

WELCOME TO

# Obstetrical Webinars

## Fetal Monitor Strip Review

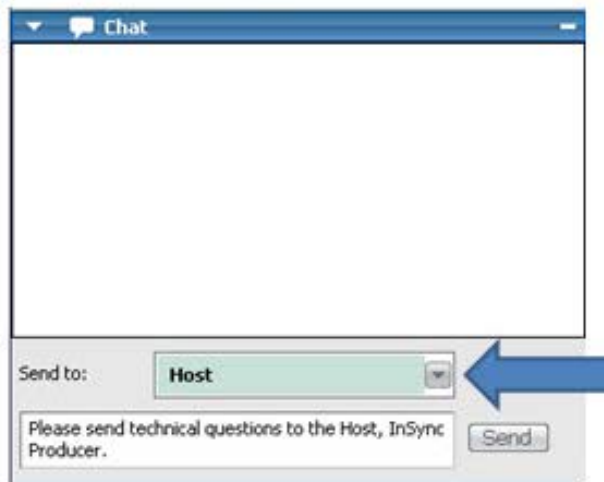
Amen Ness, MD, MSCP  
Division of Maternal Fetal Medicine  
Stanford University Medical Center



# Tools You Can Use

## Chat used for

*Technical questions to host all other questions use Q & A panel*



## Q&A used for content related questions



## Feedback

- Raise Hand / Yes / No / Applause / Laughter



# Webinar Etiquette

- Reminder – This call is being recorded
- Do not put your phone on hold
- Questions/Comments
  - Use the *Raise Hand Icon* (we will unmute your line)
  - Say your name and hospital, then speak
  - If attending via audio conference through your pc, type your questions into the Q&A box on your right
- Technical problems?
  - Type your problem into the chat box or call (818) 545-3350

# FETAL HEART INTERPRETATION CASE REVIEWS

**Amen Ness, MD, MSCP**

**Division of Maternal Fetal Medicine  
Stanford University Medical Center**

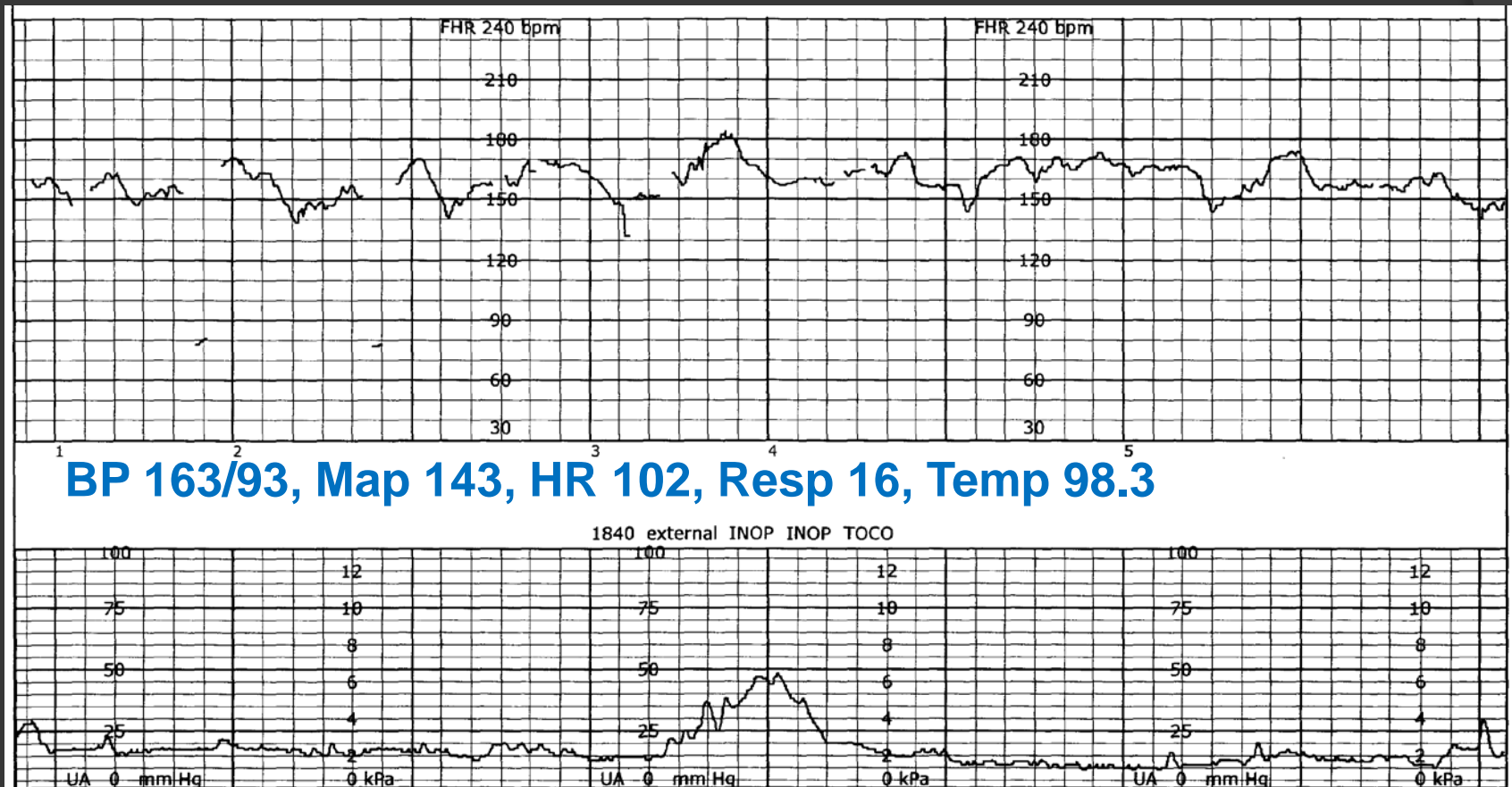




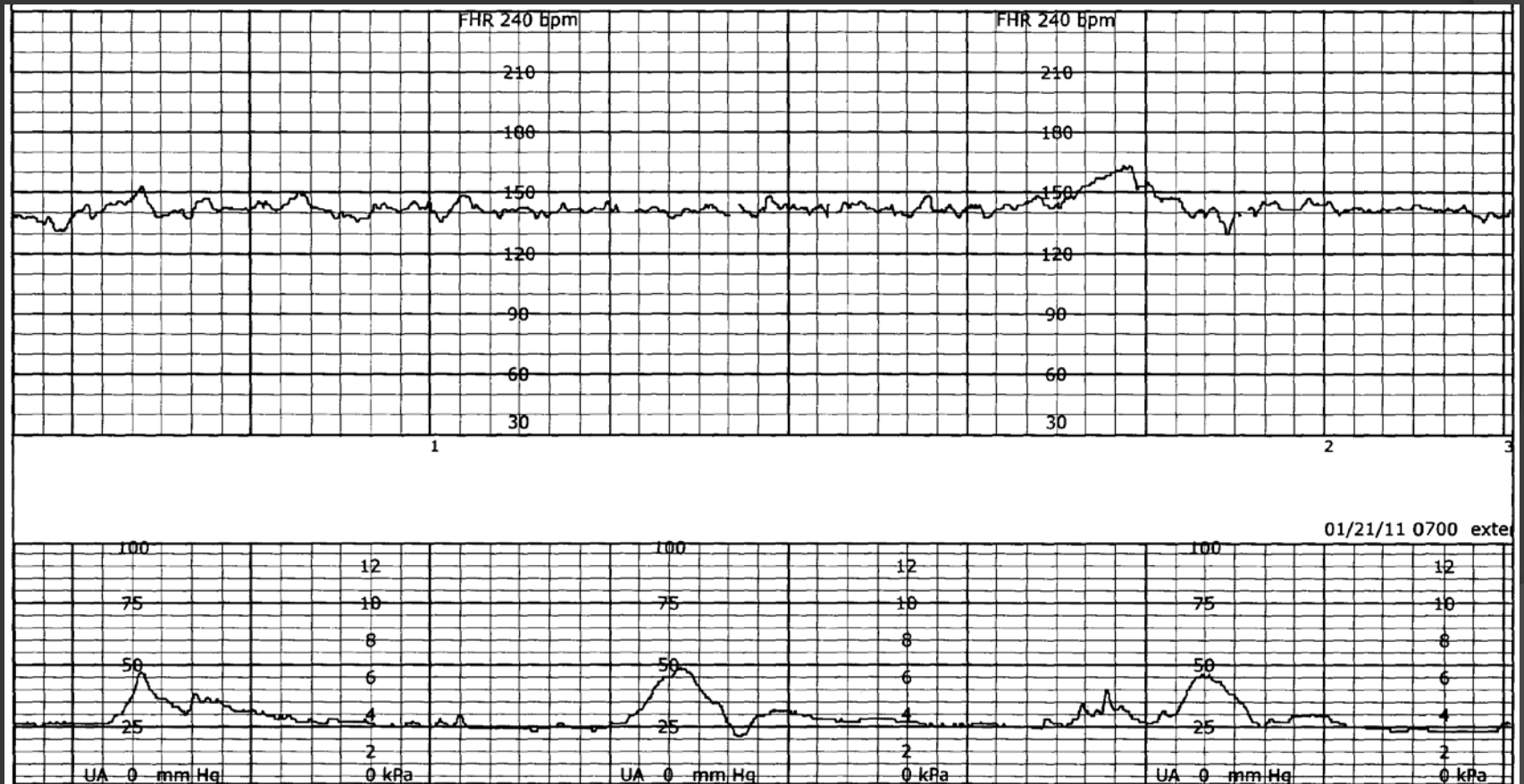
# Case 1 SL

- 26 year old G6 P4 at 39 weeks
- Induction due to mild preeclampsia
- Initial BP at 11 wks- 134/86
  - 24 hr urine of 300mg/24hrs
  - BP's 130-140's/60-90's
- WT: 288lbs
- OB: Term SVD
- Otherwise normal AP course

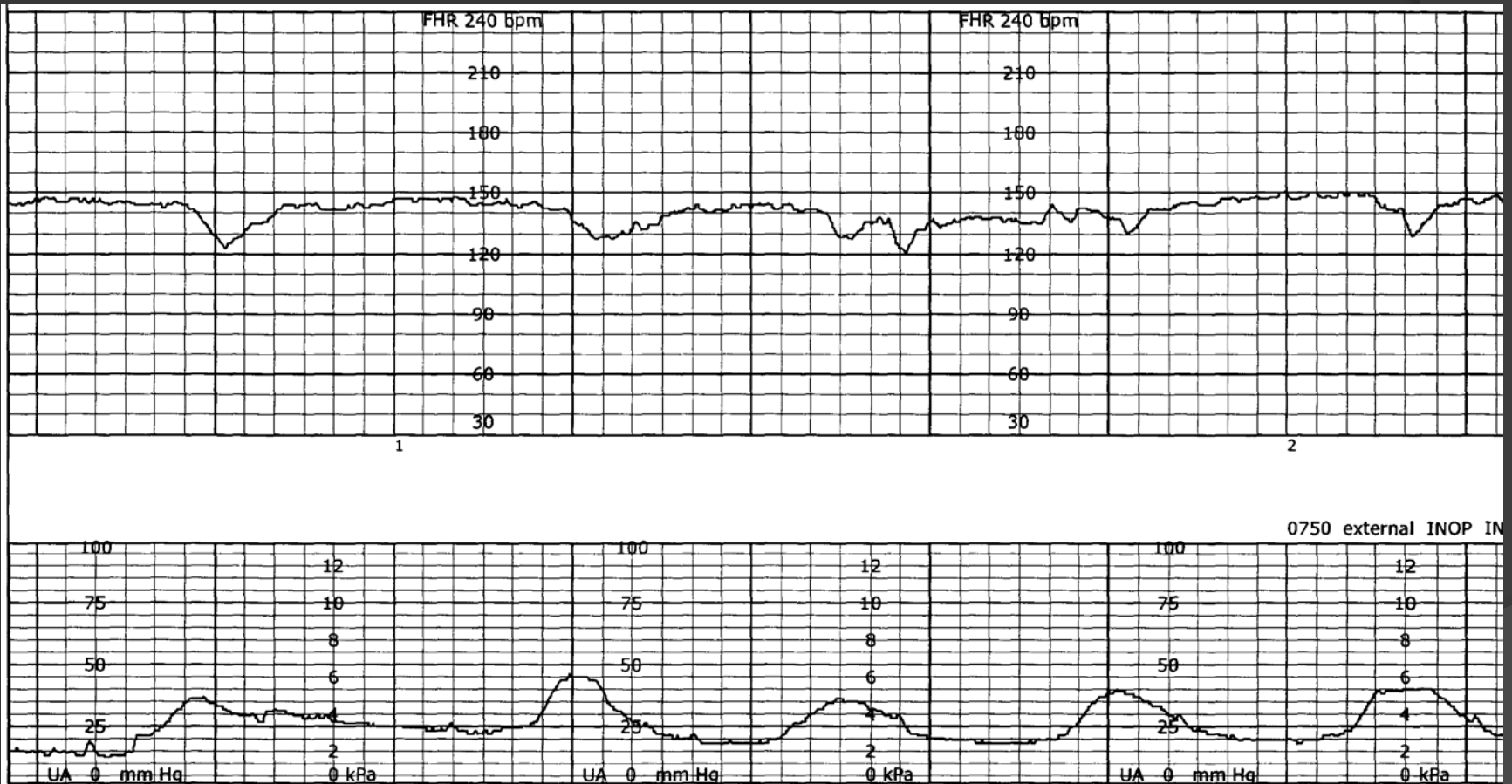
18:37- 2+ protein  
SVE: FT/25%/-4



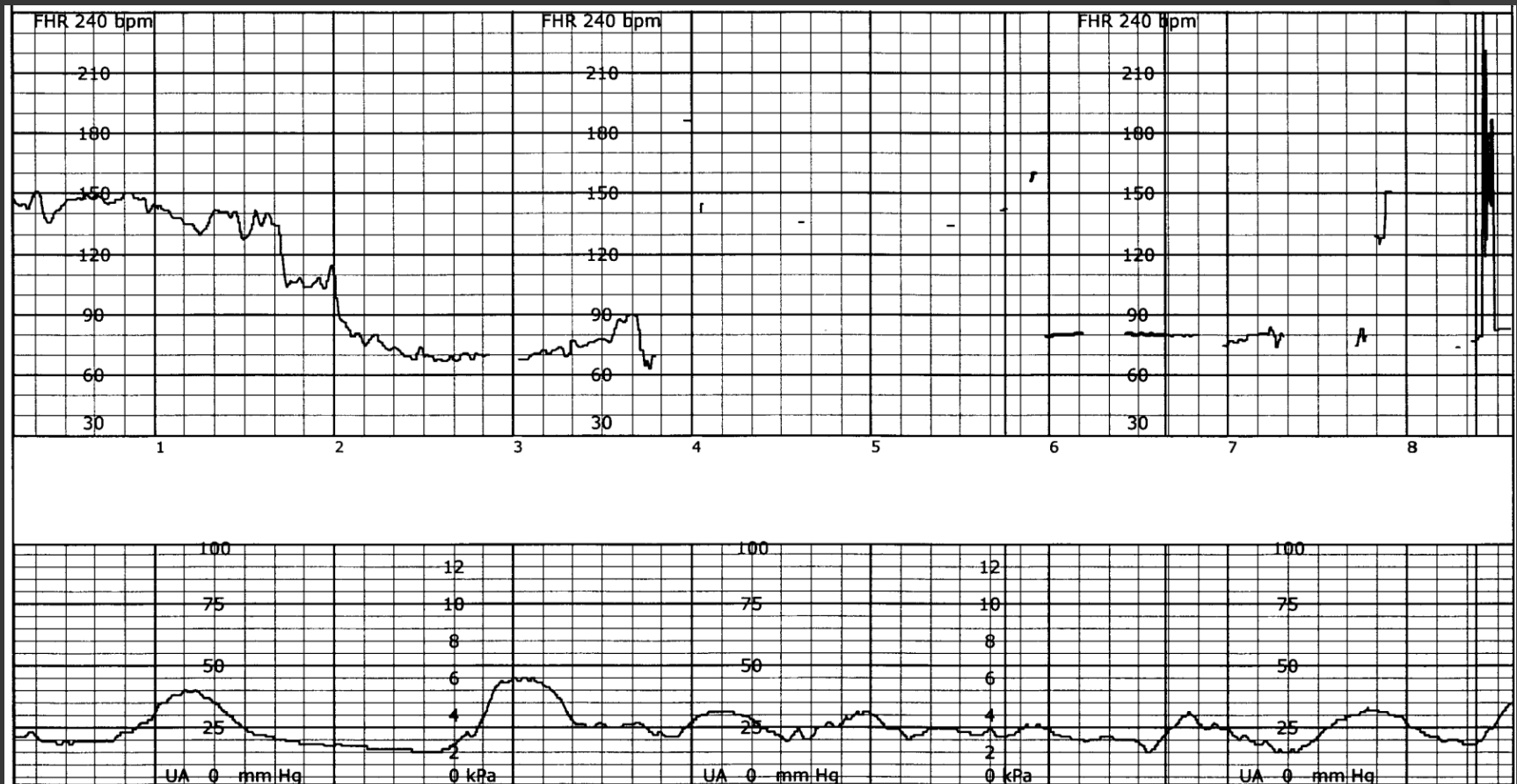
07:00: SVE- 4cm/80%/-3  
Pitocin @ 8mu



07:45

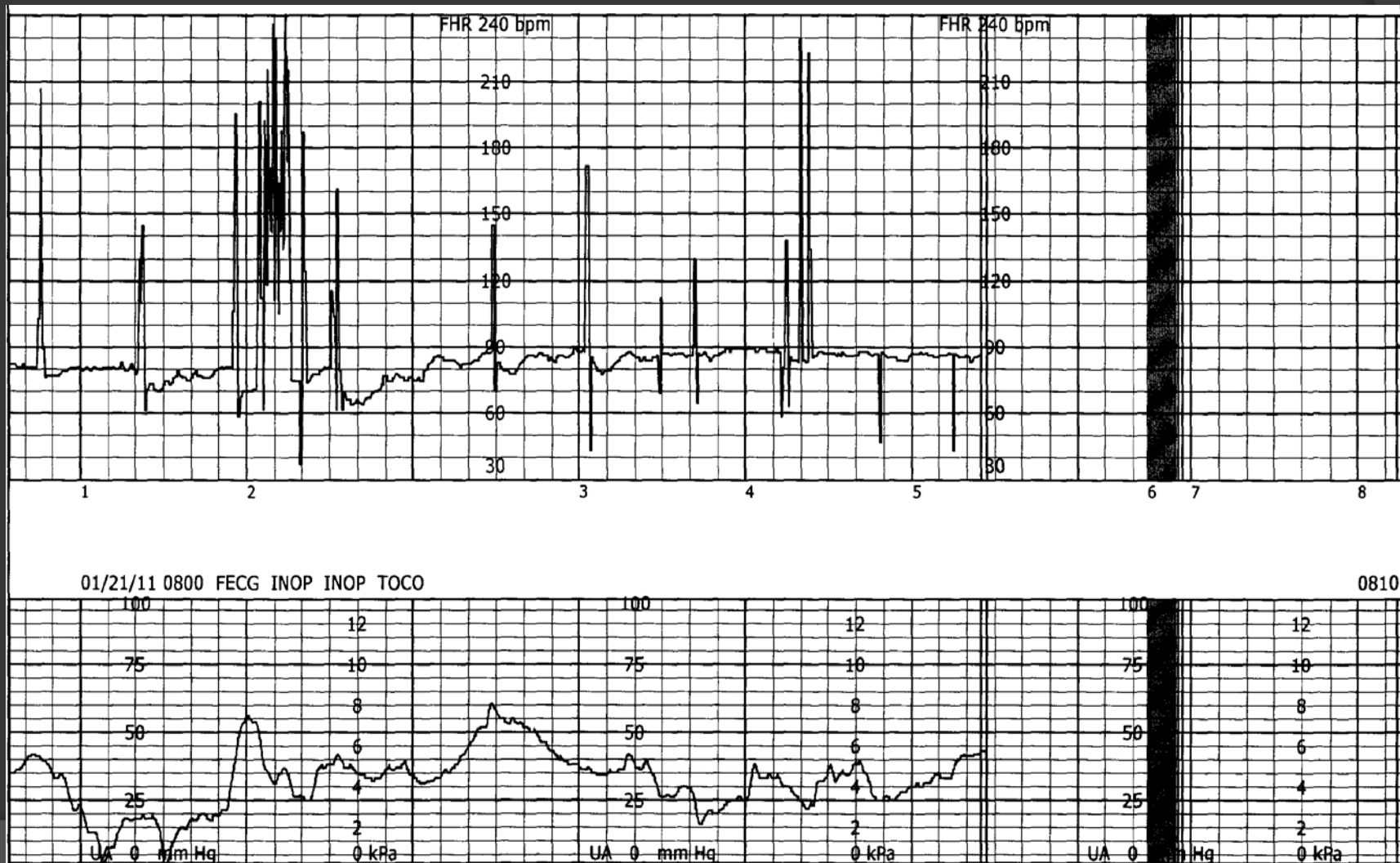


07:52-Patient states “I feel hot, it’s hard to hear you.” Patient slightly diaphoretetic. Magnesium sulfate and pitocin off



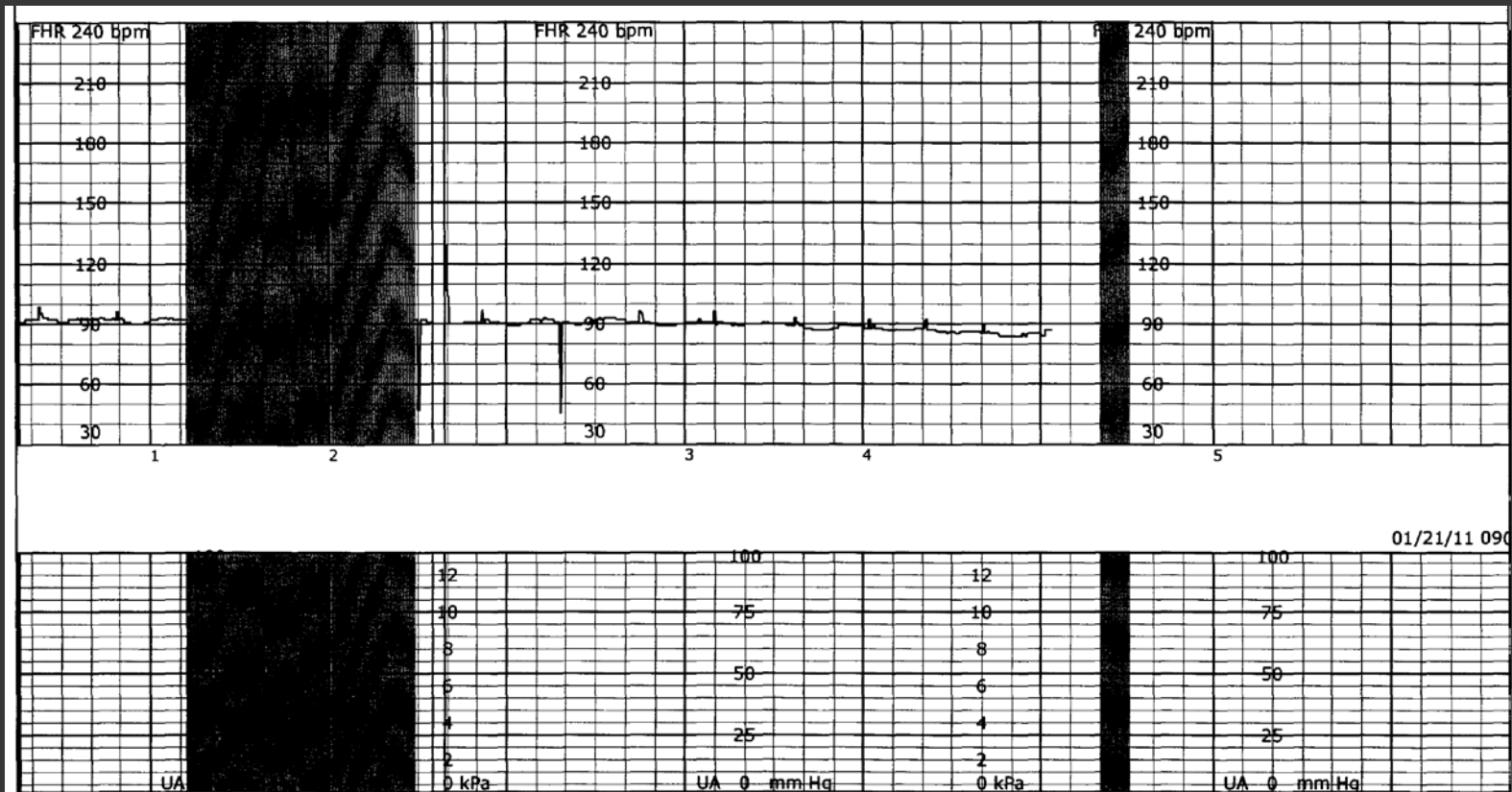
08:00-FECG placed by MD. Moderate amount of blood clots at introitus. Anesthesia present...

