



UCL Elizabeth Garrett Anderson

Institute for Women's Health

Crash section, baby crying; why are obstetricians always getting it wrong?

Pat O'Brien





FETAL HEART RATE MONITORING

- 1970's:
“if we can monitor, we can prevent CP”
- Introduced without any RCT
- By 1980, EFM used in 50% of labours in USA



1970s: uncontrolled studies

- Retrospective observational studies:
 - continuous EFM vs selective or no EFM
 - control and study time periods differed
- ↓ perinatal mortality reported
- Results 'reinforced clinical enthusiasm' for EFM



FETAL HEART RATE MONITORING

- Dublin randomised trial
 - increased intervention
 - no improvement in neonatal outcome

(MacDonald et al.
Am J Obstet Gynecol
1985)





- **1976, Denver** (high risk population)
- **1976, Melbourne** (high risk population)
- **1978, Sheffield** (low risk population)
- **1979, Denver** (high risk population)
- **1981, Melbourne** (low risk population)
- **1985, Dublin** (low risk population)
- **1985, Copenhagen** (low & high risk population)
- **1987, Seattle** (high risk population)
- **1993, Athens** (low & high risk population)



- **Highly abnormal CTG:**
 - 50% - fetal acidosis
 - 0.2% - cerebral palsy

 - i.e.... False positive = 99.8%

(Nelson et al. *N Engl J Med* 1996)



Perinatal outcome

- Significant decrease in neonatal seizures with EFM:
RR 0.51, CI 0.32-0.82
- However - only trials including FBS, and those with 'high quality scores'



Long-term effects of neonatal seizures

- 3 follow up studies of prevalence of cerebral palsy:
 - 2 found no difference
 - 1 found an **increased** frequency amongst EFM group!





Perinatal outcome

No other measurable impact
on perinatal outcome:

- 1 minute Apgars <4 or <7
- rate of admission to NICU
- perinatal mortality





Intervention

- **Increase in CS rate:**
 - **overall: RR 1.41, CI 1.23-1.61**
 - **trials including FBS: RR 1.24, CI 1.05-1.48**

- **Increase in rate of operative vaginal delivery:**
 - **overall: RR 1.20, CI 1.11-1.30**
 - **most marked in trials including FBS**



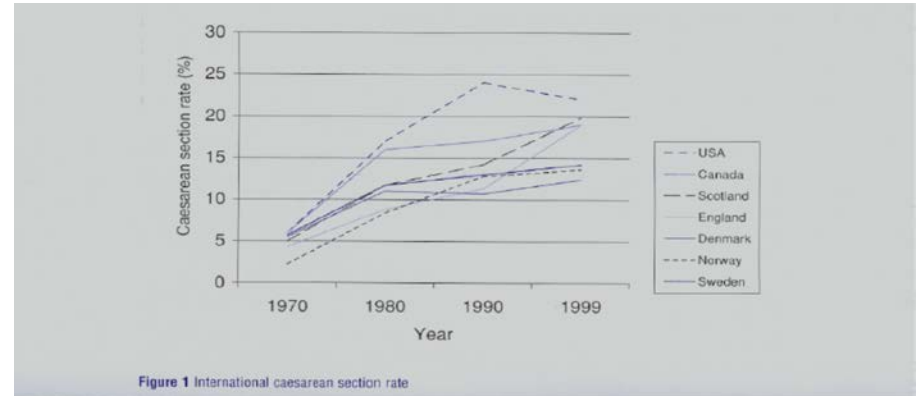


Are we surprised? No!

- Outcome rare:
 - perinatal mortality: 8 per 1000
 - cerebral palsy: 1.1 per 1,000
- Only 10% of cerebral palsy due to perinatal events
- *Indirect* measure
- Up to 40% of CTGs are defined as 'abnormal':
 - out of proportion to the pathological events sought

