Recent advances in Obstetric anaesthesia

Dr Mary Mushambi

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DAS Professor

Obstetric patient vs. Obstetric anaesthetist

- Complex medical conditions
- Maternal age/IVF choices
- Higher expectations
- Prepared to get pregnant against doctors advice
- Those who survive against all odds come back again

Knowledge (physician)

Skills

Communication – MDT

IVF – in 73yr old woman
Successful twin delivery

INDIA

Woman, 73, is oldest mother after giving birth to twin girls

By Harry Cockburn

A woman aged 73 has reportedly given birth to twin girls in eastern India following successful IVF.

Doctors in the state of Andhra Pradesh have claimed that the woman's age makes her the world's oldest ever to give birth after they delivered the twins by Caesarean section on Thursday.

Local media quoted the woman, Erramatti Mangayamma, as saying: "God has answered our prayers."

She said she had seen many doctors before she and her husband, Sitarama Rajarao, found success.

Mr Rajarao told the BBC that he was "very happy... everything is the work of the doctors".

"The mother and the babies are doing well," said the lead doctor, Dr Uma Sankar.

According to the BBC, which spoke to the doctor and the couple, Ms Mangayamma is 73 years old, but other reports put her age at 74. Uncertainties over exact ages are common in India, where many people do not have birth certificates.

The oldest confirmed mother was María del Carmen Bousada from Spain, who gave birth at 66 using IVF treatment. She died of ovarian cancer two years later.

In 2016, an Indian woman from Punjab who "believed she was 70", gave birth to her first child after receiving two years of IVF treatment.

THE INDEPENDENT

Erramatti Mangayamma is claimed to be the world's oldest new mother after delivering twins this week INDIA PHOTO AGENCY/SWNS

In The 'i'
7th September 2019

Imagine you are on call and this patient comes in for emergency CS…..

- 48yr old
- BMI 48
- Endstage renal failure (HD/RT)
- BBI
- Hypertrophic cardiomyopathy
- Previous laparotomy
- Thyroidectomy/DVT
- IVF/Pregnant with twins

Advances in Obstetric anaesthesia?

1. Management of spinal hypotension
2. Use of uterotonics
3. Enhanced maternal care
4. Obesity
5. Cardiac diseases
6. Airway management
7. Abnormal placentation
8. PDPH

1. **MDT in Obstetrics**
2. **Ultrasound in obstetric anaesthetic practice**
3. **Maintenance of epidural analgesia – PIEB/CIPCEA**
4. **Exit procedure and intra-uterine fetal surgery**

Management of spinal hypotension Consensus statement - 2018

1st line drug – alpha agonist

Phenylephrine - **Infusion of 100 mcg/ml at 15 - 30 ml/h (25–50 mcg/min).**

- **Boluses 50 – 100 mcg**

Anaesthesia 2018, 73, 71–92 doi:10.1111/anae.14080

Guidelines

International consensus statement on the management of hypotension with vasopressors during caesarean section under spinal anaesthesia

S. M. Kinsella,[1] B. Carvalho,[2] R. A. Dyer,[3] R. Fernando,[4] N. McDonnell,[5] F. J. Mercier,[6] A. Palanisamy,[7] A. T. H. Sia,[8] M. Van de Velde[9,10], A. Vercueil[11] and the Consensus Statement Collaborators

Uterotonics
International consensus statement - 2019

Oxytocin boluses: 1-3 iu

Carbetocin: 100 mcg

Move onto 2nd line drugs

Anaesthesia 2019 doi:10.1111/anae.14757

Guidelines

International consensus statement on the use of uterotonic agents during caesarean section

M. Heesen,[1] B. Carvalho,[2] J. C. A. Carvalho,[3] J. J. Duvekot,[4] R. A. Dyer,[5] D. N. Lucas,[6] N. McDonnell,[7] S. Orbach-Zinger[8] and S. M. Kinsella[9]

Box 1 Suggested dose regimens for uterotonic administration at low-risk elective caesarean section, and caesarean section in labouring women. N.B. take account of national drug license restrictions. See text for further information.

First-line drugs

Oxytocin

Elective caesarean section	Intrapartum caesarean section
Bolus 1 IU oxytocin; start oxytocin infusion at 2.5–7.5 IU.h^{-1} (0.04–0.125 IU.min^{-1}).	3 IU oxytocin over ≥ 30 s; start oxytocin infusion at 7.5–15 IU.h^{-1} (0.125–0.25 IU.min^{-1}).
If required after 2 min, give a further dose of 3 IU over ≥ 30 s.	
Consider second-line agent early in the event of failure of this regimen to produce sustained uterine tone.	
Review the patient's clinical condition before discontinuing the infusion; this will usually be between 2 h and 4 h after commencement.	

Alternative – carbetocin

Elective caesarean section	Intrapartum caesarean section
100 μg over ≥ 30 s.	100 μg over ≥ 30 s.
Smaller doses (as low as 20 μg) may be sufficient; in this case, doses can be repeated if required, up to 100 μg.	Do not exceed 100 μg – if required move to second-line drug.
Do not exceed 100 μg – if required move to second-line drug.	

Care of the critically ill woman
Enhanced maternal care

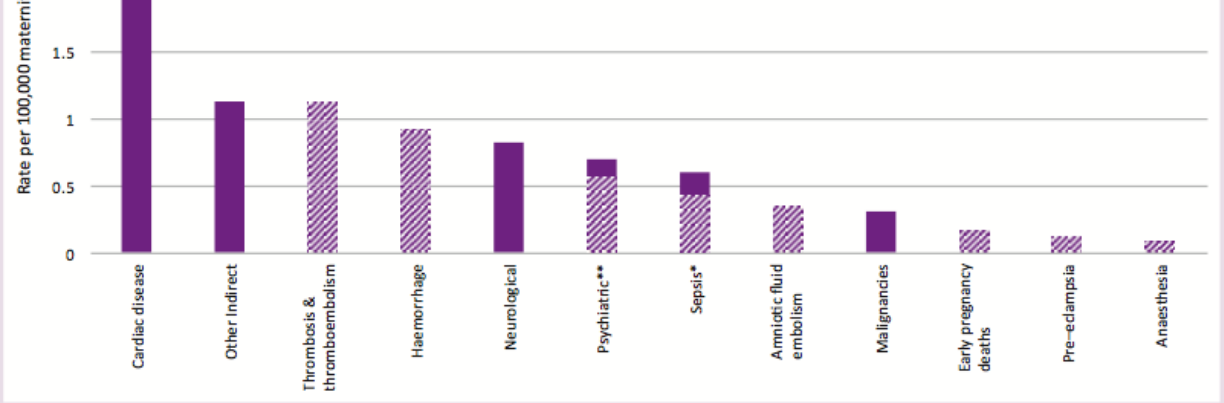
Key messages of document

- **Staff and teams**
  - **Named lead for enhanced maternal care**
  - **Obs team review ITU Pt every 24hr**
- **Education and training – competencies**
- **EWS - modified for Obs**
- **Where care is delivered – LW or ITU**

Advances in Obstetric anaesthesia?

1. Management of spinal hypotension
2. Use of uterotonics
3. Enhanced maternal care
4. **Obesity**
5. **Cardiac diseases**
6. **Airway management**
7. **Abnormal placentation**
8. **PDPH**

Why O



Hatched bars show direct causes of death, solid bars indicate indirect causes of death;

*Rate for direct sepsis (genital tract sepsis and other pregnancy related infections) is shown in hatched and rate for indirect sepsis (influenza, pneumonia, others) in solid bar

**Rate for suicides (direct) is shown in hatched and rate for other psychiatric causes (drugs, alcohol) in solid bar

Source: MBRRACE-UK

+ Obesity (30%)

Super morbid obesity

Age: 27

Weight: 226Kg BMI 72

Antenatal MDT - plan

- Elective CS under RA
- Main theatres
- Extra theatre staff and equipment
- HDU post-op

Consent

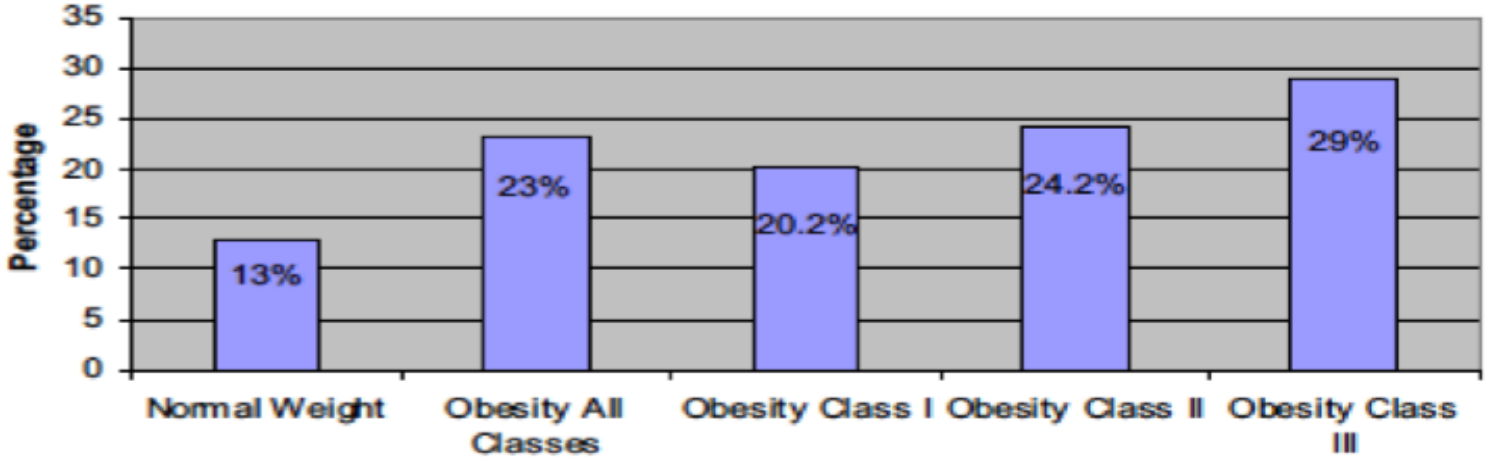
Category 1-2 CS

Failed inductions

13% vs 29%

FIGURE 2

Percentage of women who had a failed induction of labor, stratified by obesity class



Wolfe. Obesity and induction of labor. Am J Obstet Gynecol 2011.

