

PROTOCOL DE SOSPITA DE PÈRDUA DE BENESTAR FETAL

Interpretació fisiològica del RCTG

Tutores: Dra. Garrido, Dra. Choliz

Resident: Dra. Paniello



SANT PAU
Campus Salut
Barcelona



Hospital de
la Santa Creu i
Sant Pau

TAULA DE CONTINGUTS

FISIOPATOLOGIA DE LA HIPOXIA FETAL

INTERPRETACIÓ RCTG BASADA EN LA FISIOLOGIA

TIPUS D'HIPOXIA I PROTOCOL D'ACTUACIÓ

ALGORITME RESUM

INTERPRETACIÓ DEL pH DE CALOTA FETAL

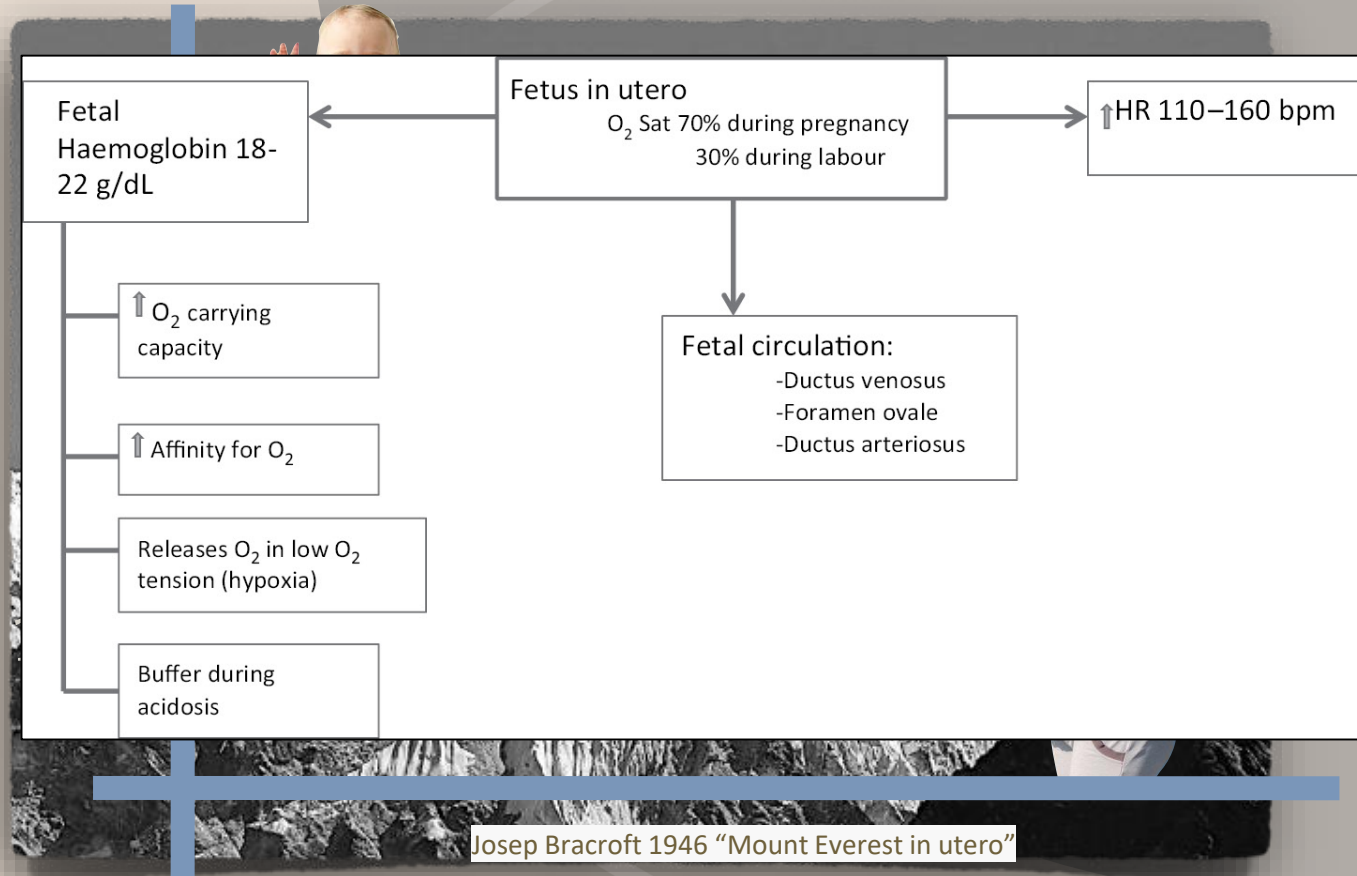
FISIOPATOLOGIA DE LA HIPOXIA FETAL

ADAPTACIÓ FETAL A LA HIPOXIA



Augment FR
Augment FC
Alliberació de catecolamines

VS



Singer D. Neonatal tolerance to hypoxia: a comparative-physiological approach. Comp Biochem Physiol A Mol Integr Physiol 1999;123(3):221e34.

INTERPRETACIÓ DE LA GASOMETRIA



pH 7,35
pO₂ 20-30 mmHg
Hb fetal 40-50%

pH 7,25
p10 -> 7,15

2 mostres, arterial representativa de l'estat fetal

Acidosi pH <7,10. Greu pH <7,00

Acidosis	Respiratoria	Metabólica	Mixta
pH	<7,25	<7,25	<7,25
pCO ₂	>75 mmHg	40-50 mmHg	>75 mmHg
EB	+5-12 mEq/L	<-12 mEq/L	<-12 mEq/L
Pronóstico	Bueno	Malo	Incierto

Acidosis neonatal

Com interpretar les gasometries?

