Decision to deliver in maternal critical care

SFOAI Svensk Förening för Obstetrisk Anestesi och Intensivvård

Rupert Gauntlett

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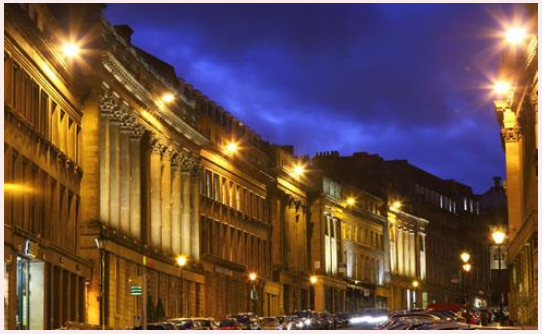
The Newcastle upon Tyne Hospitals NHS
NHS Foundation Trust

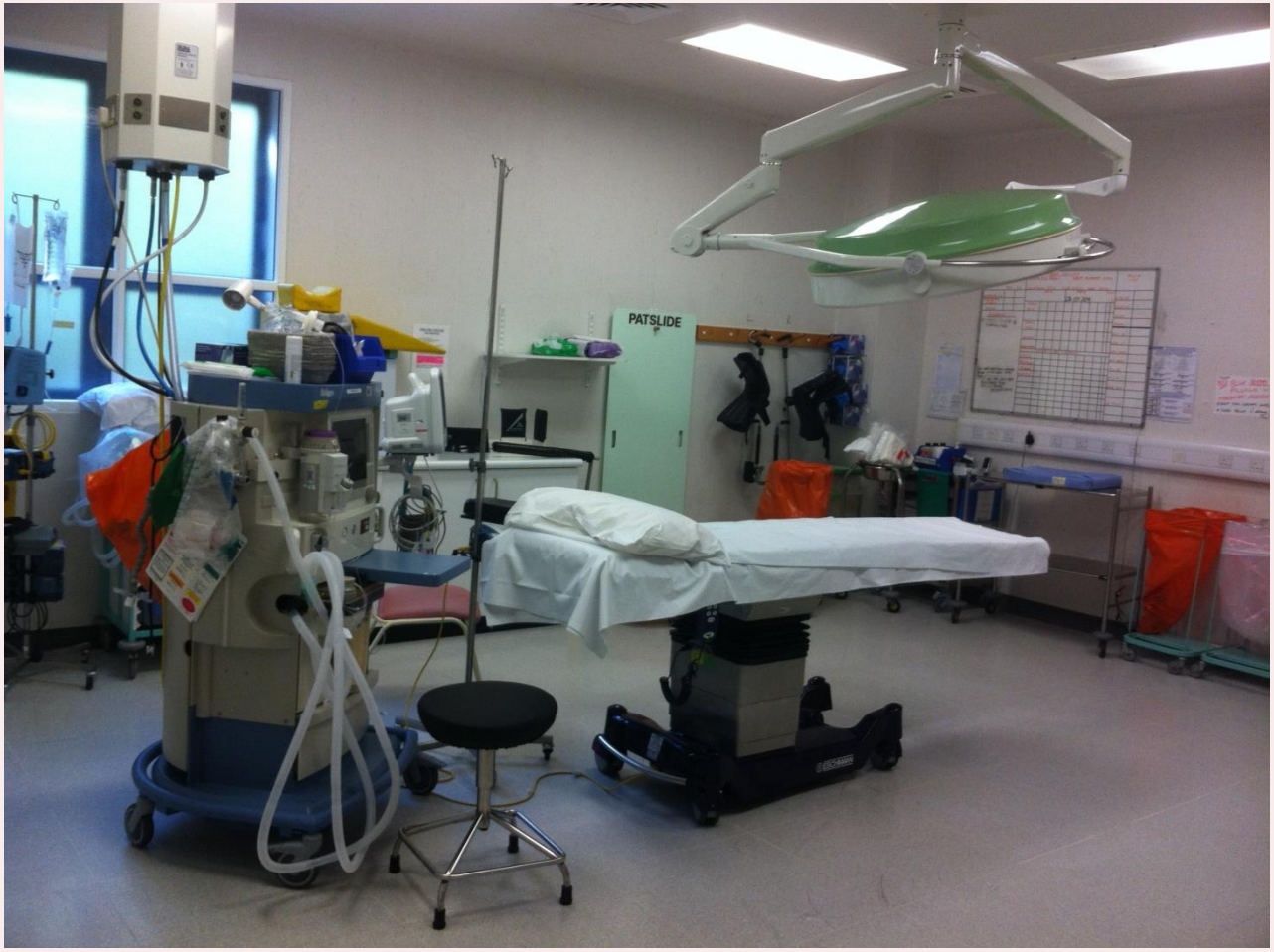



ROYAL
VICTORIA
INFIRMARY
STOP


great north
CHILDREN'S HOSPITAL
S405 KTY


LEAZES WING
AMBULANCE


Fire exit


PATSLIDE

When should we consider delivery (or ending a pregnancy) in a woman who is critically ill?