The effect of maternal obesity on the rate of failed induction of labour
Wolfe KB, Rossi RA, Warshak CR AJOG 2011

CMACE 2010
Mode of delivery vs obesity

	UK	35-39.9	40-49.9	≥50
SVD	62.4	56.6	52.9	47.9
Instrum	12.1	8.5	6.4	5.8
CS	24.6	34.7	40.4	45.8

Super morbid obesity - BMI 72

- Emergency admission on a Saturday
- Reduced FM
- Unable to pick up baby's HR on CTG properly

Case – BMI 72
New Plan

Called for more help

US (depth- 10.5cm)

CSE (depth 11cm)

Anaesthesia uneventful

Obstetrician – shoulder injury

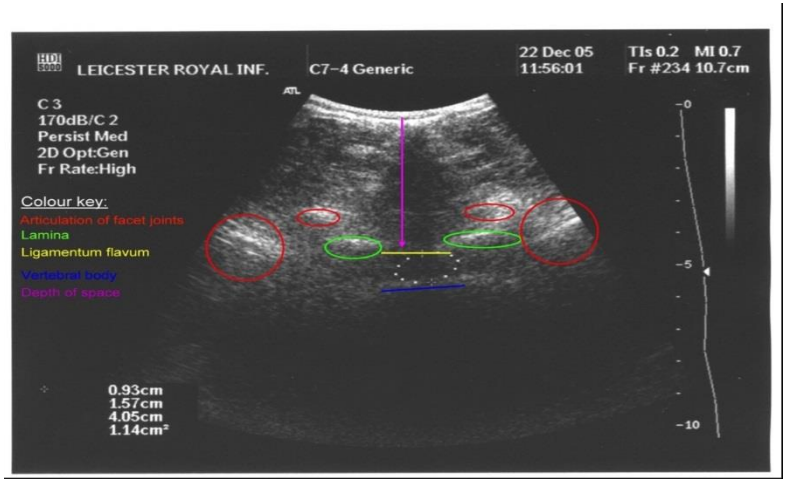
RA in the obese parturient

Ultrasound

- ✓Iliac crest/sacrum
- ✓Level of spine
- ✓Midline
- ✓Depth – 8cm vs 11cm Tuohy needle
- ✓Angle of needle
- ✓Skin markings

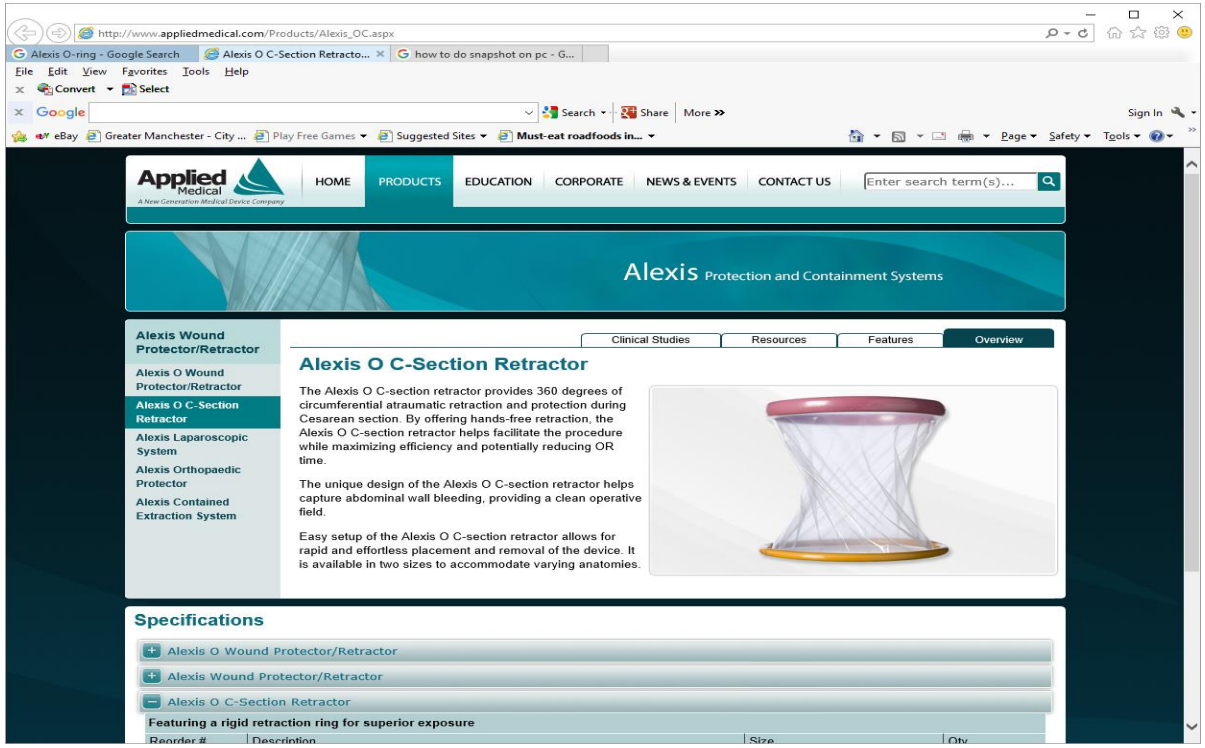
Tips: Mark 2 levels

Do the US yourself



Surgery in the obese parturient

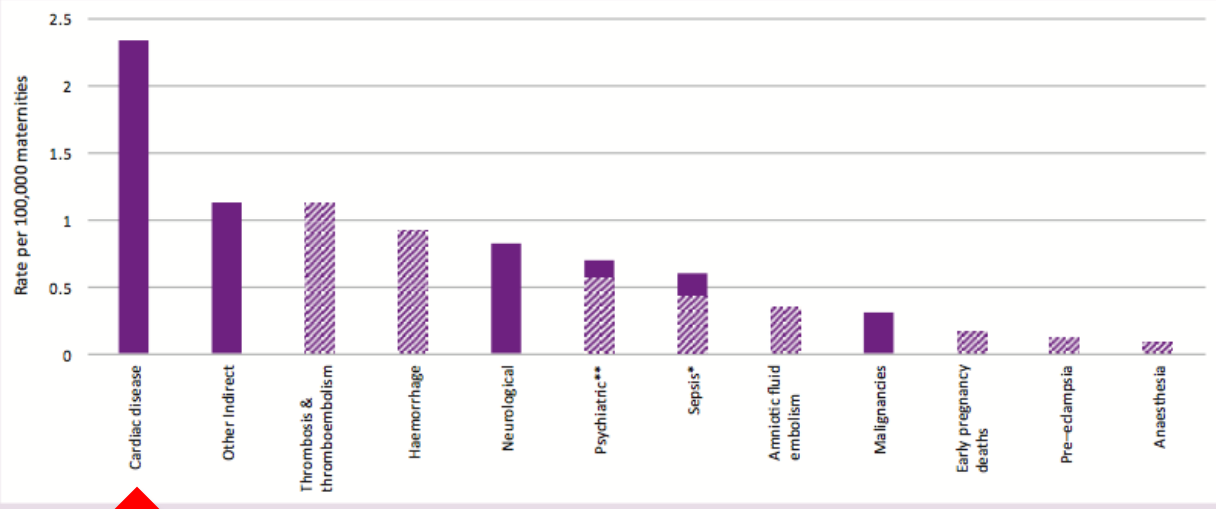
Alexis O-Ring



Alexis O-Ring

Cardiac disease in pregnancy

Figure 2.3: Maternal mortality by cause 2013–15



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Source: MBRRACE-UK

Types of cardiac diseases

Congenital :

- Shunts (TOFs, Eisenmenger, TGA)
- Valve lesions
- Pulm HT

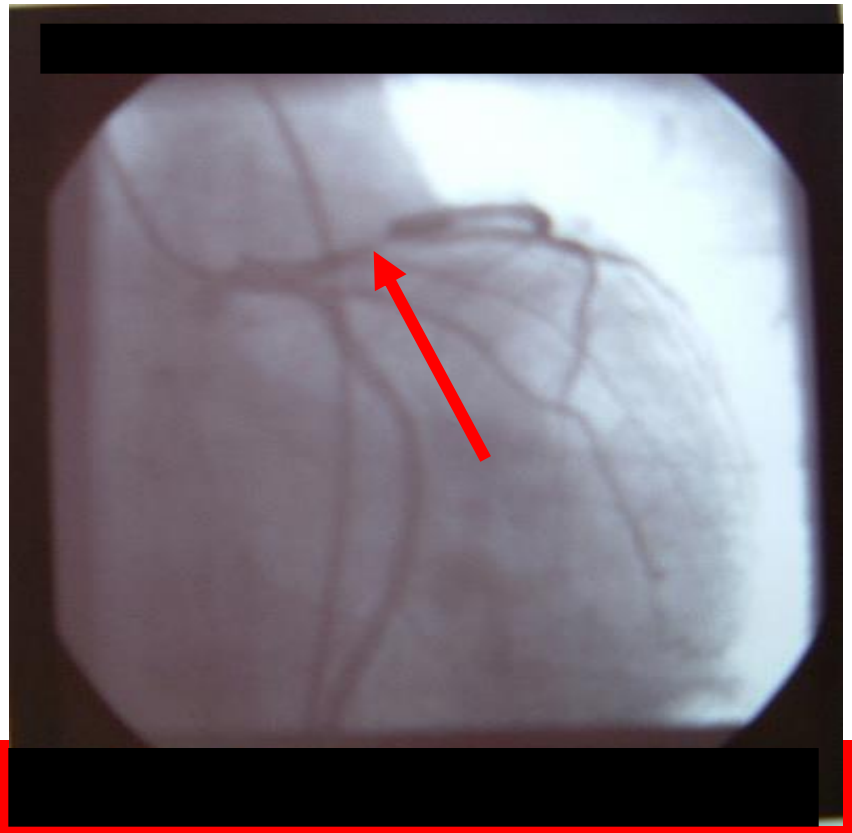
Acquired:

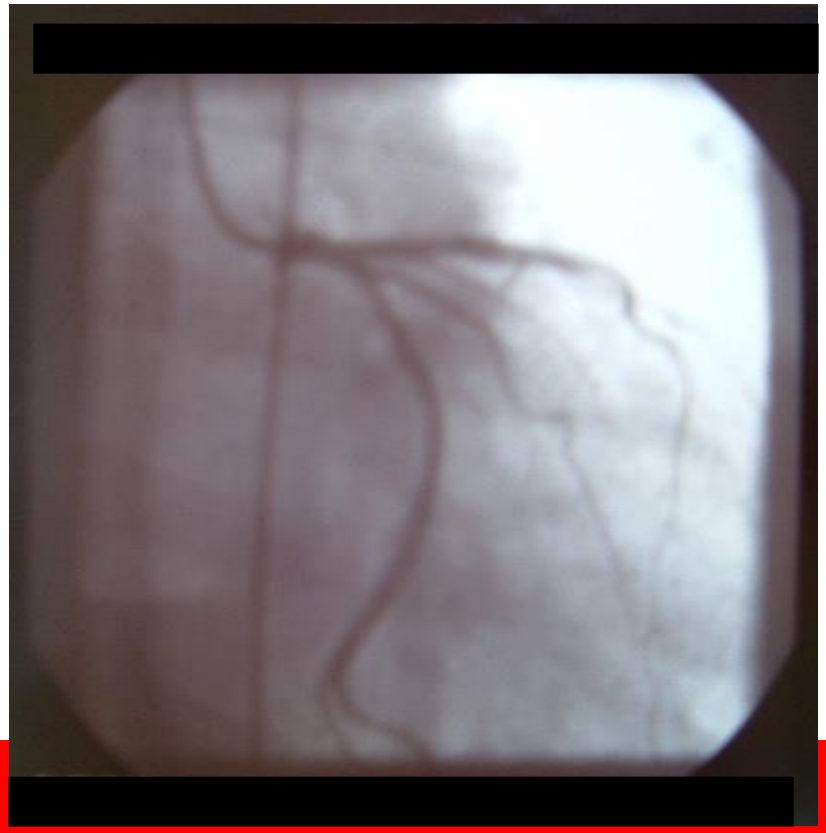
- IHD
- Cardiomyopathy

Ischaemic heart disease

- 24yrs old, previous 1 NVD
- Previous recent MI & Stent

- Frequent ‘Angina’
- Significant SOB - 12 yards
- Cocaine and Heroin abuser
- Still smoking 60/day





Emergency Admission

- Pregnant against medical advice
- 27 weeks – twins
- CCF

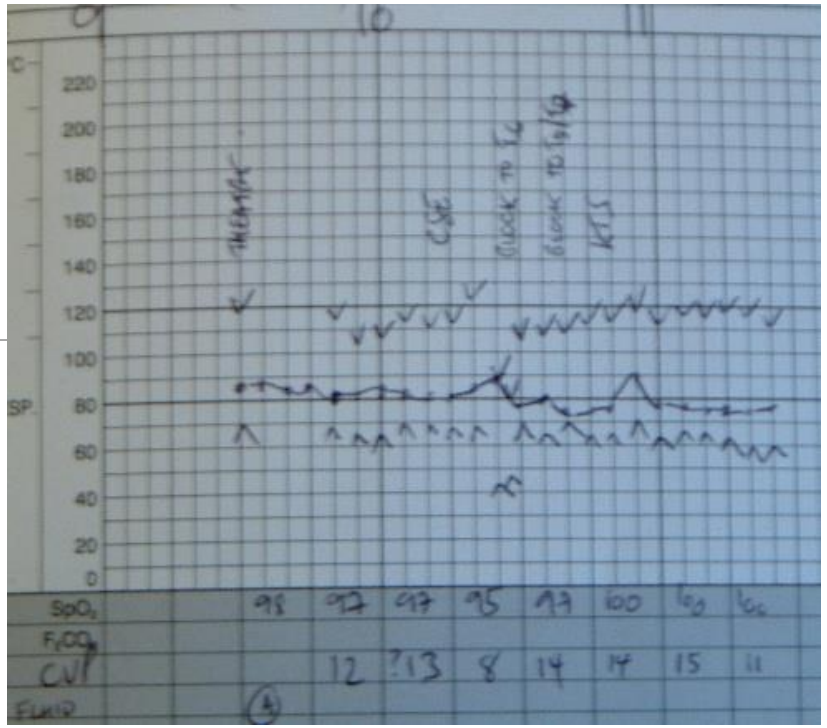
Plan

- MDT meeting
- Deliver by CS at 32 weeks
- Cardiac centre

Anaesthetic plan

- **Sequential CSE**
  - **1ml 0.5% Heavy Bupivacaine**
  - **25mcg Fentanyl**
  - **Incremental epidural 0.5% levobupivacaine total 9 mls over 20 mins**
- **No Syntocin**

Anaesthetic



Uneventful Anaesthetic

Discharged home 12 days post op

Result:

- **Anaesthetists stressed**
- **Patient – happy and refused sterilisation**

Obstetric anaesthesia and cardiac disease – IJOA 2019

International Journal of Obstetric Anesthesia (2019) **37**, 73–85
0959-289X/$ - see front matter
https://doi.org/10.1016/j.ijoa.2018.09.011

www.obstetanesthesia.com

REVIEW ARTICLE

Obstetric anesthesia management of the patient with cardiac disease

K.W. Arendt,[a] K.J. Lindley[b]

- Cardiac conditions
- Physiological effects of pregnancy
- Anaesthetic goals
- Risk stratification

Anaesthetic management of patient with ischaemic heart disease

Table 5 Pregnancy effects and anesthetic goals for cardiovascular disease in pregnancy

	Physiologic Effects of Pregnancy and Delivery	Anesthetic Goals
Coronary Artery Disease	(-) The decreased SVR of pregnancy can result in lesser coronary perfusion to the myocardium. (-) The increase in HR during pregnancy can result in decreased coronary filling time (-) Cardiac work can increase significantly during labor, especially painful labor	Normal heart rate (avoid tachycardia) → *Excellent labor analgesia* → *Continue beta blockade through labor and delivery* → *Avoid beta agonist agents (e.g. terbutaline)* Maintain afterload → *Consider intra-arterial blood pressure monitoring* → *Phenylephrine is vasopressor of choice* → *Careful titration of onset of neuraxial anesthetic for labor or CD* → *Consider phenylephrine infusion for CD* → *Titrate oxytocin carefully* Monitor for and avoid ischemia → *5-lead ECG monitoring for CD or labor* → *Avoid methylergonovine* Postpartum monitoring → *Monitor for postpartum ischemia or heart failure*

International Journal of Obstetric Anesthesia (2019) 37, 73–85
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https://doi.org/10.1016/j.ijoa.2018.09.011

REVIEW ARTICLE

ELSEVIER
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Obstetric anesthesia management of the patient with cardiac disease

K.W. Arendt,[a] K.J. Lindley[b]
[a]*Department of Anesthesiology and Perioperative Medicine, Mayo Clinic, Rochester, MN, USA*
[b]*Cardiovascular Division, John T. Milliken Department of Internal Medicine, Washington University School of Medicine, St. Louis, MO, USA*

Anaesthetic options

1. **Sequential CSE**

   2.5 – 5 mg hyperbaric Bupiv (0.5-1ml) + 15-25 mcg fentanyl

2. **Spinal catheter - CSA**

3. **GA Opiates/TOE**

Uterotonics

✓ Oxytocin – avoid if possible /infusion

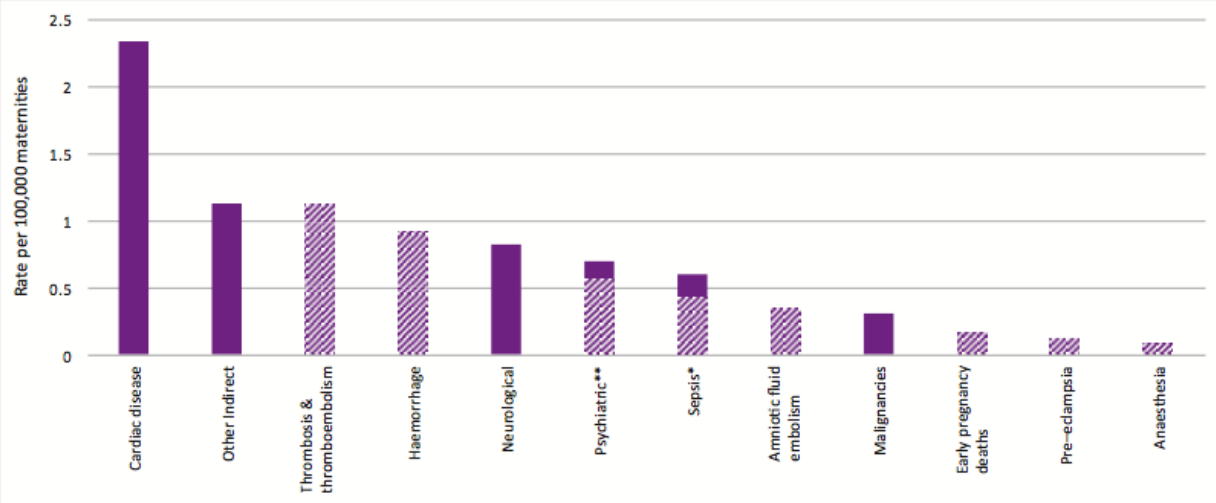
✓ Misoprostol – OK but may not be sufficient for PPH