1. Aquest fetus presenta una acidosis?

2. És una acidosis metabòlica o respiratòria?

ACIDOSIS	RESPIRATORIA	METABÓLICA	MIXTA
PH	<7,25	<7,25	<7,25
PCO ₂	>60 mmHg	40-50 mmHg	>60 mmHg
EB	+5-12 mEq/L	<-12 mEq/L	<-12 mEq/L
PRONÓSTICO	Bueno	Malo	Incierto

4. Ens donen aquest nou resultat. Què creieu que ha passat?

5. Quines diferències veiem entre vena i arteria?

Parámetro	Rango	Resultado
! pH	↓	7.058
✓ pCO ₂	↑	68.9
! pO ₂	↓	28.4
✓ FIO ₂		21.0
✓ HCO ₃ ⁻	↓	19.4
✓ HCO ₃ ⁻ (P,st)	↓	14.1
✓ cBase(B)	↓	-12.5

Parámetro	Rango	Resultado	Unidades	Rango	Critico
! pH	↓	7.195		[7.35 - 7.45]	[7.2 - 7.6]
✓ pCO ₂	↑	56.6	mmHg	[38 - 45]	[20 - 70]
✓ pO ₂	↓	19.0	mmHg	[28 - 40]	
✓ FIO ₂		21.0	%		
✓ HCO ₃ ⁻	↓	21.8	mmol/l	[22 - 25]	[10 - 40]
✓ HCO ₃ ⁻ (P,st)	↓	17.1	mmol/l	[22 - 25]	[10 - 40]
✓ cBase(B)	↓	-7.3	mmol/l	[-2 - 2]	

	Media (+- DE)	Rango
Sangre arterial		
pH	7,27(0,069)	7,2-7,34
pCO ₂ (mmHg)	50,3 (11,1)	39,6-61,4
HCO ₃ (mEq/L)	22 (3,6)	18,4-25,6
Exceso de bases (mEq/L)	-2,7 (2,8)	-5,5-0,1
Sangre venosa		
pH	7,34 (0,063)	7,28-7,40
pCO ₂ (mmHg)	40,7 (7,9)	32,8-48,6
HCO ₃ (mEq/L)	21,4 (2,5)	18,9-23,9
Exceso de bases (mEq/L)	-2,4 (2)	-4,4-0,4

