Съезд Congress

5-7 сентября 2018 / Санкт-Петербург
September 5-7, 2018 / St. Petersburg

Anesthesia for Emergency Delivery

Dr (Prof) Jyotsna Punj
All India Institute of Medical Sciences, New Delhi, India

III Съезд
Congress

АССОЦИАЦИЯ АКУШЕРОК-РЕАНИМАТОЛОГОВ * АССОЦИАЦИЯ АНЕСТЕЗИОЛОГОВ

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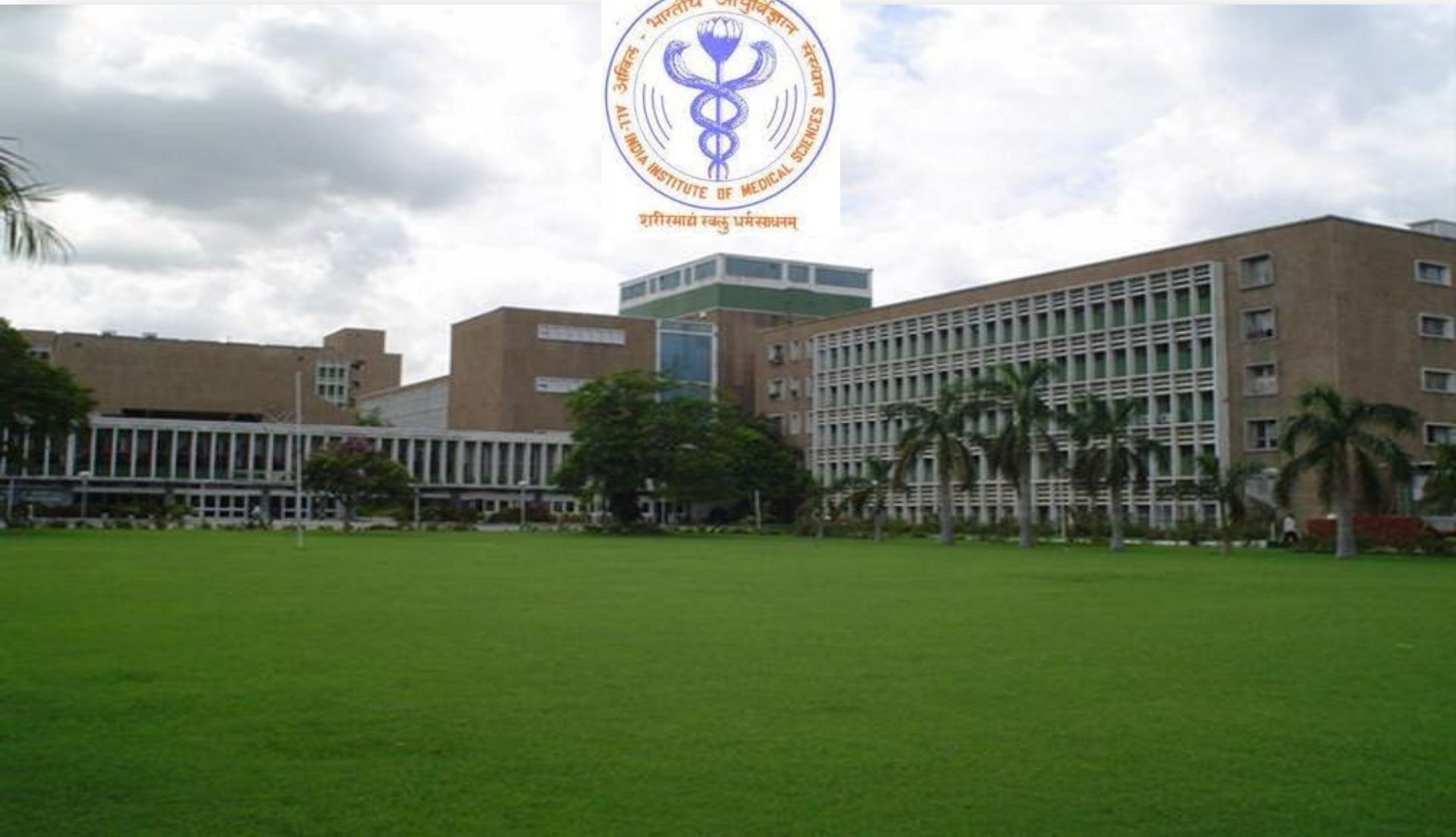

