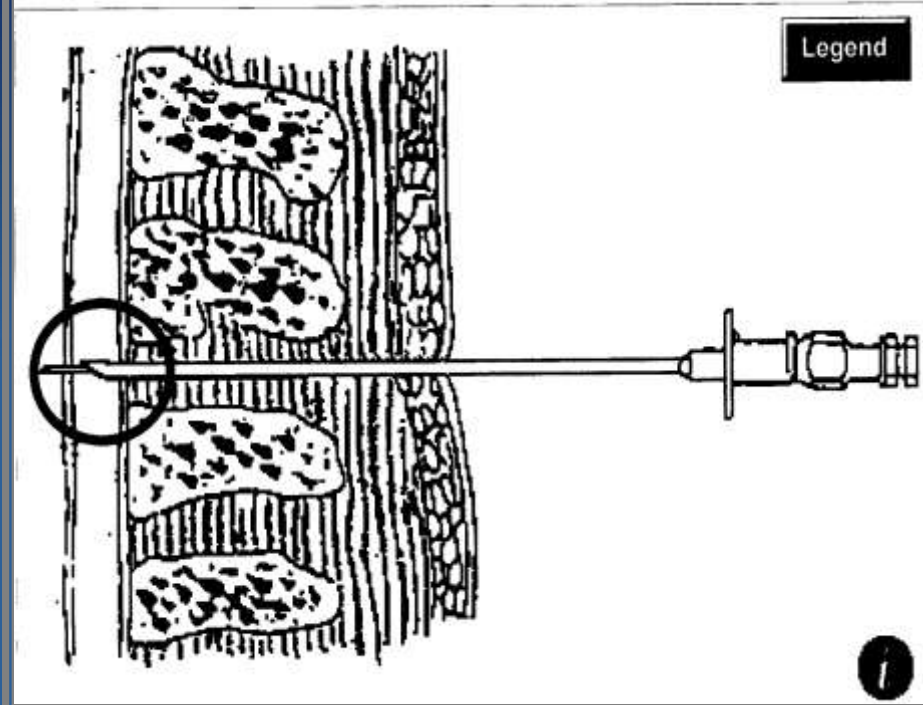
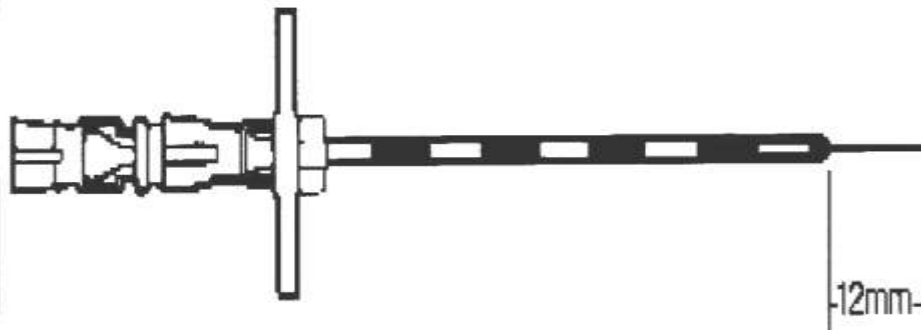
- Combined Spinal Epidural Anaesthesia

WHY ?

Combined spinal-epidural technique: sequential



A combined spinal-epidural needle. (Becton Dickinson 'Durasafe'). The spinal needle is