“I think the only thing that I can offer here is to empty the uterus”

consultant obstetrician faced with a 28 week pregnant mother with rapidly deteriorating critical illness

‘The best way to keep the fetus well is to keep the mother well’

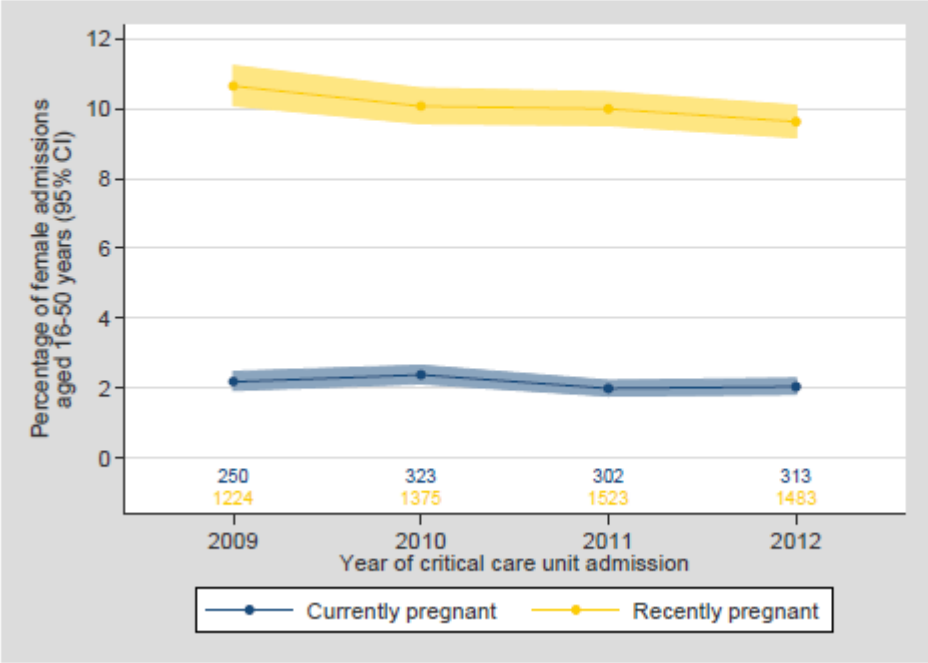
mantra of maternal medicine

Are the interests of the mother and the fetus always coincident in critical care?

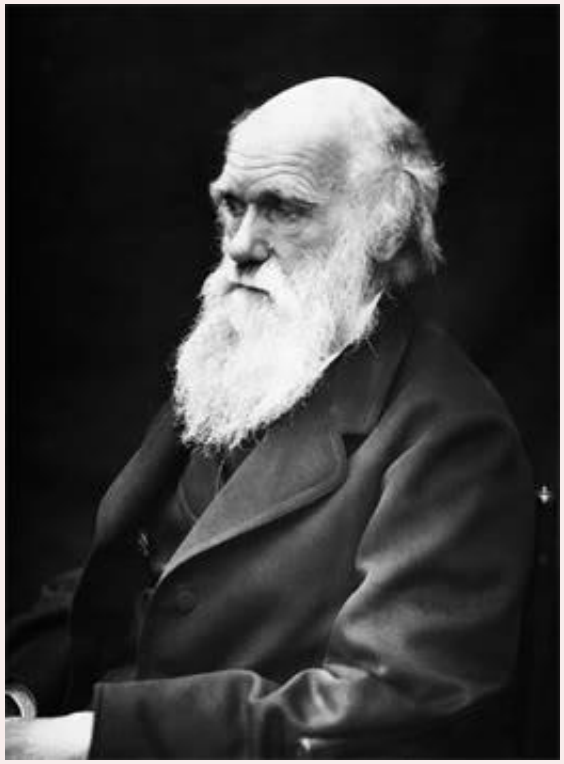
Why is this such an uncomfortable question?

1. Clinical rarity

Figure 7. Trend in admissions reported as 'currently pregnant' or 'recently pregnant' as a percentage of female admissions aged 16-50 years, 2009 to 2012



Beware of ‘experts’



“Ignorance more frequently begets confidence than does knowledge”

Why is this such an uncomfortable question?