08:04- Decision to go to OR





08:11- in OR, - 9cm- patient pushed once,  
decision to incision...





- ⦿ 0810- FH in OR 90's
- ⦿ 0812- patient pushing per instruction
- ⦿ 0814- Decision to do CS
- ⦿ 0817- Start time

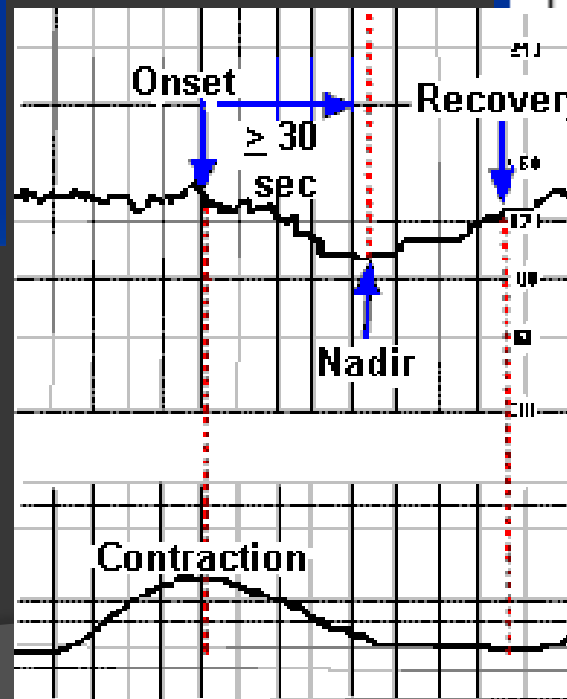
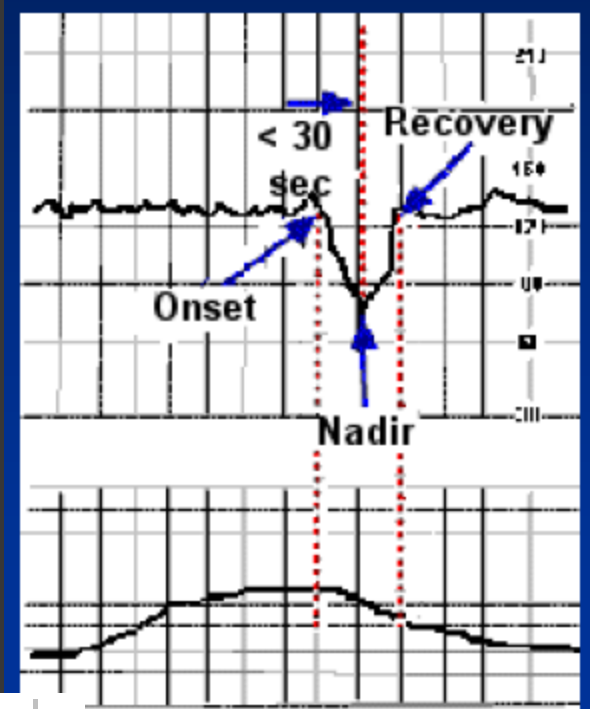
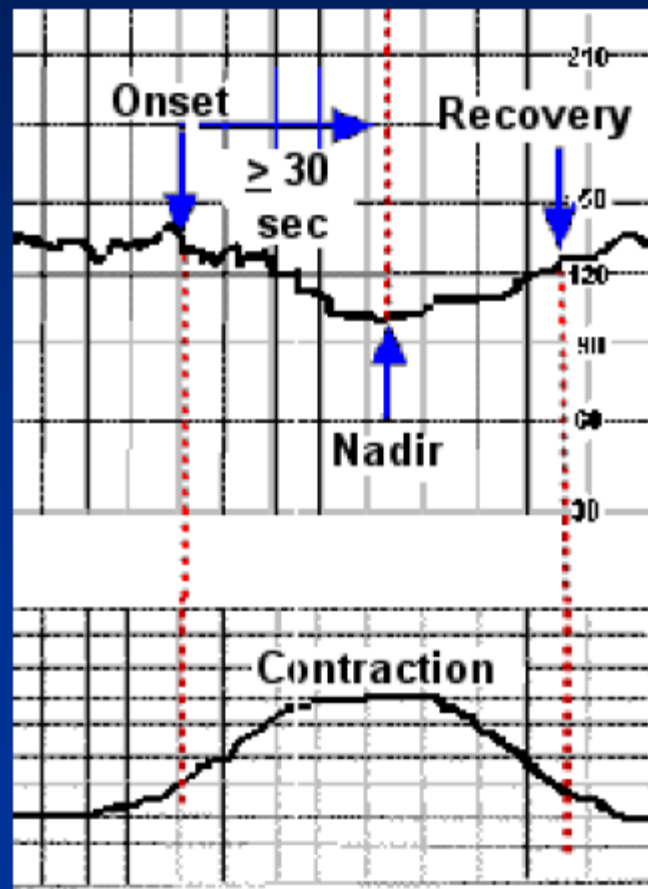
# Findings at CS

- ⦿ Profuse bleeding and clots in lower abdomen
- ⦿ Infant floppy
- ⦿ Rupture on left side
- ⦿ EBL: 1000cc
  
- ⦿ Cord PH: 6.55 pCO<sub>2</sub> 194 BD -26.2

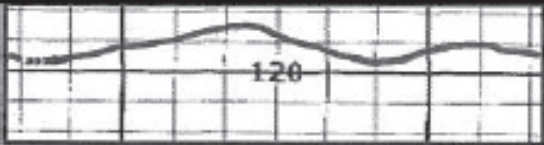
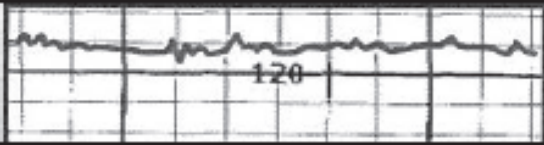
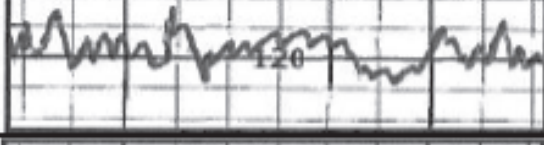
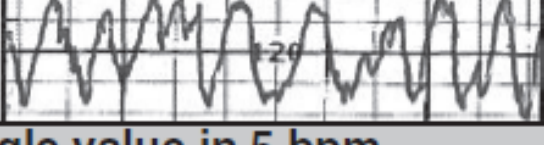
# NICHD

- Category I- Normal
- Category II- Indeterminate
- Category III- Abnormal

| PERIODIC/EPISODIC $\Delta$ 's   |  | EVALUATION ORDER  |
|---|--|---|
| Variable  | $\geq 15$ bpm $\downarrow$ BL $\times \geq 15$ s<br>$< 30$ s to reach nadir  | 1.<br>FHR Variability<br>2.<br>Periodic /Episodic<br>Change s<br>3.<br>FHR Baseline<br>4.<br>Evolution of EFM<br>Features Over Time |
| Early   | $\geq 30$ s to reach nadir<br>Timing with UC   |   |
| Late  | $\geq 30$ s to reach nadir<br>Nadir after UC peak  |   |
| Prolonged decelerations<br>and/or accelerations   | $\geq 2$ min to $< 10$ min<br>$\geq 10$ min constitutes an<br>FHR baseline change  |   |
| Accelerations   | $\geq 15$ bpm $\uparrow$ BL $\times \geq 15$ s<br>$\geq 10$ bpm $\uparrow$ BL $\times \geq 10$ s<br>(in a fetus $< 32$ wk) |   |
| RECURRENT PATTERN: Decels occurring with more than 50% of uterine contractions in any 20-min window of time |  |   |



## VARIABILITY

|  |                        |   |
|--|------------------------|---|
| Absent   | Undetectable           |  |
| Minimal  | >Undetectable to 5 bpm |  |
| Moderate   | 6 bpm to 25 bpm        |  |
| Marked   | >25 bpm                |  |
| <b>FHR BASELINE:</b> Mean BL rounded to single value in 5 bpm increments, exclude accelerations, decelerations & marked variability<br><b>Tachycardia</b> >160 bpm<br><b>Bradycardia</b> <110bpm |                        |   |

# Category I

- ⦿ A Category I FHR pattern has the following four characteristics:
  - Baseline rate, 110–160 bpm
  - Moderate variability (6–25 bpm)
  - NO late or variable decelerations
  - Early decelerations or accelerations OK

**NO FETAL ACIDEMIA**



# Category III

- Four FHR patterns as **abnormal**:
  - Predictive of abnormal fetal acid–base status.
  - Baseline FHR variability is **absent** and any one of the following:
    - 1) **Recurrent late decelerations**
    - 2) **Recurrent variable deceleration**
    - 3) **Bradycardia**
- **Sinusoidal heart rate**
  - regular variability resembling a sine wave, with fixed periodicity of 3–5 cycles/ min and amplitude of 5–40 bpm.

# NO DEBATE

- ⦿ CATEGORY I– NO PROBLEM

- ⦿ CATEGORY III

- INTRAUTERINE RESUSITATION
- PREPARE FOR DELIVERY
- CALL EVERYONE!
- DELIVER IF NOT RESOLVED

# Category II

- ⦿ All FHR patterns not in Category I or III
  - I.e. *indeterminate*.
  - Not predictive of abnormal fetal acid–base status.
  - When a Category II tracing is identified, a fetal scalp stimulation test may help identify fetuses in which acid–base status is normal.

# CATEGORY II Problem

- Mixtures of patterns
- Heterogeneous
- No guidance on management
- Most frequent patterns
- Most benign—low risk for acidosis

## *Graded Classification of FHRT:*

*Assn with neonatal acidosis and neurologic morbidity*

*Elliott et al 2010 AJOG;202:258.e1-8*

### ⦿ **Group A- abnormal**

- Base Deficit > 12 mmol/L
- Neurologic evidence of encephalopathy

### ⦿ **Referent**

- **Group N-Normal**—normal cord gases and no neurologic signs of encephalopathy
- **Group I-Intermediate-** Base Deficit > 12 mmol/L without encephalopathy

- ⦿ The duration of tracing abnormality strongly affects sensitivity and false-positive rates for each color.
- ⦿ Combinations of EFM abnormalities considered more serious (orange and above) required only minutes
- ⦿ Combinations with milder aberrations (blue and above) required hours to detect the same portion of adverse outcomes

# E/M Category II

- Require **evaluation and continued surveillance and reevaluation**, taking into account the entire associated clinical circumstances.

TABLE 3

**Conservative ameliorating techniques for the modification of variant FHR patterns**

Position change

Hyperoxia

Correct hypotension

Adequate intravascular volume

Correct excessive contractions (eg, decrease oxytocin)

Avoid constant pushing

Tocolysis

Amnioinfusion to correct amniotic fluid deficit



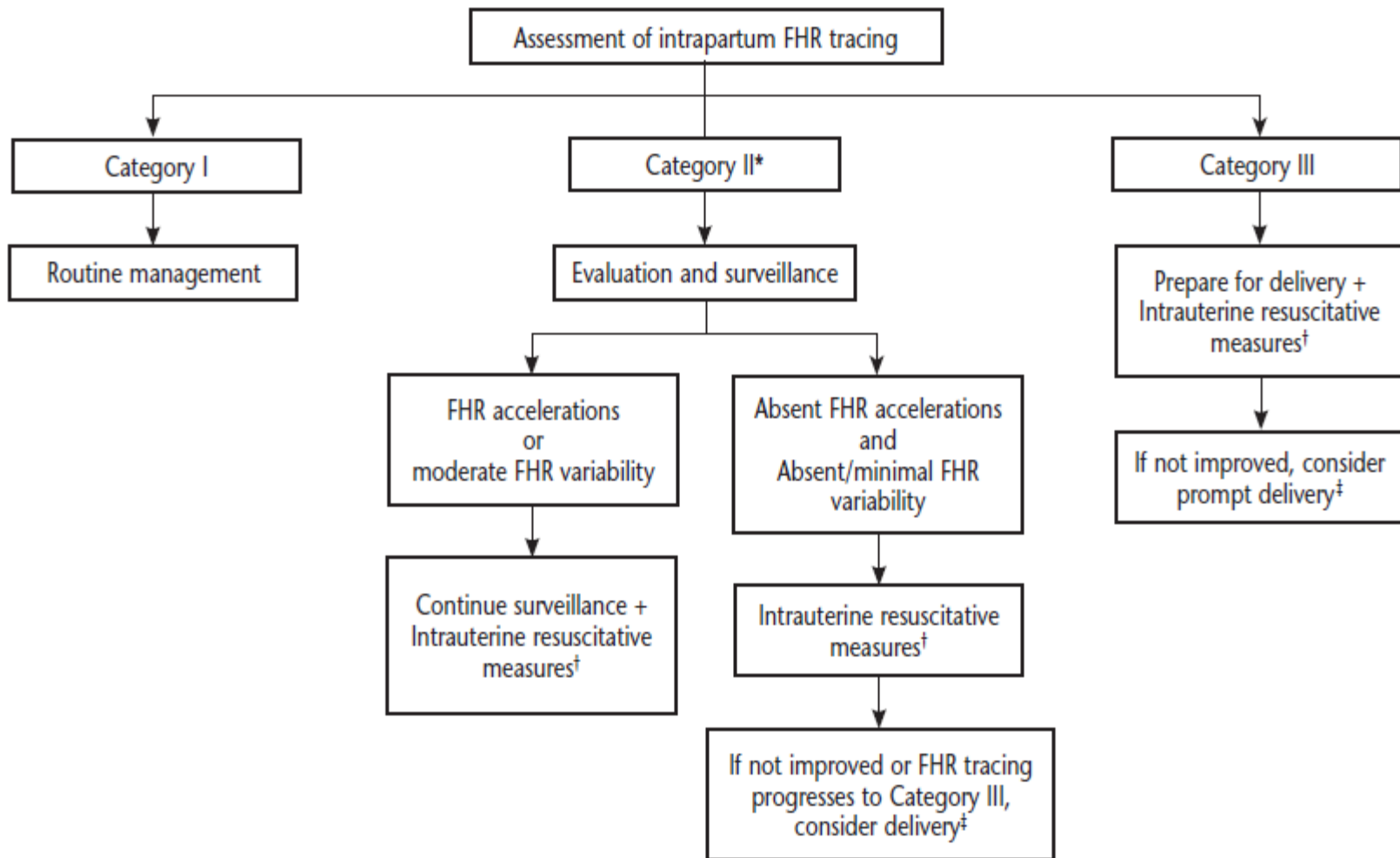
# Management

- “**L**” LEFT LATERAL RECUMBENT position. If she is already in that position, try changing to the right or a knee-chest position
- “**O**” OXYGEN via 100% non-rebreather mask
- “**C**” CORRECT or improve contributing factors
- “**K**” KEEP reassessing fetal heart rate and intervene when indicated..

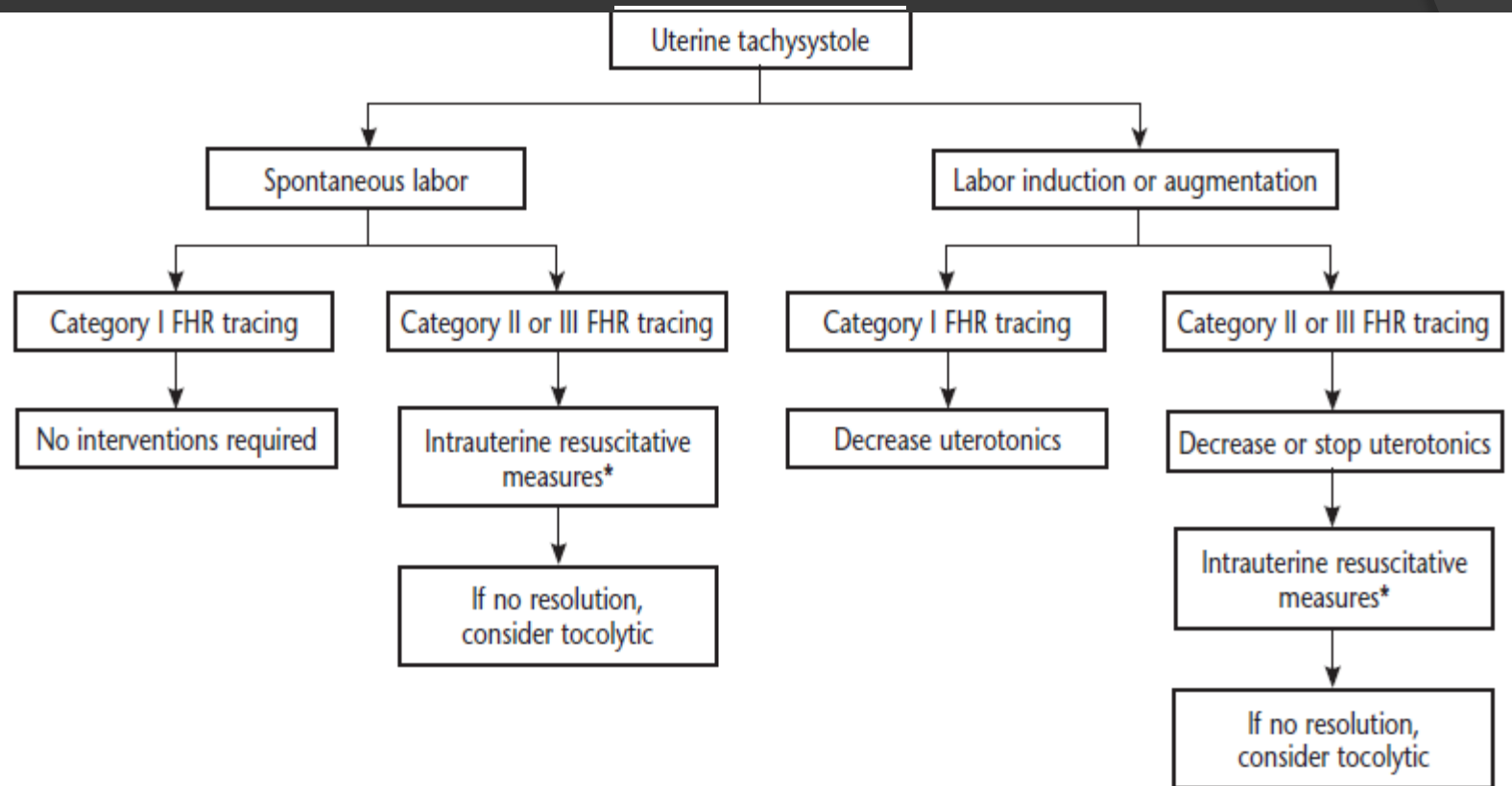
# CORRECT

- **Hypotension:**
  - Initiate a 500cc fluid bolus depending on the condition of the patient, or correct supine hypotension.
- **Hypertonic or tetanic contractions:**
  - Discontinue Oxytocin. Oxytocin has a half-life of approximately 3 minutes and blood levels diminish rapidly.
  - Consider Terbutaline 0.25 mg SQ.
- **Rule out a prolapsed cord.**
  - If present, lift the presenting part off of the cord and reposition the patient.
- **Assess for placental abruption or other complications that may affect fetal heart rate.**
- **Cord Compression**
  - Change the position of the mother.
  - If a position change does not relieve cord, reposition the mother again, and reassess

# ACOG



# TACHYSYSTOLE



# Kaiser Permanente Perinatal Patient Safety Program Initiative

- The Fetal Heart Rate Collaborative Practice Project
- Situational Awareness in Electronic Fetal Monitoring

*J Perinat Neonat Nurs* Vol. 23, No. 4, pp. 314–323;2009

# What it does:

- ④ *Shared mental model*
- ④ Set time parameters for provider notification for variant FHR tracing patterns.
- ④ Using a fetal surveillance algorithm with SBAR communication and assertion
- ④ Clear escalation policy that identified the names, titles, and phone numbers of team members

# Goals:

- Ensure fetus is delivered in the absence of a significant **fetal metabolic acidosis** and/or in the presence of neonatal vigor.
- Avoid inappropriate interpretation of FHR patterns resulting in **unnecessary operative interventions**.
- Avoid tendency to focus only on decelerations, rather than **moderate baseline variability**  
--the most reliable indicator of fetal well-being



- Most fetal hypoxic situations are associated with a **loss of variability over time** and usually develop over a 60- to 120-minute time period
- Exception –Prolonged Deceleration