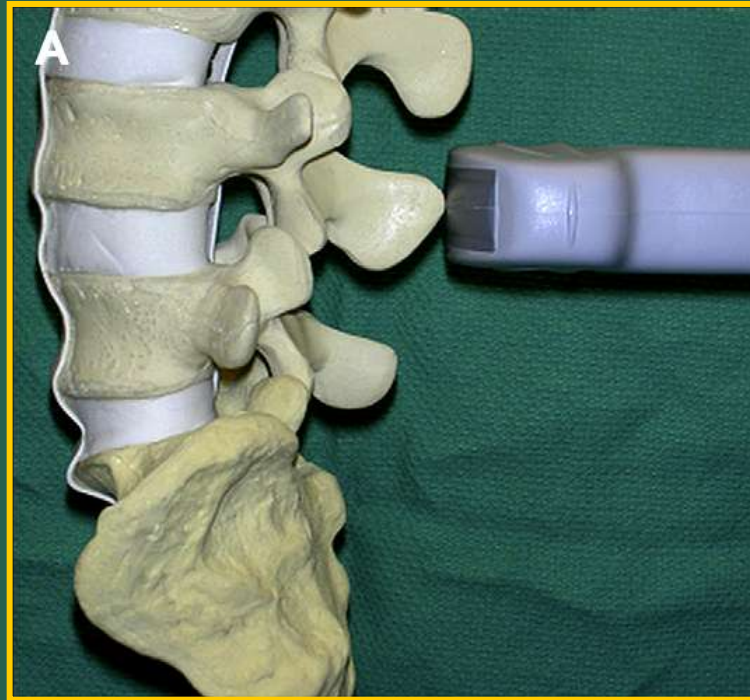
Advantages of CSE

- Rapid onset of analgesia
- Aids epidural localization in difficult backs
- Reliable, fewer failed, or patchy blocks

Obesity - Neuraxial Techniques - Pregnancy

