

# PCEA

Susanne Ledin Eriksson

[susanne.ledin.eriksson@regiongavleborg.se](mailto:susanne.ledin.eriksson@regiongavleborg.se)

# Drugs

- You should choose weak solutions of local anaesthetic to reduce the incidence of motor block
- With a weak local anaesthetic the risk of influencing 2nd stage is reduced
- Less risk of epidural-induced fever
- **Bupivacaine 0,625 mg/ml**
- **Ropivacaine 1 mg/ml**
- **Levobupivacaine 0,625 mg/ml**

# Drugs

- Sufentanilconcentration should be 0,3 – 0,5  $\mu\text{g/ml}$
- Stronger concentration does not give better analgesia but more side-effects (pruritis, effect on the baby?)
- Fentanyl – in the literature 2  $\mu\text{g/ml}$

# Advantages with PCEA

- Individual dosing
- Lower drug consumption
- Many parturients want to titrate their block

# Disadvantages with PCEA

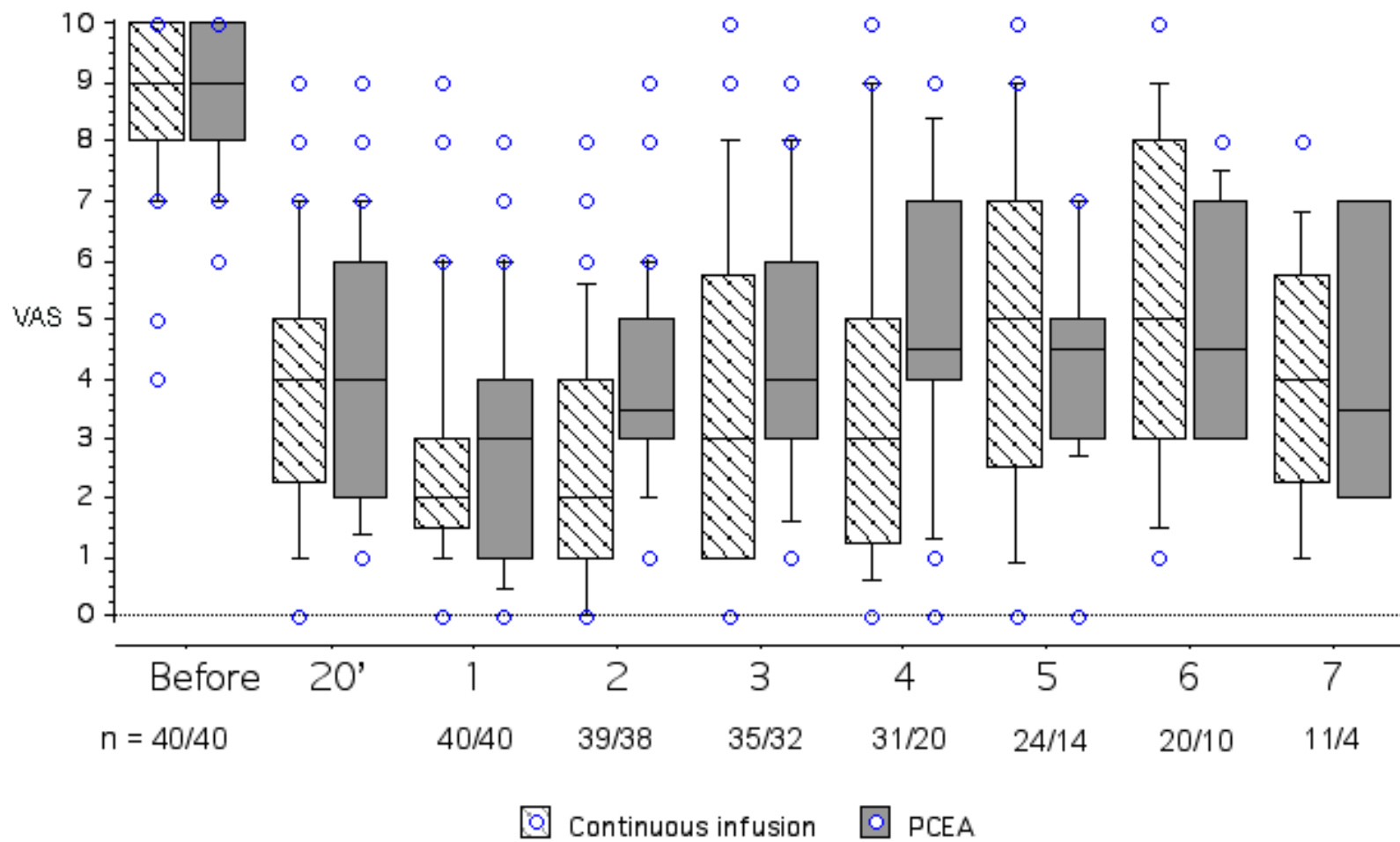
- Not everyone wants to titrate
- Have to be able to understand the instructions
- Nighttime – be able to slumber between contractions
- The method in itself contains breakthrough pain. That's when she presses the button. Important information not to wait too long "uncomfortable instead of painful"

