SFOAI

Hyponatraemia complicating labour

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Waterintoxication after large water intake during labor

Johansson, Acta Paediatr 2002; 91: 811- 4

Case A

Healthy 29 yr primipara, v 41

Drank >8 l over 13,5 hours

No intravenous fluid

Oxytocin 0.12 E i v

Vaginal delivery

Waterintoxication after large water intake during labor

Johansson, Acta Paediatr 2002; 91: 811- 4

APGAR 9-10-10

Age 1 hour: Irritability

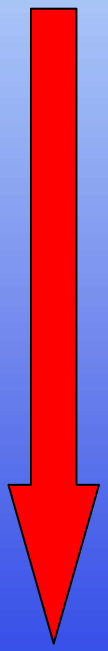
Age 7 hours: Seizures

p-Na 122 mmol/l

Treatment: Fluid restriction
normalising p-Na

Age 3 months: Normal development

Hyponatraemia-symptoms



- Tiredness, headache, nausea and vomiting
- Somnolence……coma
- Seizures
- Respiratory arrest
- Herniation
- Death

Hyponatraemia (Normal p-Na 135-146 mmol/l)

Severe hyponatraemia:

p-Na < 120 mmol/l

However:

Severity largely dependent of speed of lowering:

P-Na 130 mmol/l associated with symptoms of severe hyponatraemia

Studies regarding :

Energetic supplies during labour

Fluid administration during labour

Hyponatraemia during labour ...

and in endurance sports

Effect of food intake during labour on obstetric outcome: randomised controlled trial

O´Sullivan et al BMJ 2009; 338: 784-9

Light meals during labour:

No difference obstetric/neonatal outcome

No increased vomiting

Energy and fluids during labour

NPO widespread practice:

USA, UK

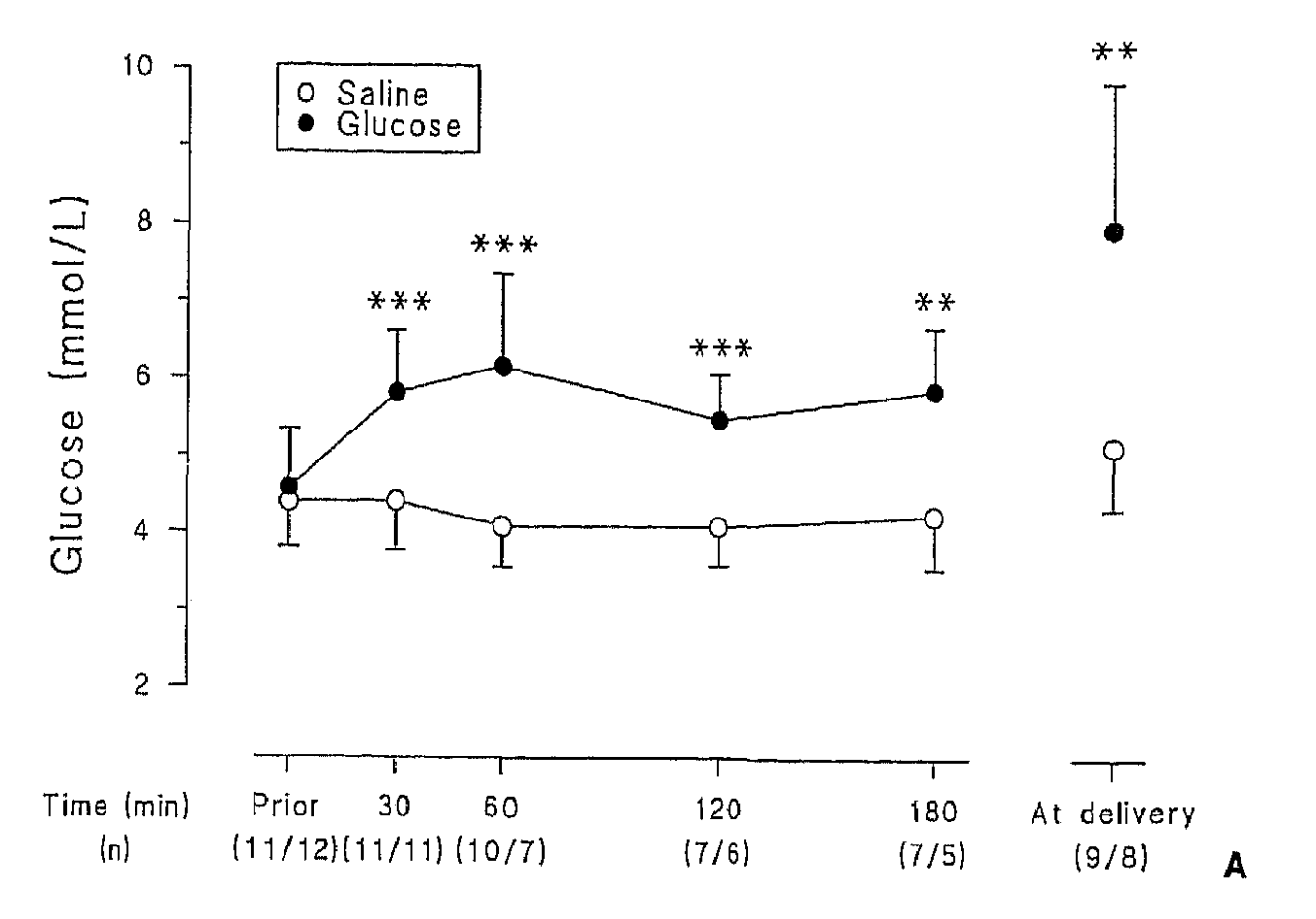
Energy and fluids by iv infusion

Midwives often recommend food

Myths and belifs flourish-
very few studies

CONTINUOUS MATERNAL GLUCOSE INFUSION DURING LABOR: EFFECTS ON MATERNAL AND FETAL GLUCOSE AND LACTATE LEVELS

Nordström et al, Am J Perinatology 1995; 12: 357-62



Conclusion: glucose 9 g/h safe

with respect to hyperglycaemia
lactate
insulin levels

but:
electrolyte free solutions
no discussion electrolyte balance
Glucose 9g/h as Glucose 5 %:
180 ml/h 4,3 l/24 h