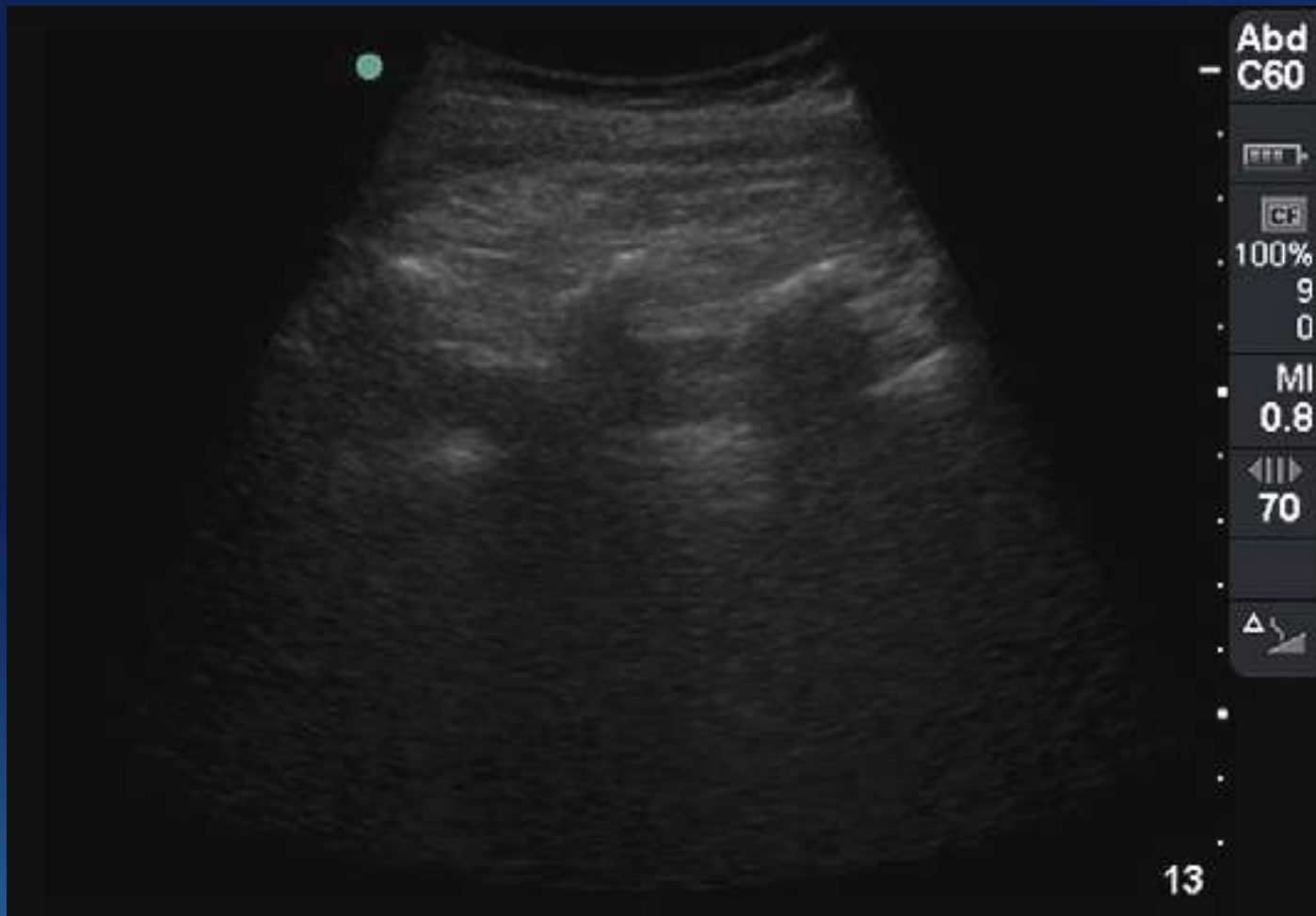
- Need for a NEAR PERFECT CNB
- Fixation Error & Displacement Factor
 - Epidurals in Obese parturients
- Reduction in dose of Epidural LA and Spinal anaesthetics in Obese
- Usage of US imaging techniques