PCEA compared to continuous epidural infusion in an ultra-low-dose regimen for labour pain relief: randomized study  
Acta Anesthesiol Scand 2003 Ledin Eriksson et al

- Ropivacaine 1 mg/ml + sufentanil 0,5 µg/ml
- 80 pat
- Bolus 8 ml
- PCEA 4 ml lockout 20 min
- Cont. inf. 6 ml/tim
- Hourly consumption 25% lower with PCEA
- Total total consumption 30% lower with PCEA

## Drugconsumption

	CEI ( No 40)			PCEA ( NoI 40)			
total consumption ( ml )	52 (19.6)			35 (18.0)			p<0.001
consumtion per hour (8 ml+ml / h)	6.9 (1.31)			5.2 (2.54)			p<0.001
	1	2	3	1	2	3	
Need for extra bolus dose ( No )	14	2	2	9	3	1	



# Variation in drug consumption

- PCEA 0 - 10 .63 ml/h
- 65% < 6 ml/h ; 30% > 6 ml/h
- CEI 6 - 11.6 h
- 45% > 6 h



## **Automatic intermittent bolus doses vs continuous infusion**

### **A Randomized Comparison of Programmed Intermittent Epidural Bolus with Continuous Epidural Infusion for Labor Analgesia**

**Wong et al. Anesthesia & Analgesia Vol 102(3), March 2006, pp 904-909**

Same analgesia but lower drug consumption ( 3 ml/hour)

### **A Comparison of a Basal Infusion with Automated Mandatory Boluses in Parturient-Controlled Epidural Analgesia During Labor**

**Sia et al. Anesthesia & Analgesia Vol 104(3), March 2007, pp 673-678**

Same analgesia but lower drug consumption ( 1 ml/hour)

### **International Journal of Obstetric Anesthesia (2005) 14, 305–309**

**Automated regular boluses for epidural analgesia:  
a comparison with continuous infusion**

**Y. Lim, A. T. H. Sia, C. Ocampo**

Less breakthrough pain and better "satisfaction score"

Bolus doses as administration mode seems better than continuous infusion

# Chronopharmacology of Intrathecal Sufentanil for Labor Analgesia: Daily Variations in Duration of Action

Debon et al. Anesthesiology Volume 101(4), October 2004, pp 978-982

Farmakokinetics and farmakodynamics for opioids varies during 24 hours.

91 pat had CSE med Sufentanil 10 µg.

The duration of the pain relief and time of the day was recorded

They analyzed according to a cosinor-method to detect a periodic circadian variation.

They found a mean effect time of 93 min  $\pm$  3,8 min.

They found a strongly significant 12 tim rythm with a peak at midnight and a peak at noon.