Fluid administration during labour

- Garite TJ. A randomized controlled trial of
- the effect of increased intravenous
- hydration on the course of labor in
- nulliparous women.
- Am J Obstet Gynecol 2000; 183: 1544- 8

- Eslamian L. Increased intravenous fluid intake and
- the course of labor in nulliparous women.
- Int J Gynaecol Obstet 2006; 93: 102-5

Fluid administration during labour

Garite TJ et al, Am J Obstet Gynecol, 2000

Prospective randomised study

195 primiparas (NPO)

Group A: 125 ml/h Ringer-acetate i v

Group B: 250 ml/h Ringer-acetate i v

Fluid administration during labour

Garite TJ et al, Am J Obstet Gynecol, 2000

Larger fluid volume may favour uterine contractility:

Less Oxytocin
Fewer instrumental deliveries

However:
No large differences in fluid volumes:
Group A 2 000 ml Group B 2 500 ml

Reference: Fluid adminstration to athletes

Sports, athletes and water

BBC NEWS

Runner dies after London Marathon 2007

The cause of the 22-year-old's death –

Daily Telegraph reported : due to hyponatraemia

His is the ninth death since the London Marathon began in 1981 ....

Case proven:
exercise associated hyponatraemia is due to overdrinking.

…… So why did it take 20 years before the original evidence was accepted?……

T D Noakes and D B Speedy
Br. J. Sports Med. 2006

Hyponatremia among Runners in the Boston Marathon

Christopher et al. NEJM 2006
N Engl J Med 2005; 352:1550-6.

766 study participants in the race

488 fulfilled all study criteria

13 % Hyponatremia P-Na < 130 mmol/l

0,6 % P-Na < 120 mmol/l

Hyponatremia among Runners in the Boston Marathon

Christopher et al. NEJM 2006

13 % Hyponatraemia (p-Na < 130mmol/l)

0,6 % P-Na < 120 mmol/l

Hyponatraemia associated with:

Fluid intake, weight gain, longer running time, extreme BMI

Current hydration guidelines are erroneous: dehydration does not impair exercise performance in the heat

Bradley A Wall,[1,2] Greig Watson,[1,3] Jeremiah J Peiffer,[2] Chris R Abbiss,[1] Rodney Siegel,[4,5] Paul B Laursen[4,5]

To cite: Wall BA, Watson G, Peiffer JJ, *et al*. *Br J Sports Med* Published Online First: [*please include* Day Month Year] doi:10.1136/bjsports-2013-092417

Conclusion When well-trained cyclists performed a 25 km cycling time trial under ecologically valid conditions and were blinded to their hydration status, performance, physiological and perceptual variables were not different between trials. These data do not support the residing basis behind many of the current hydration guidelines.

Hyponatraemia during labour?

Tarnow - Mordi, BMJ, 1981

Omigbodun, East Afr Med J, 1991

Singhi , Br J Obstet & Gynaecol, 1994

Stratton, E J Obstet & Gynecol 1995

Hyponatraemia during labour?

Oxytocin (Syntocinon)
Intravenous fluids
Epidural analgesia

Correlate with:

Hyponatraemia in mother and child
Longer labours
Respiratory distress
Hyperbilirubinaemia

Consequences of earlier studies

Syntocinon

electrolytes in fluid
higher concentrations
lower doses

Mechanical pump devices

PROBLEM RESOLVED?

What are pregnant women told?

During pregancy fluid requirements increase
-drink at least a glass of water every hour

Don´t wait untill you get thirsty – then You are really way behind!

Concept from sports medicine:

Volontary dehydration

What are pregnant women told?

…during active labour the body requires

Approx 500 kcal and

0.5-1 l fluid

……. Every hour!

https://www.google.se/#q=ladda+kungs%C3%B6rnen

Important for Daddy to know....

During labour it is important you make her drink all the time

..if she despite of this vomits, make her drink again , as quickly as possible

Ref:

Ladda Kungsörnen:

https://www.google.se/#q=ladda+kungs%C3%B6rnen

Hyponatremia complicating labour—rare or unrecognised? A prospective observational study

V Moen,[a,b] L Brudin,[c] M Rundgren,[d] L Irestedt[b]

BJOG 2009; 116:552-61

Hypothesis: High prevalence hyponatraemia during labour

18. January - 14. July 2007
Kalmar County Hospital

Included:
All pregnant women 37+6

Study:Hyponatraemia complicating labour

Treatment:

As usual (observational study)

Aim:

Hyponatraemia during labour?
Effects on the progress of labour?
Effects on the baby?