Predicts a Difficult Spine Score





Longitudinal para-median view of the lumbar spine with the typical saw sign



Epidural catheter fixation / prevention of catheter migration



PLAN-B

- Continuous spinal anaesthesia
- Intentional Wet tap - Intrathecal epidural catheter

Inadequate block...Plan C

PLAN-C

- Spinal anaesthesia
- Titrate the dose
- Prevent - Minimize
hypotension - Prophylactic
vaso-pressors

SOS - Infiltration

**36 years, G₄ P₂ L₂
Previous CS, BMI 48**

- **Deaf, mute and blind**
- **Lawrence Moon Biedl Syndrome**
- **GDM on insulin**
- **Elective LSCS**
- **Grade IV airway**

PLAN-A

- **Combined Spinal
Epidural Anaesthesia**

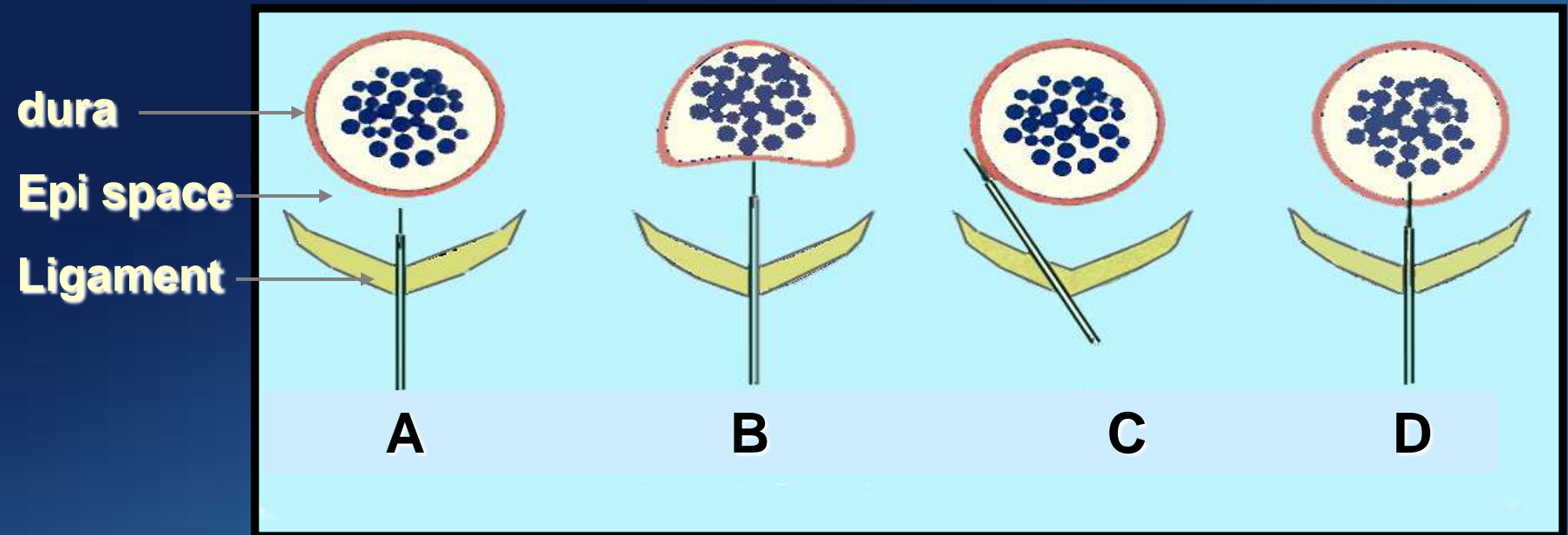
What if CSEA fails ...

CSEA Technique

A + D 15mm projection beyond Tuohy tip gives >95% of dural puncture

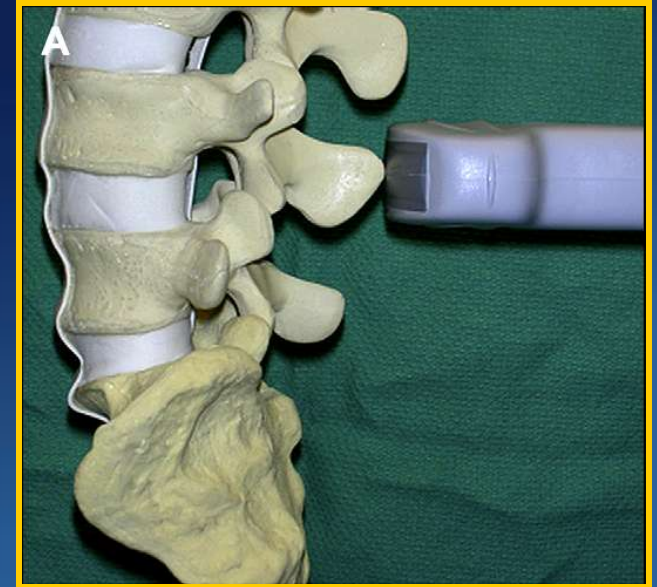
B + D CSE has *Objective* sign of 'Dural Click'