1. Clinical rarity
2. Limited evidence base
3. Irreversible ‘active’ decision
4. Crosses specialities, who is best place to judge?

Scenario

- 24 year old woman, BMI 44, smoker, 29 weeks pregnant, 2 children under 5
- Presented with abdominal pain
- Delayed diagnosis of appendicitis, extensive contamination of pus in abdominal cavity
- Returned to ICU, high dose vasopressors, appropriate antibiotics, anuric renal failure
- Initially gas exchange was OK but now has ARDS

The critical care consultant asks your advice about the on-going management of the pregnancy.
When would you recommend delivery?

a) now
b) when oxygenation/gas exchange becomes critical
c) when the mother has recovered, because ‘the best way to keep the fetus well is to get the mother well’

Key Causal Factor 2:

Failure to offer all management options to a patient experiencing inevitable miscarriage of an early second trimester pregnancy where the risk to the mother increased with time from the time that membranes were ruptured.

Royal College of Obstetricians and Gynaecologists

Setting standards to improve women's health

Green-top Guideline No. 56

January 2011

Maternal Collapse in Pregnancy and the Puerperium

4.5 When, where and how should perimortem caesarean section be performed?

If there is no response to correctly performed CPR within 4 minutes of maternal collapse or if resuscitation is continued beyond this in women beyond 20 weeks of gestation, delivery should be undertaken to assist maternal resuscitation. This should be achieved within 5 minutes of the collapse. D

Delivery within 5 minutes of maternal collapse improves the chances of survival for the baby, but this is not the reason for delivery. If maternal resuscitation continues beyond 4 minutes of the collapse, delivery of the fetus and placenta should be performed as soon as possible to aid this, even if the fetus is already dead. There is, of course, the possibility that the outcome could be that of a severely damaged surviving child, but the interests of the mother must come first.

Perimortem cesarean delivery: Were our assumptions correct?

Vern Katz, MD,[a,*] Keith Balderston, MD,[a] Melissa DeFreest, MD[b]

American Journal of Obstetrics and Gynecology (2005) **192**, 1916–21

- In 12 out of 18 cases, return of spontaneous maternal circulation immediately followed peri-mortem CS 'often in a dramatic fashion'
  - Aorto-caval compression
  - Improved ventilation
  - Removing a low resistance circulation which was taking a significant portion of the cardiac output

The physiological rationale for recommending peri-mortem CS to aid maternal resuscitation also applies in severe maternal critical illness

Pregnant and critically ill: when to deliver? What information could help?

- Overall do the physiological changes of pregnancy help or hinder in critical illness?
- Can we improve the outcome for mothers?
- Can we improve the outcome for babies?
- What is the spontaneous miscarriage rate in critically ill mothers?
- Are there long term implications for child health after maternal critical illness?
- How dangerous is a caesarean section in a critically ill woman?
- What part do human factors play in reaching this decision?

Effect of delivery on ventilatory parameters

	Pre-delivery	2-5 h post	12-15 h post
$PaO2/FiO_2$ ratio	269	239	290
Oxygenation Index	6.0	6.1	5.3
Compliance (ml/cmH_2O)	22.3	22.2	32.8
PEEP (cmH_2O)	13	11	8

[Effect of Delivery]

Lapinsky S.E. Mechanical ventilation in critically ill pregnant women
ESICM 2014, Barcelona, Spain.

What are the maternal outcomes of critical illness in pregnancy?

Table 6. Outcomes for female admissions to critical care aged 16-50 years reported as 'currently pregnant', 'recently pregnant' or neither on admission to the critical care unit

Female admissions aged 16-50 years		Currently pregnant	Recently pregnant	Neither
Number of admissions		1,188	5,605	48,998
Critical care unit mortality, deaths (%) [95% CI]		20 (1.7) [1.1, 2.6]	73 (1.3) [1.0, 1.6]	4,299 (8.8) [8.5, 9.0]
Acute hospital mortality*, deaths (%) [95% CI]		30 (2.7) [1.9, 3.8]	97 (1.8) [1.5, 2.2]	5,325 (11.6) [11.3, 11.9]
Location of death, n (% of deaths)	Original critical care unit admission	19 (63.3)	67 (69.1)	3,986 (74.9)
	Subsequent critical care unit admission†	7 (23.3)	22 (22.7)	552 (10.4)
	Acute hospital – following discharge from critical care‡	4 (13.3)	8 (8.2)	787 (14.8)

* Excluding readmissions to the critical care unit within the same acute hospital stay.