Study protocol mothers

Blood sampling before and after delivery:

ISTAT: electrolytes / glucose
blood gases

Central laboratory: p-osmolality

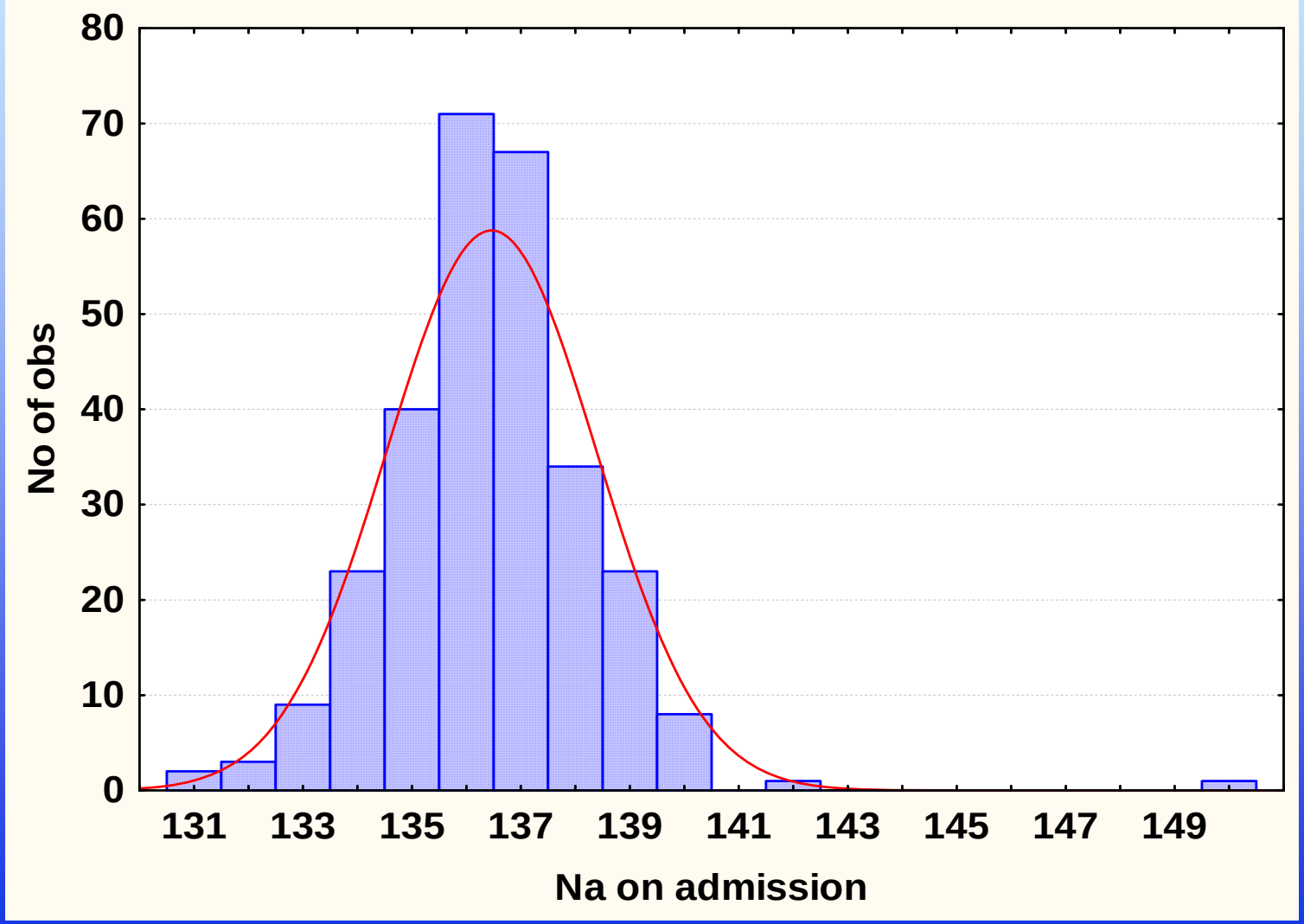
Registration of all oral intake (= drink)
i v fluids
Syntocinon

Pain relief

Duration of labour and mode of delivery

Maternal P-Na on admission: 136 mmol/l

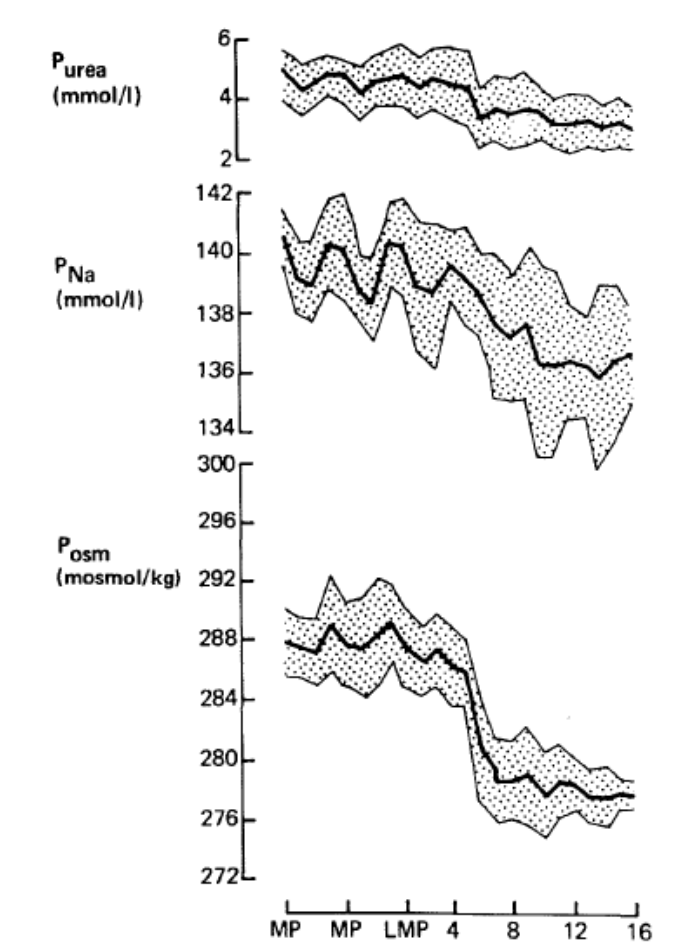
P-Na pregnancy: ref values 131-140 mmol/l