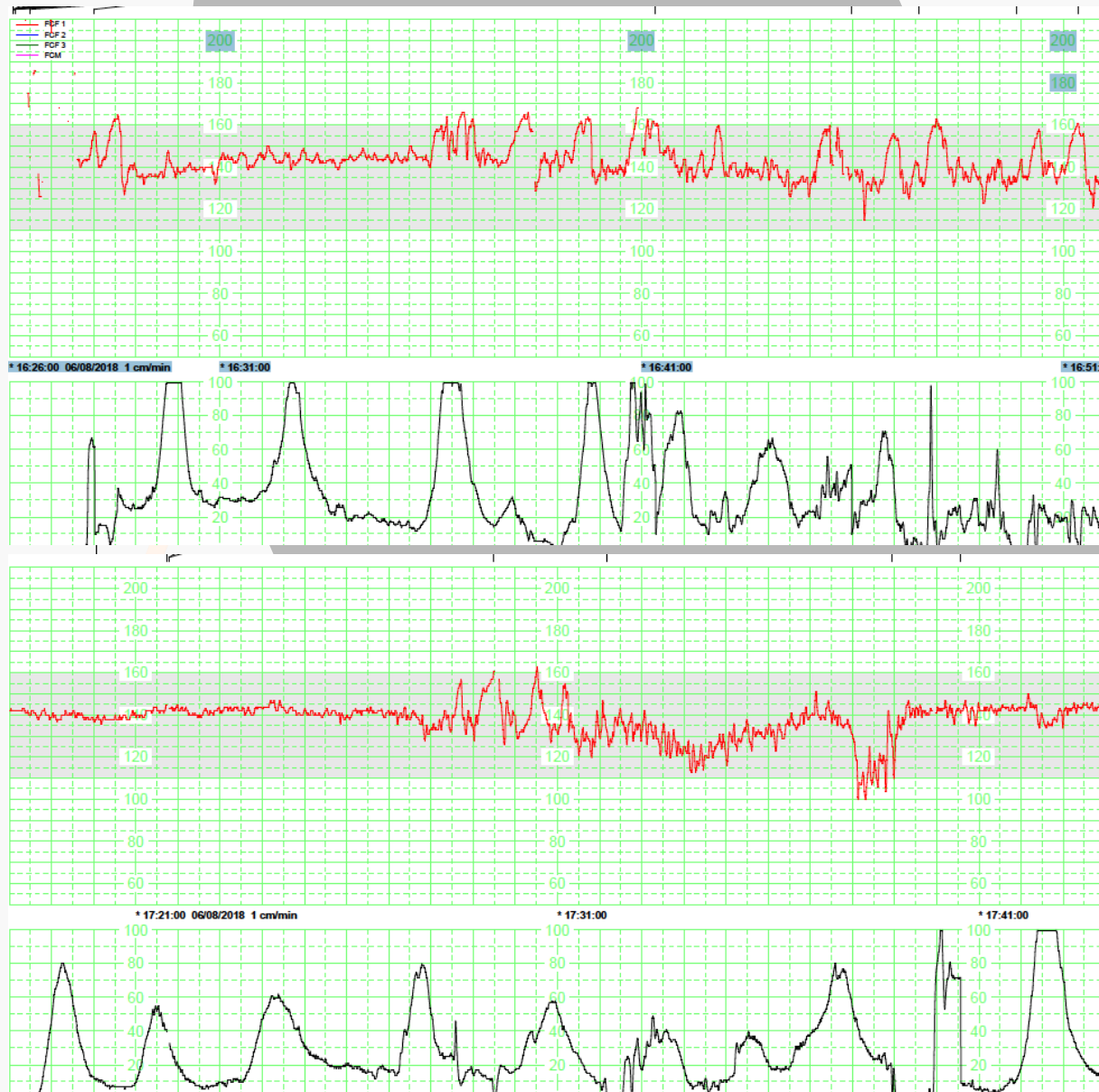
✓ pO ₂ (T)	↓	28.4
✓ cBase(Ecf)		-10.9
✓ tO ₂		4.8

