

How to Assess Pain in Newborn Babies?

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Aims of this presentation

- The history of infant pain assessment
- Current knowledge and knowledge gaps
- Implications for treatment of pain
- Implications for research on pain medicines

Measuring pain...

...is 'monkey business'



Measuring pain in children

What we've learned?

- Just ask
- Children can do it
 - Developmentally appropriate tools
- Even infants can do it
 - Indirect measures

What do we know?

- In healthy and moderately ill infants brief acute pain can be accurately and reliably detected using:
 - Behaviour
 - Cardio-respiratory signs
 - Stress hormone levels

Infant pain measures:

Cardio-respiratory and Autonomic

Heart Rate

Blood pressure

Respiratory Rate

O₂ saturation

Palmar sweat

Skin blood flow

Heart rate variability

Behavioural

Facial action

Body movement

Vocalisation

Sleep

Feeding

Neuroendocrine

Cortisol

Catecholamines

Beta-endorphin

Glucose

Insulin

Nitrogen balance

Limitations of indirect pain measures

- Do not measure pain (nociception) *per se*
- Measure intensity of
 - Pain-related distress
 - Pain reactivity
- Are influenced by contextual factors
 - Previous pain
 - Level of arousal

Indirect pain measures can also detect...

- Response to treatment
 - Non-pharmacological
 - Pharmacological

Response to non-pharmacological treatments

Heel Puncture

<u>Intervention</u>	<u>Mean PIPP</u>
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Control	9.81
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Prone	10.28
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Pacifier w/ water**	8.47
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Pacifier w/ sucrose**	7.86
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Stevens, Johnston, Franck, et al, Nurs Res, 1999

Pacifier w/ water	10.19
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Sucrose alone**	9.77
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Pacifier w/ sucrose**	8.16
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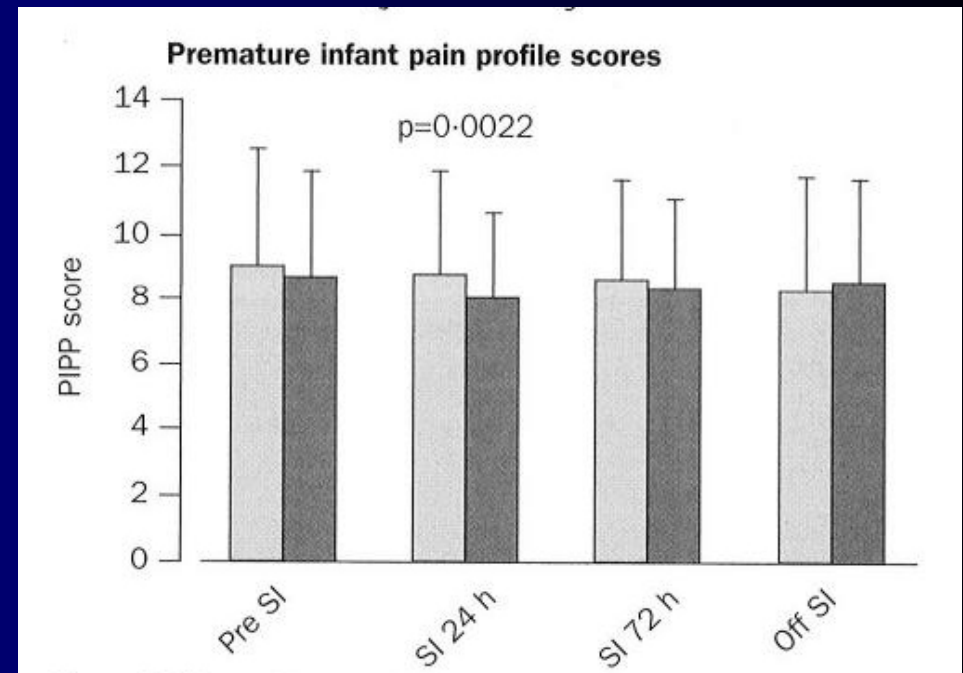
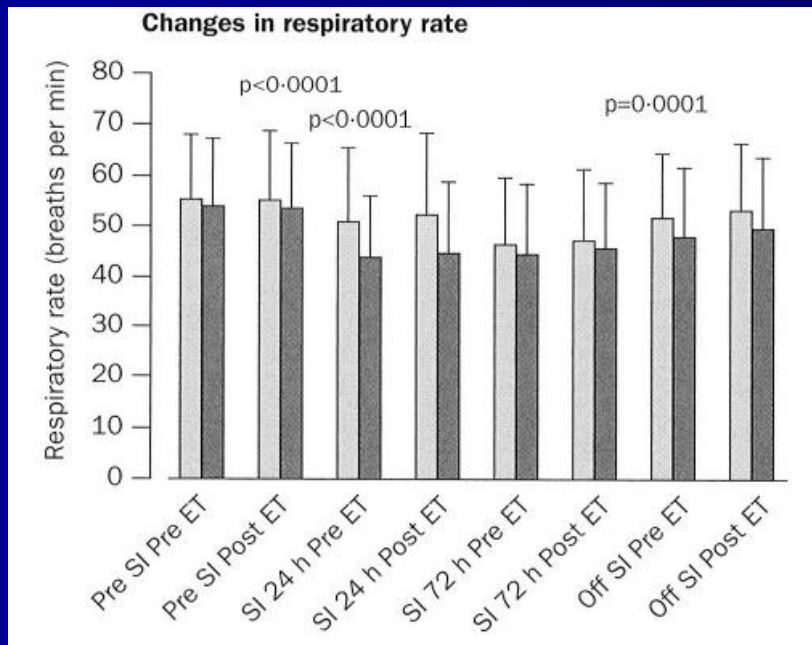
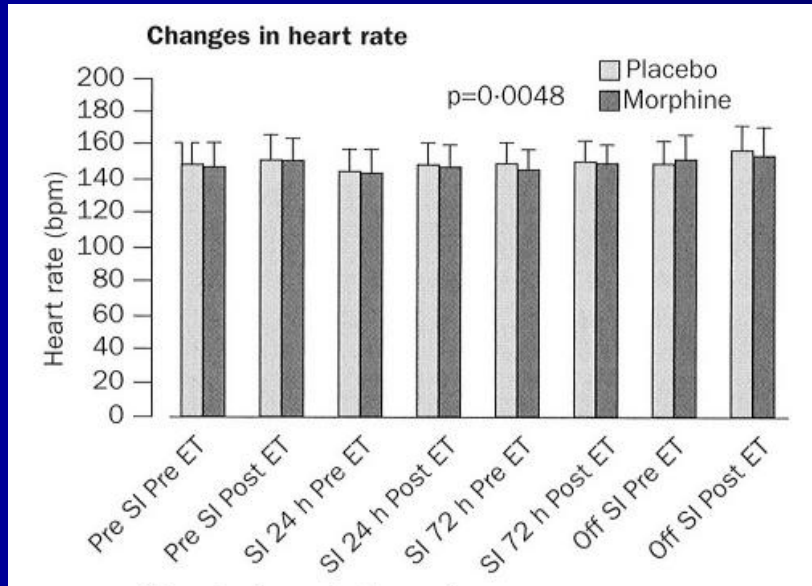
Gibbins, Stevens, Hodnett, et al, Nurs Res, 2002