X Ergometrine – avoid

X Carboprost avoid esp Right heart sided (Increases PAP)

Airway management

Figure 2.3: Maternal mortality by cause 2013–15



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Source: MBRRACE-UK

Obstetric airway morbidity and mortality

Incidence of FI

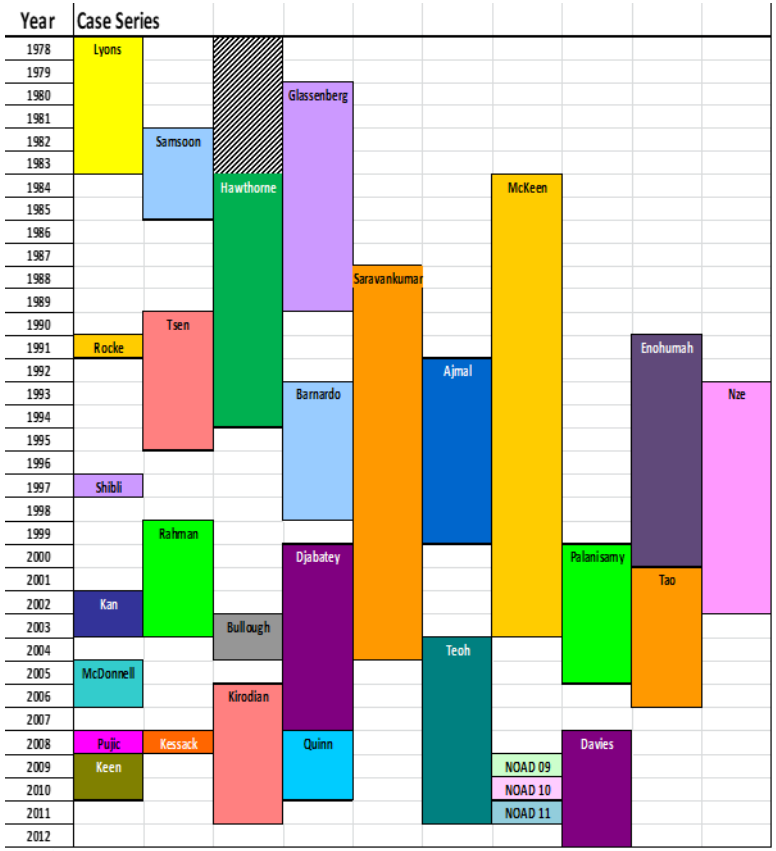
All obs cases	1	:	390
CS	1	:	443
General	1	:	2,000

Mortality

Obs GA	1	:	43,000
NAP4	1	:	180,000
FI	1	:	90-102

FON incidence

Obs GAs	1	:	30,000
General	1	:	50,000
FI	1	:	60



International Journal of Obstetric Anesthesia (2015) 24, 356–374
0959-289X/$ - see front matter © 2015 The Authors. Published by Elsevier Ltd.

http://dx.doi.org/10.1016/j.ijoa.2015.06.008
SPECIAL ARTICLE
ELSEVIER
www.obstetanesthesia.com

Failed tracheal intubation during obstetric general anaesthesia: a literature review

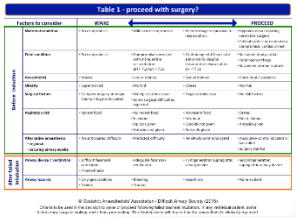
S.M. Kinsella,[a] A.L. Winton,[a] M.C. Mushambi,[b] K. Ramaswamy,[c] H. Swales,[d] A.C. Quinn,[e] M. Popat[f]

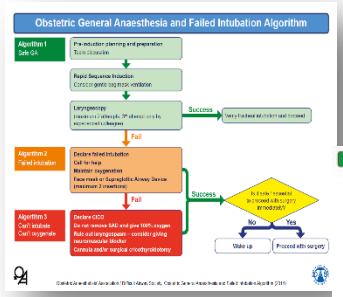
Airway challenges

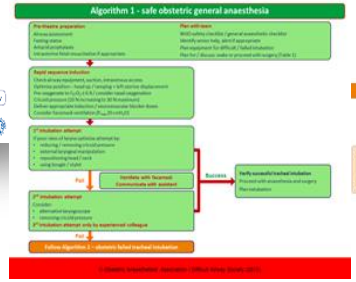
- Unanticipated difficult airway
- Anticipated difficult airway

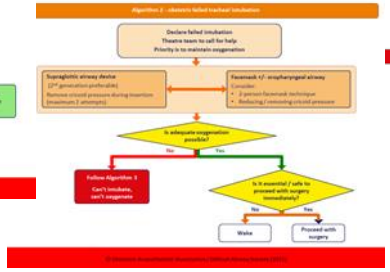
Management of the unanticipated difficult airway in the pregnant woman.

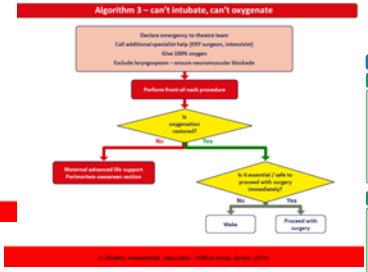
Obstetric Difficult Airway Guidelines 2015

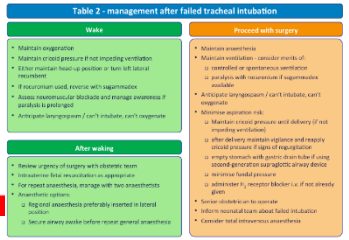












Algorithm 1 - safe obstetric general anaesthesia

Pre-theatre preparation

Airway assessment
Fasting status
Antacid prophylaxis
Intrauterine fetal resuscitation if appropriate

Plan with team

WHO safety checklist / general anaesthetic checklist
Identify senior help, alert if appropriate
Plan equipment for difficult / failed intubation
Plan for / discuss: wake or proceed with surgery (Table 1)

Rapid sequence induction

Check airway equipment, suction, intravenous access
Optimise position – head up / ramping + left uterine displacement
Pre-oxygenate to $F_{ET}O_2 \geq 0.9$ / consider nasal oxygenation
Cricoid pressure (10 N increasing to 30 N maximum)
Deliver appropriate induction / neuromuscular blocker doses
Consider facemask ventilation (P_{max} 20 cmH_2O)

1st intubation attempt

If poor view of larynx optimise attempt by:

- reducing / removing cricoid pressure
- external laryngeal manipulation
- repositioning head / neck
- using bougie / stylet

Fail

Ventilate with facemask
Communicate with assistant

2nd intubation attempt

Consider:

- alternative laryngoscope
- removing cricoid pressure

3rd Intubation attempt only by experienced colleague

Fail

Follow Algorithm 2 – obstetric failed tracheal intubation

Success

Verify successful tracheal intubation
Proceed with anaesthesia and surgery
Plan extubation

Airway challenges

- Unanticipated difficult airway
- Anticipated difficult airway

Conradi Hunermann syndrome

- Short stature
- Kyphoscoliosis
- Midfacial hypoplasia, low nasal bridge.

Conradi Hunermann syndrome

- 20 yr old
- Spinal ops aged 4 and 6 years
- G8 P0 (7 miscarriages)
- DNA clinic appointments

Anaesthetic assessment

- 33/40 - preterm labour
- A potential very difficult airway
  - ✓ Airway-MP 3
  - ✓ Poor neck extension.
  - ✓ Short neck.
  - ✓ High larynx with TMD<6.0

MRI

- MRI – Arnold Chiari Malformation with upper cervical syrinx.
- Cerebellar tonsils herniating through foramen magnum to C2.