C + D Mid-line approach essential



PLAN-B

- Change of hands
- Change of position
- Sub arachnoid block



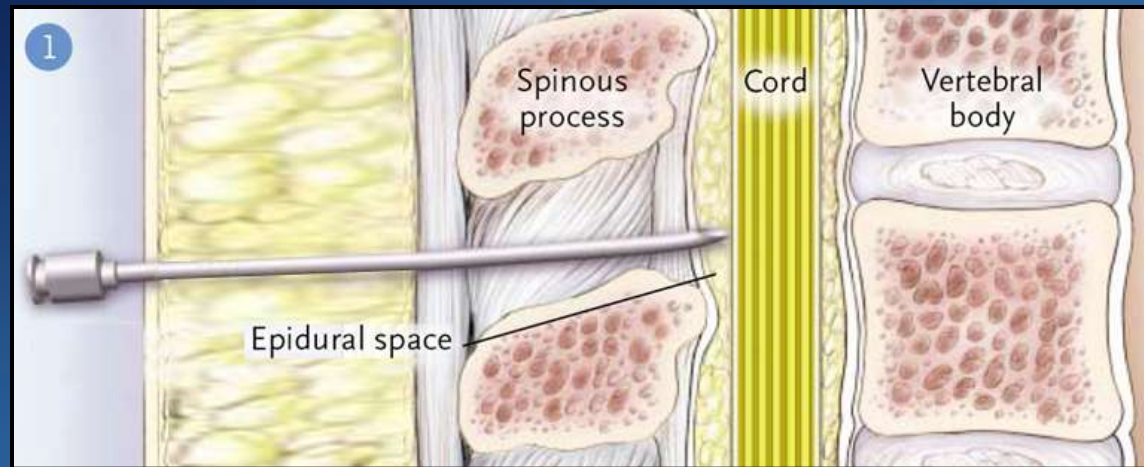
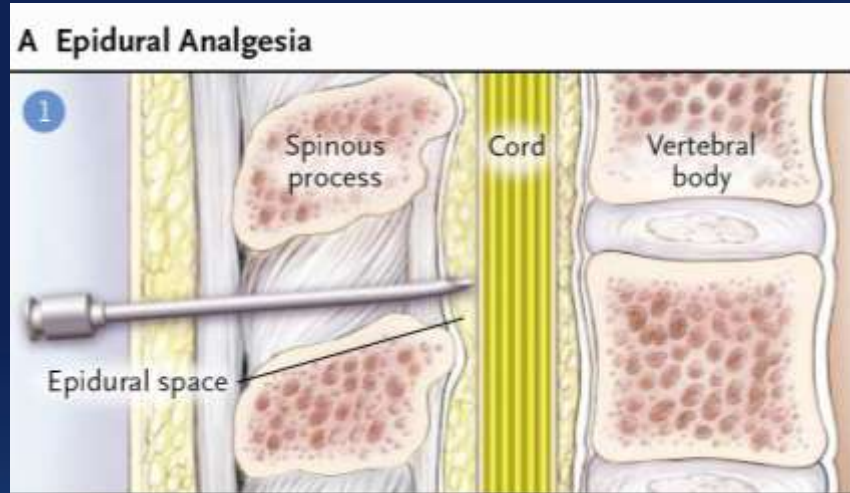
Failed block...

Reschedule the surgery / Fetal Monitoring

PLAN-C

- Plan regional
- Non compliance
- Awake FOB guided
GETA

Regional Anaesthesia in Morbid Obesity



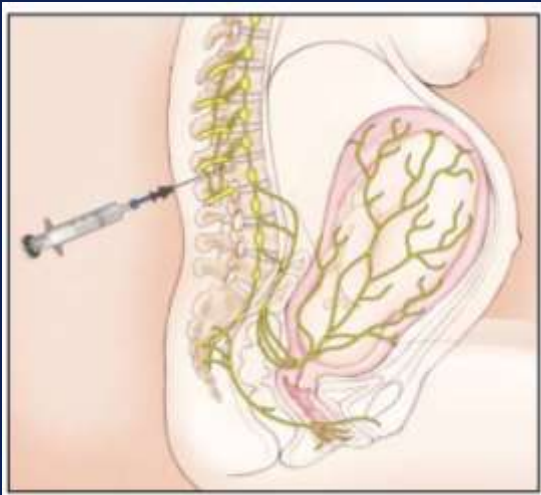
Regional Anaesthesia

Remember, in Morbid Obesity

- Landmarks : difficult to palpate
- Small directional errors - exaggerated
- Extra long needles
- Catheter : at least 5 cm into the space
- Consider Ultrasound assistance

Problems

- High incidence of failure
 - Failed Epidural
 - Unilateral block
 - More attempts
- Replacement of Catheter
 - Once : 46%
 - Two or more times : 21%