† Following transfer to another critical care unit or readmission to the original critical care unit.

‡ May include some deaths in other critical care units not participating in the CMP.

Case reports and publication bias

International Journal of Obstetric Anesthesia (2009) **18**, 268–271
0959-289X/$ - see front matter
doi:10.1016/j.ijoa.2009.02.003

ELSEVIER
www.obstetanesthesia.com

CASE REPORT

Prone positioning for ARDS following blunt chest trauma in late pregnancy

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[b] *Department of Obstetrics, Charité, Universitaetsmedizin Berlin, Germany*
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ELSEVIER

Burns Vol. 23, No. 7/8, pp. 596–600, 1997

Printed in Great Britain
0305-4179/97 $17.00 + 0.00

PII: S0305-4179(97)00055-7

Burns during pregnancy: a gloomy outcome

Amr R. Mabrouk[1], Alaa Eldin H. El-Feky[2]

[1]Department of Burns and Plastic Surgery, Faculty of Medicine, Ain-Shams University, Cairo, Egypt and
[2]Department of Obstetrics and Gynecology, Faculty of Medicine, Ain-Shams University, Cairo, Egypt

27 patients in 12 month period

Percentage burn	Fetal loss
15-25	56%
25-50	63%

Mechanical ventilation in an obstetric population: Characteristics and delivery rates

Thomas M. Jenkins, MD,[a] Nan H. Troiano, RN, MSN,[a] Connie R. Graves, MD,[b] Suzanne M. Baird, RN, MSN,[b] and Frank H. Boehm, MD[b]

Philadelphia, Pa, and Nashville, Tenn

Thirty-seven of the 43 patients who were undelivered on presentation required or experienced labor and delivery during their stay (86%): 24 by cesarean delivery and 13 by vaginal delivery. The average gestational age at delivery was 32.6 ± 4.9 weeks. Of this subgroup, 11 patients underwent a trial of labor while receiving ventilation, 6 of whom had vaginal delivery.

Dig Dis Sci (2011) 56:3672–3677
DOI 10.1007/s10620-011-1809-5

ORIGINAL ARTICLE

Severe Acute Pancreatitis During Pregnancy: Eleven Years Experience from a Surgical Intensive Care Unit

Yanxia Geng · Weiqin Li · Liqun Sun · Zhihui Tong · Ning Li · Jieshou Li

Table 3 Delivery outcome stratified by the trimester and organ failure

Trimester at presentation	Number of organs that failed	Management and outcome
2	4 ($n = 2$)	1 Stillbirth, cs
		1 Induced labor at 29 weeks[a]
3	0 ($n = 2$)	1 FTD, cm
		1 Preterm: cs
	1 ($n = 9$)	3 FTD: 2 cs, 1 cm + cs[b]
		5 Preterm: 5 cs
		1 Stillbirth, cs
	2 ($n = 5$)	1 FTD, cs
		1 Preterm, cm
		1 Induced labor at 29 weeks[c]
		2 Stillbirth, cs

FTD full term delivery, *cm* conservative management, *cs* caesarean section

[a] At the insistence of family members, fetal loss

[b] Breech presentation

[c] Threatened premature labor, dilatation of cervix at 6 cm, fetal loss

Fetal outcomes of critically ill pregnant women admitted to the intensive care unit for nonobstetric causes*

Rodrigo Cartin-Ceba, MD; Ognjen Gajic, MD, MSc; Vivek N. Iyer, MD; Nicholas E. Vlahakis, MD

- January 1995 to December 2005
- 93 women

- 32 fetal losses, 10 neonates to NICU
- Risk factors associated with fetal loss
  - Presence of maternal shock (OR 6.85)
  - Maternal transfusion (OR 7.24)

The Journal of Maternal-Fetal and Neonatal Medicine, 2013; 26(5): 503–506

ISSN 1476-7058 print/ISSN 1476-4954 online
DOI: 10.3109/14767058.2012.739221

informa
healthcare

Severe sepsis and septic shock in pregnancy: indications for delivery and maternal and perinatal outcomes

Candice C. Snyder[1], John R. Barton[2], Mounira Habli[3] & Baha M. Sibai[4]

[1]University of Cincinnati College of Medicine, Cincinnati, Ohio, USA, [2]Central Baptist Hospital, Lexington, Kentucky, USA, [3]Cincinnati Childrens Hospital Medical Center, Cincinnati, Ohio, USA, and [4]University of Texas Health Science Center, Houston, Texas, USA

Severe sepsis – 40% of patients were delivered during hospitalisation

Septic shock – all patients were delivered during hospitalisation, 70% required emergency CS

Is H1N1 a special case?