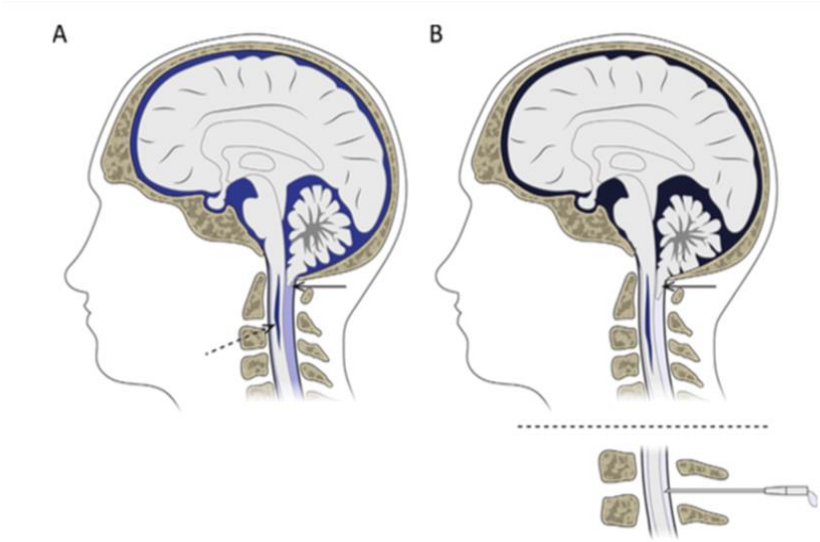
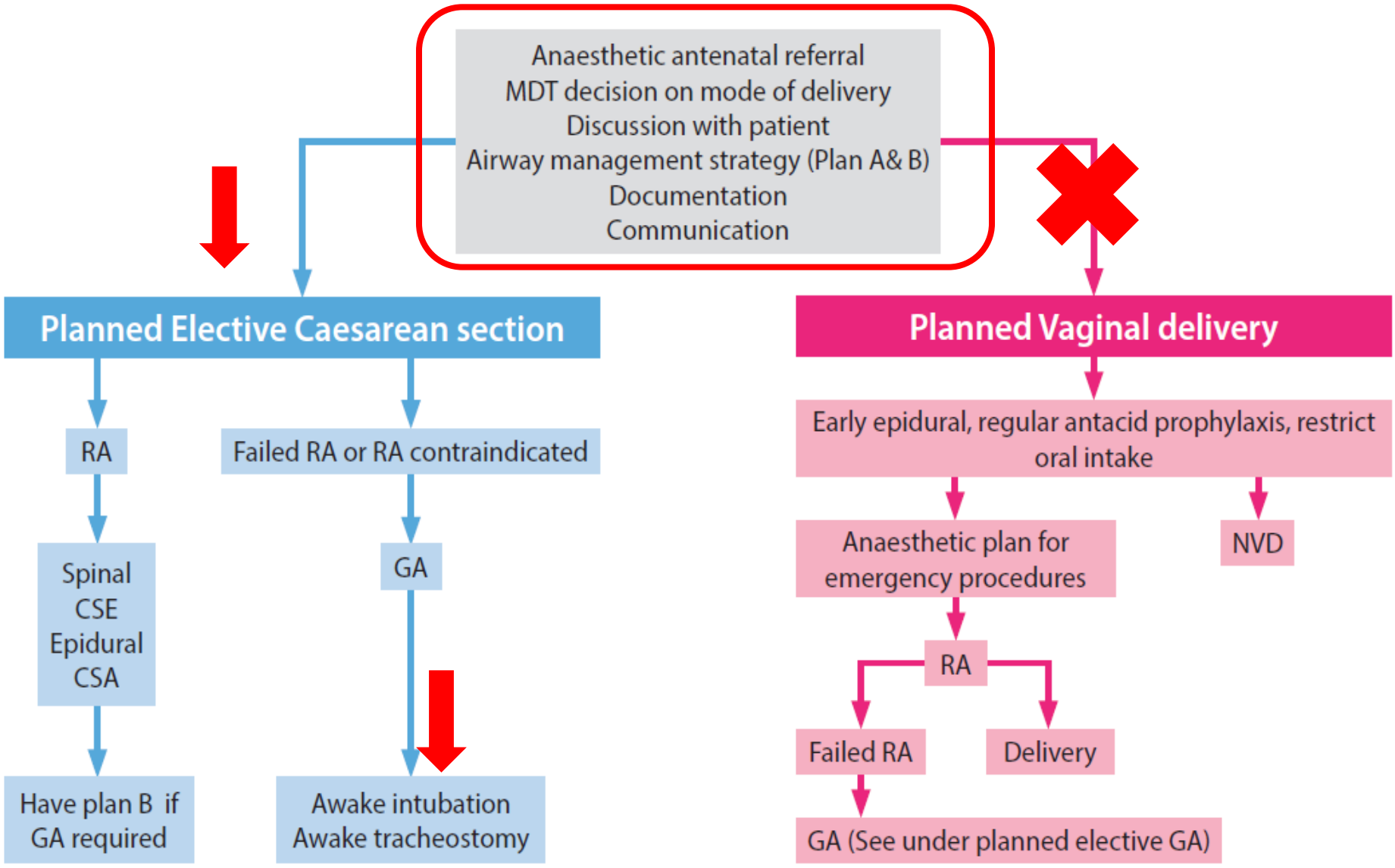


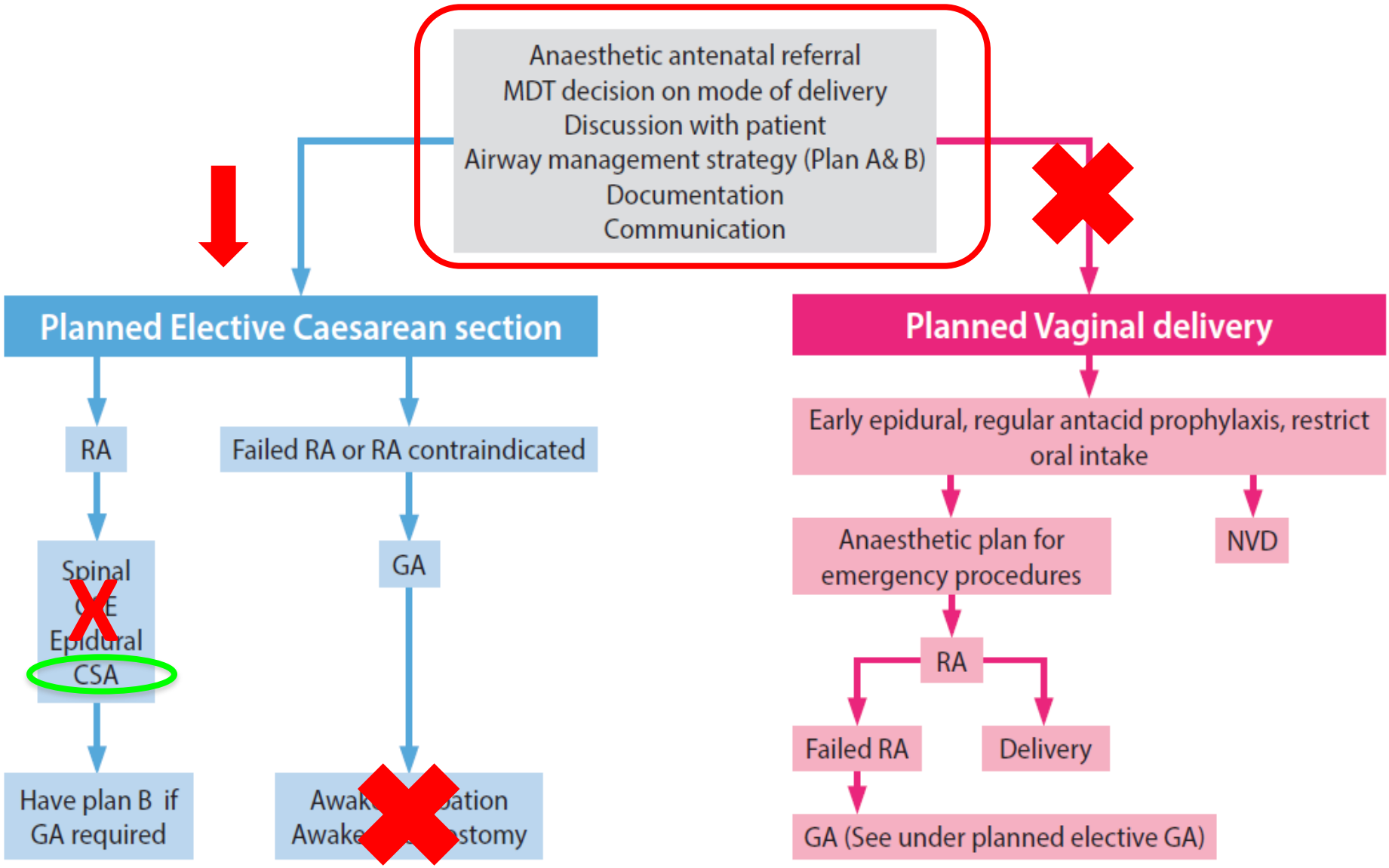
Fig. 1 Schematic representation of Arnold Chiari malformation-I. In panel A: the dotted arrow referring to the syrinx, the solid arrow referring to the Chiari malformation with herniation of the cerebellum into the foramen magnum. Despite impaired cerebrospinal fluid flow into the cervical spinal canal, there is not an excessive pressure gradient between the brain and spinal cord. In panel B: When cerebrospinal fluid pressure drops due to a dural tear (depicted with the needle) the cerebellar tonsil extends into the foramen magnum blocking the flow of cerebrospinal fluid into the cervical spinal canal (solid arrow), increasing the cerebrospinal fluid pressure exerted on the brain. In addition the decrease in pressure in the spinal canal causes the fluid pressure in the syrinx to increase, expanding the size of the syrinx in the spinal cord

Management of the Anticipated Difficult Airway in the Pregnant Patient



MDT - Multidisciplinary team , GA - General anaesthetic, NVD - Normal vaginal delivery, CSE - Combined spinal epidural, CSA - Continuous spinal anaesthetic, RA - Regional anaesthetic

Management of the Anticipated Difficult Airway in the Pregnant Patient



MDT - Multidisciplinary team , GA - General anaesthetic, NVD - Normal vaginal delivery, CSE - Combined spinal epidural, CSA - Continuous spinal anaesthetic, RA - Regional anaesthetic

Continuous spinal catheter anaesthetic (CSA)

Pajunk Intralong, 22G Spinal needle with 27G catheter

1.2mls of 0.5% heavy bupivacaine and 25mcg fentanyl

Spinal catheter threaded 3.0cms into space.