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The Indian EXPRESS

Tuesday, August 28, 2018

AIIMS nurse death: Distress call made to doctor but he didn't think it was genuine

Facing allegations of medical negligence, the senior resident defended his actions before the committee after the nurse's

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NEWS / CITY NEWS / DELHI NEWS / AIIMS SUSPENDS FIVE DOCTORS AFTER NURSE DIES POST-DELIVERY

OP SEARCHES: Earthquake in Delhi Delhi bandh Fire at Doordarshan Bhawan Delhi pollution Delhi rains

Fire at Doordarshan Bhawan

AIIMS suspends five doctors after nurse dies post-delivery

Durgesh Nandan Jha | TNN | Feb 6, 2017, 08:11 IST

HIGHLIGHTS

- The nurse had suffered a cardiac arrest during surgery, leading to complications
- The members of AIIMS nursing union staged a protest over the nurse's death
- Resident Doctors' Association demanded that the decision be rolled back

DELHI

Nurse death case: DMC suspends 2 AIIMS doctors

Bindu Shajan Perappadan

NEW DELHI, MAY 15, 2018 01:44 IST
UPDATED: MAY 15, 2018 01:44 IST

Urgent fetus delivery

Figure 1. A classification relating the degree of urgency to the presence or absence of maternal or fetal compromise

Urgency	Definition	Category
Maternal or fetal compromise	Immediate threat to life of woman or fetus	1
	No immediate threat to life of woman or fetus	2
	Requires early delivery	3
No maternal or fetal compromise	At a time to suit the woman and maternity services	4

Lucas et al; 2000
RCOG;2010

- **Category 1 (Immediate threat to life of mother or fetus)**
- **Maternal conditions**
  - PreEclampsia/Eclampsia/Sepsis/HELLP
  - Placenta anomalies : PP/PA/PPH/Hemorrhage: Uterine atony/Rupture
  - Heart diseases/Lung conditions
  - Pulmonary vein thrombosis/ Deep vein thrombosis/Amniotic Fluid embolism
- **Fetal conditions**
  - Acute & severe fetal bradycardia /Fetal heart decelerations without pick
  - Umblical cord prolapse/Fetal scalp < pH 7.2

NICE 2011

- **Category 2 (NO immediate threat to life of mother or fetus)**
  - Prevent further deterioration of maternal or fetal health
  - Antepartum bleeding
  - Obstructed labor with poor maternal or fetal health conditions
- **Category 3 (Requires early delivery)**
  - Early delivery recommended ; health conditions of mother & fetus being stable
    - Membrane rupture
    - Obstructed labor
- **Category 4 (At a time to suit the woman & maternity services)**
  - All pregnant women scheduled for CS
  - No restrictions regarding timing

NICE 2011

- **Physiology of blood supply to fetus during labor**
  - Uterine contraction/↓ uterine flow/hypoxia/catecholamine release/hypertension/reflex bradycardia/myocardial depression-**FHR decelerations**
  - **Early decelerations**
    - Head descent
  - **Variable decelerations**
    - Umblical cord compressions
  - **Late decelerations**
    - Uteroplacental deficiency