● RATE-ROUTE-ROOM

● 1-2-3 GUIDELINE

⦿ **RATE:** Heart rate

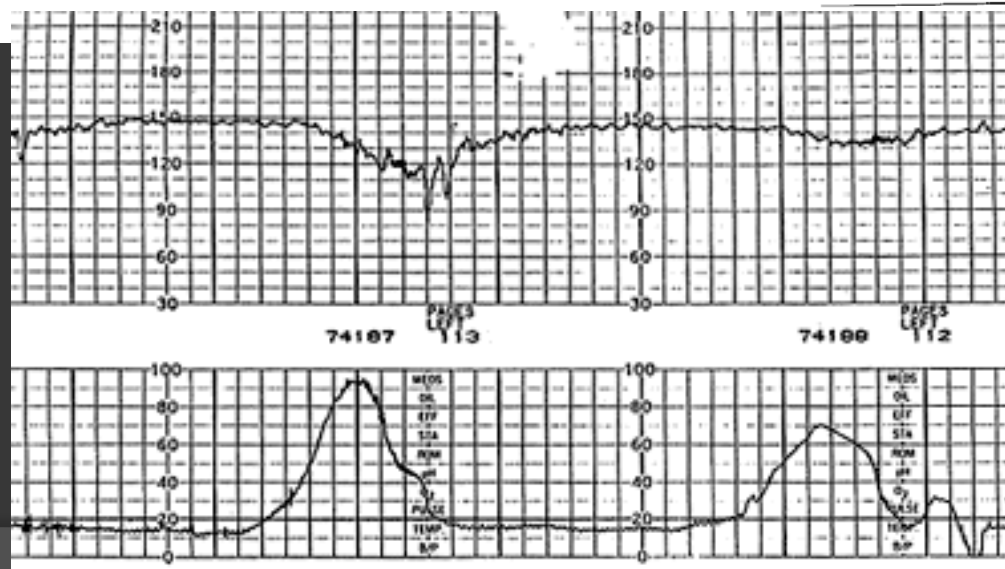
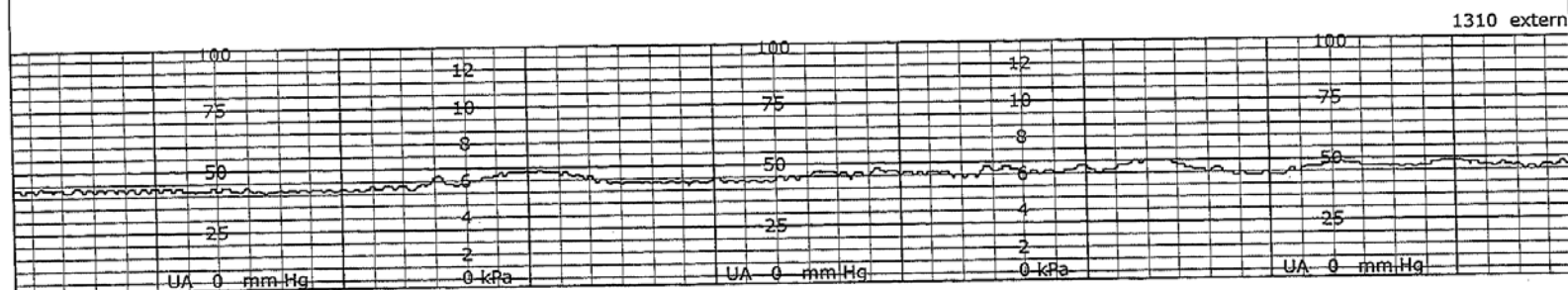
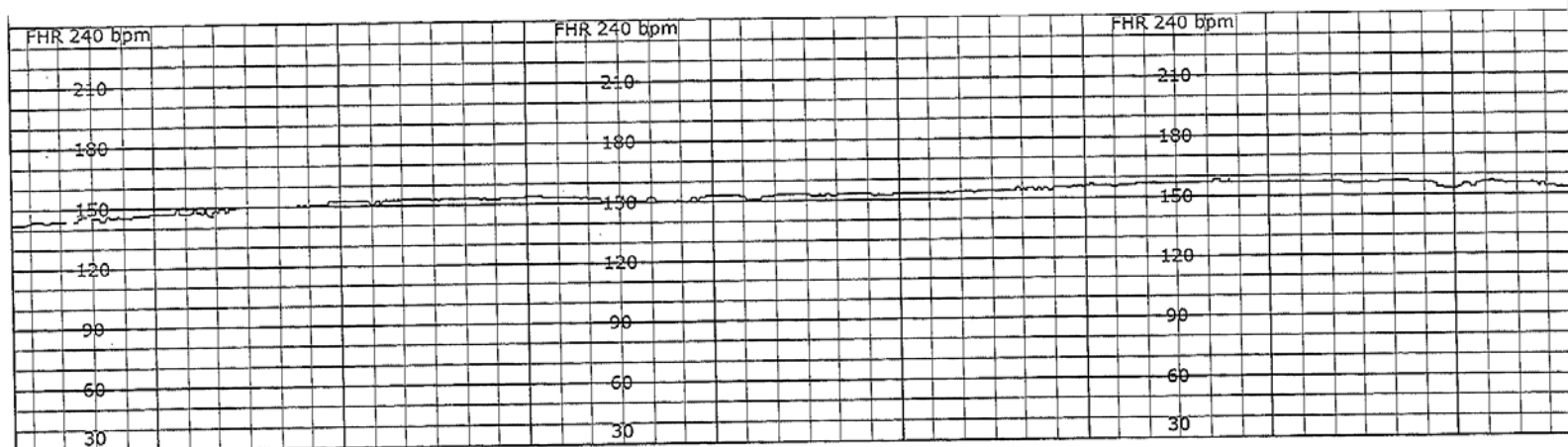
- If  $< 80$  bpm and delivery remote or 60 bpm anytime----NEXT STEPS

⦿ **ROUTE:** Cervical exam re:  
delivery/prolapse

⦿ **ROOM:** Where to deliver

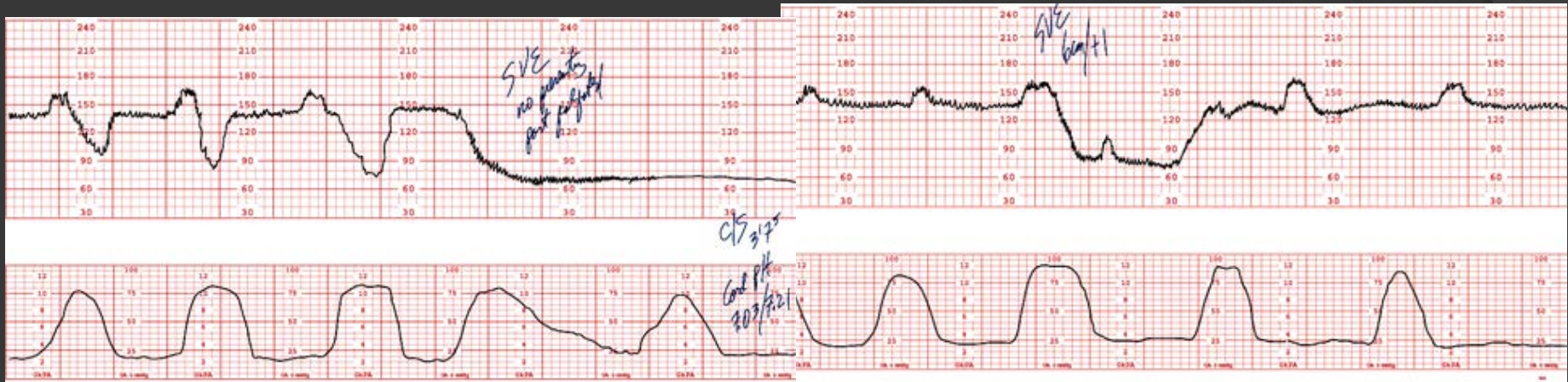
# 1-2-3 GUIDELINE

- ⦿ END OF **1 MINUTE**—FHR $\leq$  60: ASSESS CAUSE
  - EVALUATE/ CONSERVATIVE MEASURES INITIATED
- ⦿ END OF **SECOND MINUTE**: EMERGENCY ALERT
  - MD, OR TEAM, HELP
  - EXPLAIN TO FAMILY
  - READY TO MOVE—tubes, cords, plugs
- ⦿ END OF **THIRD MINUTE**: MD PRESENT, OR ANYONE CAN MOVE TO OR



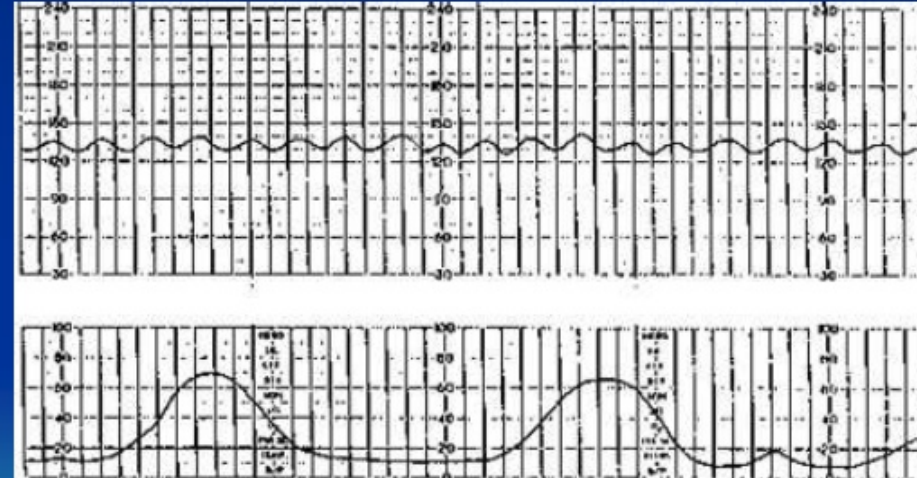
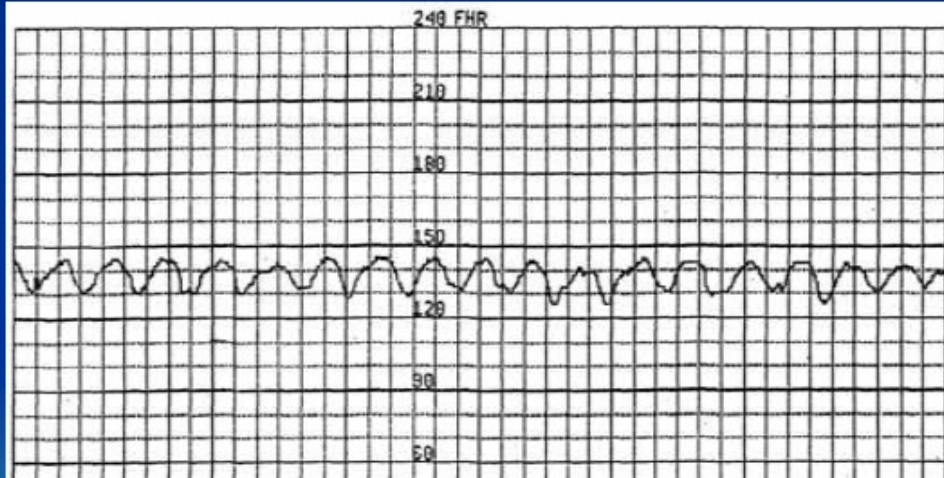
# Prolonged Decelerations

A decrease in FHR of  $\geq 15$  beats per minute measured from the most recently determined baseline rate. The deceleration lasts  $\geq 2$  minutes but less than 10 minutes.

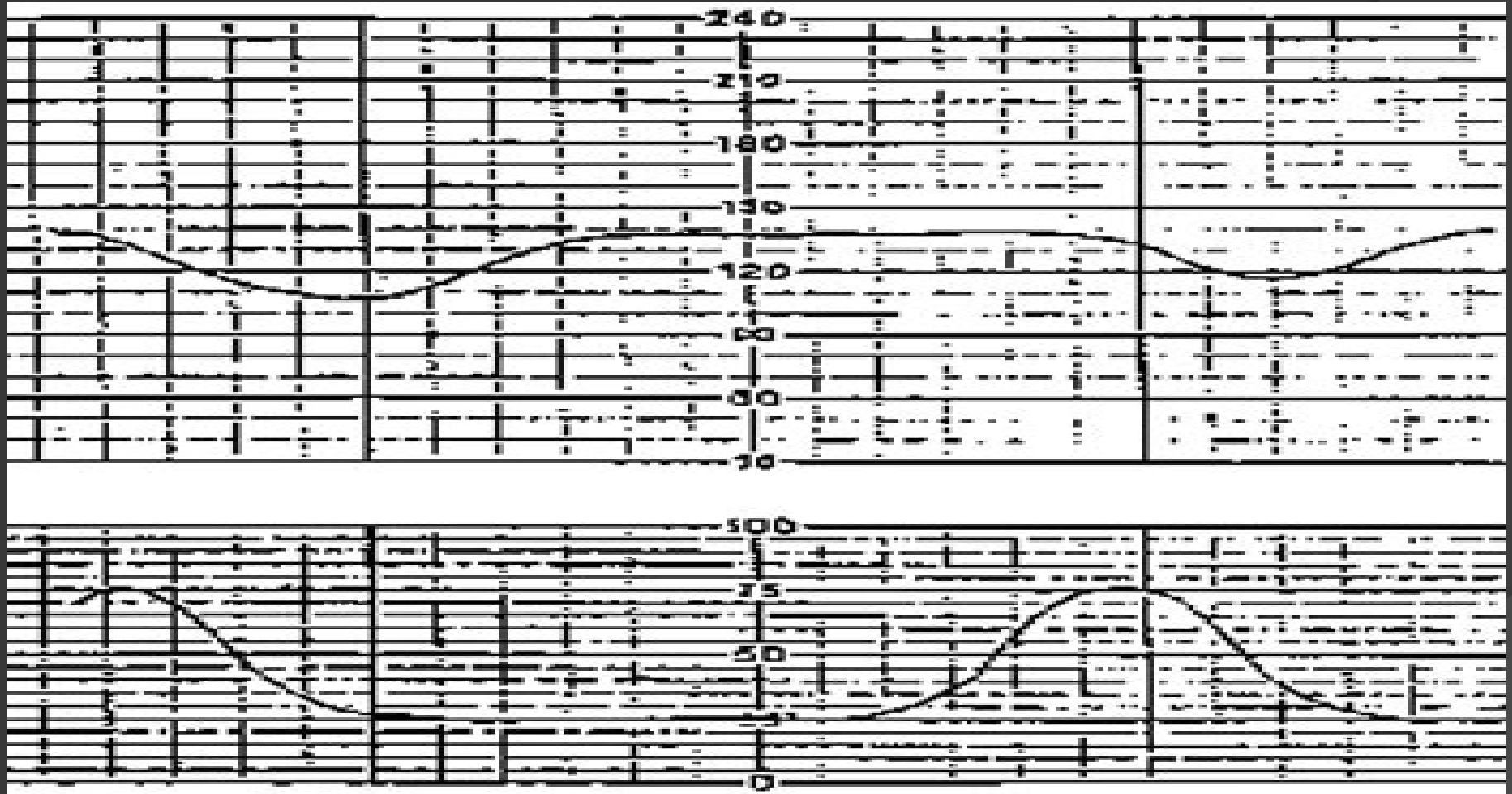


Prolonged deceleration following uterine rupture

Prolonged deceleration following vaginal exam: vagal



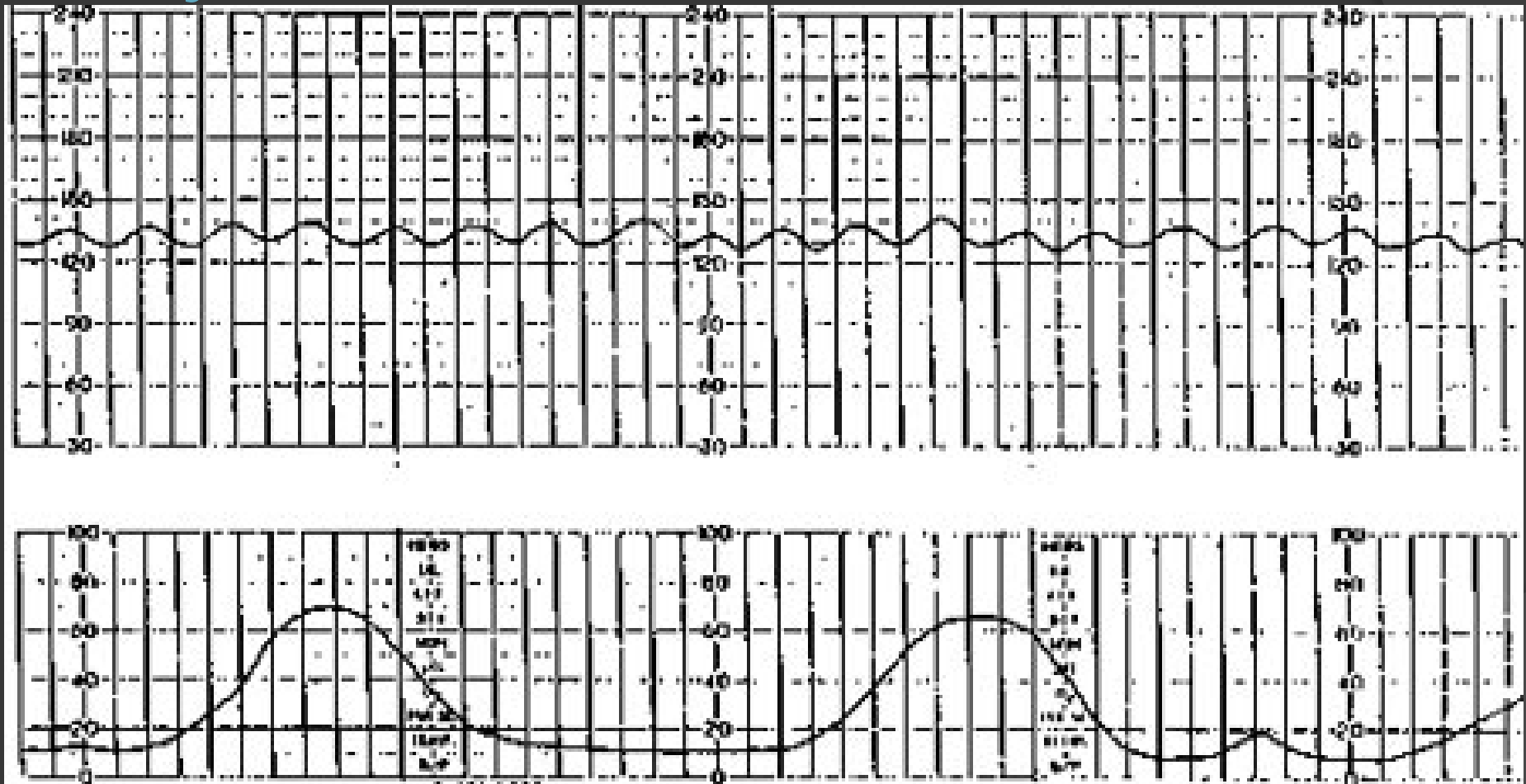
# Category FHR tracing I, II, or III?



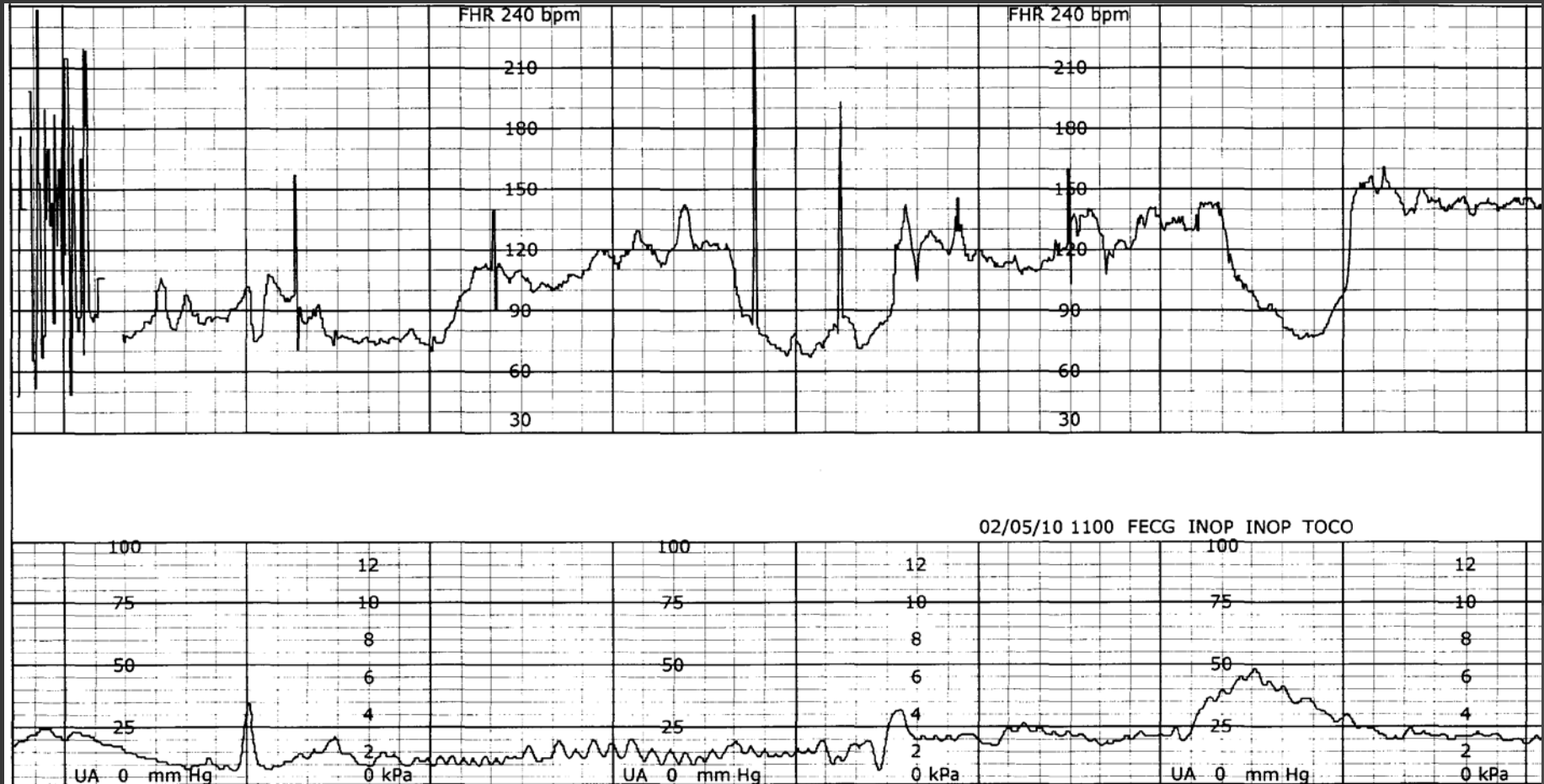


# Category FHR tracing I, II, or III?

## Why?

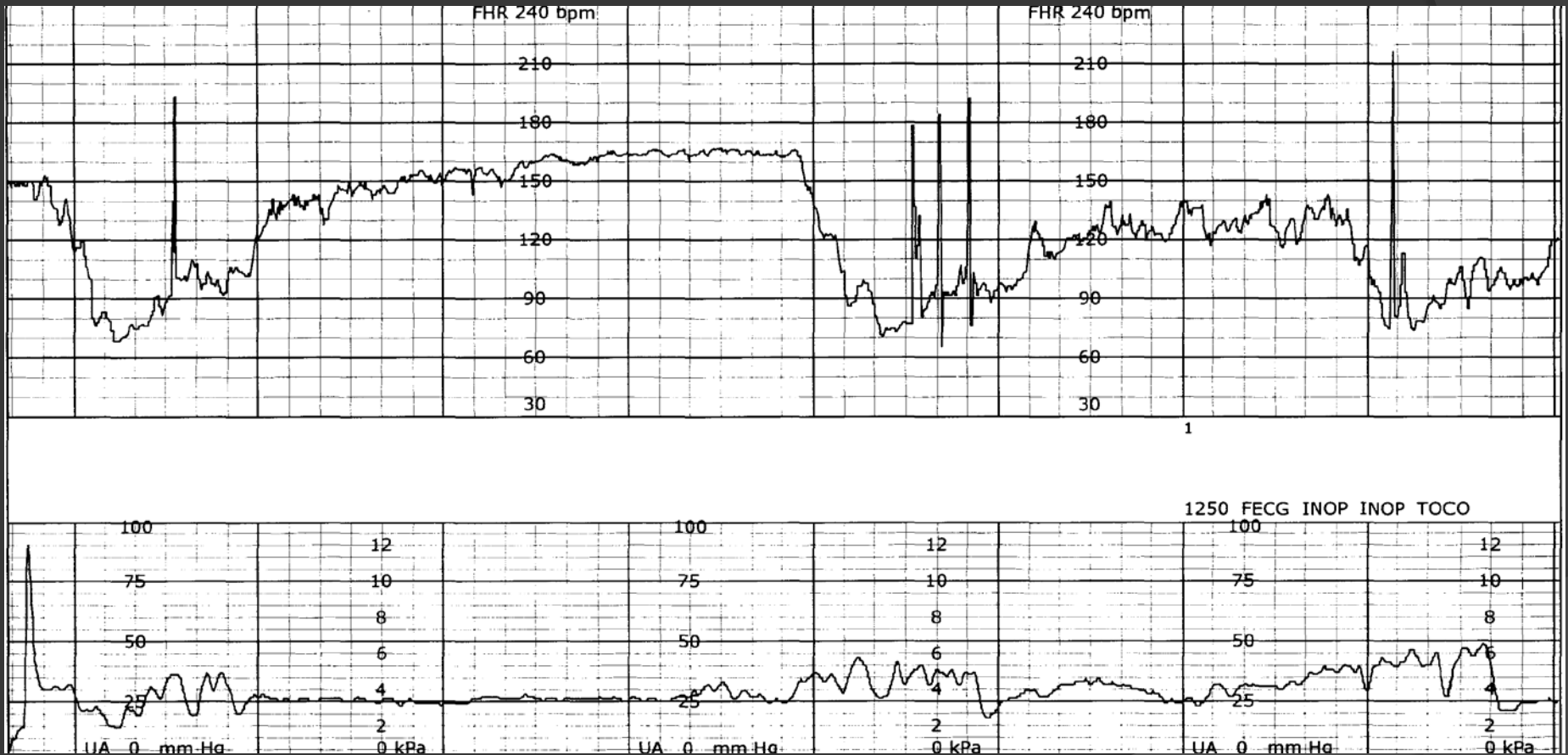


G1P0, VE 10/100%/-1 for the last 30 minutes.  
Category FHR tracing I, II, or III?  
Continued surveillance?