Abdominal skin reflex

- ASR useful in mapping intensity and location of wound hypersensitivity
- ASR detected referred visceral pain
- ASR responsive to changes in analgesia

Andrews K, Fitzgerald M. *Pain* 2002; Andrews et al., *Pain* 2002

NEOPAIN Lancet 2004



Morphine infusion n=244/446

Placebo infusion n=201/444

Pain scores and postoperative morphine requirements

- COMFORT score (Bouwmeester 2003; 2001; van Dijk 2002)
 - Infants ≤ 7 days required less
 - Less epinephrine/norepinephrine response
 - No difference intermittent vs bolus
- NIPS/VAS (Simons 2003)
 - No difference between morphine and placebo groups

Procedural pain and stress during the early postoperative period

L. Franck, R. Howard, A. Aynsley-Green

- Pre and 3 min post-procedure (pain and stress)
- Pain scores, C-R, plasma cortisol, morphine levels

Procedural pain

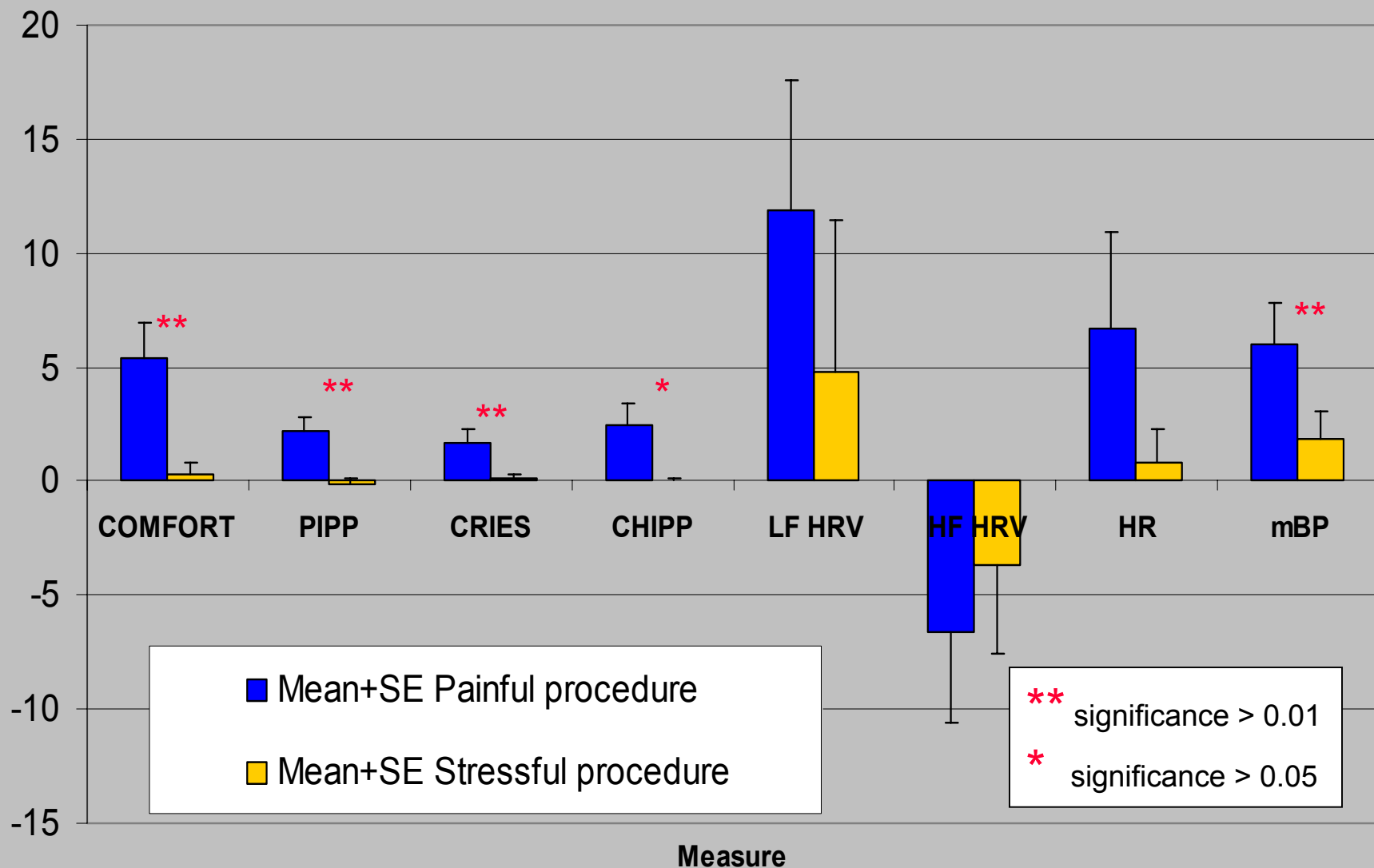
Stressful procedures (n=12):

- nappy care
- re-positioning
- mouth-care
- endotracheal suction

Painful procedures (n=18):

- chest drain removal

Mean change pre-post procedure



Preliminary findings

- Pain scores and mBP discriminated between responses to painful and stressful procedures in critically ill infants following cardiac surgery
- Pain scores are highly correlated; C-R parameters are highly correlated
- Few associations found between pain scores and C-R parameters
- Post-CDR pain scores inversely correlated with pre-procedure analgesia

Assessment of Adverse Effects

- Poor data on prevalence and risk factors
- Rarely the primary outcome variable in research
- Poor quality measures

Implications for pain treatment

- Pain treatment decisions are subjective and not based on routine standardised assessment
- Evaluation of the effectiveness of pain treatment decisions does not routinely occur
- Inability to distinguish between effects of sedatives and analgesics
- Pain treatment is not evidence-based

Implications for research on pain medicines

- Endpoints of pain assessment remain undefined
- Sensitivity and specificity need to be improved
- Analgesic and sedative effects must be distinguished
- Measures of important side effects of analgesia must be developed

Conclusions 1

- Should we bother with pain assessment in babies?
- Yes-established validity of some tools for some situations
- Yes-importance for communication and audit

Conclusions 2



Which measures?

- Whichever one clinicians will use!!
AND use to make decisions about treatment
- Careful use of sedatives alone

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