- **Terms used by obstetricians which an anesthetist needs to know**
- **Non stress test (NST)**
  - 2 accelerations in 20 minutes
- **Biophysical profile & Amniotic fluid volume & NST**
  - Score 10/10 ; normal
  - Score 6/10; suspected fetal acidemia/repeat testing
  - Score 2-6; mode of delivery decided on basis of obstetrical factors & maternal condition
  - Score 0-4; fetal acidemia, prompt delivery
- **Contraction stress test (CST)/Biophysical properties (BPP)**
- **Umblical artery Doppler**
  - Diastolic/systolic; ↑ is abnormal
  - Early induction/CS
- **Fetal ECG/HR/SpO2**

	Fetal acid base		
Category I	Normal		Routine care
Category II	Compromised	• Fetal brady with mod variability • Tachycardia • Late decelerations ↓ Baseline variability	• Close surveillance • Reevaluation/ • Inform anesthetist
Category III	Fetal acidosis	• Fetal bradycardia with Absent baseline variability • Variable/late deceleration • Recurrent	• INTRAUTERINE RESUSCITATION • Prompt intervention • O2/tilt/tt hypotension/discontinue uterotonic/tocolytic drugs/ • Operative vaginal/CS

NICE guidelines -2011

- Perform category 1 & 2 CS as quickly as possible after making the decision, particularly for category 1
- Perform **category 2** in most situations **within 75 minutes** of making the decision
- Take into account the condition of the woman and the unborn baby when making decisions about rapid delivery
- Remember that rapid delivery may be harmful in certain circumstances
- Use the following decision to delivery intervals to measure the overall performance of an obstetric unit :

  - **30 minutes for category 1 CS**
  - **Both 30 & 75 minutes for category 2 CS**

RCOG, 1995

J Anaesthesiol Clin Pharmacol. 2017 Jan-Mar; 33(1): 64–70.
doi: 10.4103/0970-9185.202197
PMCID: PMC5374832
PMID: 28413274

Evaluation of decision-to-delivery interval in emergency cesarean section: A 1-year prospective audit in a tertiary care hospital

Sunanda Gupta, Udita Naithani,[1] C. Madhanmohan,[1] Ajay Singh,[1] Pradeep Reddy,[1] and Apoorva Gupta

During the study period, 20,075 deliveries were conducted, of which 4077 (20.3%) were cesarean deliveries. Among the 4077 CSs, 453 (11.1%) cases were taken as emergency CS in whom mean DDI was 37.2 ± 17.4 min (range 15–203 min). DDI was ≤30 min in 42.4% (n = 192), >30–75 min in 55.2% (n = 250), and >75 min in 2.4% (n = 11) cases.

The mean age was 24.6 ± 3.9 years with a mean weight of 58.3 ± 5.8 kg. A majority (92.9%, n = 421/453) of the cases were carried out primarily under spinal anesthesia. 26 of these patients (6.2%) had inadequate block, and subsequently 23 (5.5%) needed supplementation. Three (0.7%) were converted to general anesthesia with endotracheal intubation. Of 453 cases, 32 (7.1%) were carried out under general anesthesia. No significant association was found between DDI and age (P = 0.430), weight (P = 0.127), or technique of anesthesia (P = 0.062).

Distribution of patients according to decision to delivery interval and indications for emergency cesarean section

Indications for CS	Decision to delivery interval, *n* (%)			Total, *n* (%)	DDI (min), mean±SD
	≤30 min	>30-75 min	>75 min		
Category 1 CS	133 (29.4)	149 (32.9)	5 (1.1)	287 (63.4)	36.3±17.2
Fetal distress	118 (26.0)	133 (29.4)	5 (1.1)	256 (56.5)	38.2±18.3
Uterine rupture	2 (0.4)	2 (0.4)	0 (0.0)	4 (0.9)	36.3±17.6
Category 2 CS	59 (13.0)	101 (22.3)	6 (1.3)	166 (36.6)	36.1±17.7
Obstructed labour	24 (5.3)	57 (12.6)	1 (0.2)	82 (18.1)	39.2±18.1
Antepartum hemorrhage	35 (7.7)	44 (9.7)	5 (1.1)	84 (18.5)	36.9±17.3
Unknown etiology	12 (2.6)	14 (3.1)	0 (0.0)	26 (5.7)	37.3±17.9
Abruptio placenta	12 (2.6)	14 (3.1)	2 (0.4)	28 (6.2)	39.3±18.5
Placenta previa	11 (2.4)	16 (3.5)	3 (0.7)	30 (6.6)	34.2±15.7
Total	192 (42.4)	250 (55.2)	11 (2.4)	453 (100.0)	37.2±17.4