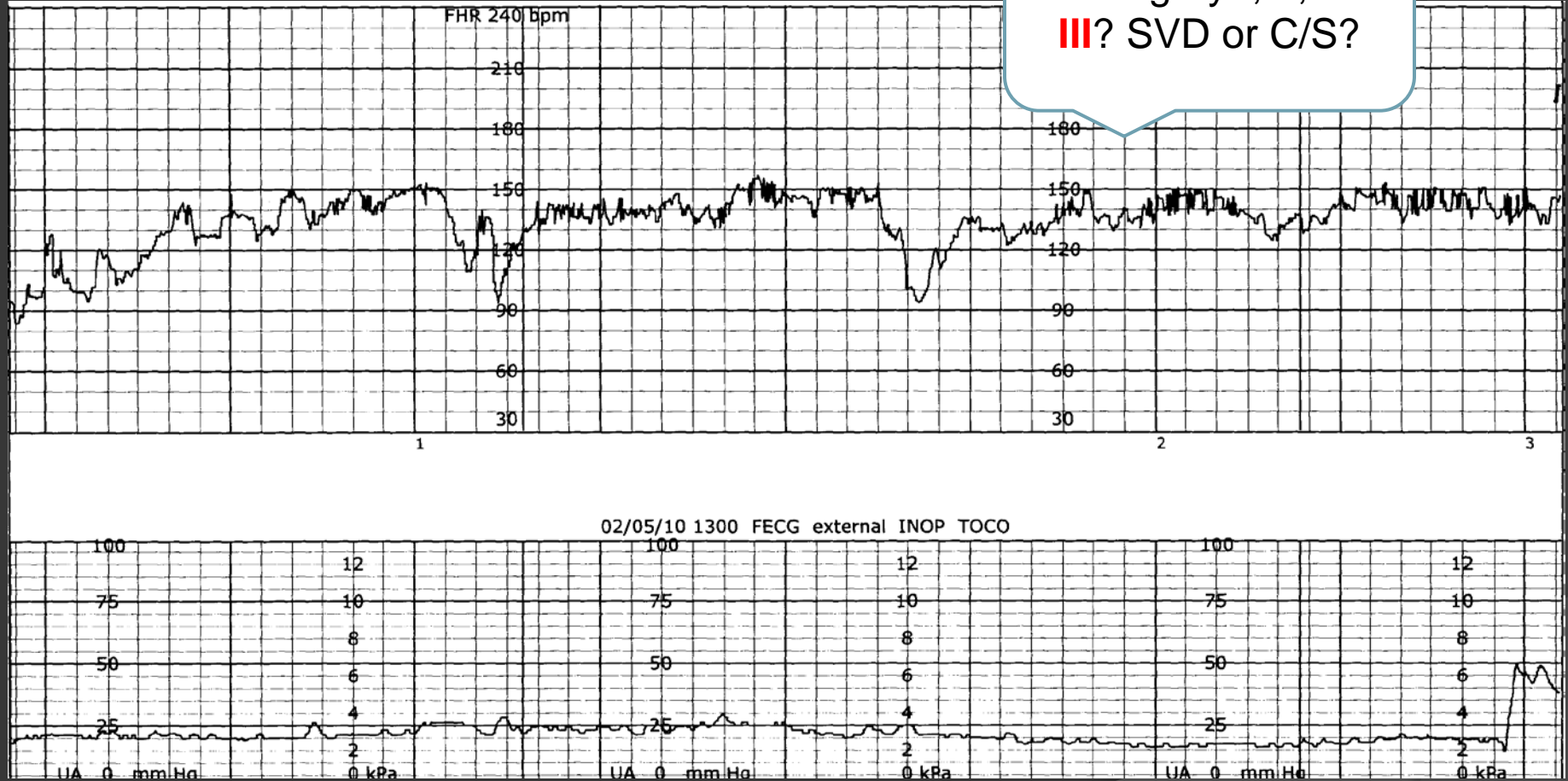
# 2 hours later...

## Patient continues to push



# Final segment...

Category I, II, or  
III? SVD or C/S?



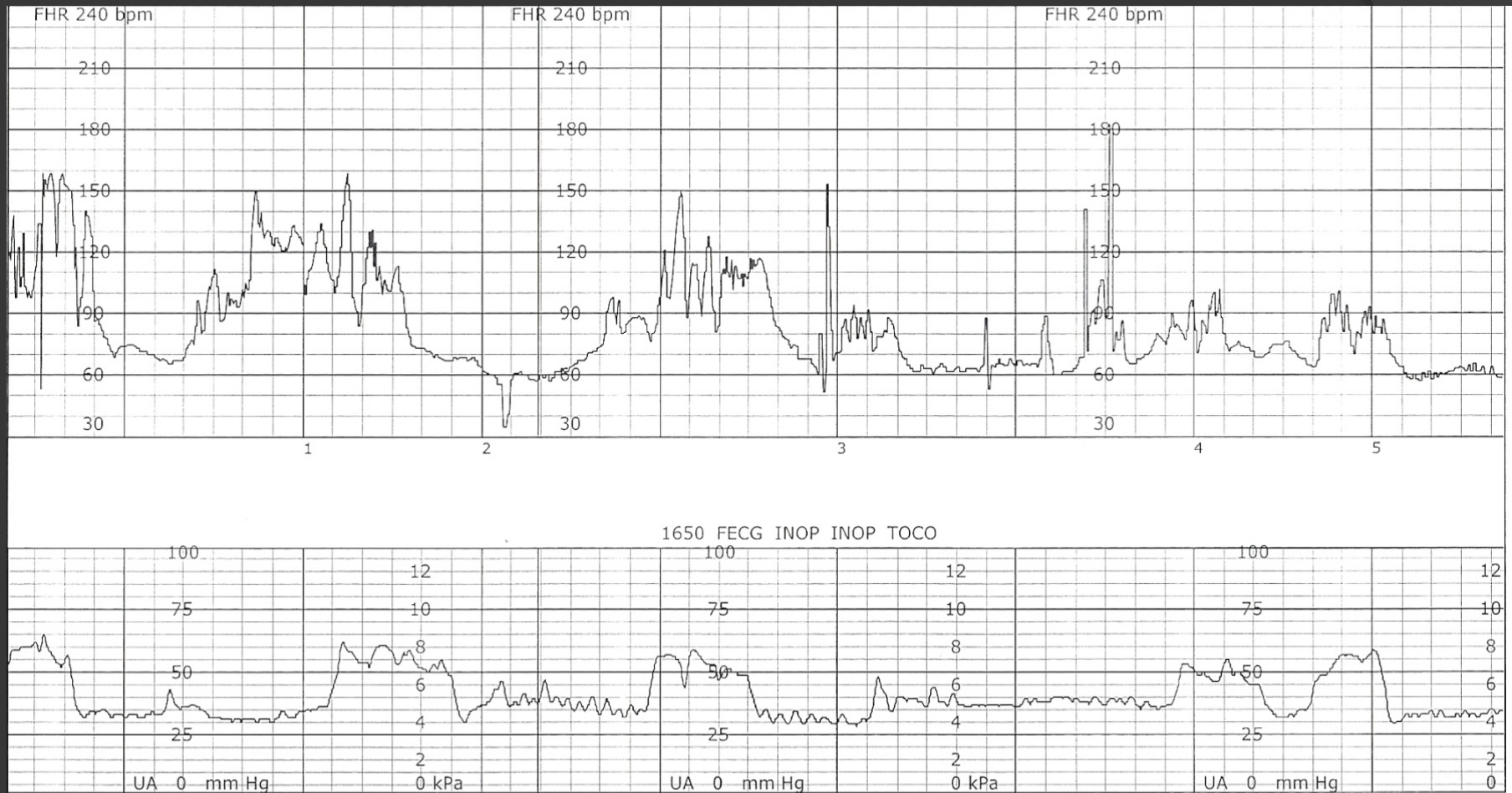
# Outcome

- ⦿ Vacuum assist delivery
- ⦿ Apgars 8/9
- ⦿ Nuchal cord X 1
- ⦿ No cord blood gases were obtained



# G1P0, Recent VE 10/90%/-1. Pitocin dc'd...

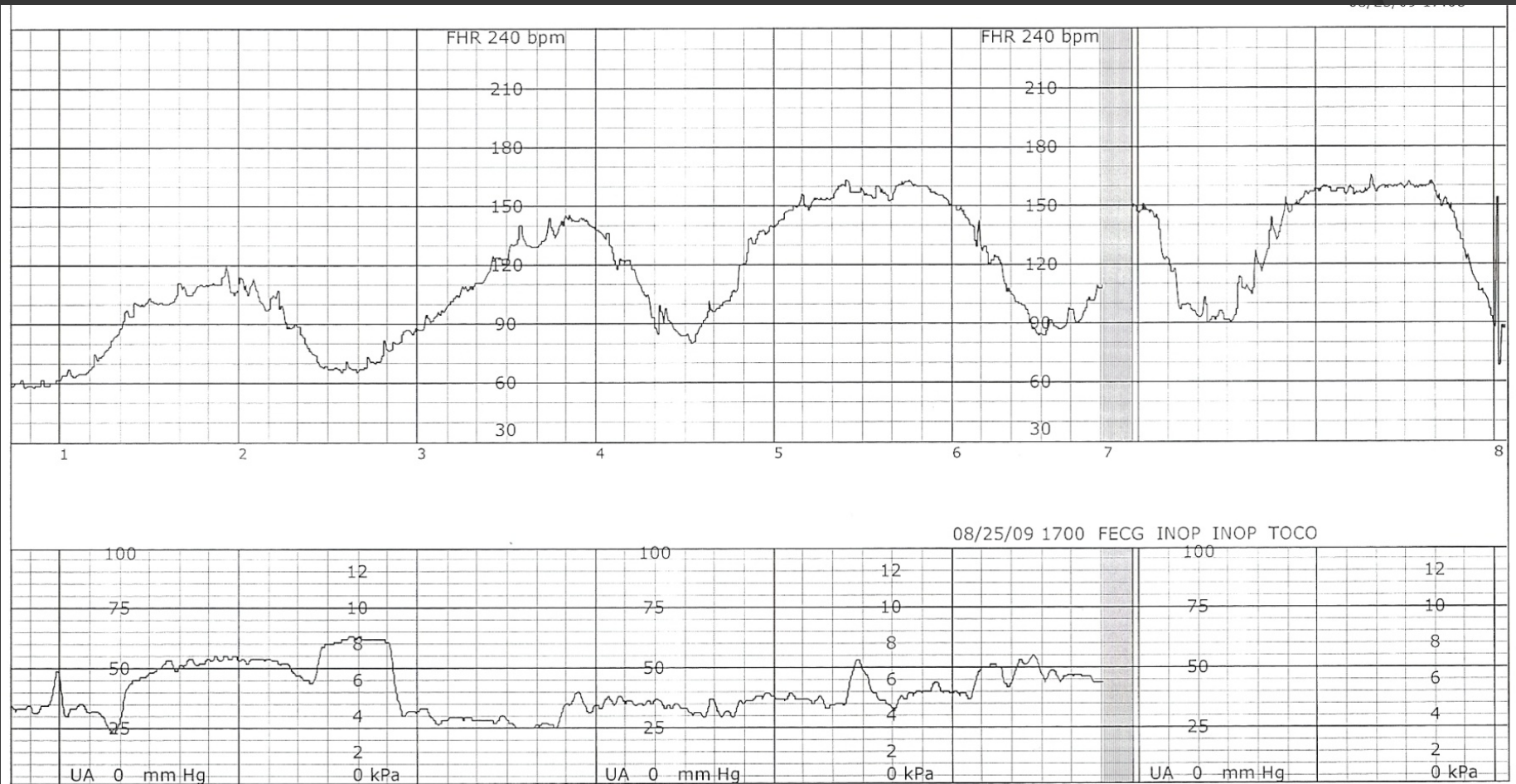
## Category FHR tracing I, II, or III?





10 minutes later...

Is this predictive of abnormal fetal-acid base status?

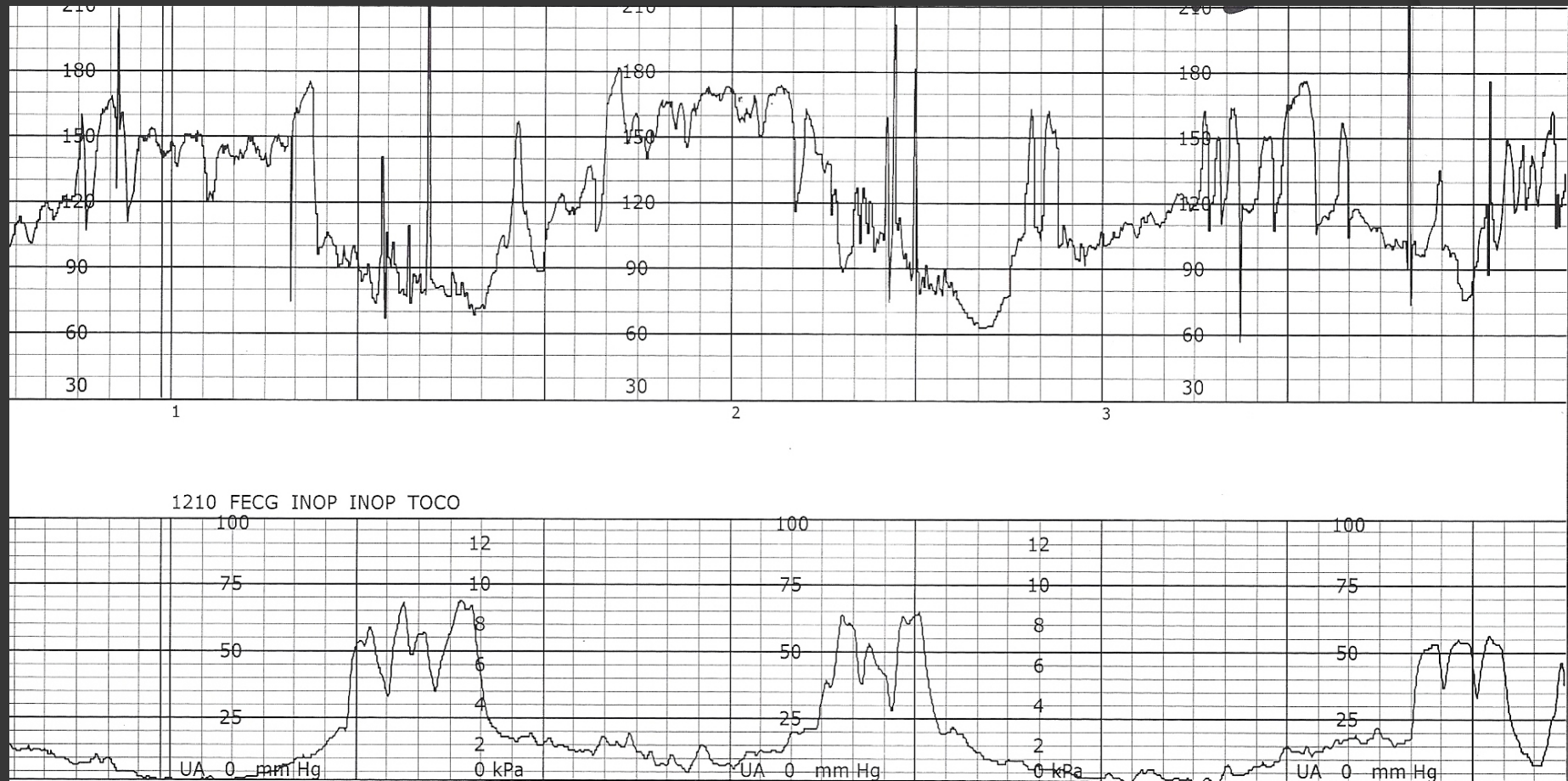


# Decision was made to perform C/S

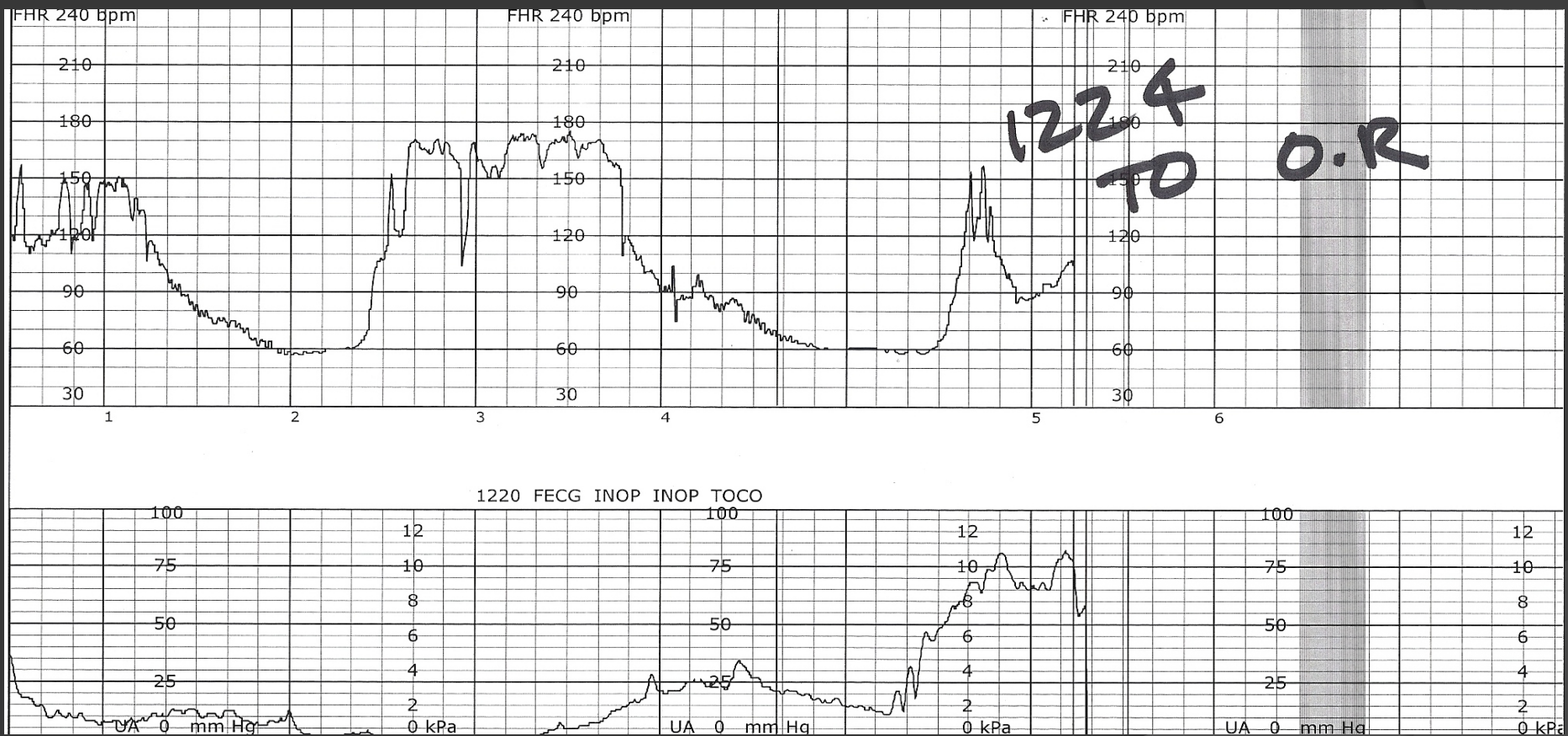
- ⊙ Apgars 8/9
- ⊙ Cord blood gases
  - PCO<sub>2</sub> 69
  - PH 7.11
  - HCO<sub>3</sub> 22
  - BE -9.1



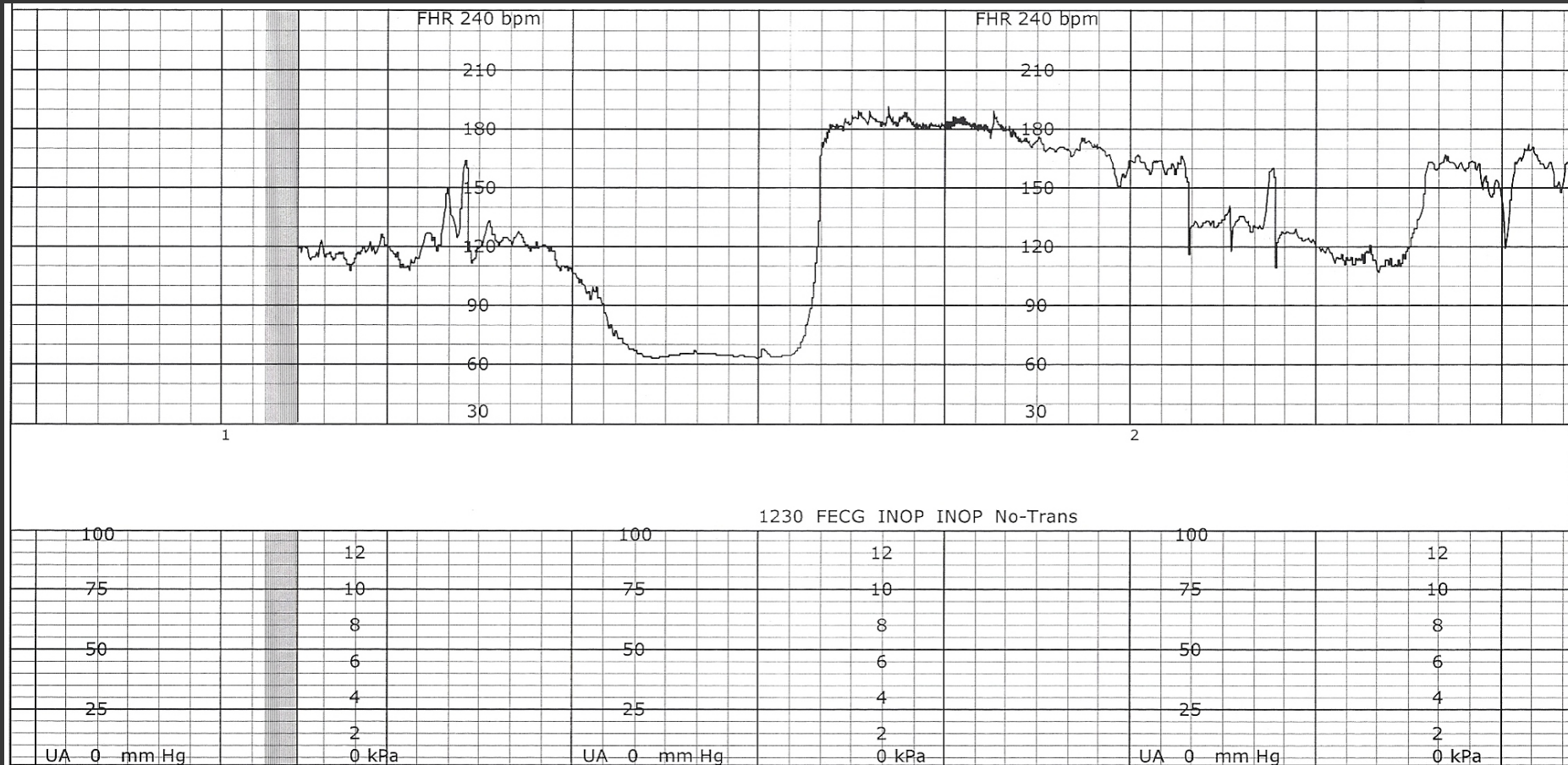
G1P0, VE 9/100%/-1 for the last 3 hours.  
Category FHR tracing I, II, or III?