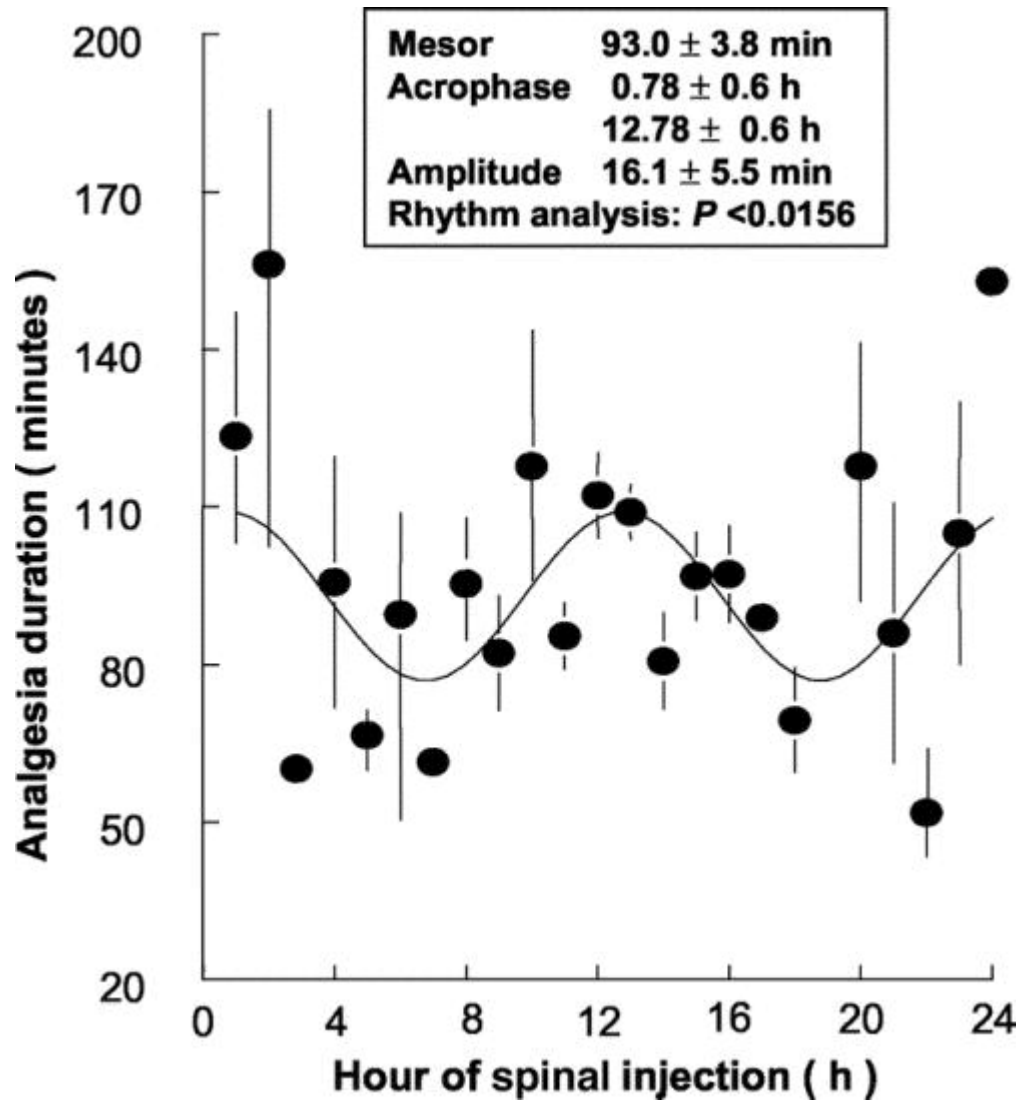
The amplitude of this variation vas 16  $\pm$  5,5 min

So, you have a timedepending variation of effect duration for up to 30%

This means that there is a significant bias in studies.

# Chronopharmacology of Intrathecal Sufentanil for Labor Analgesia: Daily Variations in Duration of Action

Debon et al. Anesthesiology Volume 101(4), October 2004, pp 978-982



## Chronobiology of Epidural Ropivacaine: Variations in the Duration of Action Related to the Hour of Administration

Debon et al. Anesthesiology Volume 96(3), March 2002, pp 542-545

There is a corresponding circadian variation also regarding local anaesthetics.

194 pat were divided into four timegroups

1. KI.01.01- 07.00 94 ± 23 min
2. KI.07.01- 13.00 110 ± 25 min
3. KI.13.01-19.00 117 ± 23 min
4. KI.19.01-01.00 91 ± 23min