Bilat T4 block to cold and neurotip

No PDPH/No new neurological changes

Second pregnancy

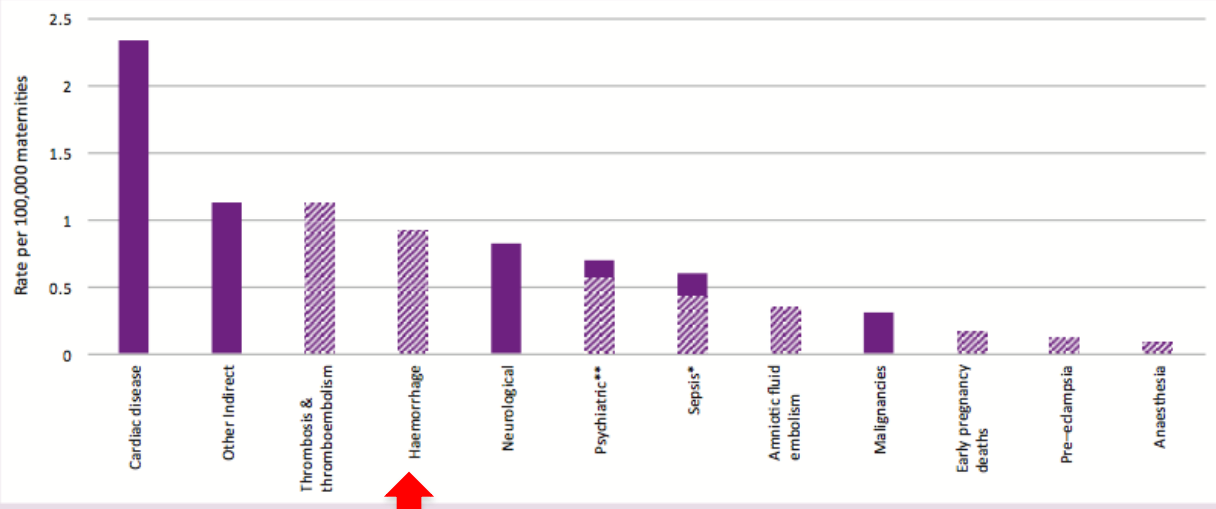
- 9 months later
- 32 /40 presented to A+E
- Overdose of NSAIDs and antidepressants
- No NNU beds, so in-utero transfer
- Receiving unit, decelerations were noted on the CTG

Third pregnancy

Changed hospitals

Haemorrhage

Figure 2.3: Maternal mortality by cause 2013–15



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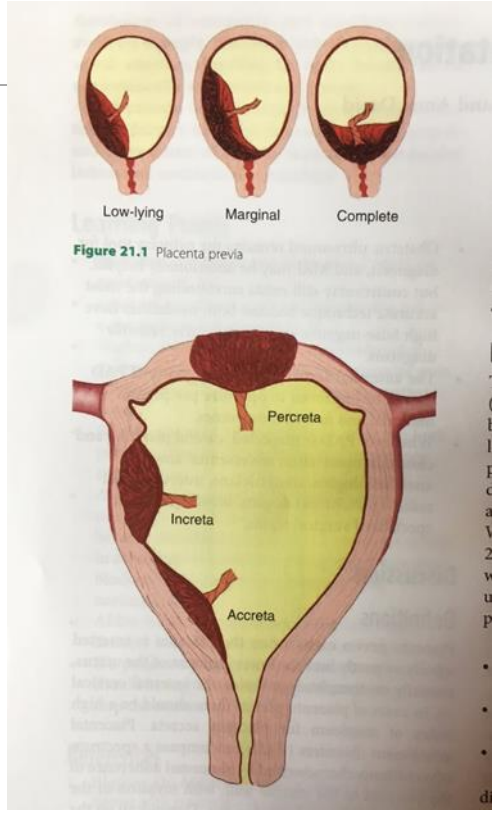
Source: MBRRACE-UK

Placenta accreta spectrum

TABLE 4 Rates of placenta accreta spectrum (PAS) disorders, placenta previa, and hysterectomy by number of previous cesarean deliveries.[a]

No. of previous cesareans	No. of women	Incidence of PAS disorders	Rate of PAS disorders if placenta previa	No. of hysterectomies
0	6201	15 (0.24%)	3%	40 (0.65%)
1	15 808	49 (0.31%)	11%	67 (0.42%)
2	6324	36 (0.57%)	40%	57 (0.9%)
3	1452	31 (2.13%)	61%	35 (2.4%)
4	258	6 (2.33%)	67%	9 (3.49%)
5	89	6 (6.74%)	67%	9 (8.99%)

[a]Modified from Silver et al.[16]



Other risks:

- **Maternal age >35yrs**
- **IVF**

MDT planning and preparation

CASE REPORT

Double Dilemma—Management of a Pregnant Patient With a Difficult Airway Presenting With Undiagnosed Placenta Percreta: A Case Report

Yewande A. Omowanile, MD, MBA, Luke N. Weiler, MD, Jill M. Mhyre, MD, and Faiza A. Khan, MD

Patients with abnormal placentation should undergo planned cesarean delivery with the option for hysterectomy based on severity. We report a case of a multigravida with a known difficult airway presenting for cesarean delivery. She was found to have an undiagnosed placenta percreta at the start of surgery after the epidural was placed. After team discussion, the procedure was aborted and rescheduled electively 2 days later under general anesthesia with preoperative placement of internal iliac artery balloon catheters. This case emphasizes the importance of a multiteam approach toward the management of challenging and unanticipated cases. (A&A Case Reports. 2017;9:1–3.)

USA/2017

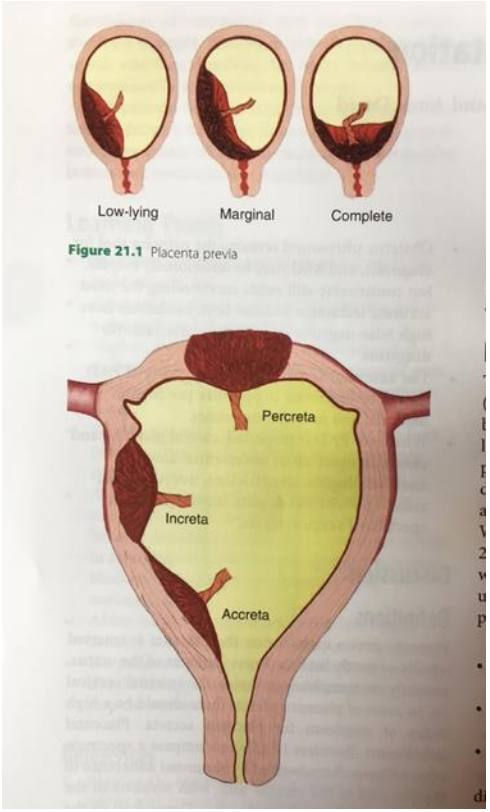
Case report

- 26yr old - BMI 48
- 7 Prev CS (last CS - adhesions +++)
- Old burns to face, neck and chest
- Very limited neck movement & MO
- Ant Placenta praevia – confirmed on MRI

Risk of Placenta accreta = >67%

Anaesthetic technique

- CS under CSE
- 4 units blood ready
- Placenta percreta
- What would you do next?
- Closed and planned to come back 2/7 later



2nd attempt

- Internal iliac catheters under LA
- Cell salvage
- Awake intubation with videolaryngoscope
- MOH

  4L EBL

  6 units blood, 2 units FFP, 1unit platelets

  1L cell salvaged blood

  Hysterectomy

Internal iliac catheter balloons

Concerns

- Benefits
- Maternal limb ischaemia
- Internal/common iliac thrombosis
- Fetal compromise
- Fetal radiation

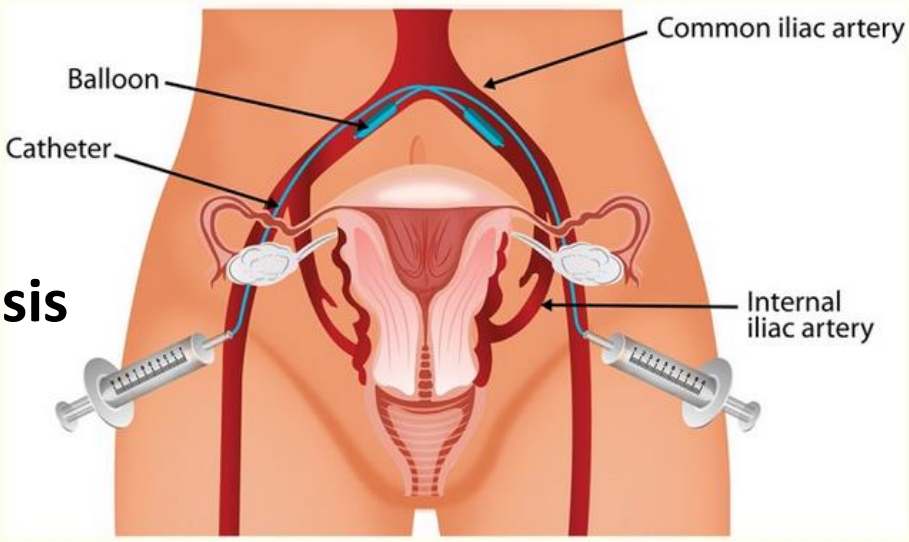


Figure 2

Diagram showing catheter being inserted in a crossover fashion.