✓ tO ₂		3.5	mmol/l		
✓ p50(act)		25.30	mmHg		

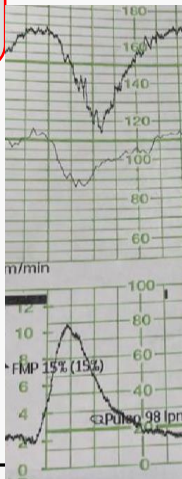
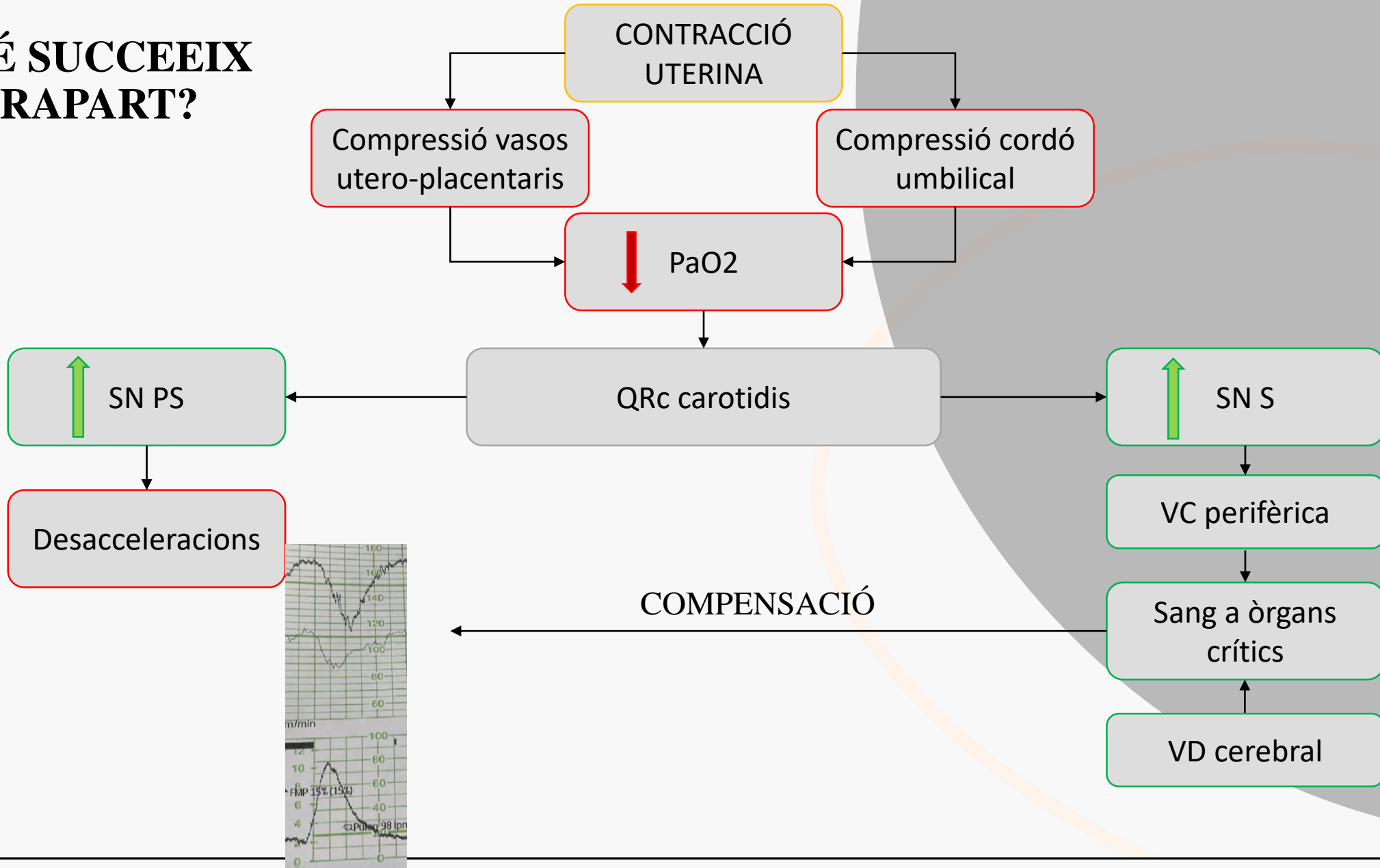
RCTG NORMAL

QUÉ VEIEM?	COM HO DEFINIM?	QUÉ SIGNIFICA?
FCFb	Mitja FCF en 10' 110-160 bpm	Equilibri SNS i PS
Variabilitat	Fluctuacions FCFb 5-25 bpm	
Acceleracions	Augment FCF 15 bpm per sobre de la basal 15" -2'	SN Somàtic Moviment voluntari