Options

- PLANNED wet tap
- Unexpected wet tap - Consider continuous spinal
 - Dilute local anesthetic & opioid for labor analgesia
 - 2ml/hr of 0.1% bupivacaine with fentanyl 2mcg/cc
 - More concentrated local anesthetic for CS
 - 1-1.5 ml of 0.5% bupivacaine - Hyperbaric with fentanyl 20mcg
- Postdural puncture headache - rare

Additional Points to Remember

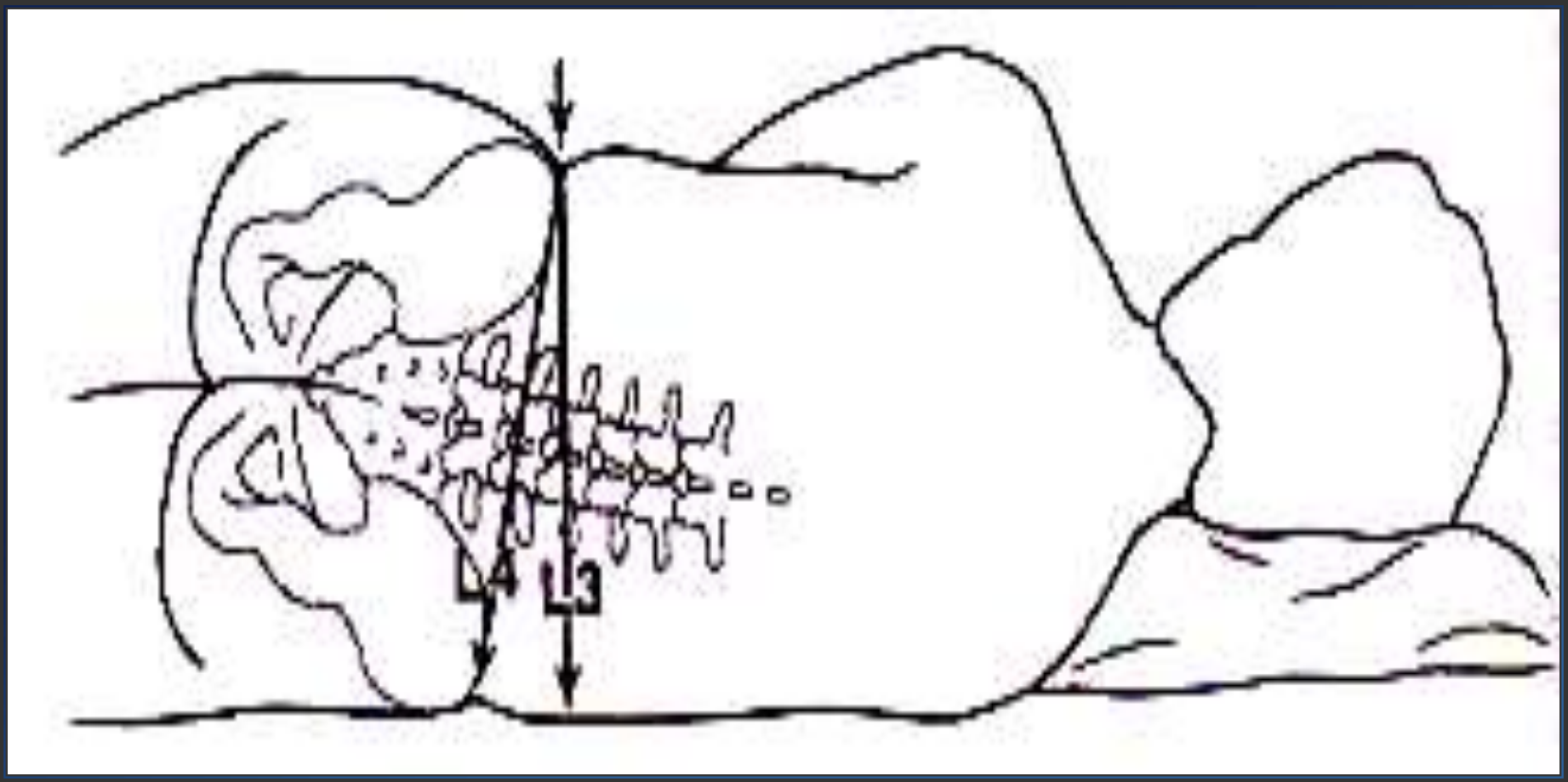
- Lateral, sitting or semi recumbent position
- Optimal titration of local anesthetic
- Direct Arterial blood pressure monitoring
- Postoperative pain management
- PPPC Protocol, DVT prophylaxis