P = 0.062. CS = Cesarean section, SD = Standard deviation, DDI = Decision-to-delivery interval

In our audit, we observed that only 42.4% of emergency CS conformed to the 30 min DDI recommended by WHO while 57.6% cases had a >30 min DDI, the mean DDI being 37.2 ± 17.4 min.

Reasons for delay	Frequency (%)	Intervals affected
Patient factors	16/453 (3.5)	
Patient delay in consenting	12 (2.6)	I
Previous surgery with adhesions	4 (0.9)	IV
Obstetrician factors	24/453 (5.3)	
Nonavailability of senior obstetrician on-site	12/453 (2.6)	I
Junior obstetrician operating	12/453 (2.6)	IV
Anesthesia factors	82/453 (18.1)	
Procedural delay	61 (13.5)	II
Nonavailability of senior anesthetist on-site	10 (2.2)	I
Conversion to GA	11 (2.4)	III
Lack of resources/staff	73/453 (16.1)	
Lack of operation theatre space	34 (7.5)	I
Delay in arrival of second anesthesia team	10 (2.2)	II
Delay due to nonavailability of instruments/linen	2 (0.4)	I
Nonavailability of helpers	12 (2.6)	I
Equipment/drugs/blood not available	10 (2.2)	II
Delay in patient preparation	5 (1.1)	I
Others (system delay)		
Shifting of patient to OT took 15-20 min due to system delay	100/453 (22.1)	I

In our audit, we observed that only 42.4% of emergency CS conformed to the 30 min DDI recommended by WHO while 57.6% cases had a >30 min DDI, the mean DDI being 37.2 ± 17.4 min.

while some of the Western counterparts[15,16] showed a mean DDI of 32 ± 13 min[15] with 45% deliveries occurring in <30 min and 93% deliveries occurring in <75 min. Kolås *et al.*[16] found an 11.8 min DDI for emergency CS while Helmy *et al.*[13] found the recommended DDI exceeded in 64% of cases of CS.

In contrast, much longer DDI has been observed in reports from some of the African countries, for example, Onah *et al.* reported a DDI of 511 min from Enugu and 201 min from Abiya,[17] while Yakasi found a mean DDI of 137 min at a tertiary center from Northern Nigeria.[18] In our study, ther

International Journal for Quality in Health Care 2008; **Volume 20, Number 2:** pp. 88–94
Advance Access Publication: 23 December 2007
10.1093/intqhc/mzm070

The decision to perform Caesarean section in Russia

KIRILL DANISHEVSKI[1], MARTIN MCKEE[2], FRANCO SASSI[3] AND VICTOR MALTCEV[4]

Tula
Tver
Dubna

- 92 respondents

	Odds ratio	*P* value	Lower CI
Expected birthweight			
2500 g	1.00		
3500 g	1.41	0.012	1.08
4200 g	7.39	<0.0001	5.58
Length of gestation			
35 weeks	1.00		
37 weeks	0.71	0.010	0.54
42 weeks	1.77	<0.0001	1.37
Eyesight			
Normal	1.00		
Severe myopia	1.92	<0.0001	1.54
Hystory of abortions			
None	1.00		
Four previous abortions	1.95	<0.0001	1.57
Heart disease			
None	1.00		
Prolapsed valve	10.55	<0.0001	7.84
Valvular stenosis	6.92	<0.0001	5.20
Pelvic outlet size			
10 cm	1.00		
10.5 cm	0.96	0.562	0.71
11 cm	0.62	<0.0001	0.48
Time of the day			
Noon	1.00		
11:00 PM	1.55	<0.0001	1.24	1.94
Maternal age			
17 years	1.00		
21 years	1.01	0.967	0.77	1.31
32 years	3.57	<0.0001	2.71	4.70
Socio-economic factors			
Single, low education	1.00		
Married, educated	0.87	0.242	0.69	1.10
Maternal smoking			
Non-smoker	1.00		
Over 20 cigarettes/day	0.81	0.076	0.64	1.02
Gender of physician[a]			
Female	1.000		
Male	2.737	0.015	1.22	6.17
Age of physician[a]			
Additional year of age	1.04	0.033	1.00	1.07