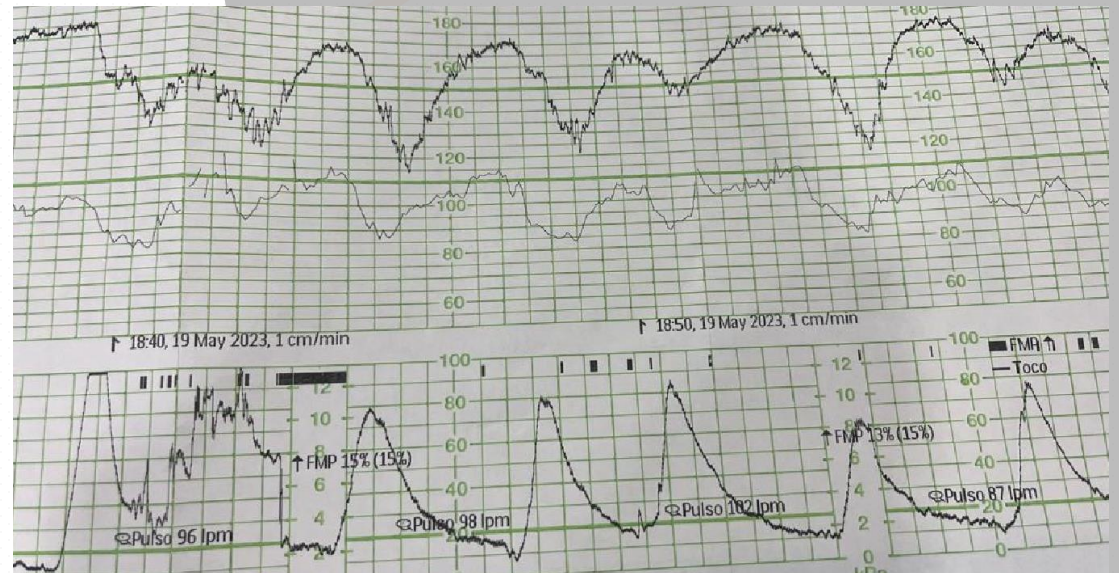
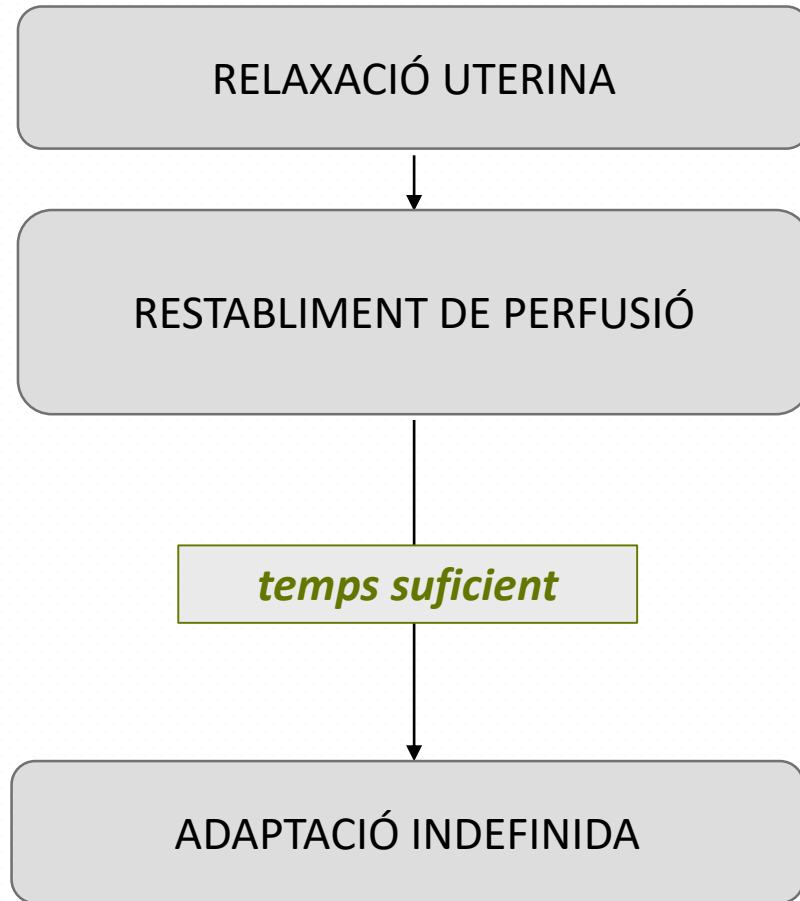
*Cycling fetal



QUÉ SUCCEEIX INTRAPART?