Osmoregulation, the secretion of arginine vasopressin and its metabolism during pregnancy

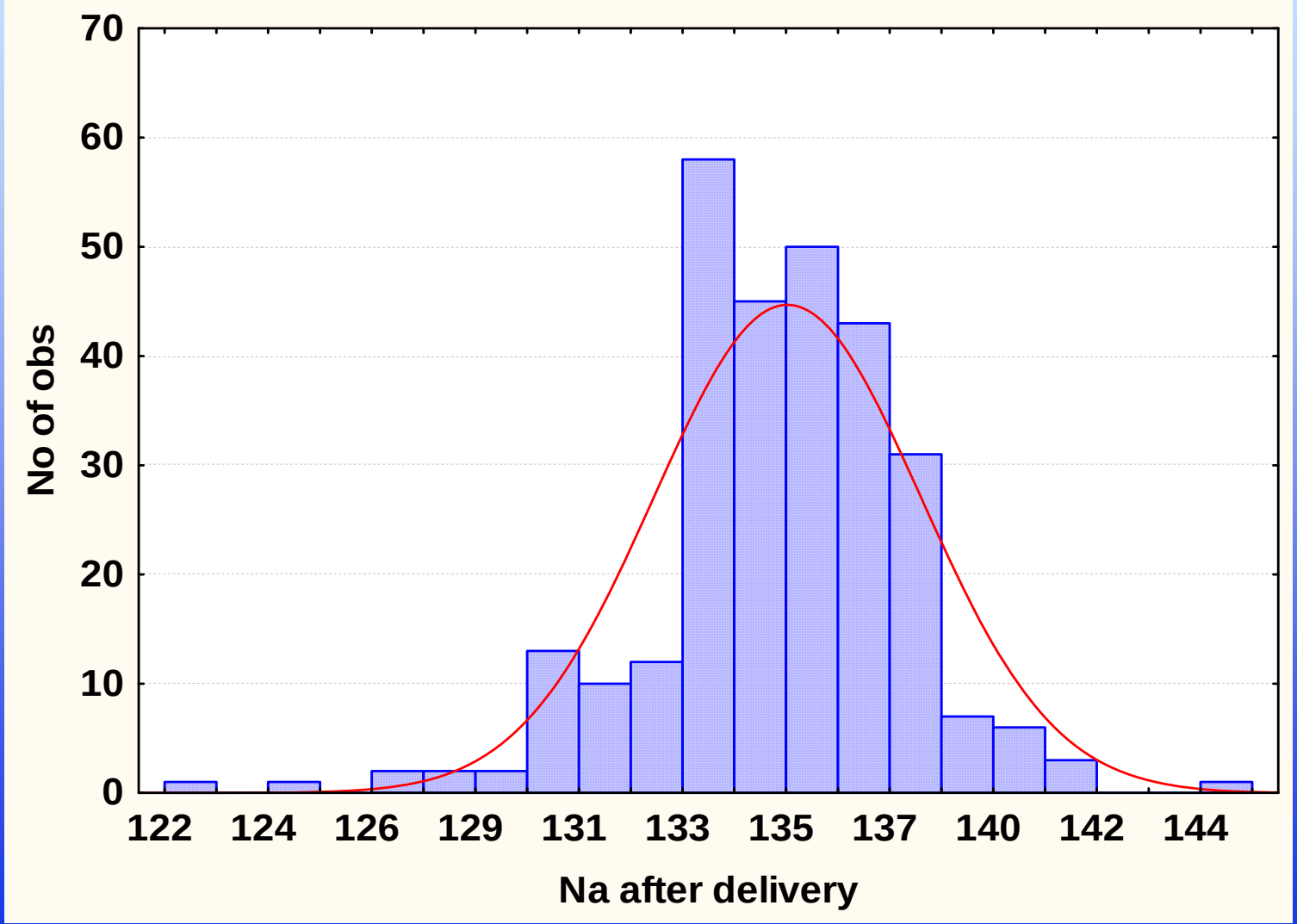
Marshall D Lindheimer and John M Davison[1]