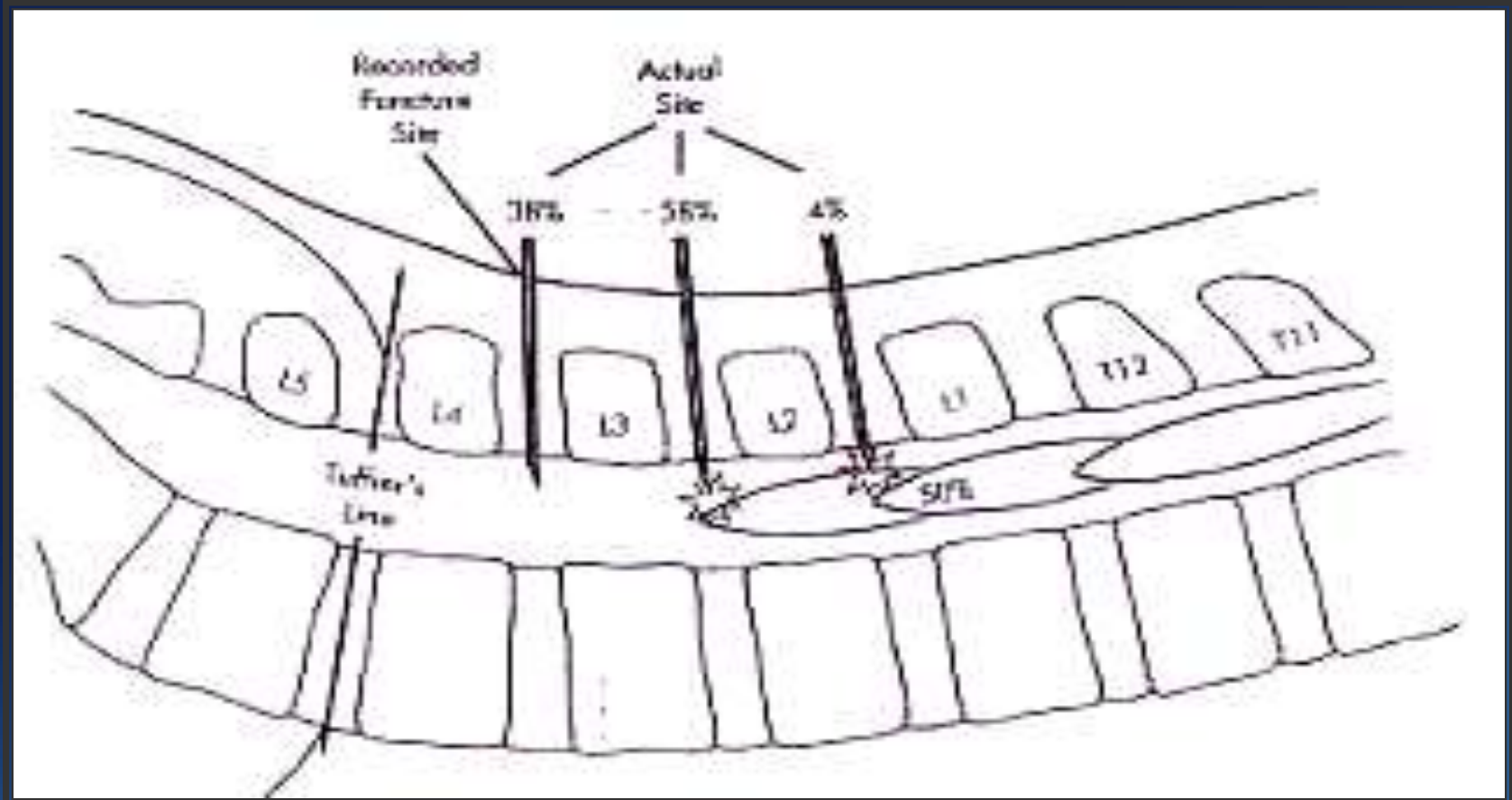
Spinal Anaesthesia

- **High incidence of hypotension**
 - Higher and variable autonomic blockade
- **Pelvic tilt - inadvertent conus injury**
- **High block**
 - May exaggerate hypoxemia
- **Single shot spinal**
 - Disadvantageous in prolonged surgery

Pelvic Tilt



Injury to Conus Medullaris



General Anaesthesia

- Increased complications with GETA
- The operating room
 - Bed of appropriate width and strength
 - Wider arm supports and pads
 - Most OR beds are for 300 lbs only
- The patient should be interviewed early

Oops the OT table crashed!!



General Anaesthesia

- Pre - Op evaluation
 - CXR, EKG and PFT with ABGs
- Thorough airway evaluation mandatory
- GETA only, if indispensable
- Maternal Safety : paramount importance

**Considerable proportion of maternal mortality
during cesarean delivery**

Key Points

- Consider multimodal aspiration prophylaxis
- Anticipate
 - Difficult mask ventilation
 - Laryngoscopy and intubation
- Difficult intubation
 - 13% obese patients
 - 30% obese parturients

**However, obesity alone
doesn't predict difficult airway**

Key Points

- Landmarks for block obscure
- Topical anesthesia
 - Airway with 4% Xylocaine
- Direct laryngoscopy
 - Anticipated difficult airway
- Obesity + MP IV
 - Consider fiberoptic intubation

General Anaesthesia - Key Points

- Rapid sequence induction
 - Not recommended
- Patient should be fully de-nitrogenated
 - h 100% O₂ for 3min / 8 FVC Breaths