Anesthesia for Vaginal Emergency delivery ??

- If high risk / laboring without epidural catheter/ cervix dilated > 7 cm
  - Nitrous oxygen
  - Low dose ketamine
  - Pethidine Phenergan
- Forceps/ventous

- Cesarean Section most common for emergency delivery
- **Anesthesia for emergency CS**
  - Top up of well functioning epidural
  - Spinal anesthesia for non functioning epidural
  - Spinal anesthesia
  - Combined spinal epidural anesthesia
  - General anesthesia

Top up of functioning epidural

Evaluation of Surgical and Anaesthesia Response Times for Crash Caesarean Sections – An Audit of a Singapore Hospital

Y Lim,[1] *M Med*, MK Shah,[1] *M Med*, HM Tan,[1] *M Med*

Ann Acad Med Singapore 2005;34:606-10

anaesthesia. Lim *et al.* [10] in Singapore found the same decision-to-delivery time between general anaesthesia and top-up of epidurals, an impressive 7.7 ± 3.0 min.

Anaesthesia for emergency caesarean section, 2000–2004, at the Royal Women's Hospital, Melbourne

P Popham, AU Buettner, M Mendola
Department of Obstetrics and Gynaecology, University of Melbourne and Department of Anaesthesia, Royal Women's Hospital, Victoria

AIC 2007

In an audit from Australia encompassing 444 code green (grade 1 emergency) caesareans, mean decision-to-delivery time was 17 ± 6 min for general anaesthesia, 19 ± 9 min for epidural extensions and 26 ± 9 min for spinal anaesthesia [11•]. Clearly, the speed of onset is important, and

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Comparison of 2% lignocaine with adrenaline and fentanyl, 0.75% ropivacaine and 0.5% levobupivacaine for extension of epidural analgesia for urgent caesarean section after low dose epidural infusion during labour

BL Sng, LL Pay, ATH Sia
Department of Women's Anaesthesia, KK Women's and Children's Hospital, Singapore

reach satisfactory level of anaesthesia [12]. A comparison between 2% lignocaine with fentanyl, 0.5% levobupivacaine and 0.75% ropivacaine showed no significant difference in time to surgical readiness, defined as loss of sensation to cold at T4 between the three, but not surprisingly a longer duration of sensory block with levobupivacaine and ropivacaine [13•]. Malhotra and

Anaesthesia. 2007 Jul;62(7):667-71.

Extending low-dose epidural analgesia in labour for emergency Caesarean section - a comparison of levobupivacaine with or without fentanyl.

Malhotra S[1], Yentis SM.

Women in labour receiving epidural analgesia with 15 ml bupivacaine 0.1% and 2 microg.ml(-1) fentanyl followed by 10-15-ml top-ups as required, who needed Caesarean section, were randomly allocated to receive 20 ml levobupivacaine 0.5% over 3 min with either 75 microg fentanyl (1 ... reakthrough pain. Time to onset (los ... s were recorded. The study was stc ... administered top-ups to patient-con ... for analysis. There were no significan ... ative nausea/vomiting v ... epidural levobupivacaine w ... there was an increased inciden ... d the study proceeded to completion.

levobupivacaine and ropivacaine [13]. Malhotra and Yentis [14] have examined the addition of 75 μg fentanyl to 0.5% levobupivacaine (20 ml) and did not find any benefits compared with parturients getting only 0.5% levobupivacaine.