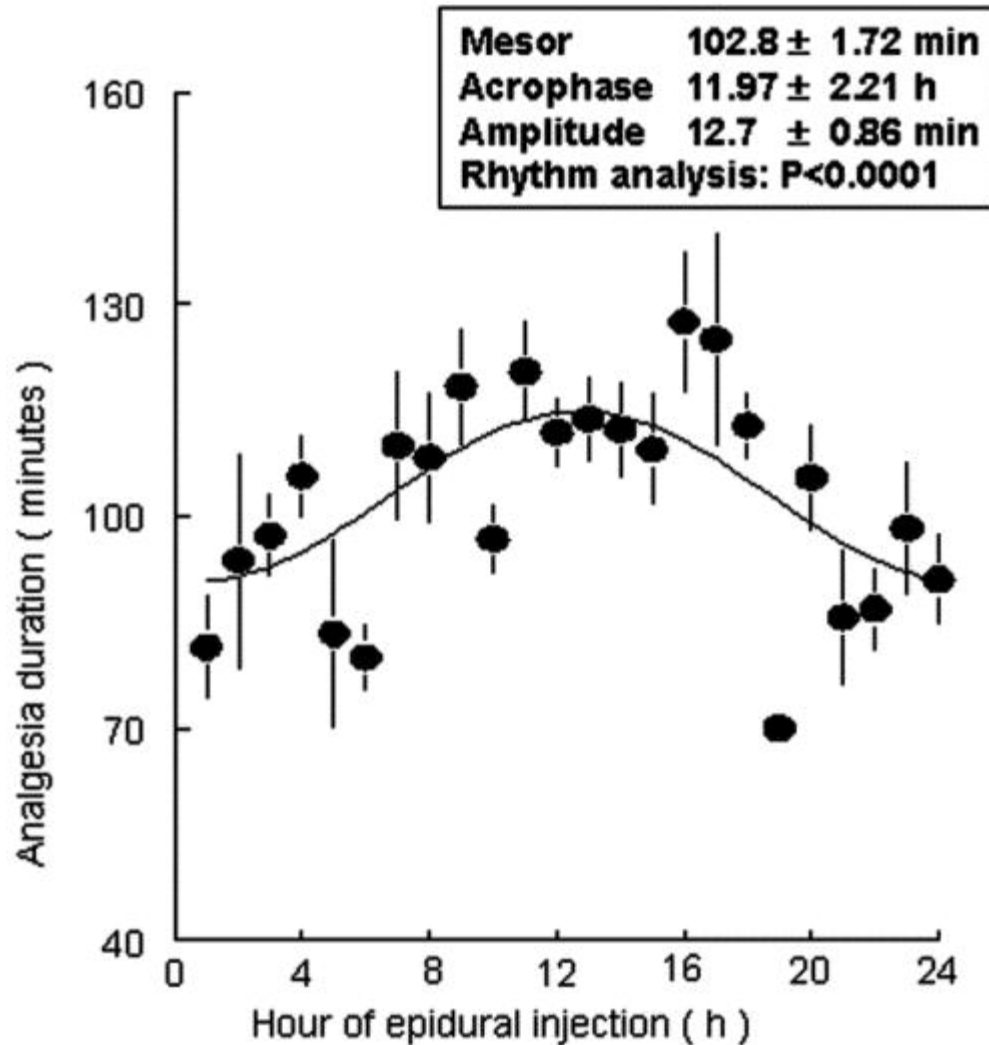
They had bolus Ropivacain 1, 7 mg/ml 14 ml epidurally

Group 2 och 3 had longer duration of their block than 1 and 4

The biggest difference was 28%

# Chronobiology of Epidural Ropivacaine: Variations in the Duration of Action Related to the Hour of Administration

Debon et al. Anesthesiology Volume 96(3), March 2002, pp 542-545



# Quality survey Gävle 1 jan – 30 april 2011

## Observation-study

- All epidurals were recorded thoroughly
- 211 epidural-protocols
- 178 registered of which 161 PCEA and 17 cont.inf
- 12 too fast delivery(<1 hour) 5 primi / 7 multi
- 14 failure ( no change in VAS)
- 6 protocol unsuffisient
- 1 durapct ( with catheter 20G, had intermittent spinalbolus, 0 headache)

# Doses

- Chirocain 0,625 mg/ml + Sufenta 0,5µg/ml
- 12 ml test and bolus
- PCEA 4 ml, lockout 15 min or
- cont.inf 8 ml/tim

# Analgesic effect PCEA

Vas median every hour and No of patients											
VAS before	VAS 20 min	VAS 1 tim	VAS 2 tim	VAS 3 tim	VAS 4 tim	VAS 5 tim	VAS 6 tim	VAS 7 tim	VAS 8 tim	VAS 9 tim	VAS 10 tim
8	3	2	3	3	4	3	3	4	4	4	4
159	156	149	123	100	81	64	52	40	32	24	16



# Analgesic effect

Parturients opinion:

Excellent 61%

Good 22%

Fair 5%

Bad 1%

No record 10%

# Level of interspace

- L 1-2 14 %
- L 2-3 64 %
- L 3-4 18 %
- L 4-5 4 %

# Obstetric data

## **Cervixstatus at EDA administration**

Primip 4 (1-7) multip 4 (0-8)