Occlusion vs no occlusion

Retrospective - 1985 - 2014

	Blood loss
No occlusion	3.7 +/- 2.9 L
Internal iliac artery ligation	4.1 +/- 1.9 L
Common Iliac balloon catheter	2.0 +/- 1.6 L

Fetal radiation exposure 29 +/- 25 milliGray (mGy) (Max allowable <100)

J Obstet Gynaecol Res. 2018 Mar; 44(3): 456–462. PMCID: PMC5873444
Published online 2018 Jan 3. doi: 10.1111/jog.13550 PMID: 29297951

Study of the utility and problems of common iliac artery balloon occlusion for placenta previa with accreta

Yoshihisa Ono,[1] Yoshihiko Murayama,[1] Sumiko Era,[1] Shigetaka Matsunaga,[1] Tomonori Nagai,[1] Hisato Osada,[2] Yasushi Takai,[1] Kazunori Baba,[1] Satoru Takeda,[1] and Hiroyuki Seki[1]

Prospective observational

Fan et al. Medicine (2017) 96:45

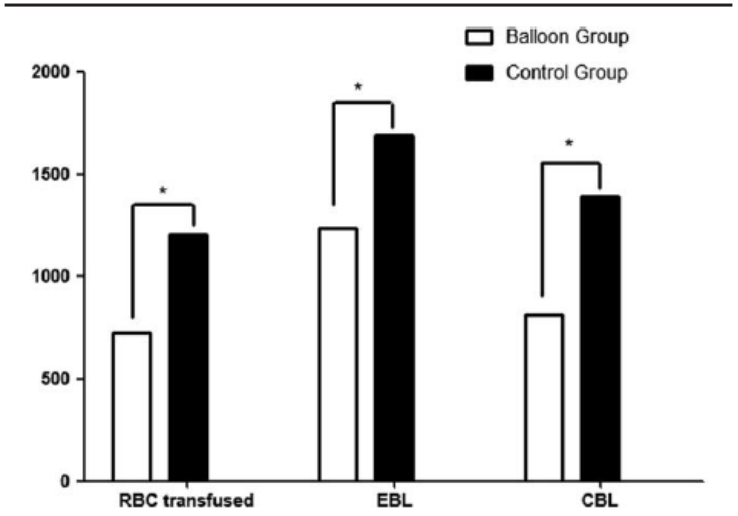


Figure 4. RBC transfused, EBL, and CBL of Balloon group and Control group.

Observational Study
Medicine
OPEN

A prospective observational study evaluating the efficacy of prophylactic internal iliac artery balloon catheterization in the management of placenta previa–accreta

A STROBE compliant article

Yao Fan, MM[a], Xun Gong, MD[a], Nan Wang, MD[b], Ketao Mu, MD[b], Ling Feng, MD[a], Fuyuan Qiao, MD[a], Suhua Chen, MD[a], Wanjiang Zeng, MD[a], Haiyi Liu, MD[b], Yuanyuan Wu, MD[a], Qiong Zhou, MD[a], Yuan Tian, MD[a], Qiang Li, MD[a], Meitao Yang, MM[a], Fanfan Li, MD[a], Mengzhou He, MD[a], Rajluxmee Beejadhursing, MM[a], Dongrui Deng, MD[a,*]

Comparison between prophylactic balloon catheters (PBC) and control group

	PBC	Control	P
Numbers	13	14	
RBC	5.2 ±6.2	4.1±3.8	0.9
FFP	2.8 ±5.4	1.7 ±2.7	.84
Cryo	0.8 ±2.8	0.7 ±2.7	.99
Calc. blood loss	4.95 ±5.0	4.7 ±3.4	.72
Hysterectomy	6 (40%)	7 (50%)	.84

Prospective randomised

No difference in use of blood products and calculated blood loss

Precesarean Prophylactic Balloon Catheters for Suspected Placenta Accreta

Salim R, Chulski A, Romano S, Garmi G, Rudin M, Shalev E. Obstet Gynecol 2015;126:1022–8.

Complications of Prophylactic balloon catheters

- 2 women (15.4%) in PBC group had reversible complications
  - 1 – leg weakness and pain resolved before discharge
  - 1 – Buttock claudication 2 weeks post discharge, resolved 5 days post re-admission
- Right common iliac artery thrombosis requiring embolectomy

Salim R, et al Obstet Gynecol 2015;126:1022–8.

Case Report http://doi.org/10.18231/j.ijogr.2019.053

Internal iliac balloon 'catheter' with ligation or 'only ligation' for morbidly adherent placenta

Sonalika Sarkar[1*], Nitin Paidhungat[2], Tejaswi Kamble[3]

[1]Senior Resident Officer, [2]Honorary Consultant, [3]Clinical Associate, [1-3]Dept. of Obstetrics and Gynaecology, [1-3]Bombay Hospital Institute of Medical Sciences and Research Centre, Mumbai, Maharashtra, India

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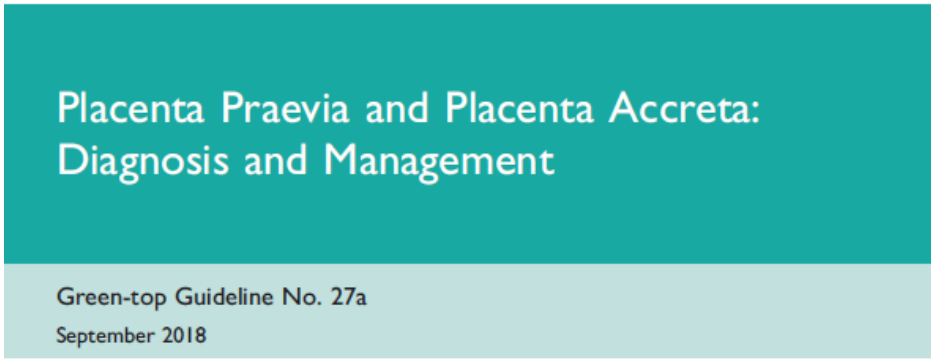
Email: sonalika511@gmail.com

Received: 26th August, 2018 Accepted: 13th May, 2019

RCOG guidance

BJOG An International Journal of Obstetrics and Gynaecology

Royal College of Obstetricians & Gynaecologists



When is interventional radiology indicated?

Larger studies are necessary to determine the safety and efficacy of interventional radiology before this technique can be advised in the routine management of placenta accreta spectrum.

Dural tap and PDPH
2009 MBBRACE

- Two deaths after dural tap
- Deaths from cerebral vein thrombosis and subdural haematoma
- Poor communication/Inadequate follow up
- OAA survey
- OAA working party on guidance on treatment

Treatment of PDPH Guidance IJOA

2019

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https://doi.org/10.1016/j.ijoa.2018.12.006

REVIEW ARTICLE

ELSEVIER
www.obstetanesthesia.com

Treatment of obstetric post-dural puncture headache. Part 1: conservative and pharmacological management

R. Russell,[a] C. Laxton,[b] D.N. Lucas,[c] J. Niewiarowski,[a] M. Scrutton,[d] G. Stocks[e]

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0959-289X/$ - see front matter © 2019 Elsevier Ltd. All rights reserved.
https://doi.org/10.1016/j.ijoa.2018.12.005

REVIEW ARTICLE

ELSEVIER
www.obstetanesthesia.com

Treatment of obstetric post-dural puncture headache. Part 2: epidural blood patch

R. Russell,[a] C. Laxton,[b] D.N. Lucas,[c] J. Niewiarowski,[a] M. Scrutton,[d] G. Stocks[e]
[a] *Nuffield Department of Anaesthetics, Oxford University Hospitals NHS Foundation Trust, Oxford, UK*

PDPH

Conservative and pharmacological management

- Bed rest - not prolonged – DVT
- Oral/iv fluids – Normal hydration
- Simple oral analgesics –

  Paracetamol/NSAIDs/Weak opioids
- Stronger opioids – if simple analgesics fail
- Caffeine - ?efficacy

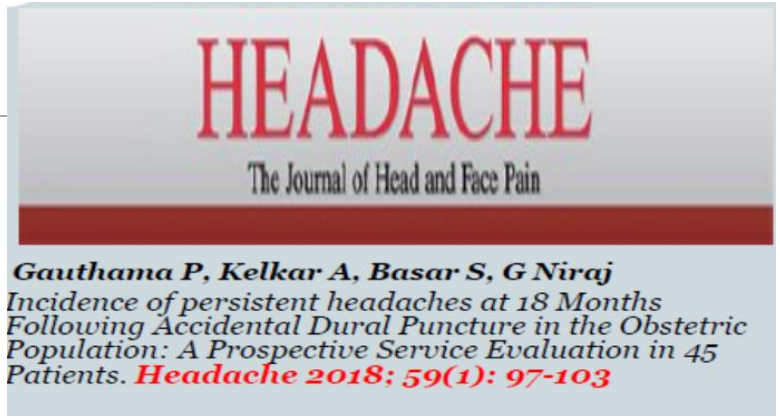
Epidural blood patch guidelines

- >48 hr better success
- Use of a check list (check last dose of anticoagulant)
- Follow up and inform GP

- Written informed consent (OAA leaflet) (50-80% success)
- Level of EBP – same level or space lower
- Blood volume – Aim for 20ml
- Blood cultures – No
- Position after EBP - ?evidence - 1-2hr supine

International Headache Society (IHS) PDPH

- Headache within 5 days of lumbar puncture (Incl ADT)
- Caused by CSF leak
- Accompanied by neck stiffness ± hearing symptoms
- Resolves within 2 weeks or after EBP



- 18 month follow up
- 45 women with DT
- 39 followed up
- 12 headache at 18 months
- 6 new onset
- 6 worsening of headache
- 30% chronic headache rate

Definitive: ADP Outcomes Study

- **Prospective Multicentre Trial: 9 UK** centers
- NIAA funded, NIHR supported
- **1** Dural Puncture : **2** Controls (**90: 180 = 270 patients)**
- Follow-up Period: **18 months (Headache & Low Back Pain)**
- *Primary Outcome: Incidence of persistent headache @ 18 months*
- ***Recruitment completed***
- Follow-up Completion: April 2020