# 10 minutes later...



# 5 minutes later the patient was transferred to the OR...



# Outcome...

- ⦿ Decision made to perform C/S
- ⦿ Apgars 8/9
- ⦿ Cord blood gases
  - PCO<sub>2</sub> 70
  - PH 7.14
  - HCO<sub>3</sub> 24
  - BE -7.5



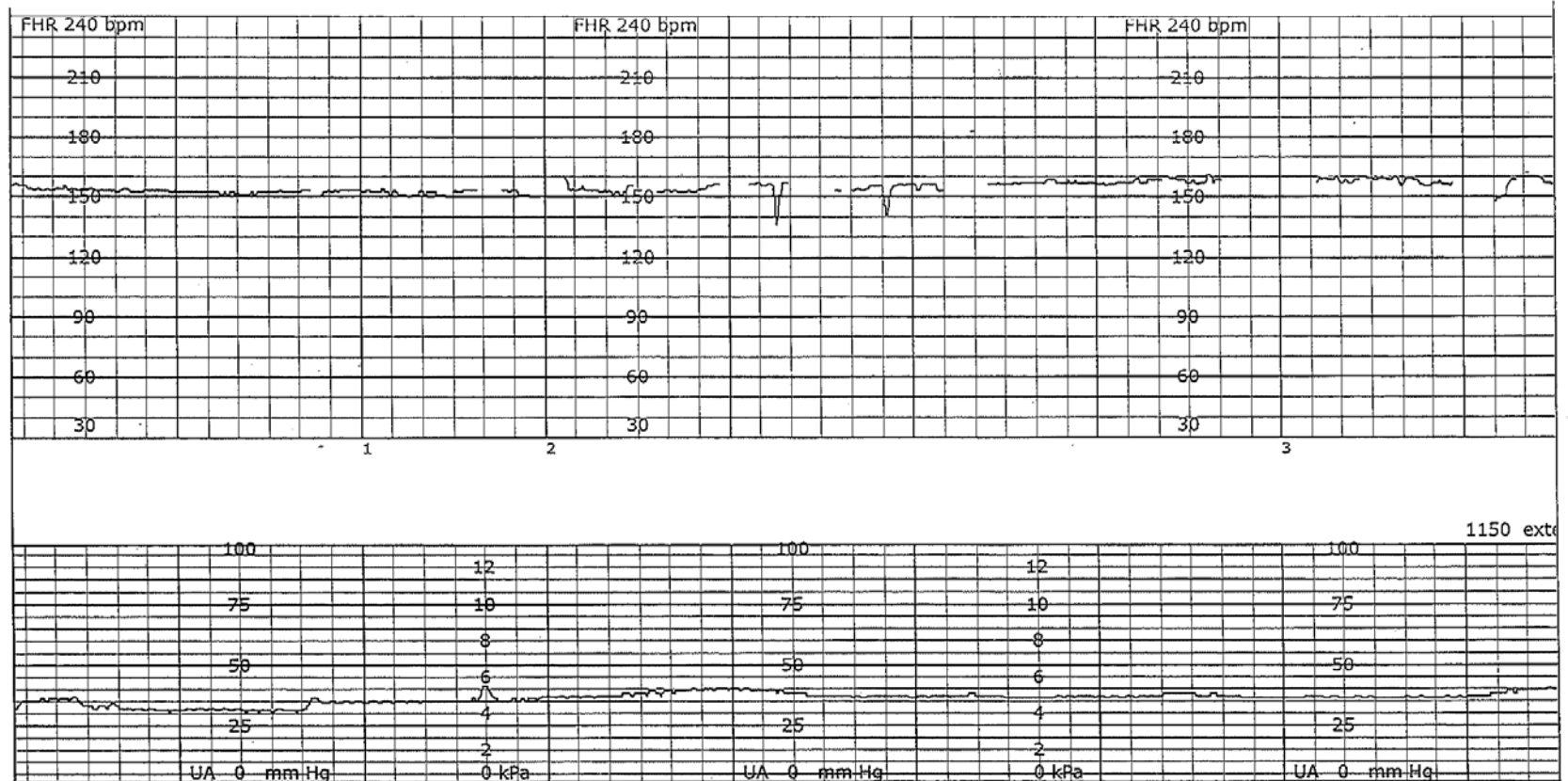
# Case 3

- 30 y.o G3P2
- 26 4/7<sup>th</sup> weeks gestation by mother's LMP and an early ultrasound done at 7 and 5/7 weeks
- Previous preterm deliveries at 33 and 36 weeks gestation
- Patient taking progesterone weekly and was started on aldomet 250 mg twice a day for PIH

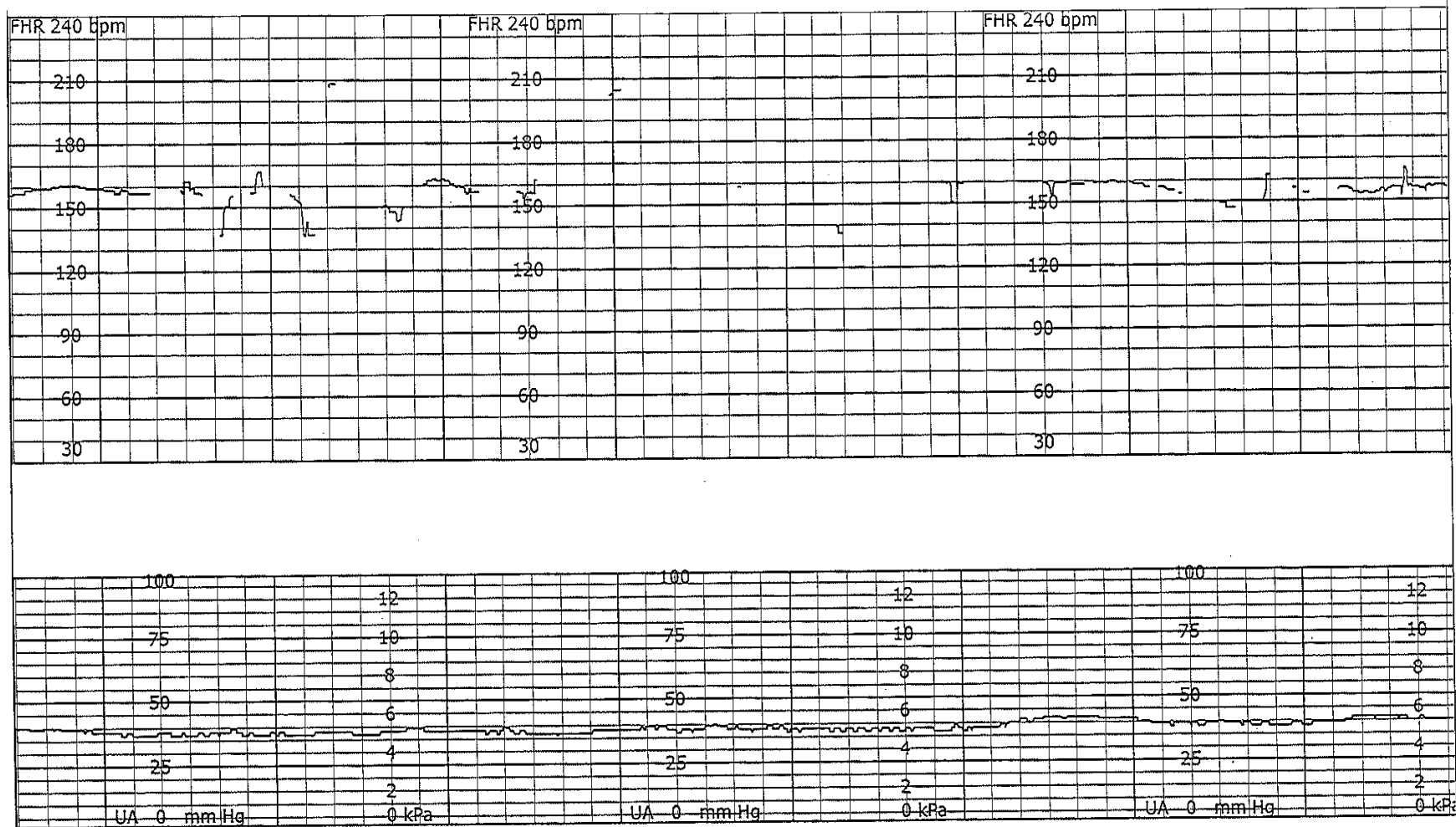


- Patient directly admitted from doctor's office for PIH and severe IUGR with absent end diastolic flow and placental insufficiency
- Possible transfer
- BP 169/104, HR 69, Resp 20, Temp 98.2
- Weight 246 lbs, HT 5'8", BMI 37.40
- 2+ proteinuria

# 1145- BP 153/89, left tilt



# 1158

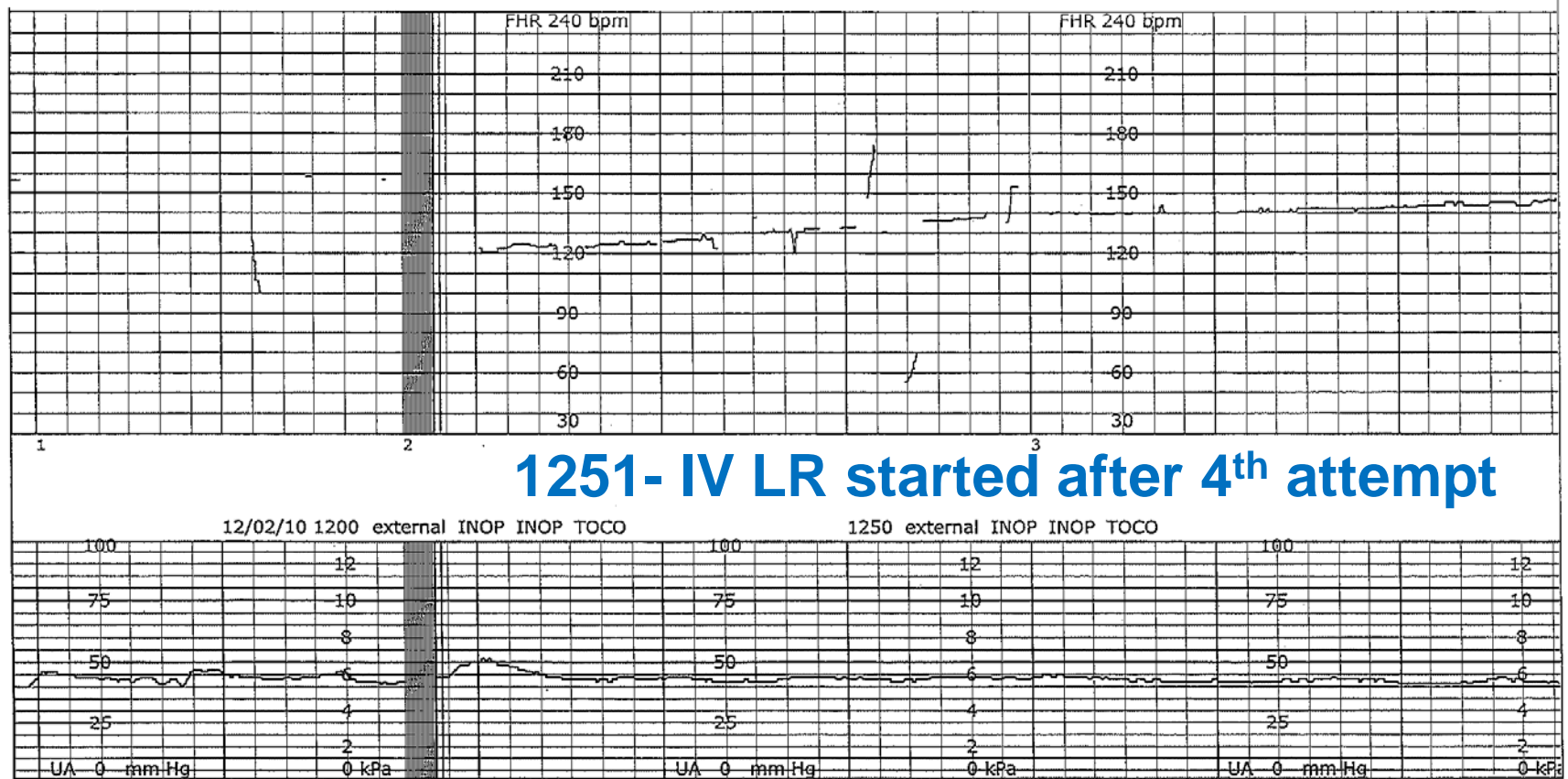




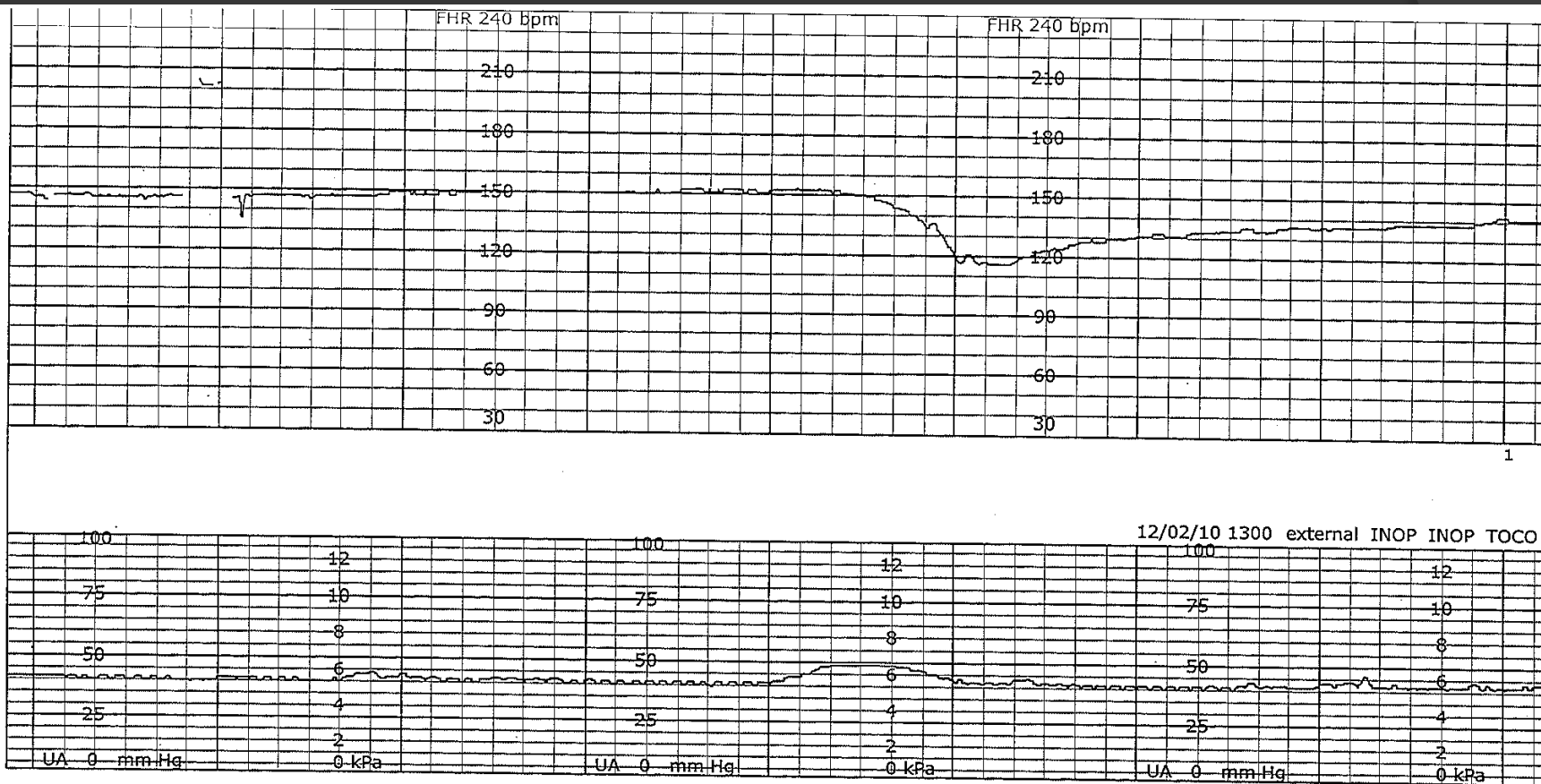
# 1200- Labs

- ⦿ HGB 9.2
- ⦿ HCT 27.7
- ⦿ ALT 15
- ⦿ AST 13
- ⦿ PTLC 225
- ⦿ Uric acid 3.1
- ⦿ Creatinine 0.6

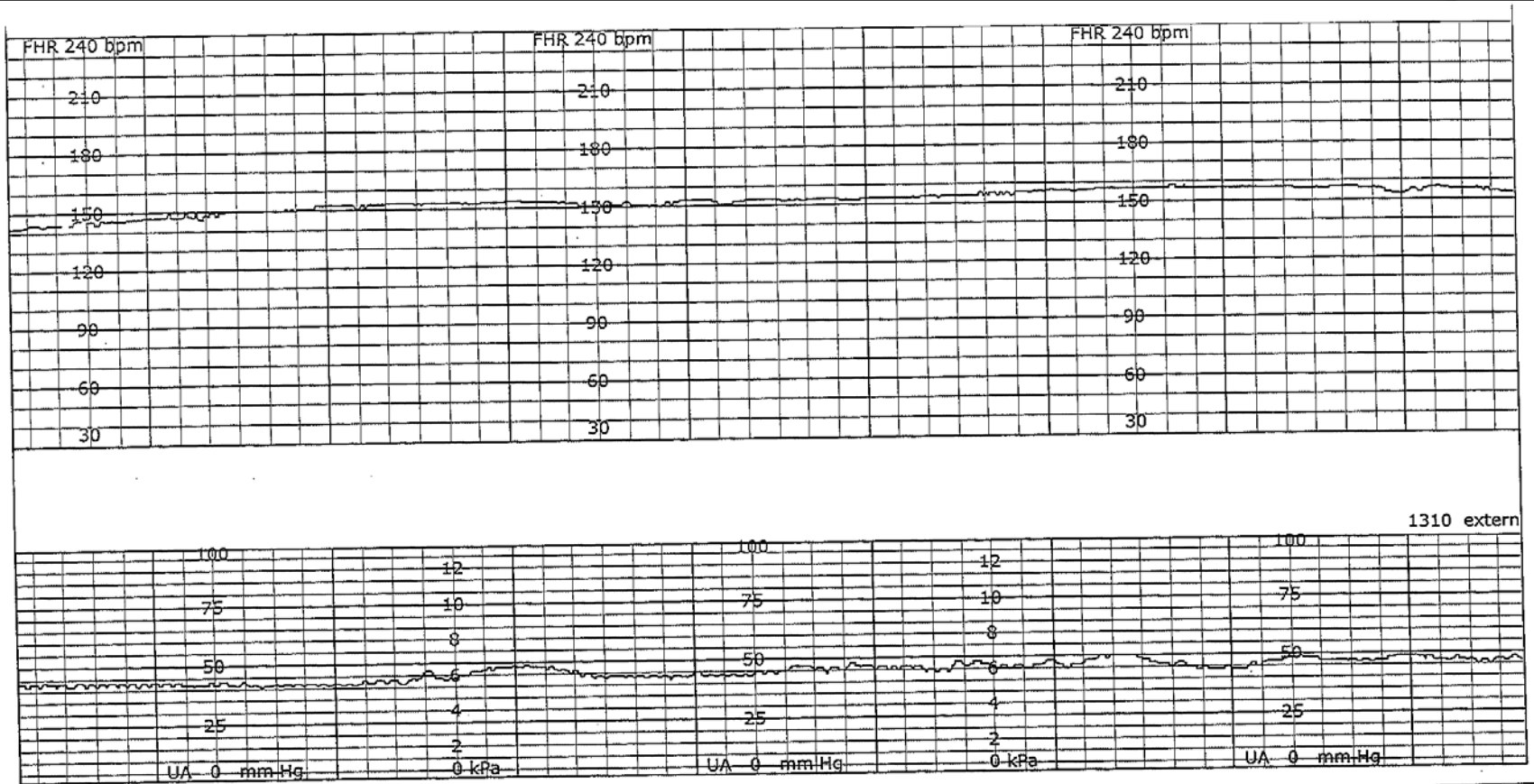
# 1159- EFM off. 1248- EFM on



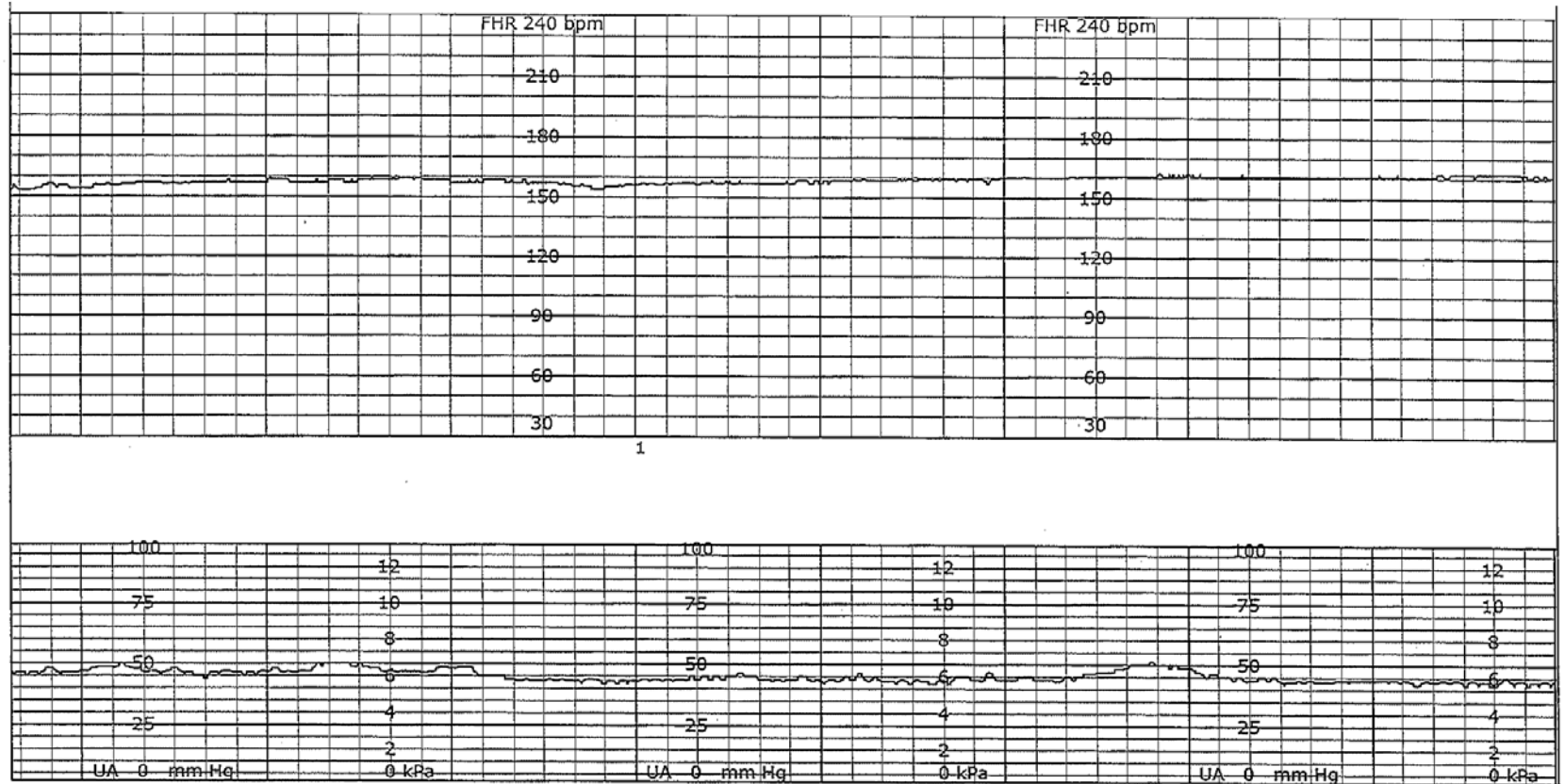
1300



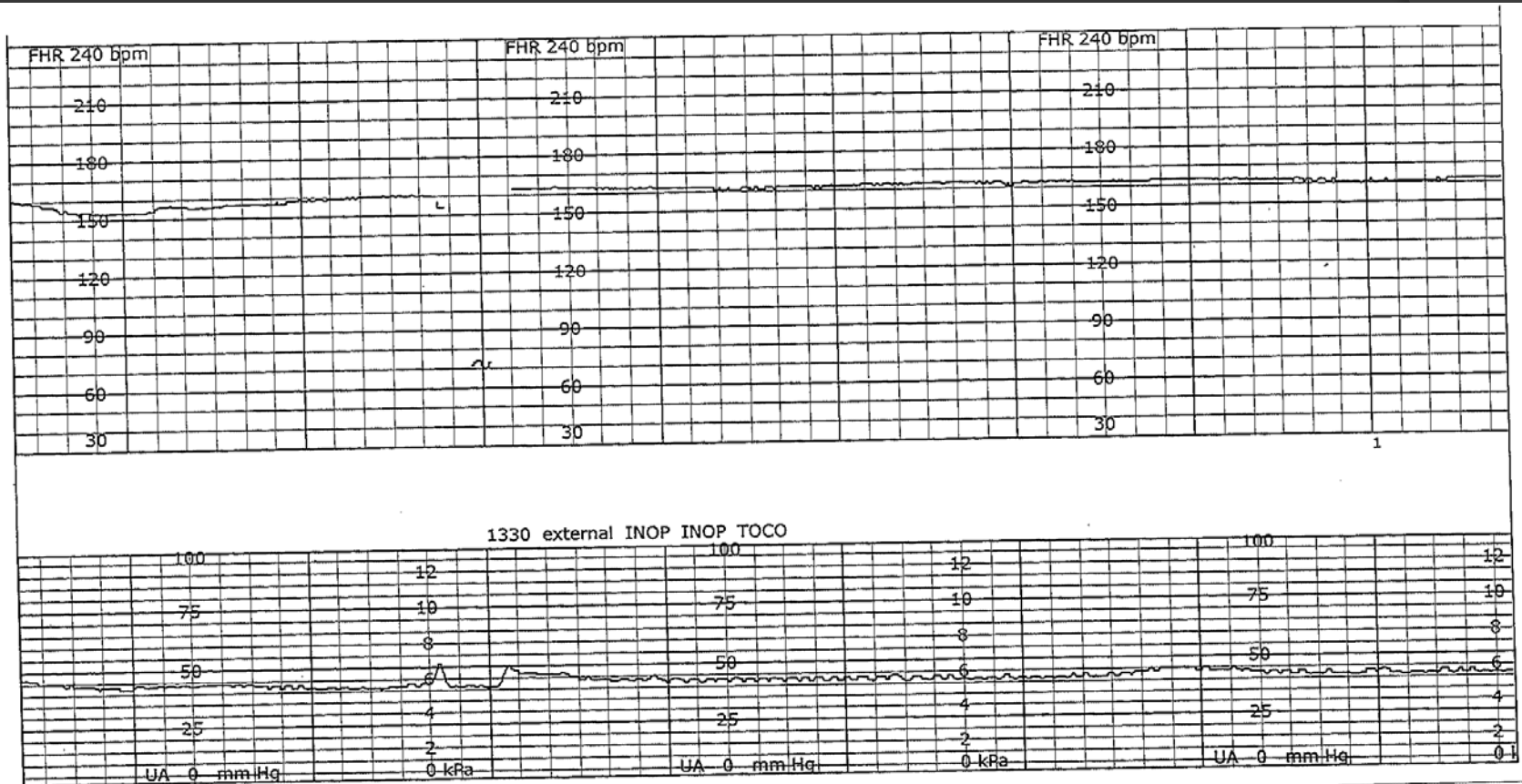
1302- OB discussing plan of care  
with patient. BP 172/107