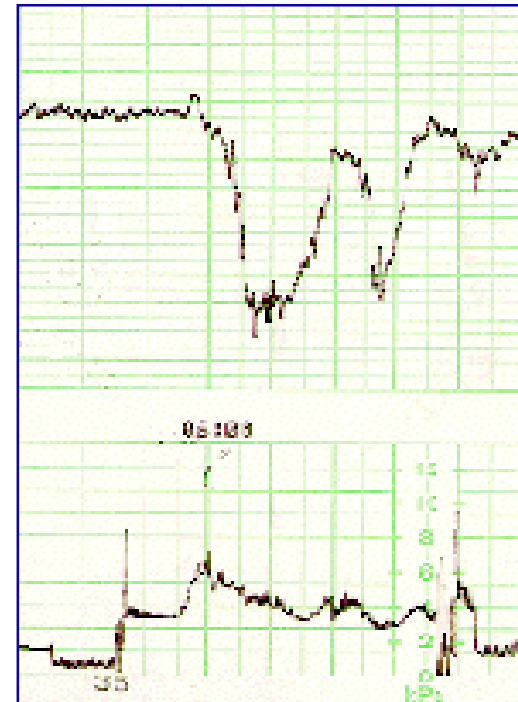
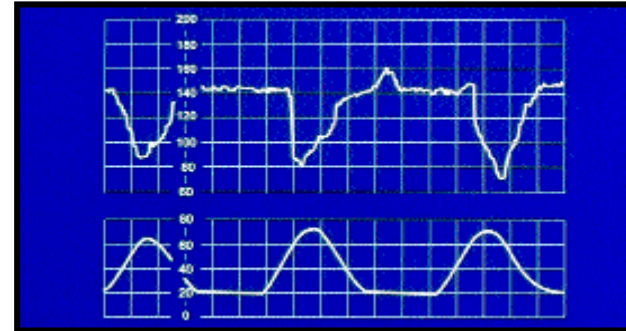


Why has FHR monitoring led to an increase in CS, but no improvement in perinatal mortality?



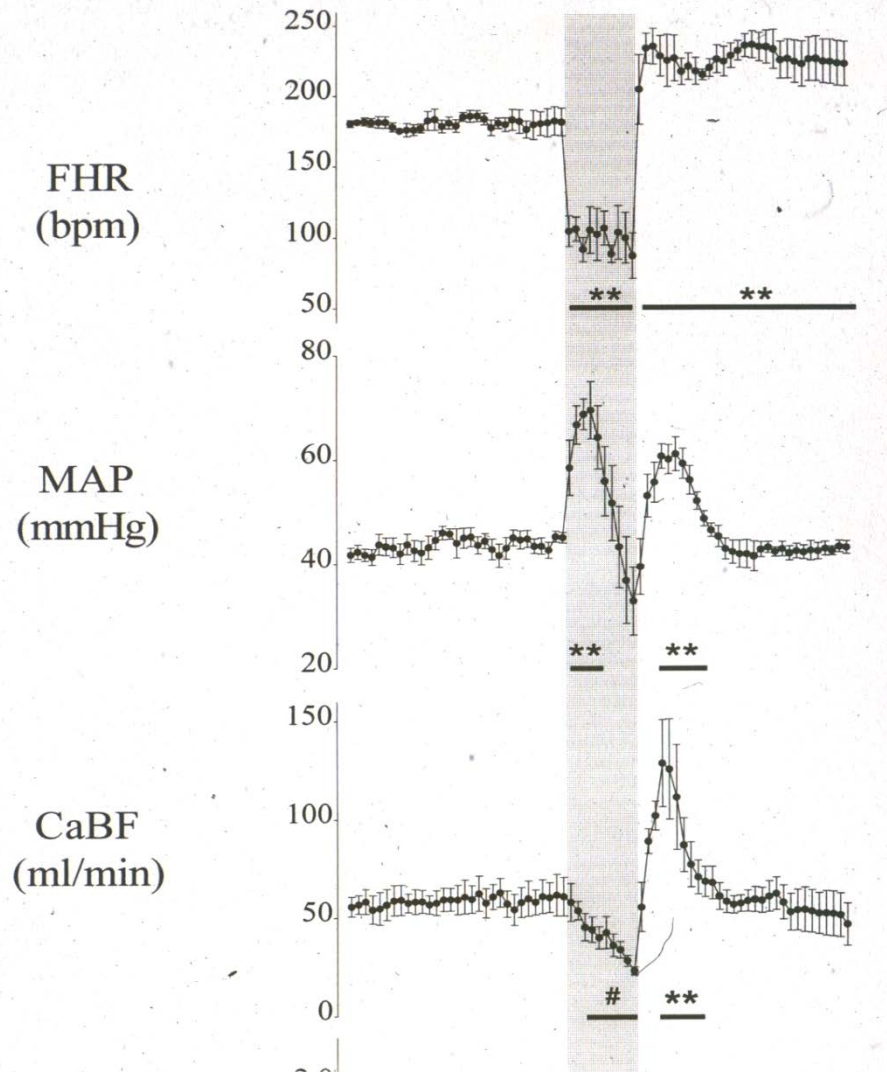


- Hypoxia leads to bradycardia
- Hypoxic episodes common
- Why are more babies not damaged?