Obstetric patient vs. Obstetric anaesthetist

- Complex medical conditions
- Maternal age/IVF choices
- Higher expectations
- Prepared to get pregnant against doctors advice
- Those who survive against all odds come back again

Knowledge (physician)

Skills

Communication – MDT

Thank you

Algorithm 1 - safe obstetric general anaesthesia

Pre-theatre preparation

Airway assessment
Fasting status
Antacid prophylaxis
Intrauterine fetal resuscitation if appropriate

Plan with team

WHO safety checklist / general anaesthetic checklist
Identify senior help, alert if appropriate
Plan equipment for difficult / failed intubation
Plan for / discuss: wake or proceed with surgery (Table 1)

Rapid sequence induction

Check airway equipment, suction, intravenous access
Optimise position – head up / ramping + left uterine displacement
Pre-oxygenate to $F_{ET}O_2 \geq 0.9$ / consider nasal oxygenation
Cricoid pressure (10 N increasing to 30 N maximum)
Deliver appropriate induction / neuromuscular blocker doses
Consider facemask ventilation (P_{max} 20 cmH_2O)

1st intubation attempt

If poor view of larynx optimise attempt by:

- reducing / removing cricoid pressure
- external laryngeal manipulation
- repositioning head / neck
- using bougie / stylet

Success

Verify successful tracheal intubation
Proceed with anaesthesia and surgery
Plan extubation

Fail

Ventilate with facemask
Communicate with assistant

2nd intubation attempt

Consider:

- alternative laryngoscope
- removing cricoid pressure

3rd Intubation attempt only by experienced colleague

Fail

Follow Algorithm 2 – obstetric failed tracheal intubation

Cardiac disease risk scoring in pregnancy

1. CARPREG I
2. CARPREG II
3. ZAHARA
4. WHO

Table 2 CARPREG II risk score

Risk factors	Points
Prior cardiac event or arrhythmia	3
NYHA class >II or cyanosis	3
Mechanical valve	3
Ventricular dysfunction	2
High-risk left-sided valve disease/ LVOT obstruction	2
Pulmonary hypertension	2
Coronary artery disease	2
High-risk aortopathy	2
No prior cardiac intervention	1
Late pregnancy assessment	1
Total score	**Risk of cardiac complications**
0–1 points	5%
2 point	10%
3 points	15%
4 points	22%
>4 points	41%

NYHA: New York Heart Association; LVOT: left ventricular outflow tract; From: Silverside CK, Grewal JM, Mason J, et al. Pregnancy outcomes in women with heart disease: the CARPREG II study. *J Am Coll Cardiol* 2018;**71**:2419–30.

Table 3 ZAHARA risk score

Risk factors	Points
Mechanical valve prosthesis	4.25
Left heart obstruction	2.5
History of arrhythmia	1.5
Cardiac medication prior to pregnancy	1.5
Cyanotic heart disease (corrected or uncorrected)	1.0
NYHA class ≥ II	0.75
Systemic atrioventricular valve regurgitation >mild	0.75
Pulmonic atrioventricular valve regurgitation >mild	0.75
Total score	**Risk of cardiac complications**
0–0.5 points	2.9%
0.51–1.5 points	7.5%
1.51–2.5 points	17.5%
2.51–3.5 points	43.1%
>3.51 points	70%

NYHA: New York Heart Association; From: Drenthen W, Boersma E, Balci A, et al. Predictors of pregnancy complications in women with congenital heart disease. *Eur Heart J* 2010; **31**: 2124–32.

CARPREG II risk score

Table 2 CARPREG II risk score

Risk factors	Points	
Prior cardiac event or arrhythmia	3	✔
NYHA class >II or cyanosis	3	✔
Mechanical valve	3	
Ventricular dysfunction	2	✔
High-risk left-sided valve disease/ LVOT obstruction	2	
Pulmonary hypertension	2	✔
Coronary artery disease	2	
High-risk aortopathy	2	
No prior cardiac intervention	1	
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Total score	Risk of cardiac complications
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>4 = 41% risk of cardiac complications

IHD Pt total score = 10

Myometrial contractility

Studies suggest that obesity results in impaired myometrial contractility and that leptin, which is released by adipose tissue, may contribute to inhibit uterine contractions.

Moynihan AT, Hehir MP, Glavey SV, Smith TJ, Morrison JJ. Inhibitory effect of leptin on human uterine contractility in vitro. American Journal of Obstetrics and Gynecology 2006; 195: 504-509.

PDPH – conservative treatment
No evidence

- **ACTH**
- **Steroids**
- **Gabapentinoids**
- **DDAVP**
- **Aminophylline**
- **Neostigmine**
- **etc**

Patients with Arnold Chiari

- **Some patients are undiagnosed (20%)**
- **Mode of delivery**

  CS or avoid prolonged labour
- **Type of anaesthetic/ analgesia**

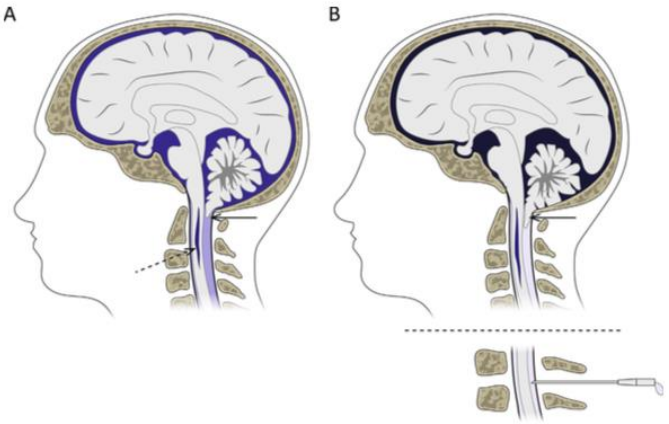

Fig. 1 Schematic representation of Arnold Chiari malformation-I. In panel A: the dotted arrow referring to the syrinx, the solid arrow referring to the Chiari malformation with herniation of the cerebellum into the foramen magnum. Despite impaired cerebrospinal fluid flow into the cervical spinal canal, there is not an excessive pressure gradient between the brain and spinal cord. In panel B: When cerebrospinal fluid pressure drops due to a dural tear (depicted with the needle) the cerebellar tonsil extends into the foramen magnum blocking the flow of cerebrospinal fluid into the cervical spinal canal (solid arrow), increasing the cerebrospinal fluid pressure exerted on the brain. In addition the decrease in pressure in the spinal canal causes the fluid pressure in the syrinx to increase, expanding the size of the syrinx in the spinal cord

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https://doi.org/10.1016/j.ijoa.2018.10.002

ORIGINAL ARTICLE

ELSEVIER
www.obstetanesthesia.com

Anesthetic management of parturients with Arnold Chiari malformation-I: a multicenter retrospective study

T.R. Gruffi,[a] F.M. Peralta,[a] M.S. Thakkar,[b] A. Arif,[c] R.F. Anderson,[d] B. Orlando,[c] J.C. Coffman,[b] N. Nathan,[a] R.J. McCarthy,[e] P. Toledo,[a] A.S. Habib[d]
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[e]*Department of Anesthesiology, Rush University Medical Center, Chicago, IL, United States*

Analgesia and anaesthesia in patients with Arnold Chiari

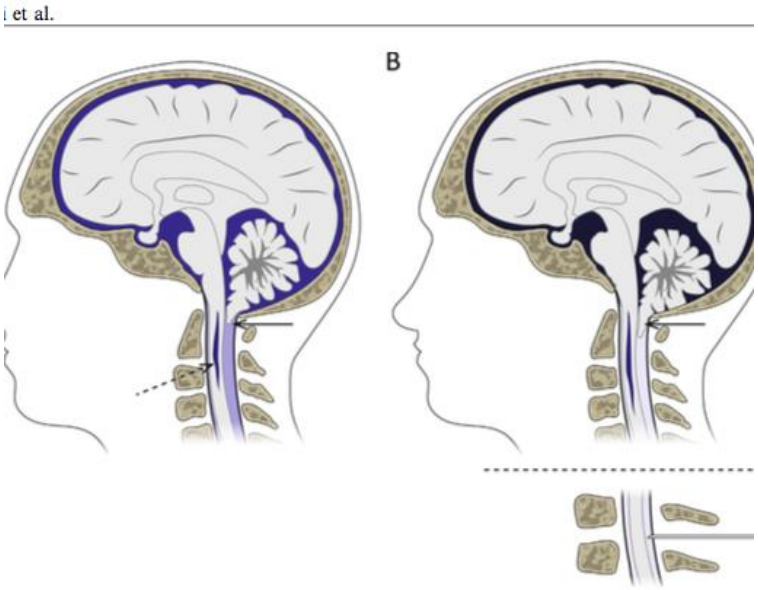
RA/GA

Case reports assoc with RA

1992 – Spinal – PDPH/visual changes – EBP – MRI – ACM

1993 – ADT – new neurological signs – MRI showed ACM – occipital decompression

When EBP fails, consider ACM



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Barton JJ Ann Neurol 1993;33:418-21
Hullander Anesth Analg 1992;75:1025-6

ITC for prevention of PDPH

			ITC	No ITC
N			35	30
PDPH			24 (69%)	16 (53%)
EBP			15 (43%)	8 (27%)
EBP	ITC	<24hrs	6/11	
		>24hrs	0/2	

Concerns

Increased anaesthetic workload

1 ITC had catastrophic high block with CVS collapse and LOC

3 ITC vs 1 ER had conversion to GA

Safety concerns over having ITC for >24hrs

Lau HY IJOA 2019;39 S1:S45

Duraisamy K IJOA 2019; 39 S1:S46