# 1310

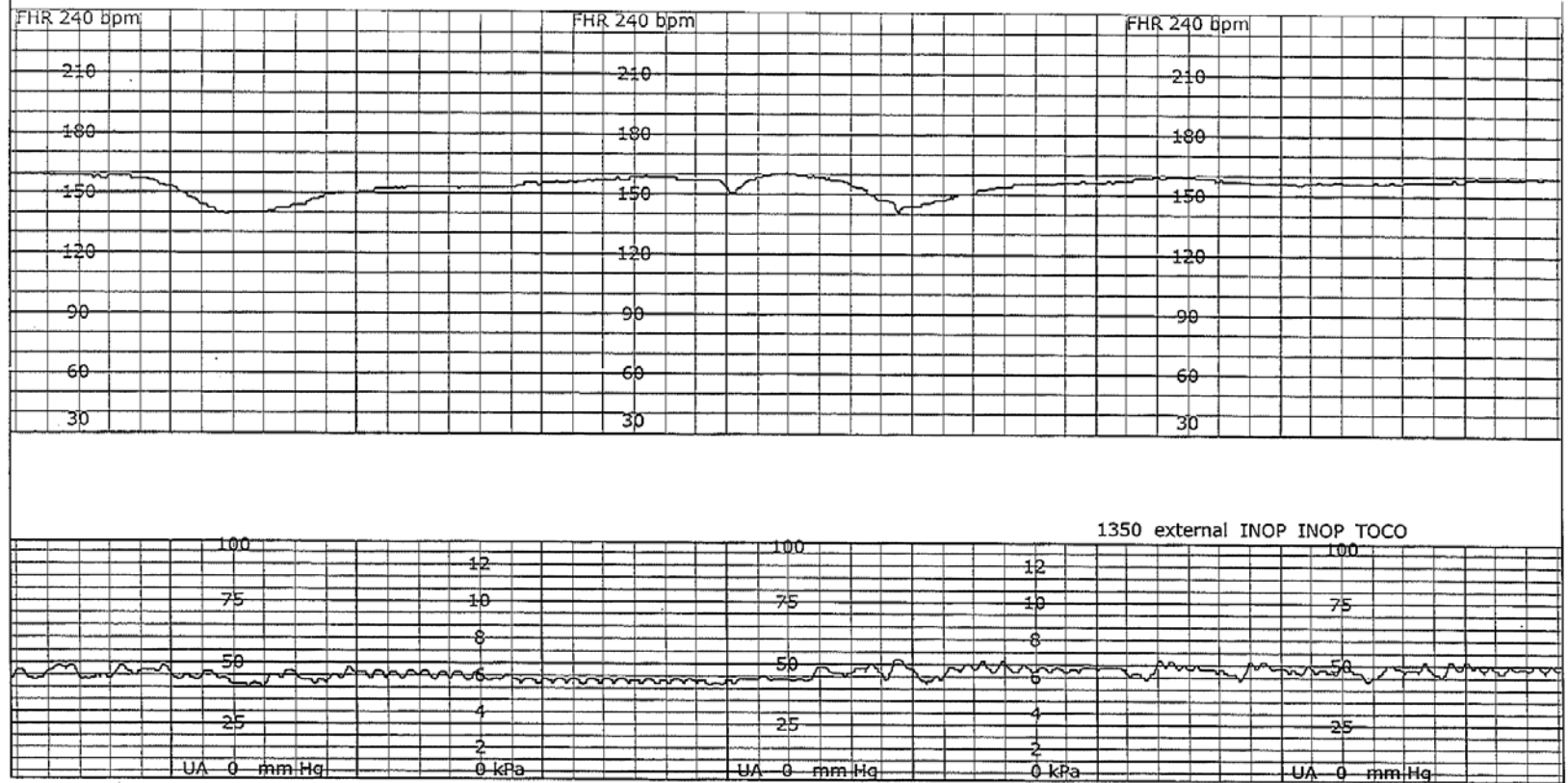


# 1335- Betamethasone 12 mg IM

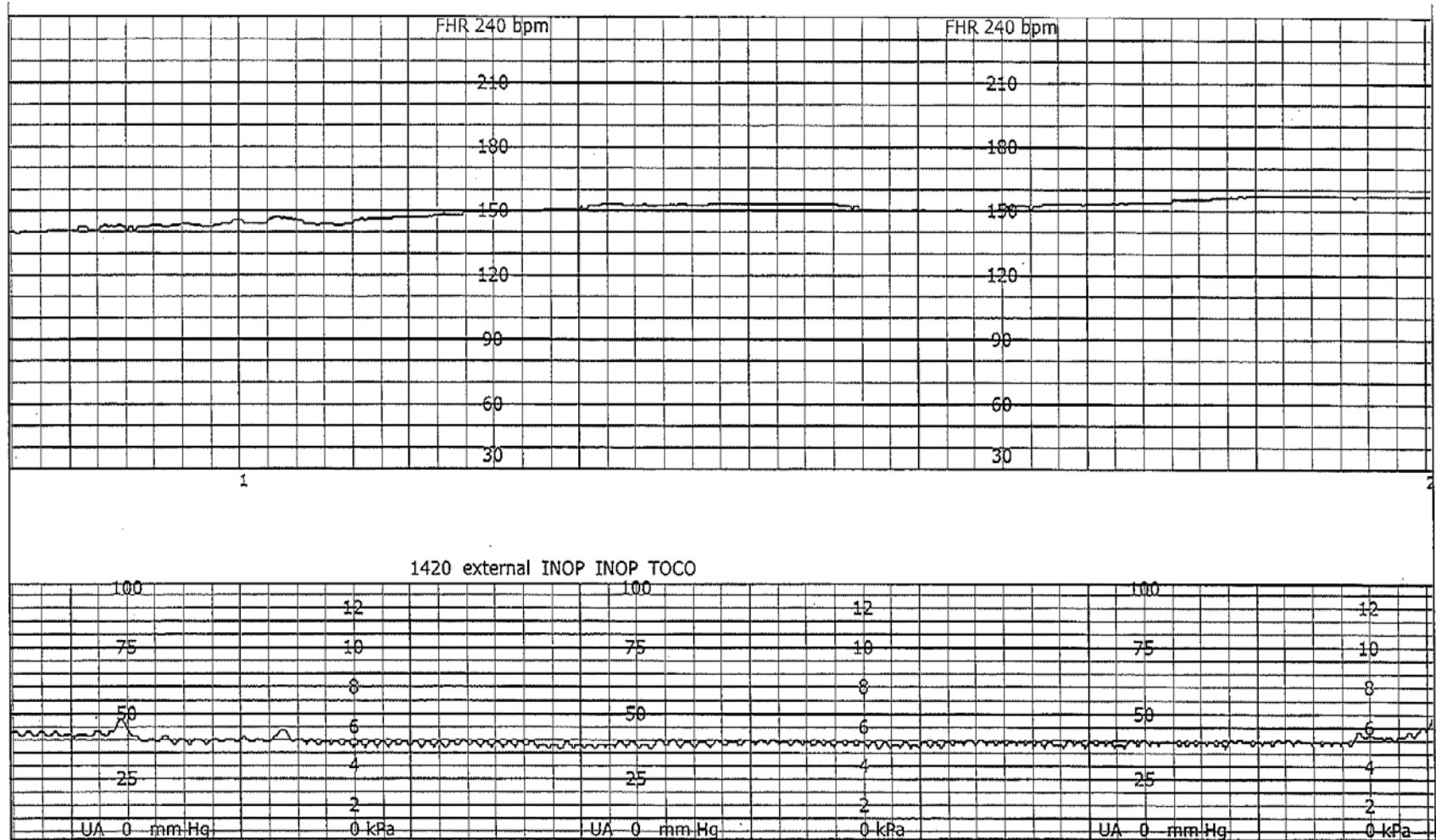




# 1350- BP 174/79

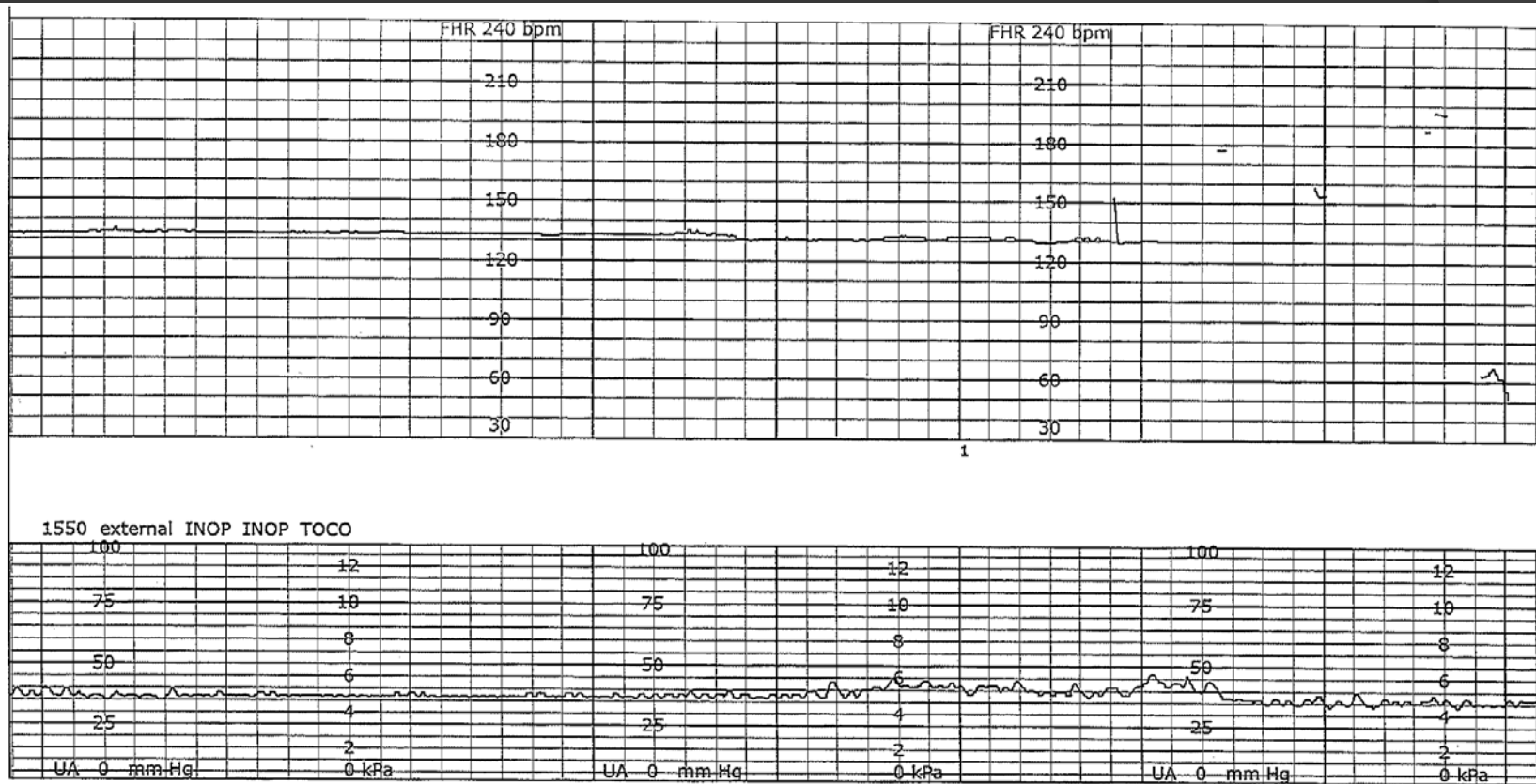


1419- Phone call to OB, update given on BP's and FHR tracing, orders received for labetalol 200 mg PO and labetalol 20 mg IVP

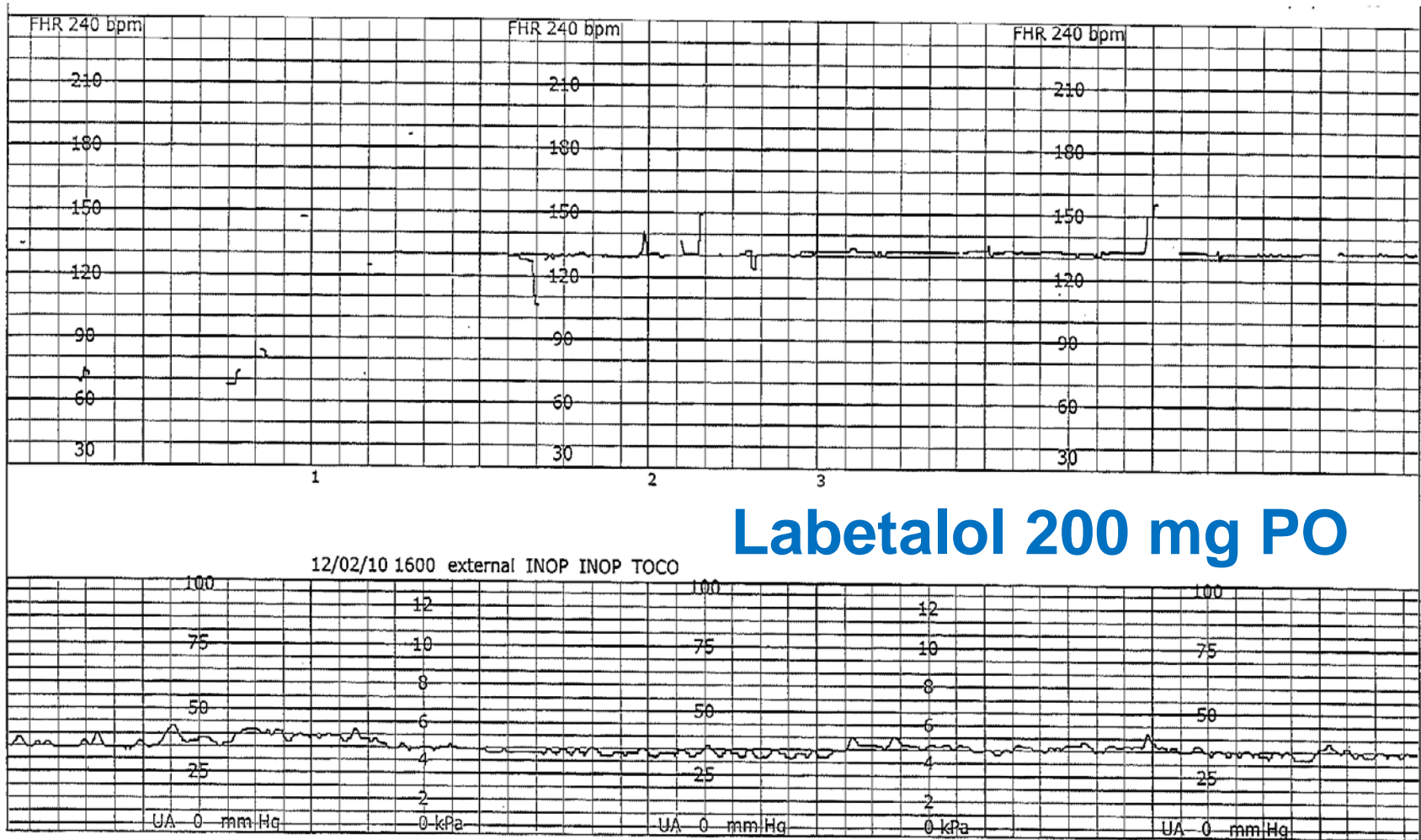




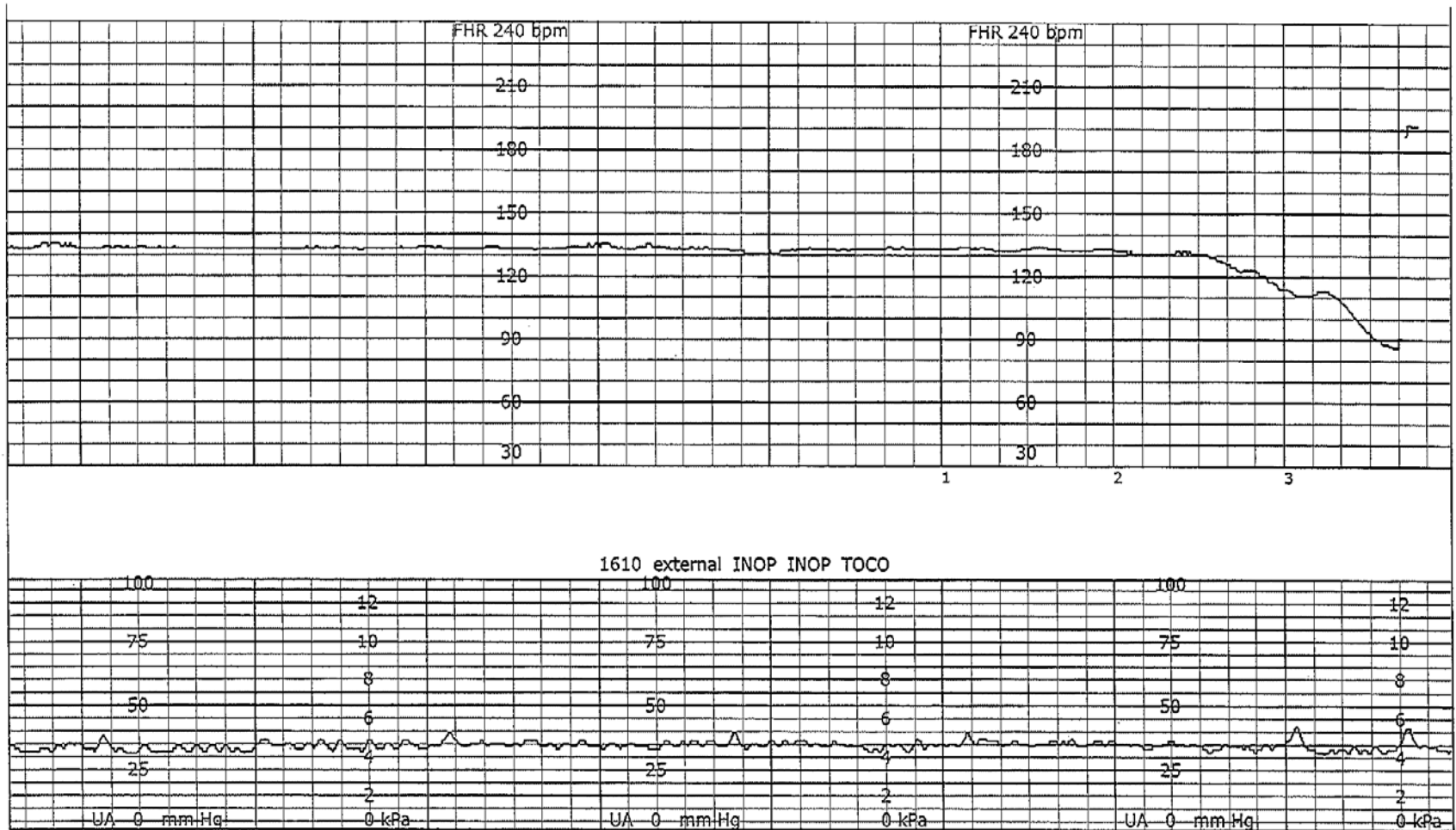
# 1550



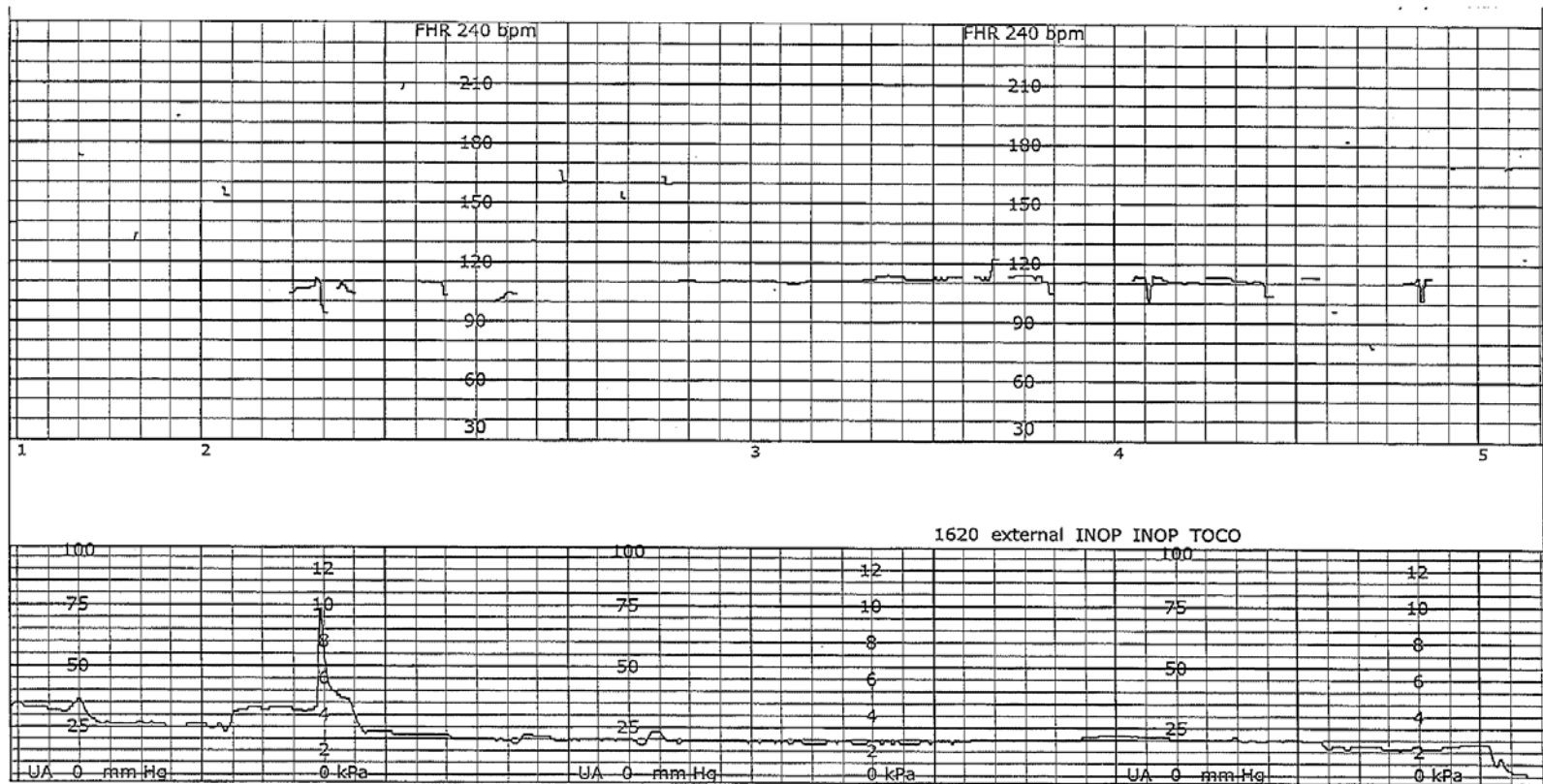
1555- OB on unit, informed of BP's and FHR tracing.  
OB speaking with patient and family