Eur J Endocrinol 1995; 132: 133-43

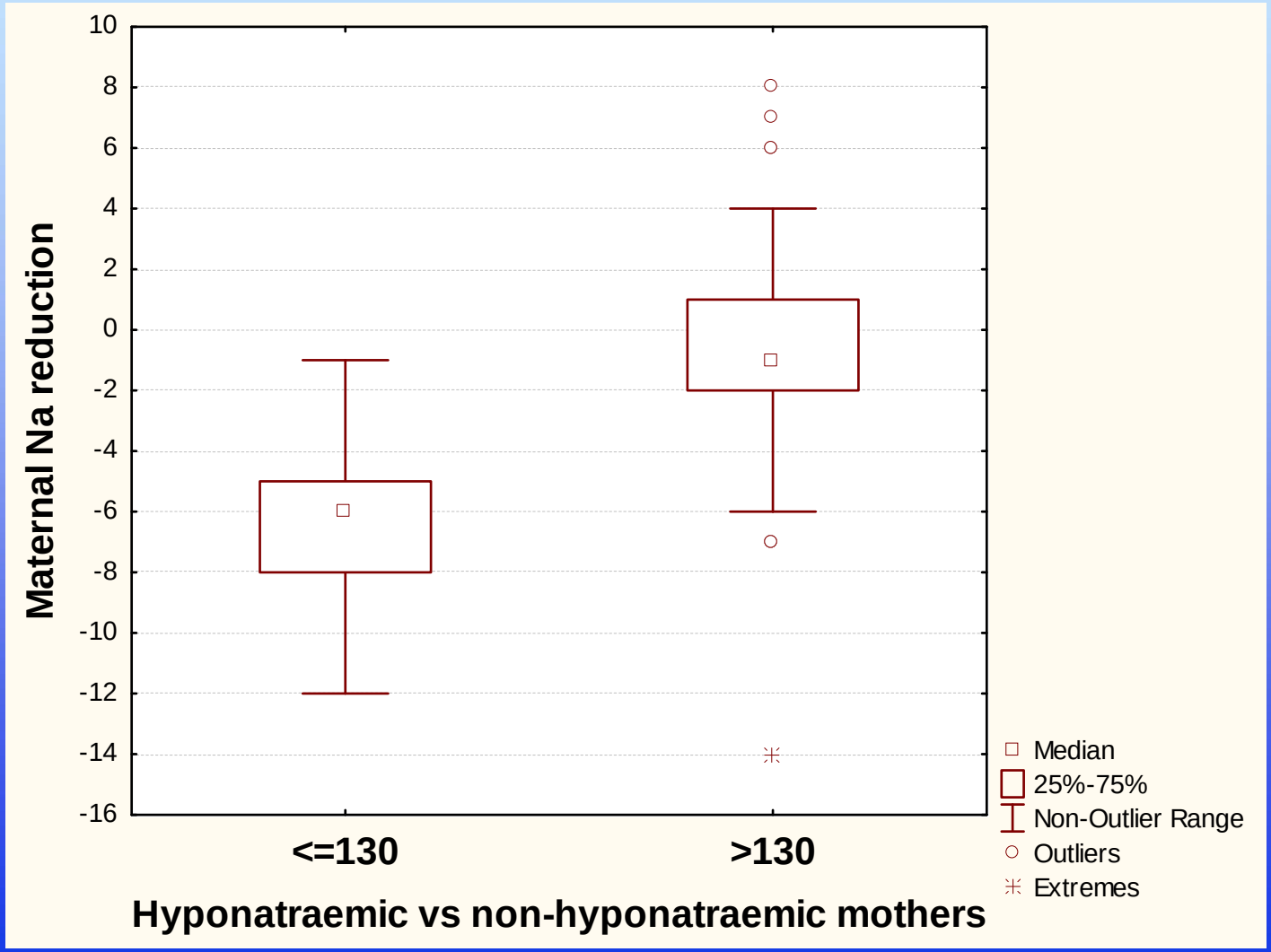


Hyponatremia ≤ 130 mmol/l

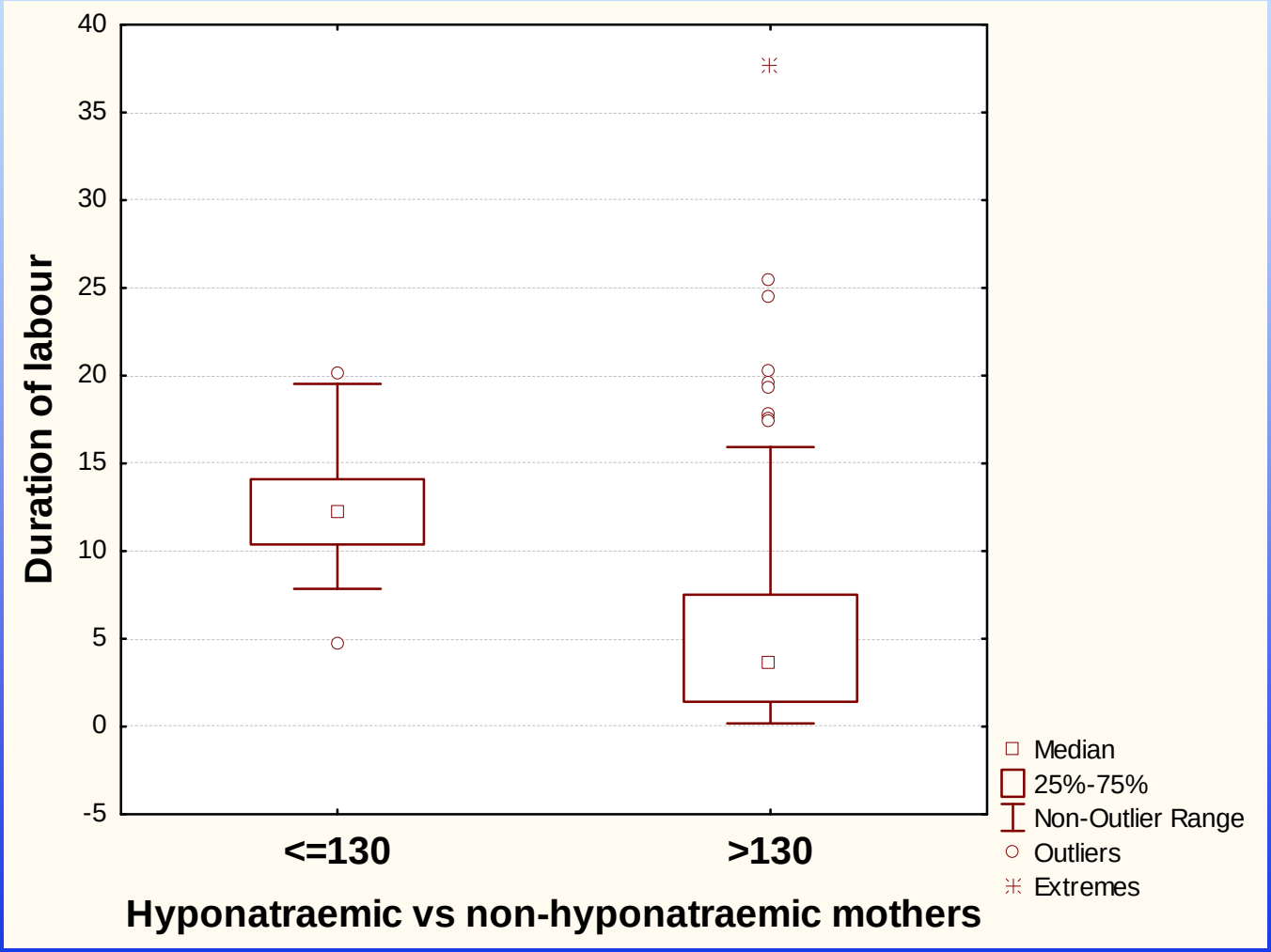
21 mothers after delivery



Reduction of p-Na in hyponatraemic mothers (p<0.001)



Hyponatraemic vs non-hyponatraemic mothers: 300 ml/h (p=0.16)



Significant hyponatraemia
P-Na < 130 mmol/l

Total fluid volume during labour

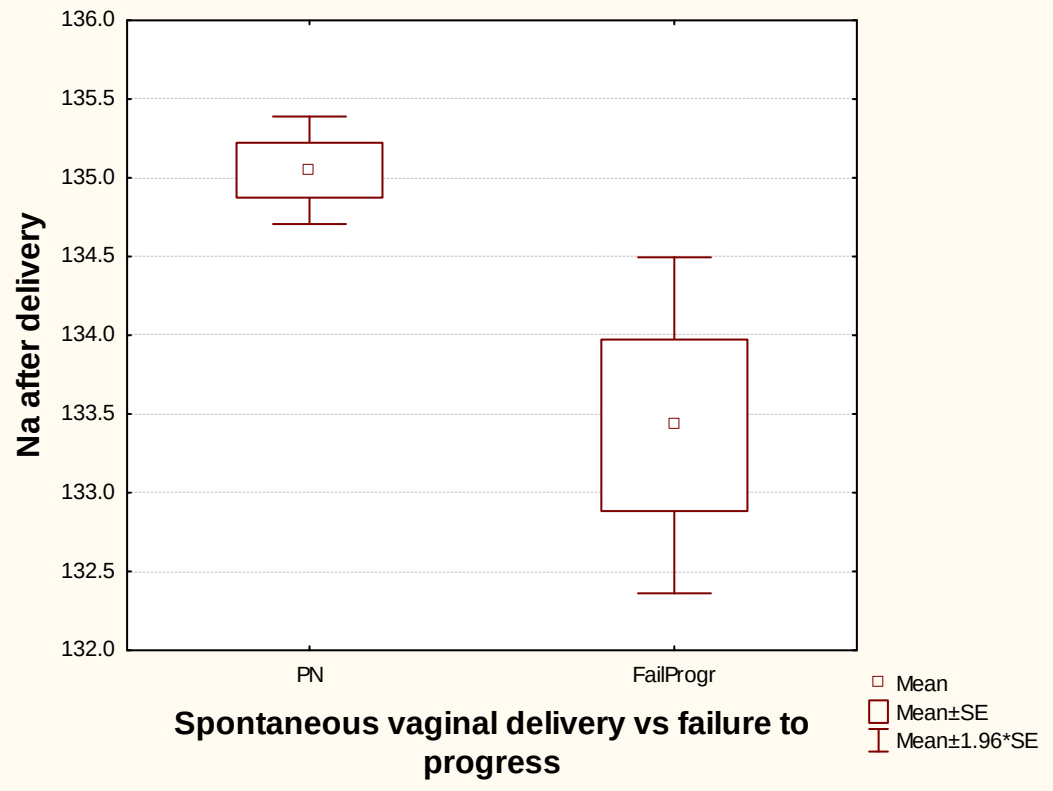
< 1000	1000-2500 ml	>2500
n 113	**n 87**	**n 61**
1(1%)	4(5%)	16(26%)

Uni/multivariate analysis

	Univariate	Multivariate
Fluids> 2500 ml	p<0,001	< 0,001
Oxytocin > 5U	p<0,001	0.07
Epidural	p<0,001	-
Parity	p<0,01	-

Significant hyponatraemia and failure to progress: p <0.001

Instrumental deliveries and caesarean section vs spontaneous vaginal delivery



How often is a low Apgar score the result of substandard care during labour?