- Additional experienced hands
- Planned extubation

General Anaesthesia

- Ancillary airway equipment
- Fiber-optic bronchoscope
- Short handle laryngoscope
- Assortment of laryngeal mask airways
- Higher FiO₂, tidal volumes and PEEP

**Effect of muscle relaxant
during surgery may be
overestimated,
reversal effect may be
underestimated**



Pharmaco-kinetics

General Anaesthesia and Obesity

- Drug doses based on actual or ideal body weight
- Highly lipophilic drugs
 - Barbiturates, benzodiazepines
 - Increased distribution / Longer elimination half-lives
- Non-lipophilic or weakly lipophilic drugs
 - Administered based on lean body mass
- Desflurane
 - Emergence faster / O₂ saturations higher

Extubation - Key Points

- Extubate conservatively
- In reverse trendelenburg position
- In OSA, post-extubation obstruction \approx 5%
- Extubate with oral or nasal airway in place

*Concerned about possible re-intubation,
extubate over an airway exchanger*

Post Operative Management

- Semi-recumbent
- Or reverse trendelenberg position
- Monitor for hypoxia & hypoventilation
- Consider CPAP mask in OSA
- A monitored or step down bed

Conclusions

- **GETA : anaesthesia related mortality**
- **Regional : Safe option**
- **Pre Op assessment and stabilization**
- **Early labour EA**
- **USG guided neuraxial block**

**Murphy's dictum that
“anything that can go wrong,
will go wrong.”**

We must be prepared for all possibilities



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