# 1612- Magnesium sulfate 4 gram bolus started

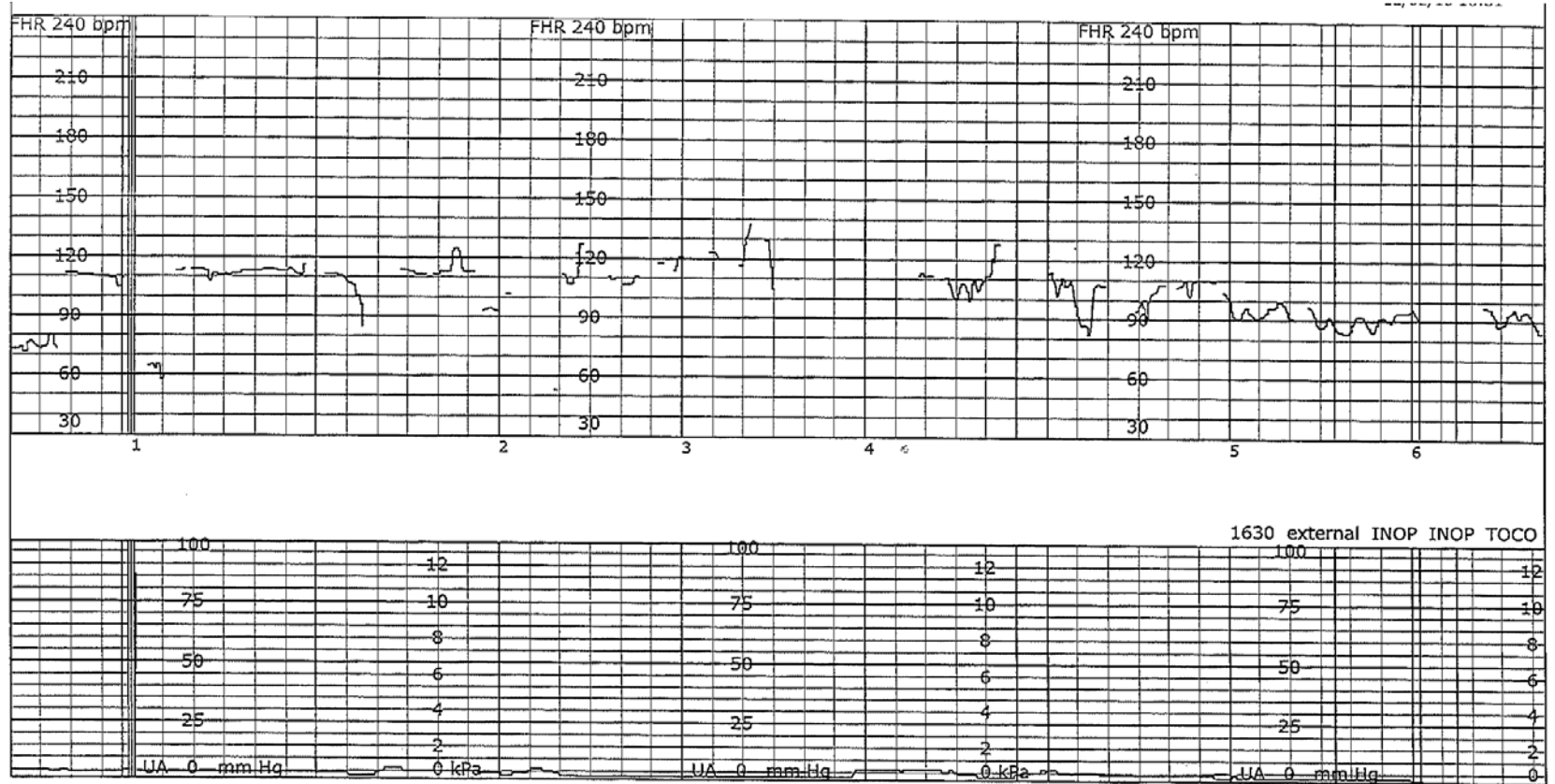


1619- Phone call to OB, informed of FHR decel and  
Orders received to prep patient for C/S

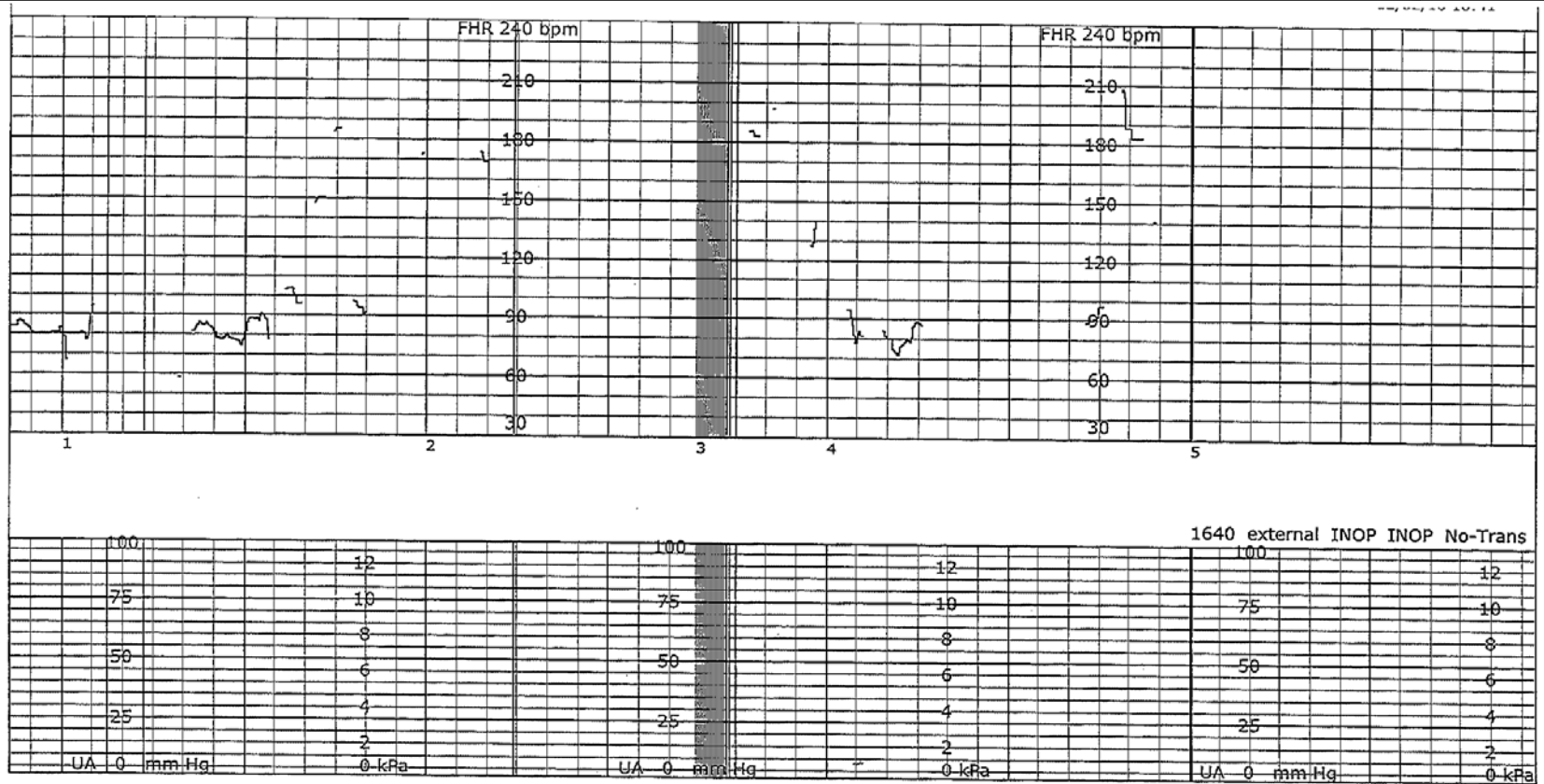




# 1627- OB at bedside



# 1638- in the OR...



- ⦿ 1649- surgery start
- ⦿ 1650- delivery time
- ⦿ 1714- surgery end
- ⦿ EBL 800 MLs

# Baby outcome

- Apgars 0,1,2,3,4
- Weight 585 grams, 1lb-5oz
- Baby appearing 24-25 weeks gestation by exam
- Baby admitted to the NICU



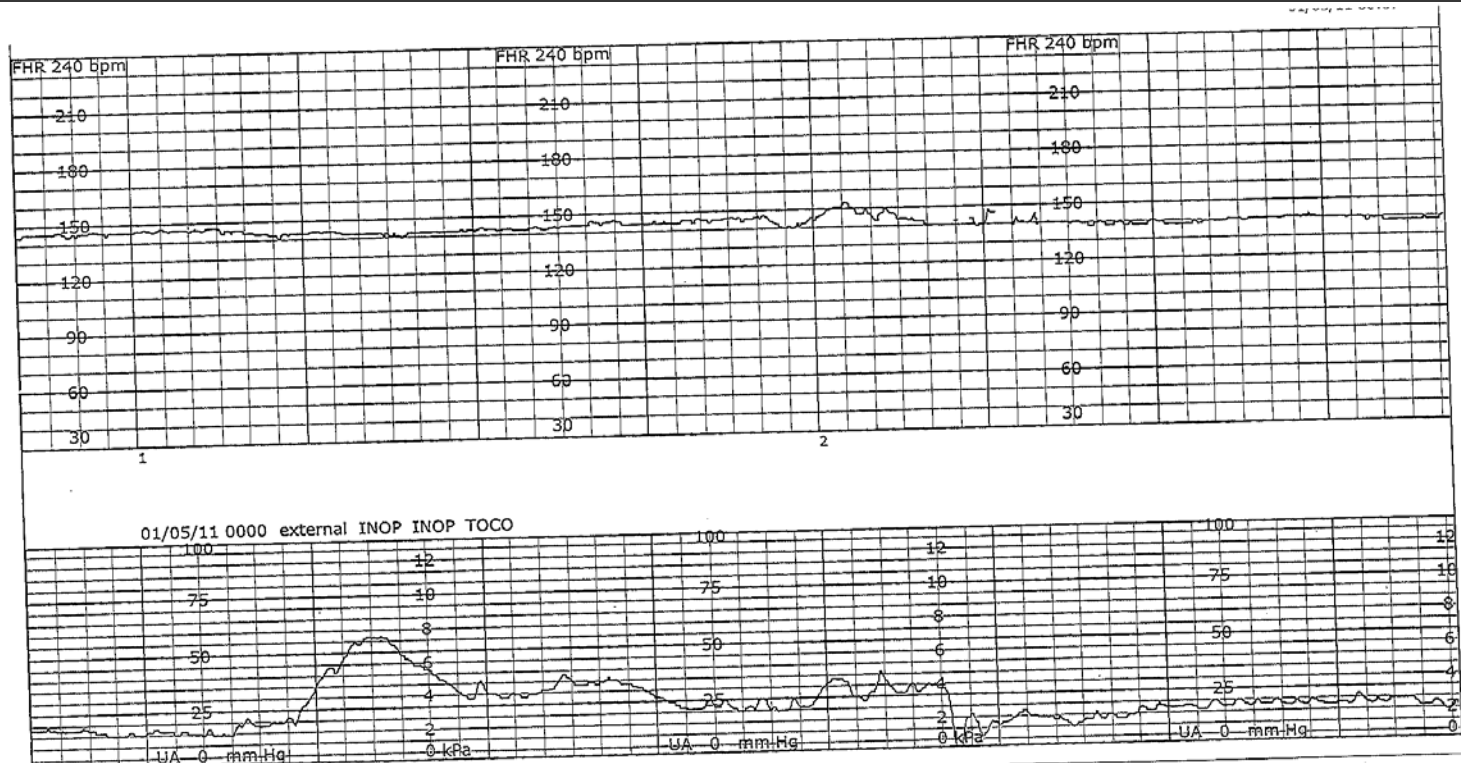
# Cord blood gases

- ⦿ PH 6.89
- ⦿ PCO<sub>2</sub> 103
- ⦿ HCO<sub>3</sub> 19
- ⦿ BE -15.5

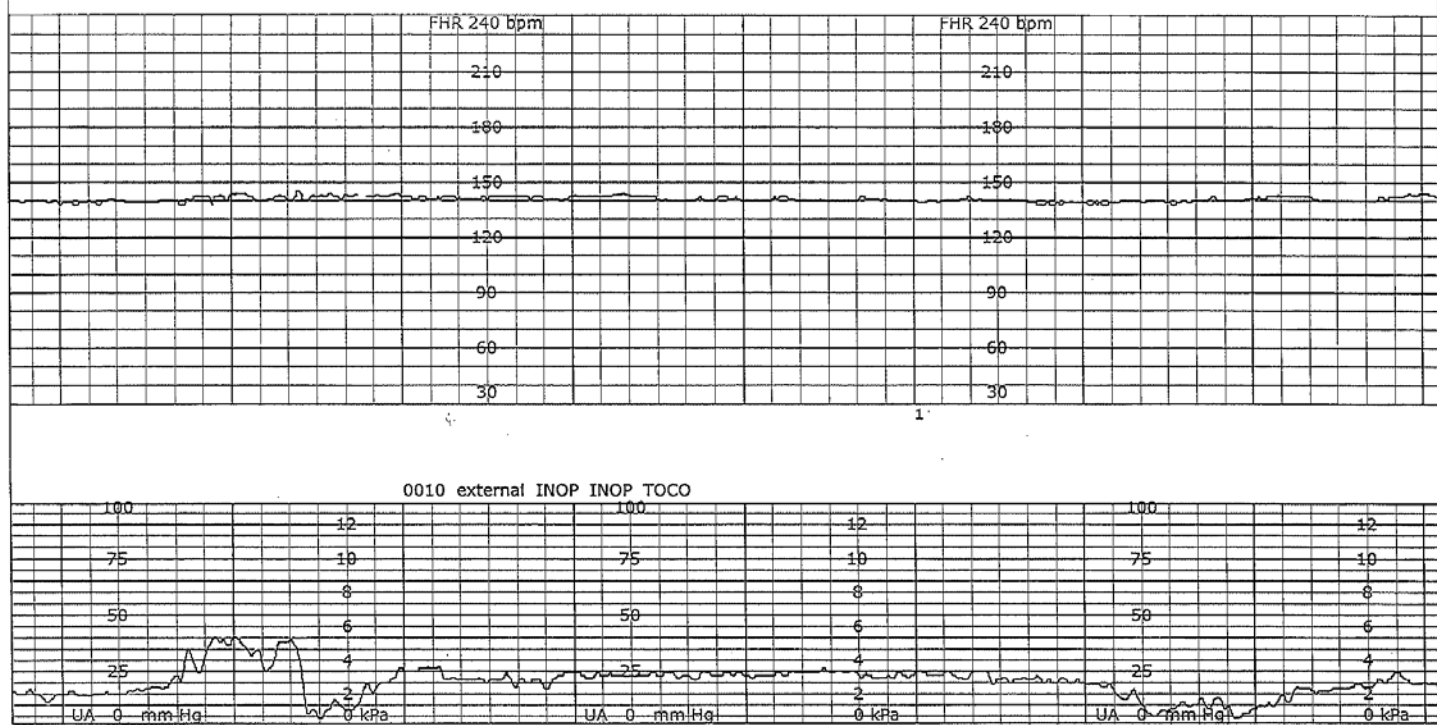
# Case 4

- 27 y.o G1P0, 40 weeks
- 163 lbs, HT 5'6"
- GBS negative
- c/o contractions
- BP 135/90
- HR 55
- Resp
- 20
- Temp 97.3

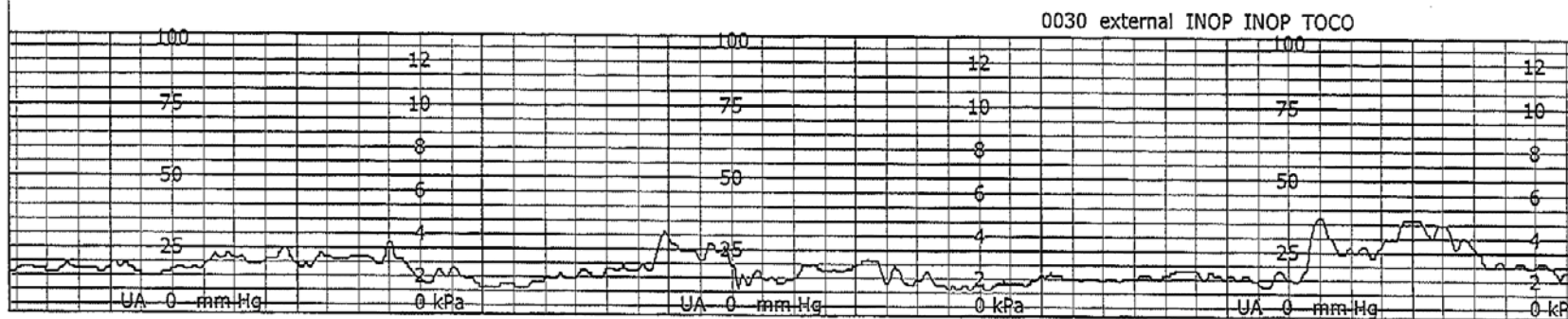
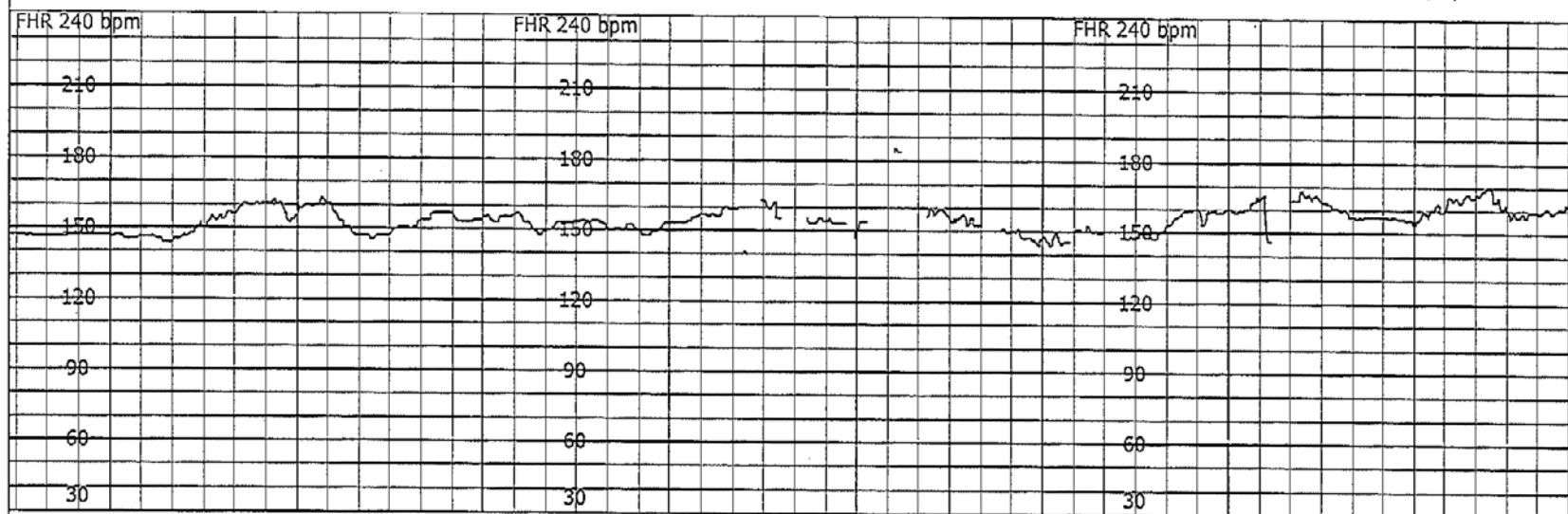
# 0004- VE 2-3/90/-2