ate and epinephrine. Allam *et al.* [15•] demonstrated that a mixture of 1.8% lidocaine, 0.76% bicarbonate and 1:200 000 epinephrine resulted in surgical readiness in half the time compared with 0.5% levobupivacaine, with a median time to reach a block to T5 of about 7 min for the lidocaine–bicarbonate–epinephrine group. Although lidocaine may result in a slight increase in maternal sedation, it still seems to be a good alternative when time is utterly important [15•]. Bjornestad *et al.* [16] have shown in a controlled randomized trial that 2-chloroprocaine (30 mg/ml) without preservatives or additives provides loss of cold sensation at T5 as fast as lidocaine (20 mg/ml) and epinephrine 5 μg/ml. Epidural top-up

Timing of epidural top up

- Mostly done in OT
- Top up while transporting/Preparation of patient
  - Regan & O Sullivan: *Anaesthesia*; 2008
- Monitoring is insufficient
  - Levy 2006/Moore 2004/Russell 2004

Spinal anesthesia after epidural anesthesia

- Poorly functioning epidural
  - Pain/discomfort
- Conversion to GA/ Conversion to Spinal Anesthesia

Anaesthesia. 2008 Aug;63(8):822-32. doi: 10.1111/j.1365-2044.2008.05499.x. Epub 2008 Jun 28.

A prospective audit of regional anaesthesia failure in 5080 Caesarean sections.

Kinsella SM[1].

unsatisfactory anaesthesia for an emergency caesarean section. The rate of failure to achieve a pain-free operation was 24% with epidural top-up and 18% with the combined spinal/epidural (CSE) technique in a prospective audit performed over a 5-year period in Bristol, UK

Spinal anaesthesia for caesarean section following epidural analgesia in labour: a relative contraindication

A. Gupta, MBBS, DA, FRCA (Senior Registrar), G. Enlund, MD (Assistant Professor), M. Bengtsson, MD, PhD (Associate Professor), F. Sjöberg, MD, PhD (Assistant Professor)
Department of Anaesthesiology. University Hospital, S-581 85 Linköping, Sweden

Anesthesiol Clin North America. 2003 Mar;21(1):39-57.

Mechanisms and management of an incomplete epidural block for cesarean section.

Portnoy D[1], Vadhera RB.

- **Inadequate epidural**
  - Decrease dose by 20-30 %; add opioids
  - 9.38mg hyperbaric bupivacaine with 10-15 ug fentanyl

Int J Obstet Anesth. 2004 Oct;13(4):239-43.

Spinal anesthesia for cesarean section following inadequate labor epidural analgesia: a retrospective audit.

Dadarkar P[1], Philip J, Weidner C, Perez B, Slaymaker E, Tabaczewska L, Wiley J, Sharma S.

BACKGROUND: High blocks have been reported when spinal anesthesia is used for cesarean section following inadequate labor epidural analgesia. We have therefore modified the practice at our institution to minimize this risk and conducted a retrospective observational study of outcome following the change of practice.

METHOD: The records o 115 women ith inadequate epidural labor analgesia who required cesarean section between July 1998 and January 2002 were studied. No epidural boluses were administered in the 30 min preceding spinal anesthesia and a reduced spinal dose, median (range) 9.3 mg (7.5-11.3 mg) of 0.75% hyperbaric bupivacaine and fentanyl 15 microg (10-25 microg) was used. Patients were left sitting for 2 min y monitored for symptoms or signs that would suggest a hig

RESULTS: No parturient e neonatal outcome.

CONCLUSION: These fin anesthesia for cesarean section following suboptimal labo y preceding spinal injection, using a lower spinal dose, and delayed supine positioning following spinal injection may be advisable.