## **Oxytocin usage 59%**

Primip 72% multip 35%

## **Sectio 9%**

Primip 12% multip 2%

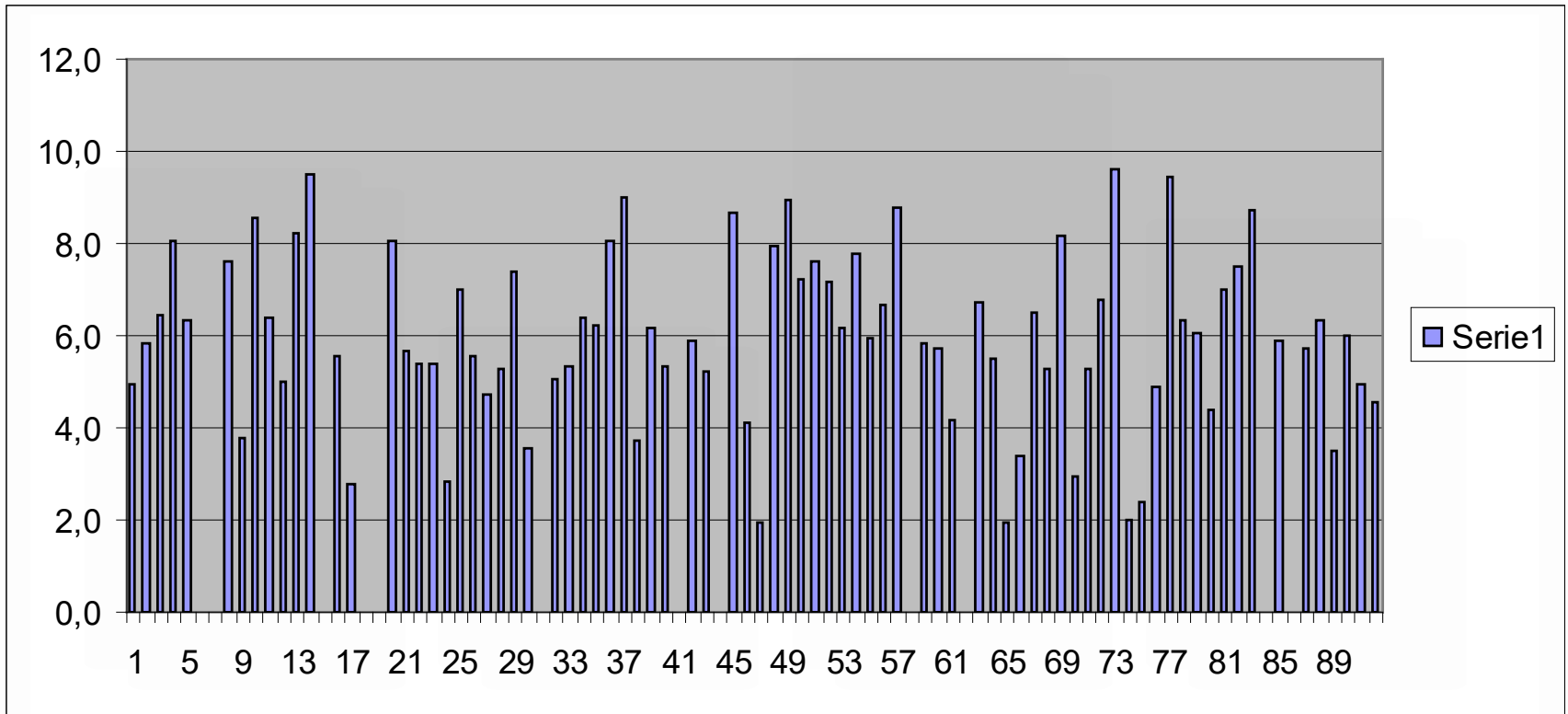
## **Instrumental delivery 11%**

Primip 16% multi 0%

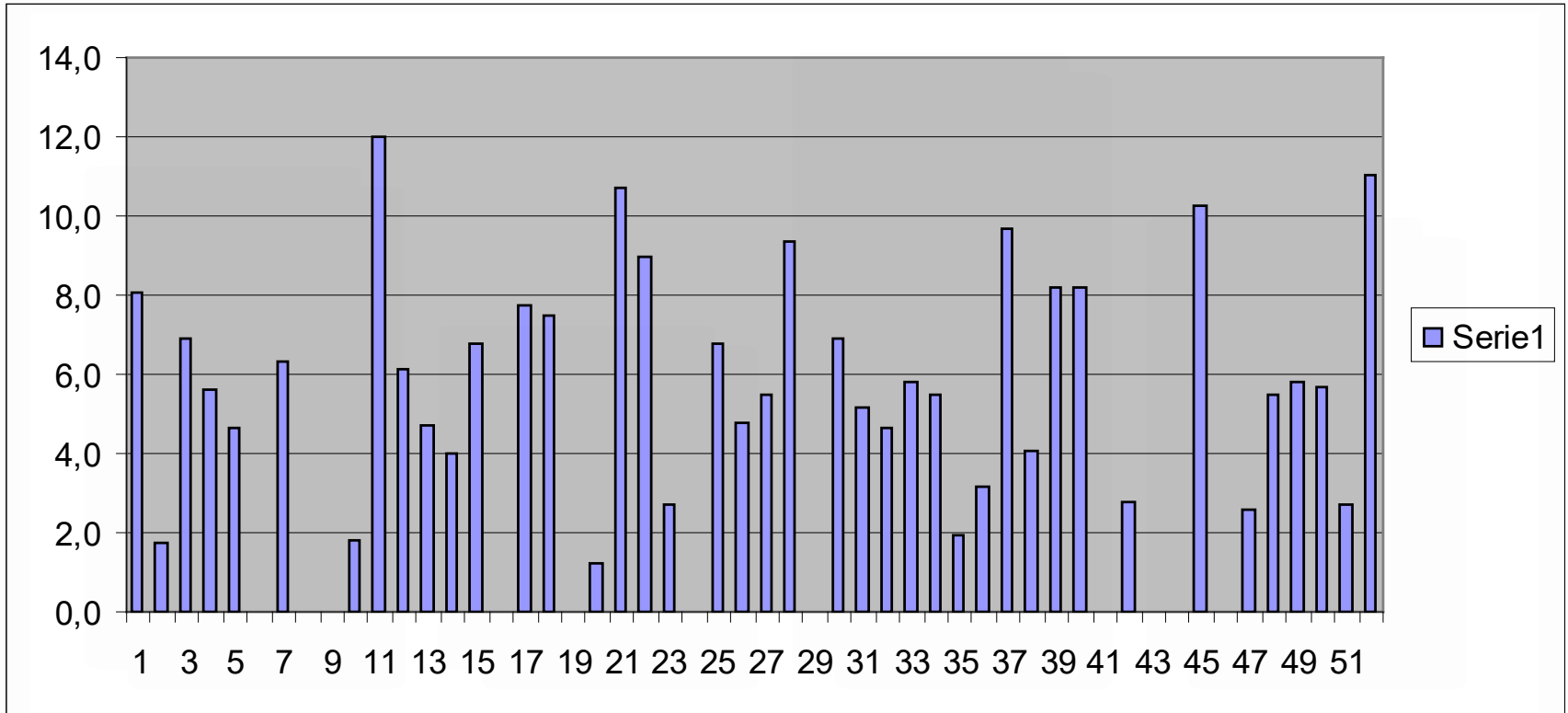
# Times and drug consumption

(Pat with C/S are not included)	Primiparae 94 st	Multiparae 53 st
EDA time Median (min-max)	6:19 ( 1:37 – 22:31)	3:15 (1:00 – 12:10)
Fully dilated cervix – 1:a pushing contraction Median (min-max)	0:45 ( 0:00 – 1:58)	0:11 (0:00 – 1:40)
1:a pushing contraction - partus Median (min-max)	0:27 ( 0:06 – 1:58)	0:10 (0.01-0:51)
Fully dilated cervix – partus median (min-max)	1:18 ( 0:17 – 6:53)	0:25 (0:03 – 2:00)
Total drug consumption mls (mean)	43	25
Drug consumption ml/hour Median (min-max)	5,8 (0-9,6)	5,5 (0 – 12)
< 5 ml/hour	27%	42%

# Primiparae ml/tim



# Multiparae ml/tim



” Before conclusion we say that each centre should select a technique which is suitable depending upon the availability of the anaesthetist, equipment and expectation of parturient as well as obstetrician”

# Conclusion

## **PCEA**

Weak drug solution , testdose 8 – 10(12) ml of the weak solution, works also as the first bolus dose and activation of epidural catheter

PCEA bolus: 4-5 ml

Lockout time 10 – 15 min max 20 ml/hour

Background: optional, but no more than 5 ml/h

With a background infusion you don't achieve a truly patient controlled technique