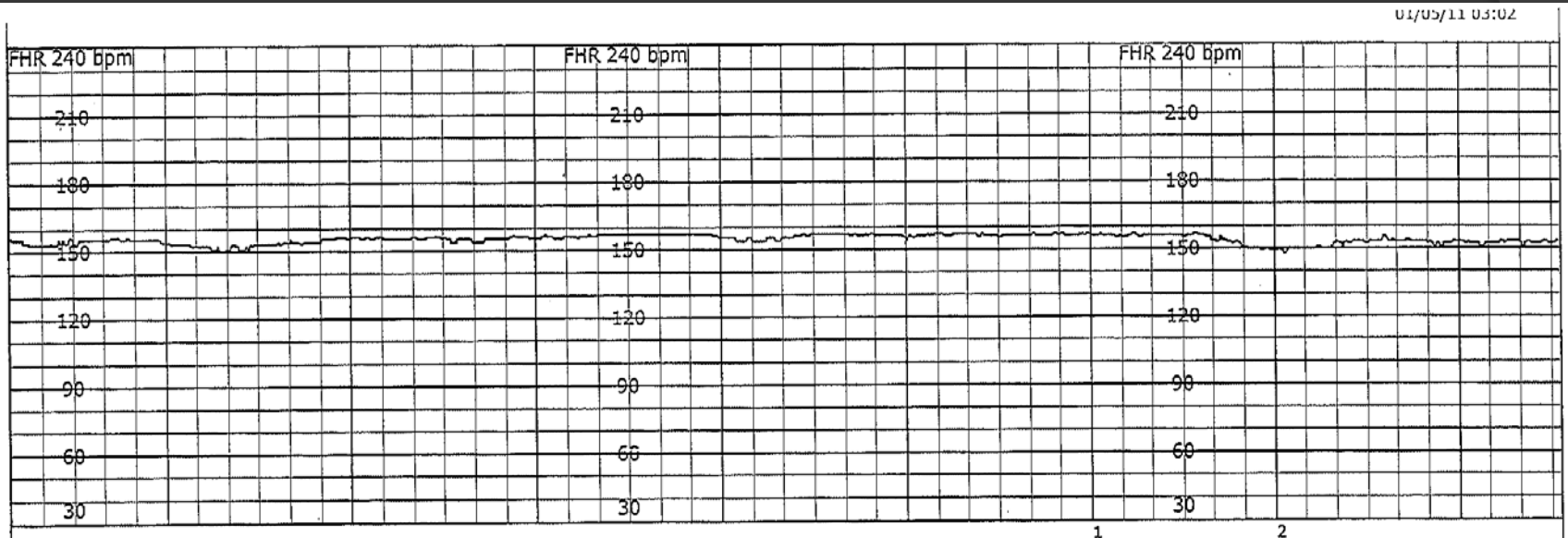
# 0010



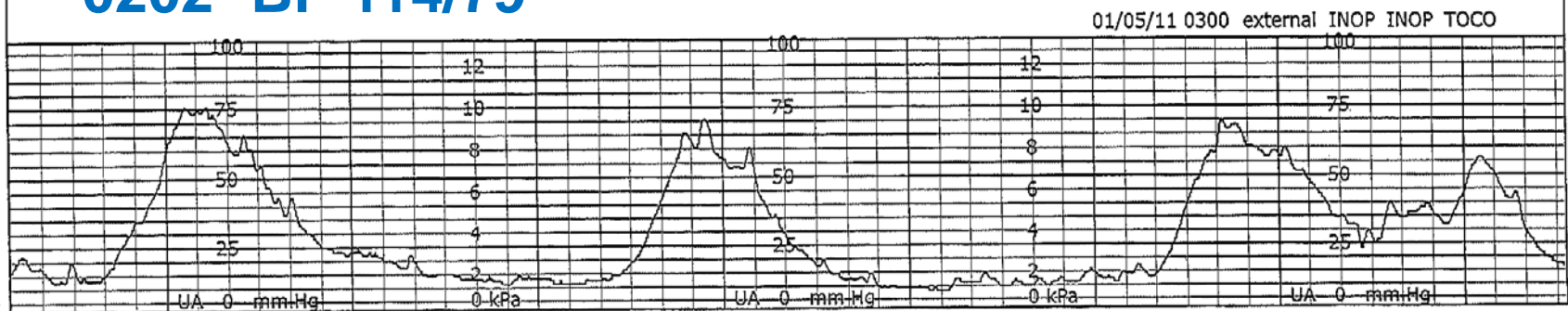
# 0030



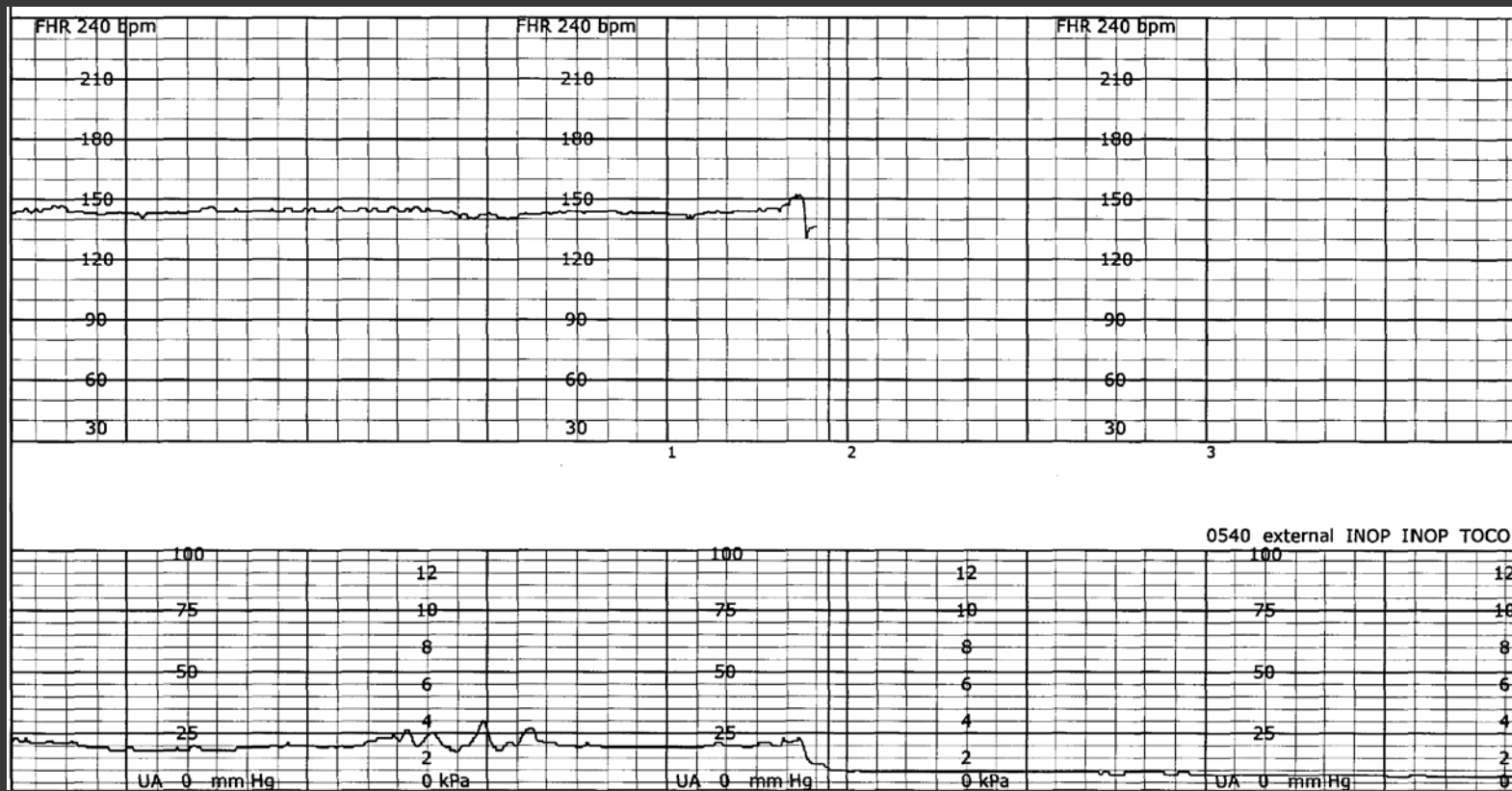
0300- VE 3-4/90/-2, fentanyl 100  
mcg IVP



**0202- BP 114/79**

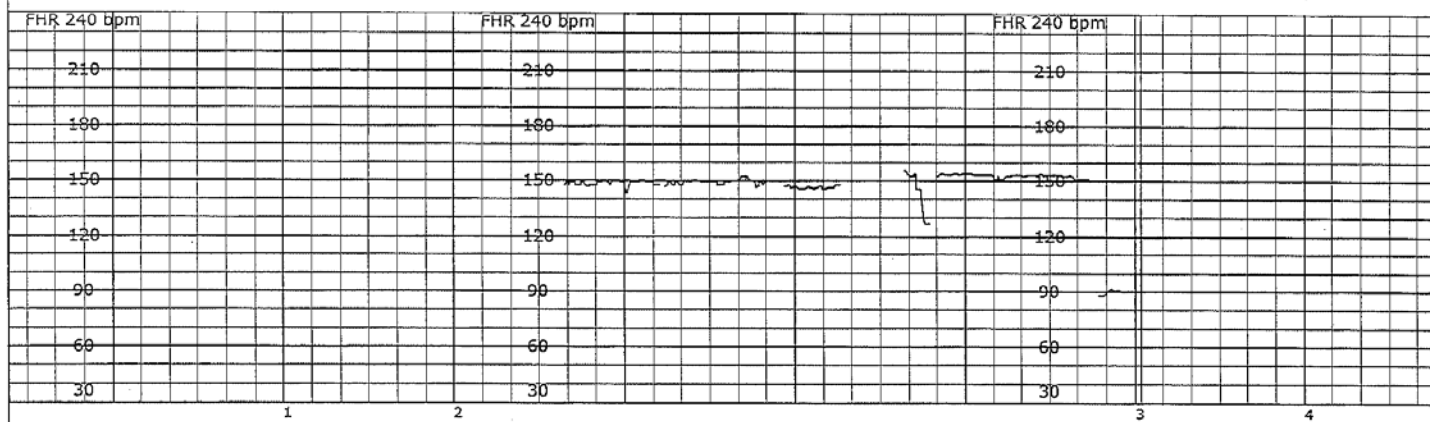


0537- anesthesiologist present,  
consent for epidural. EFM off

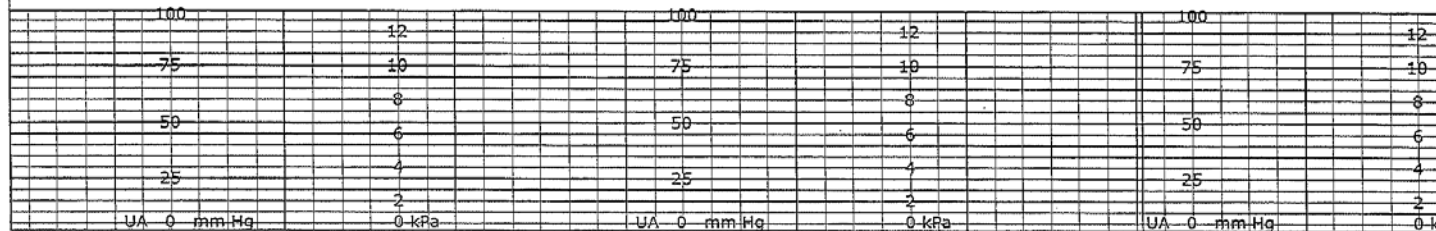




# 0642-anesthesia having difficult time with epidural

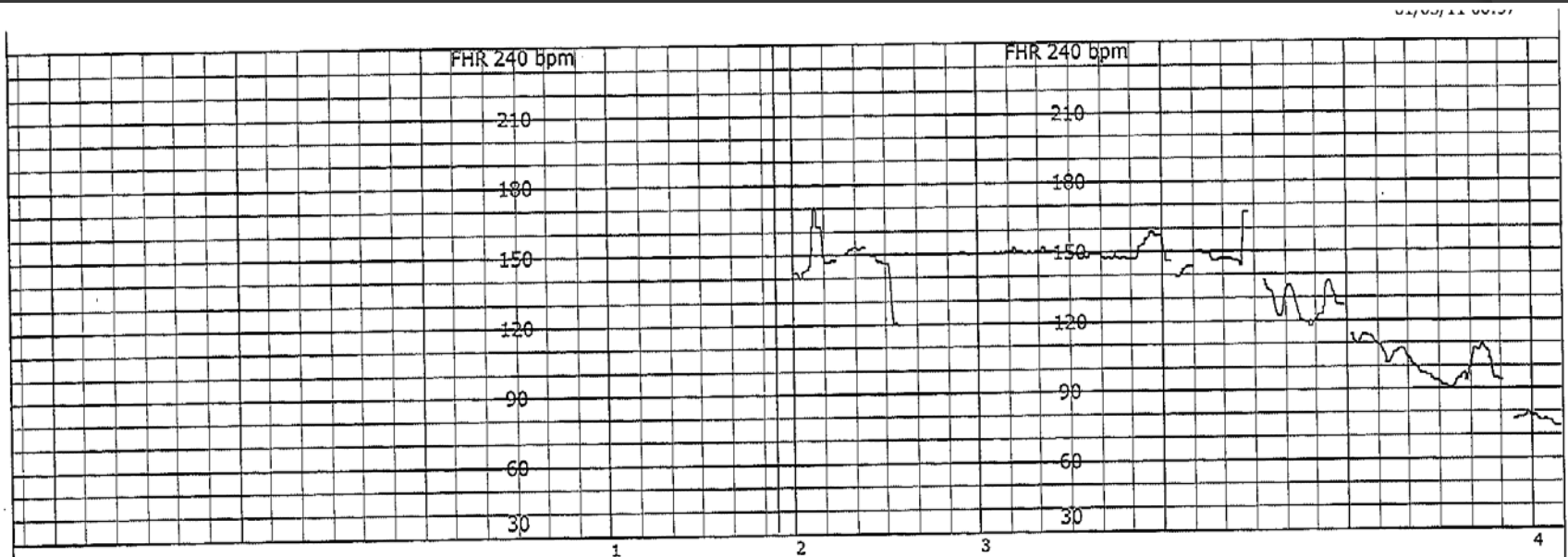


## 0643- FHT auscultated, 150

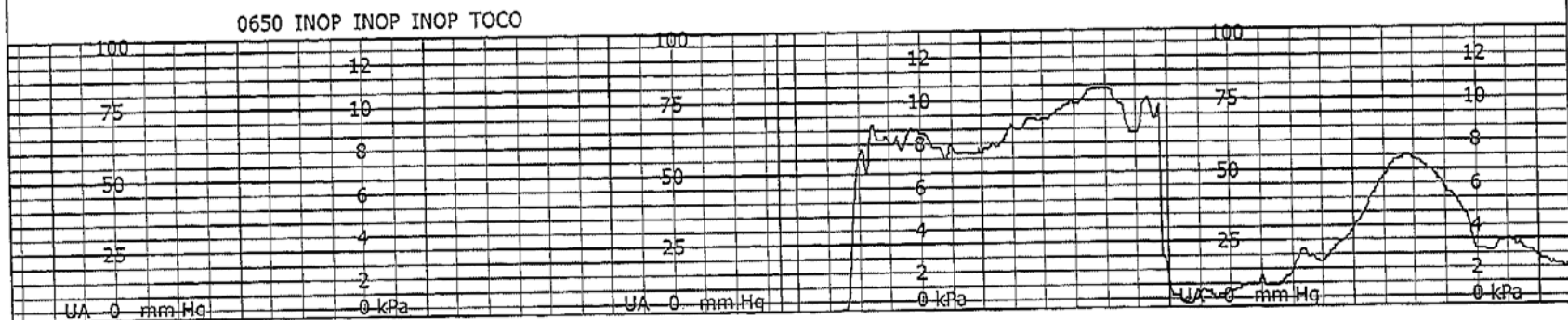




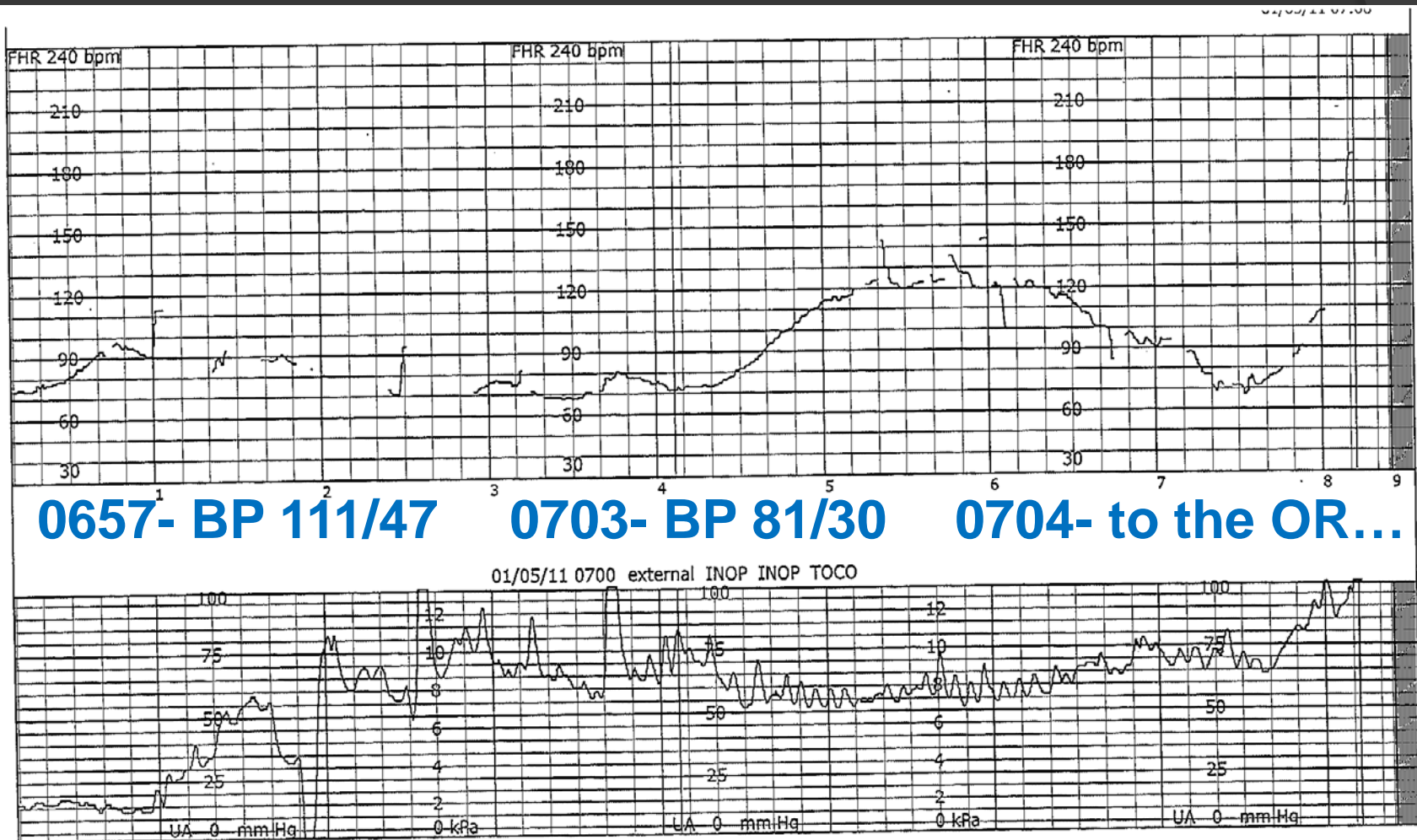
0647- unable to place epidural.  
0652- intrathecal given.



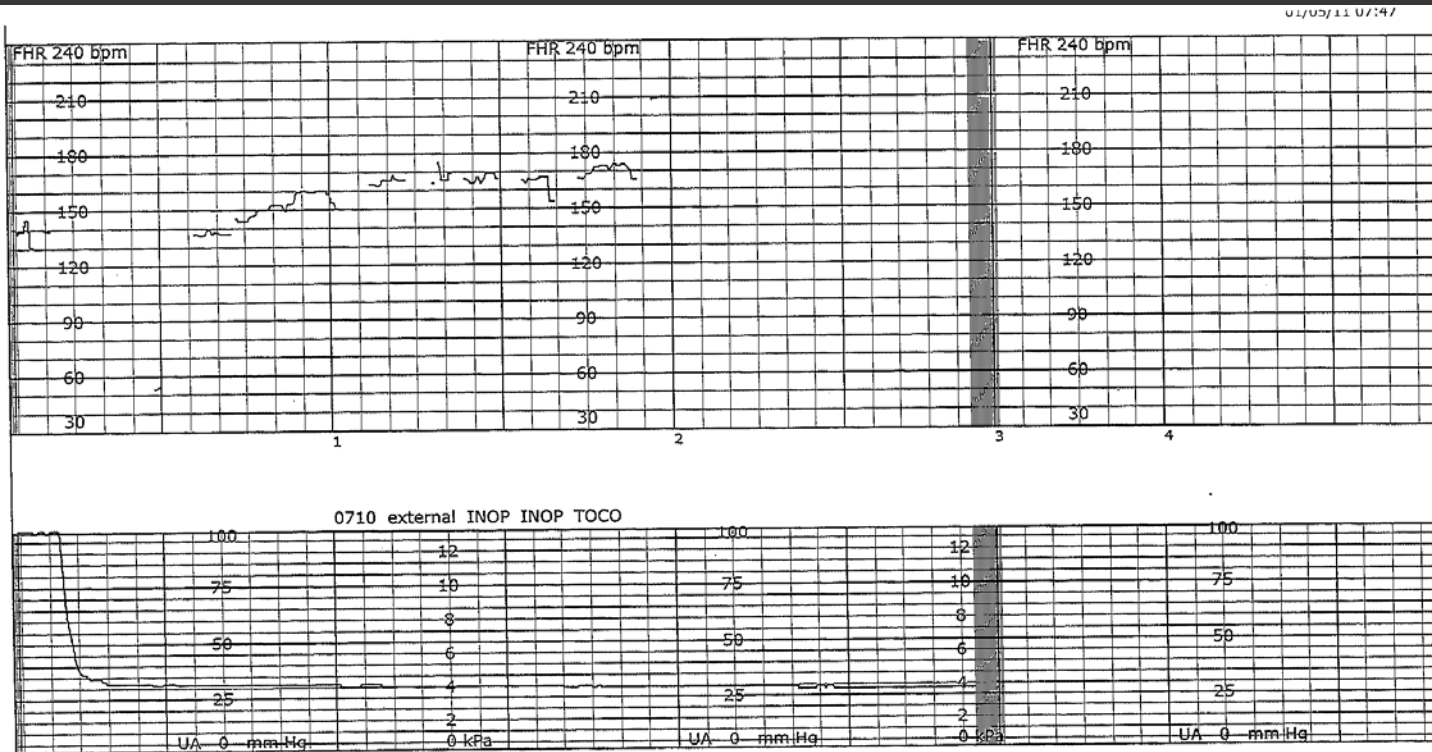
**0654- BP 91/53**



0700- VE 5-6/100/-3, BBOW. Patient positioned to trendelenberg. Phone call to the OB, will come in to see patient



# 0708- in the OR, 0B present



# Time line

- ⦿ Surgery start 0714
- ⦿ Uterine incision 0716
- ⦿ Delivery time 0716
- ⦿ Surgery end 0736

# Baby outcome

- ⦿ Apgars 9/9
- ⦿ Weight 7 lbs, 3209 grams
- ⦿ Cord blood gases
  - PH 7.15
  - PCO2 62
  - HCO3 22
  - BE -8.0

**Mother and baby were discharged home on day #2**

# Questions?

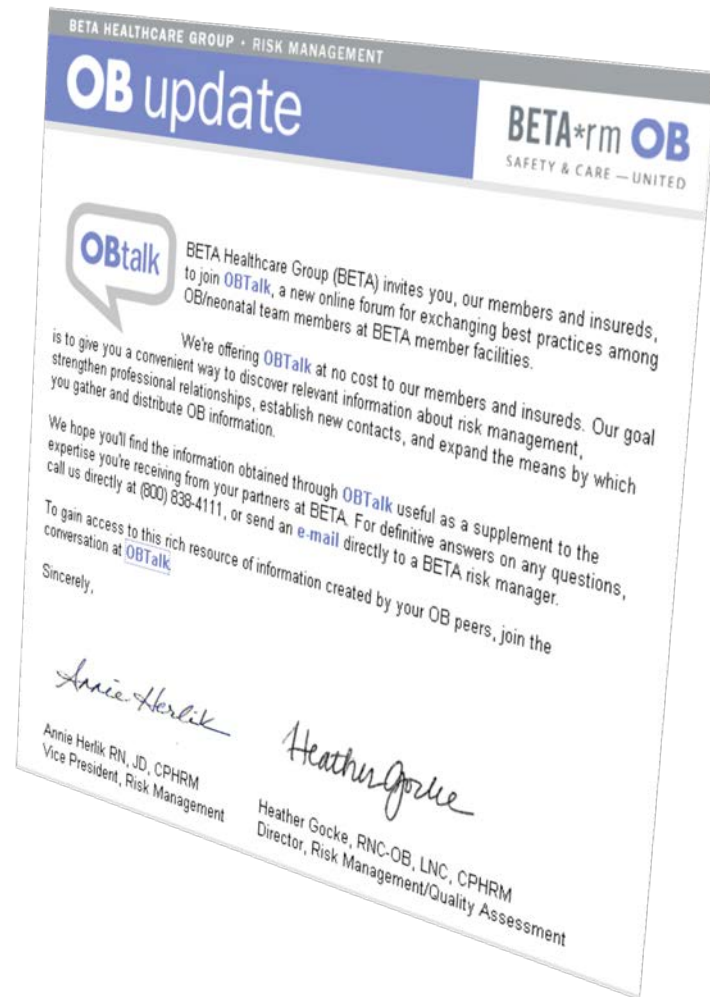


# OBtalk

## OBtalk Discussion Group

Look for an email in your inbox with registration information, or gain access by visiting:

<http://www.betahg.com/join.asp>



## More Information and CME/CEU

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