- Normal spinal dose
  - If no documented block
  - > 30 minutes since last epidural dose

Spinal Anesthesia for emergency CS

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P Popham, AU Buettner, M Mendola

Department of Obstetrics and Gynaecology, University of Melbourne and Department of Anaesthesia, Royal Women's Hospital, Victoria

AS FAST AS GENERAL ANESTHESIA

Obstet Gynecol. 2005 Aug;106(2):281-7.

Complications of anesthesia for cesarean delivery.

Bloom SL[1], Spong CY, Weiner SJ, Landon MB, Rouse DJ, Varner MW, Moawad AH, Caritis SN, Harper M, Wapner RJ, Sorokin Y, Miodovnik M, O'Sullivan MJ, Sibai B, Langer O, Gabbe SG; National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network.

OBJECTIVE: To quantify anesthesia-related complications associated with cesarean delivery in a well-described, prospectively ascertained cohort from multiple university-based hospitals in the United States and to evaluate whether certain factors would identify women at increased risk for a failed regional anesthetic.

METHODS: A prospecti th singleton gestations undergoing cesarean delivery in the centers oment Maternal-Fetal Medicine Units Network. Detailed information wa d complications, including failed regional anesthetic and materna e analyzed.

- 15,000 spinals/15,000epidurals/ 4000 GA
  - Failure 2.1 %
  - Postdural headache 0.5 %
  - High spinals 0.6 %

RESULTS: Of the wom 0%) regional procedures failed, and related maternal morbidity was cision-to-incision interval, and placement later in labor were all significa the general anesthetics, 38% were administered when the decision-to-incision interval was less than 15 minutes. Women deemed at the greatest preoperative risk (American Society of Anesthesiologists score > or = 4) were approximately 7-fold more likely to receive a general anesthetic (odds ratio 6.9, 95% confidence interval 5.83-8.07). There was one maternal death, due to a failed intubation, in which the anesthetic procedure was directly implicated.

CONCLUSION: Regional techniques have become the preferred method of anesthesia for cesarean delivery. Procedure-related complications are rare and attest to the safety of modern obstetric anesthesia for cesarean delivery in the United States.

- **Spinal Anesthesia**

- Widely used
- Choice of drug
  - Bupivacaine; iso or hyper
  - Ropivacaine/Levobupivacaine
    - *Gautier 2003; Parpaglioni2006*
  - Addition of lipophilic opioids ; fentanyl/sufentanyl
    - Faster onset/lower dose of LA
      - *Mahajan 2004*

- **Opioids in spinal anesthesia**

- Fetal hypoxia & bradycardia / Increased uterine tone
  - ↓Catecholamines after spinal anesthesia
  - ↓β agonism (uterine relaxation)/↑↑ agonism (uterine constriction)
  - ↓Uterine tone/↑Uteroplacental flow
    - *Abrao et al; 2009/Clarke et al ; 1994/Mardirosoff et al; 2002*

- No such effect
  - *Wong et al 2000/2004*

Combined spinal epidural/Dural puncture epidural

- Techniques to extend level of low dose spinal
  - 0.9 % NaCl
  - Local anesthetic
- Useful in high risk cardiac patients
- Advantages of Sequential CSE
  - May take 20-40 minutes to reach satisfactory block after low spinal dose
  - High rate of failure to achieve a pain free surgery
  - NOT recommended for Grade 1 CS

General anesthesia

- Slightly faster than RA *McEnzie et al 2002/Hillemanns 2005/Lim et al 2005*
- Extremely urgent situations
  - Cord prolapse/Uterine rupture/Hemorrhage placenta previa/Premature abruption /Fetal decelerations without pick
  - Failure of RA/Contraindication of RA
- Not much time for PAC /Make drugs as soon as decision made
- Haste detrimental for mother & fetus
  - Less experience with GA
- Preparation of GA
  - Antacids/proton pump inhibitors
  - Antibiotic after skin incision to prevent endometriosis