S Berglund,[a] H Pettersson,[a] S Cnattingius,[b] C Grunewald[a]

Population based case-control study:

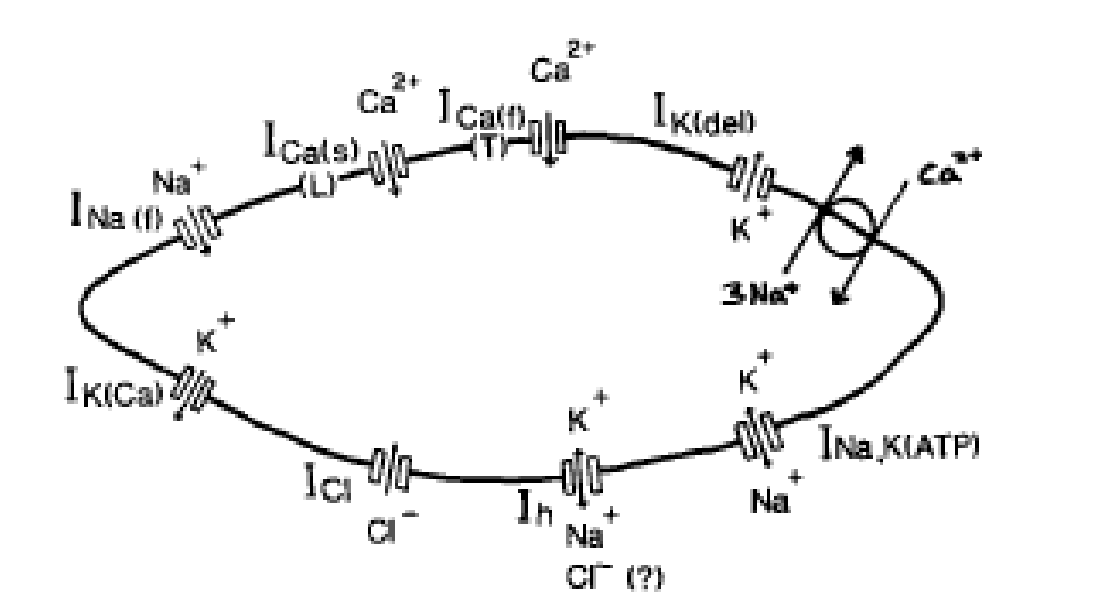
Substandard care APGAR 5 min <7: 62%

controls : 36%

Oxytocin:

Every fifth case AND control received oxytocin despite no signs of inertia

Ionkanaler i myometriet



Reduceras myometriekontraktiliteten vid låga natriumnivåer i blodet?

Moen V, Ekman-Oderberg G, Irestedt L,Ebberyd A, Brudin L

Metod: Biopsier vid planerad sectio v 39

Biopsi; 6 mm x 15 mm

Rensas, delas i 8 strips :

Organbad: 1) 120 mmol Na/L

2) 136 mmol Na /L

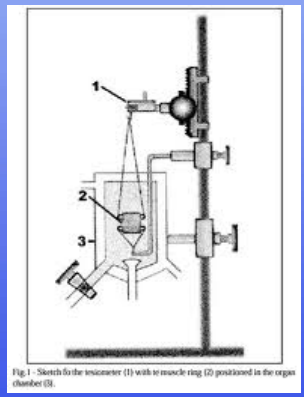


Fig.1 - Sketch fo the tensiometer (1) with te muscle ring (2) positioned in the organ chamber (3).

Metod:

Metod:

Spänna upp, vänta ca 1 timme till stabilisering

KCL 100 mM för maximal kontraktion, skölja x 3

Oxytocin 0.001 IE,

observera kontraktioner 20 min, skölja x 3

0.01 IE

observera kontraktioner 20 min, skölja x 3

0.1 IE

observera kontraktioner 20 min, skölja x 3

KCL 100 mM för maximal kontraktion

Analys

- **Frekvens och Amplitud (relaterad till maxamplitud efter KCL)**

- **Myometrieaktivitet:**
- **Frekvens x Amplitud: Montevideo Units**

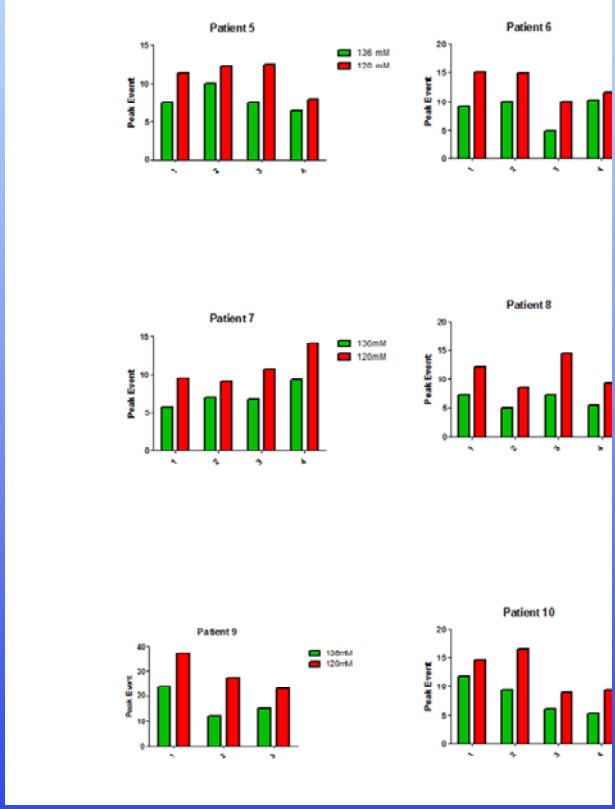
Intensitet av kontraktion:

- **Area under the curve (AUC): gram x minut**

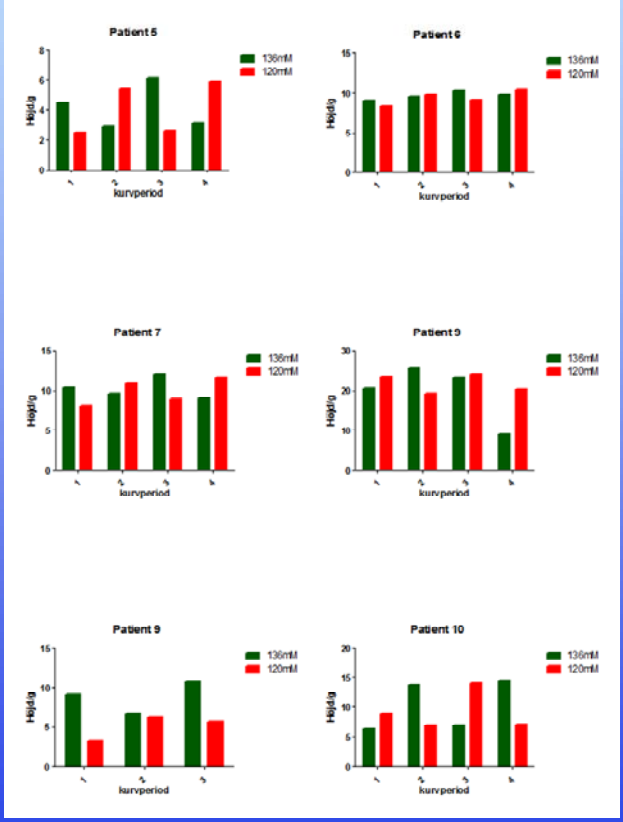
Preliminärresultat :

Preliminärresultat

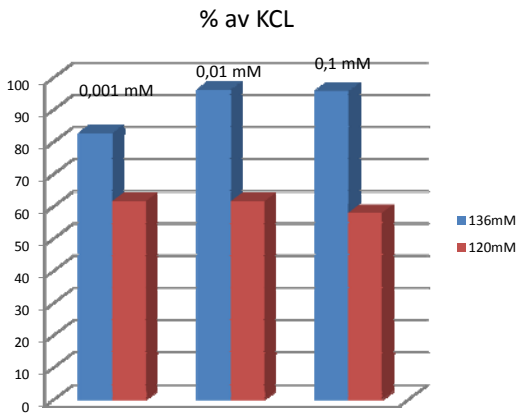
Frekvens

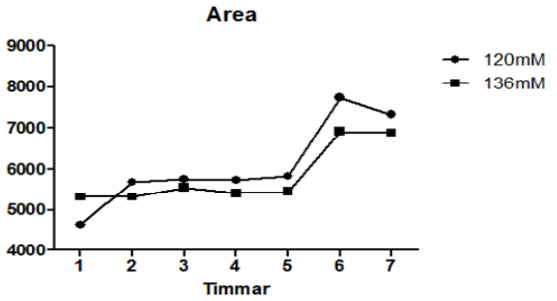


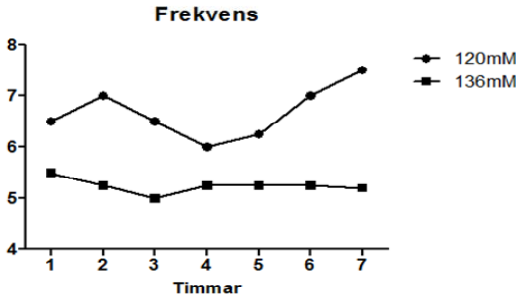
Amplitud

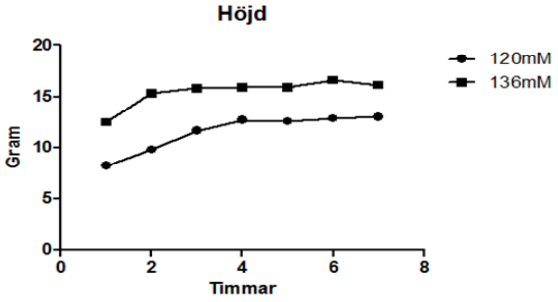


Preliminärresultat: Amplitud i % av maxamplitud vid olika OT-doser




Area
9000
8000
7000
6000
5000
4000
1
2
3
4
5
6
7
Timmar
120mM
136mM


Frekvens
8
7
6
5
4
1
2
3
4
5
6
7
Timmar
120mM
136mM


Höjd
20
15
10
5
0
Gram
0
2
4
6
8
Timmar
120mM
136mM

Sammanfattningsvis…

- Hyponatremi uppkommer under förlossning vid endast måttligt ökad vätskeintag
- Hyponatremin kan i sig vara skadlig för såväl moder som barn
- Hyponatremi kan bidra till värksvaghet
- Ökad uppmärksamhet om hyponatremin kan kopplas till verksvaghet?

Tack för uppmärksamheten!

Frågor?