HYPOXIA



10 minutes of umbilical cord occlusion

Diving reflex

Bennet, Peebles, Edwards et al, *Pediatr Res*, 1998

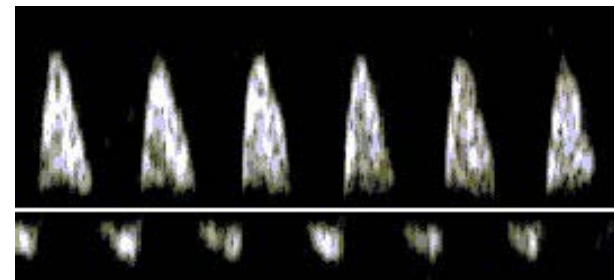
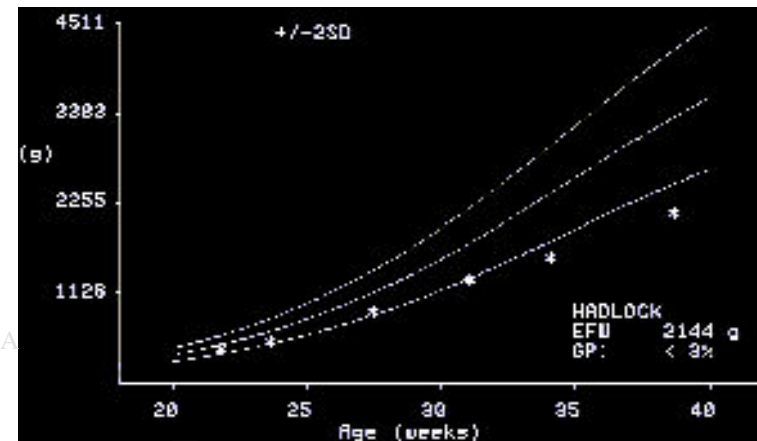


	No damage	< 10% damage	>10% damage	Fetal death
Basal BP (mean \pm SD)	6.1(1.1)	5.7 (0.6)	5.8 (0.3)	6.2 (0.4)
Minimum BP	6.4(0.9)	5.0 (0.8)	3.5 (0.8)	2.6 (1.1)

A.J.Gunn et al, 1992, Ped Res, 31:486-491



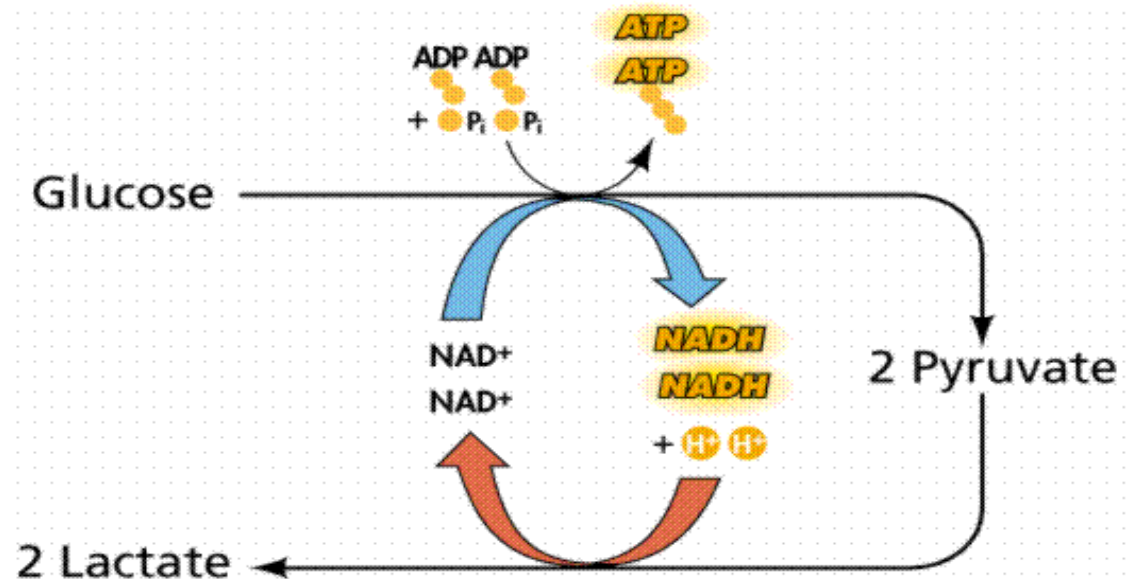
- Blood pressure
- Cerebral blood flow
- Oxygen delivery to the brain preserved
- Severe hypoxia - blood pressure falls





Anaerobic Metabolism

- Why does the brain need Oxygen?





Anaerobic Metabolism

- Release of energy without the use of Oxygen
- Production of Lactic acid



FETAL HEART RATE MONITORING

- Sensitivity high
- Specificity low



Why are obstetricians always getting it wrong?

- Imperfect technology measuring the wrong thing
- Litigation if we ignore it

'There is little evidence that the use of EFM will diminish in the near future'



Cochrane Review, 2001



Biphasic ST

grade 1

grade 2

grade 3