Induction drugs

- Thiopental 4-5 mg/kg
  - Acceptable depth of anesthesia for mother/Limited neonatal depression
  - Not available in USA
- Propofol , 2.5 mg/kg
  - More fetal depression
  - Less awareness than thiopental/Better for hypertensive response
- Both not licensed
- Hemodynamic instability
  - Ketamine ; 1-1.5 mg/kg
  - Etomidate ; 0.3 mg/kg
  - Ketofol

- *Murdoch et al 2013/Duggal et al 2003/Russell et al 2003*

Muscle relaxants

- Succinylcholine 1mg/kg
  - Rapid onset/Highly ionized/poorly lipid soluble
  - Side effects
  - Trans placental transfer
- Rocuronium 1mg/kg
  - No adverse affect on neonatal apgar scores/acid base measurements
  - Difficult airway/ Prolonged duration of action
    - Suggamadex
      - 4mg/kg ; profound NM block; 2mg/kg; moderate block
      - TOF 0.9 within 2 min
      - Safety profile in parturient ?
        - Hypersensitivity / allergic reactions
          - *Puhringer 2010/Mc Guigan 2011/Nauheimer 2012/Hemmerling 2010*

Opioids

- ↓ Utero placental perfusion/maternal hypotension
  - After umblical cord clamping
- **Indications**
  - Cardiac / neurologic disease
  - Preeclampsia
    - Risk of stroke
      - Remifentanil 0.5-1ug/kg at induction
        - Stable maternal HR
        - Minimal transient neonatal respiratory depression
          - Monitoring of neonate
  - Healthy parturients
    - Risk of awareness

- *Yoo et al 2013/van de Velde et al 2004/*

- **Supraglottic devices**
  - Fasted/ non obese pts
  - Difficult intubation/ventilation
    - Ventilation with cricoid pressure

- GOLD STANDARD; CRICOID PRESSURE & INTUBATION
  - *Han et al 2001/Halasey et al 2010*

Maintanence of anesthesia

- ↓ requirement by 25-40 %
- **Sevoflurane**
  - Before delivery
    - Transplacental drug transfer/Fetal depression
  - After delivery
    - Dose dependent myometrial relaxing properties
  - 1MAC
- **Propofol**
- Awareness
  - BIS monitoring
  - Preop explain pt

- *Sanders et al 2014/Zand et al2014/Chestnut 2014*

Hypotension in parturient

- Directly linked to fetal acid base status
  - Fetal metabolic acidosis ≈ umblical cord base deficit
    - *Ross et al; 2002/Littleford et al ; 2004*
- Management
  - Aggressive fluid/Vasopressors/Change in maternal position
- Neonatal acidemia
  - Neuraxial > GA *Mueller et al; 1997*
- Phenylephrine *Lee 2002/Saravanan 2006/Ngan 2009/Veeser 2012*
- Ephedrine
  - Fetal acidosis *Cooper et al ;2010*
- Norepinephrine ?

Management of Emergency Cesarean Section

- AVOID emergency situation/Early Anesthesia evaluation
  - Early Referral for high risk
  - Communication with Obstetricians
    - Discuss Antepartum results/Immediate & long term plan: Urgent /Emergency CS
  - Airway evaluation
    - Difficult cart/back up plan/surgical airway
- Early epidural insertion
  - Check position
  - FHR monitoring during & after insertion
    - Convert to GA if Category II to Category III
    - Category III : Assess fetal maternal risk/Communicate about time available
- Communicate with patient & relatives

What changes have we made

- Regular functioning of both maternity OT tables
- Anesthesia resident stationed 24x7 in maternity OT

  Frequent meetings on formal level b/w Consultants/ Residents

  - Better communication
  - Preop plan
- Two teams for CS OT with clear cut guidelines
- Morbidity discussion

Choice of anesthetic technique is a

Risk Benefit discussion b/w obstetrician & anesthetist

to consider well being of both mother & fetus

Should be individualized on several factors :

Anesthetic /obstetric or fetal risk factors

Neuraxial preferred

GA for immediate delivery