From The Times
July 24, 2009

Pregnant swine flu victim 'gravely ill'

Lorraine Davidson

RECOMMEND?

The family of a pregnant swine flu victim who was flown to Sweden for specialist treatment yesterday paid tribute to the medical staff working to save her life and that of her unborn baby.

Sharon Pentleton

Sharon Pentleton's family revealed that she was "gravely ill" as doctors at the Karolinska University Hospital tried to prevent her organs from collapsing after she suffered a severe complication after

The successful use of extra-corporeal membrane oxygenation in the management of a pregnant woman with severe H1N1 2009 influenza complicated by pneumonitis and adult respiratory distress syndrome

L.C. Robertson,[a] S.H. Allen,[b] S.P. Konamme,[c] J. Chestnut,[a] P. Wilson[a]
[a] *Department of Anaesthesia, Crosshouse Hospital, Kilmarnock, UK*
[b] *Department of Infectious Diseases, Crosshouse Hospital, Kilmarnock, UK*
[c] *Department of Obstetrics, Crosshouse Hospital, Kilmarnock, UK*

Is H1N1 a special case?

DOI: 10.1111/j.1471-0528.2010.02736.x
www.bjog.org

Epidemiology

Critical illness with AH1N1v influenza in pregnancy: a comparison of two population-based cohorts

M Knight,[a] M Pierce,[a] I Seppelt,[b] JJ Kurinczuk,[a] P Spark,[a] P Brocklehurst,[a] C McLintock,[c] E Sullivan,[d] on behalf of the UK's Obstetric Surveillance System, the ANZIC Influenza Investigators, and the Australasian Maternity Outcomes Surveillance System

[a] National Perinatal Epidemiology Unit, University of Oxford, Oxford, UK [b] Department of Intensive Care Medicine, Nepean Hospital, and Sydney Medical School – Nepean, University of Sydney, Sydney, Australia [c] Obstetrics and Gynaecology, National Women's Health, Auckland City Hospital, New Zealand [d] Perinatal and Reproductive Epidemiology Unit, School of Women's and Children's Health, University of New South Wales, Sydney, Australia

Correspondence: M Knight, National Perinatal Epidemiology Unit, University of Oxford, Old Rd Campus, Oxford, OX3 7LF, UK. Email Marian.knight@npeu.ox.ac.uk

Accepted 29 August 2010. Published Online 13 October 2010.

Is H1N1 a special case?

Outcome	Australia and New Zealand *n*, %* (*n* = 59)	UK *n*, %* (*n* = 57)	*P* (χ^2)
Pregnancy outcome			
Livebirth	51 (89)******	45 (88)	0.50*
Miscarriage	2 (4)	0 (0)	
Stillbirth	4 (7)	5 (10)	
Termination	0 (0)	1 (2)	
Data not received (ongoing pregnancy at discharge)	3	6	

BJOG: an International Journal of Obstetrics and Gynaecology
July 2003, Vol. 110, pp. 641–642

EDITORIAL

Severe Acute Respiratory Syndrome and pregnancy

Criteria that have been considered for early delivery

1. Maternal rapid deterioration
2. Failure to maintain adequate blood oxygenation
3. Difficulty with mechanical ventilation due to the gravid uterus
4. Multi-organ failure
5. Fetal compromise
6. Other obstetric indications

When should we consider delivery (or ending a pregnancy) in a woman who is critically ill?

- As soon as critical illness (organ support) is instigated there should be daily consideration about ending the pregnancy in a controlled manner

1. Maternal rapid deterioration
2. Failure to maintain adequate blood oxygenation
3. Difficulty with mechanical ventilation due to the gravid uterus
4. Multi-organ failure
5. Fetal compromise
6. Other obstetric indications
7. Septic shock

Is it time to think about transferring to supra-regional centres for antenatal critical care?

National Peer Review Programme

NHS England

National Peer Review Report:
Major Trauma Networks 2013/2014

An overview of the findings from the 2013/2014 National Peer Review of Trauma Networks in England

www.nationalpeerreview.nhs.uk

News

Independent review of Major Trauma Networks reveals increase in patient survival rates

25 June 2013 - 09:30

NHS England today has welcomed the findings of an independent audit that shows 20 per cent more patients are now surviving severe trauma since the introduction of Major Trauma Networks in 2010.

Results from the Trauma Audit and Research Network (TARN) national audit show that 1 in 5 patients who would have died before the networks are now surviving severe injuries.