QUÉ SUCCEEIX INTRAPART?



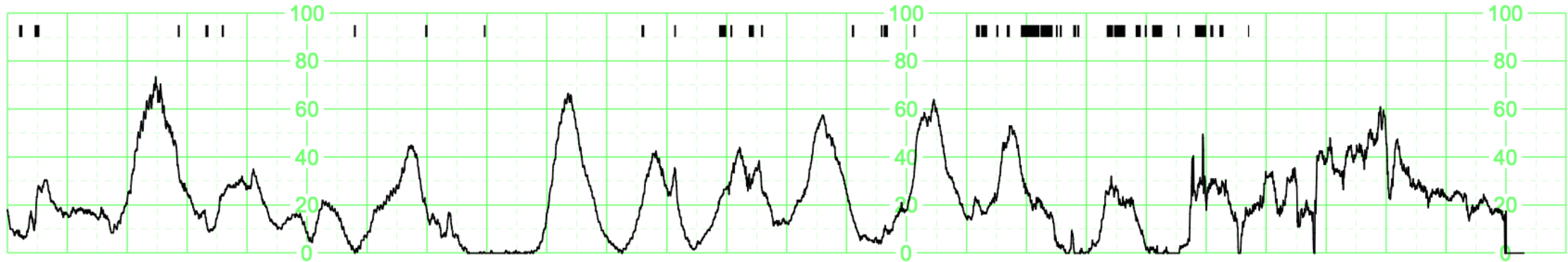
TIPUS D'HIPÒXIA I PROTOCOL D'ACTUACIÓ



* 1:55:00 17/11/2017 1 cm/min

* 2:05:00

* 2:15:00



HIPÒXIA AGUDA



Desacceleració perllongada única **>5 min** o **>3 min + variabilitat disminuïda**

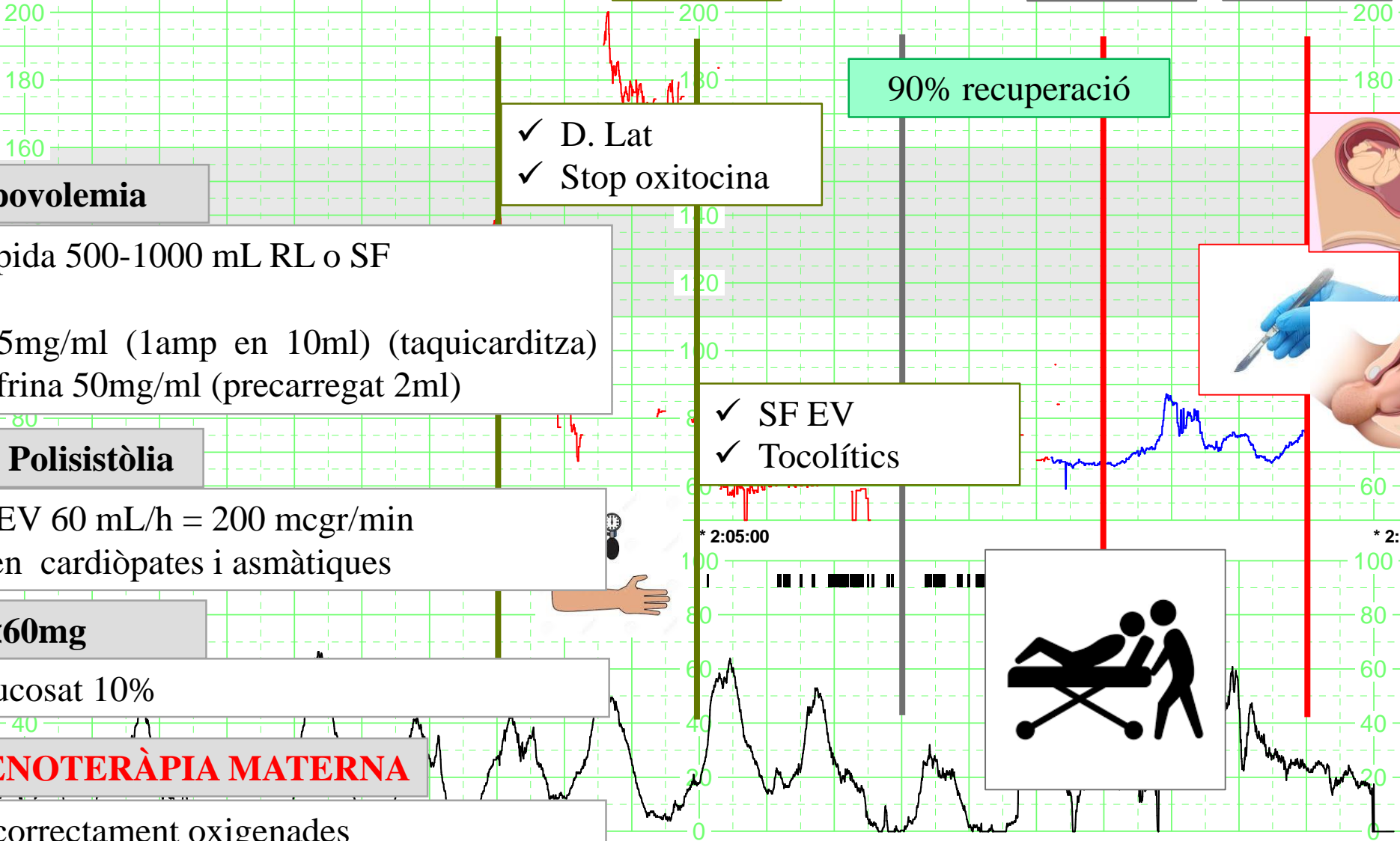
A DESCARTAR:

- prolapse de cordó → TV: palpació cordó
- DPPNI massiu → SAGNAT
- ruptura uterina → TV: elevació presentació, dolor

CAUSA MÉS FREQUËNT: **IATROGÈNIA**



0 min 3 min 6 min 9 min 12 min 15 min



hipoTA o hipovolemia

- Infusió ràpida 500-1000 mL RL o SF
- Efedrina 5mg/ml (1amp en 10ml) (taquicarditza) vs. Fenilefrina 50mg/ml (precarregat 2ml)

Hipertonia o Polisistòlia

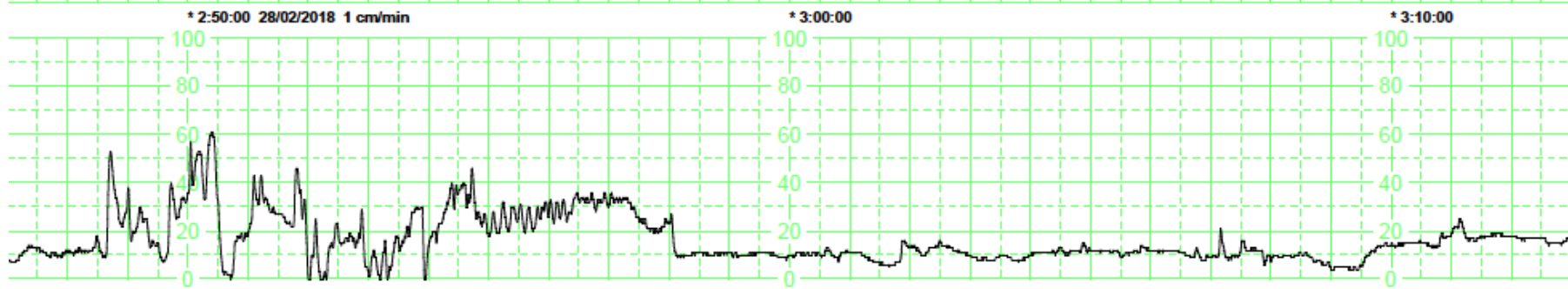
- Ritodrine EV 60 mL/h = 200 mcgr/min
- Atosiban en cardiòpates i asmàtiques

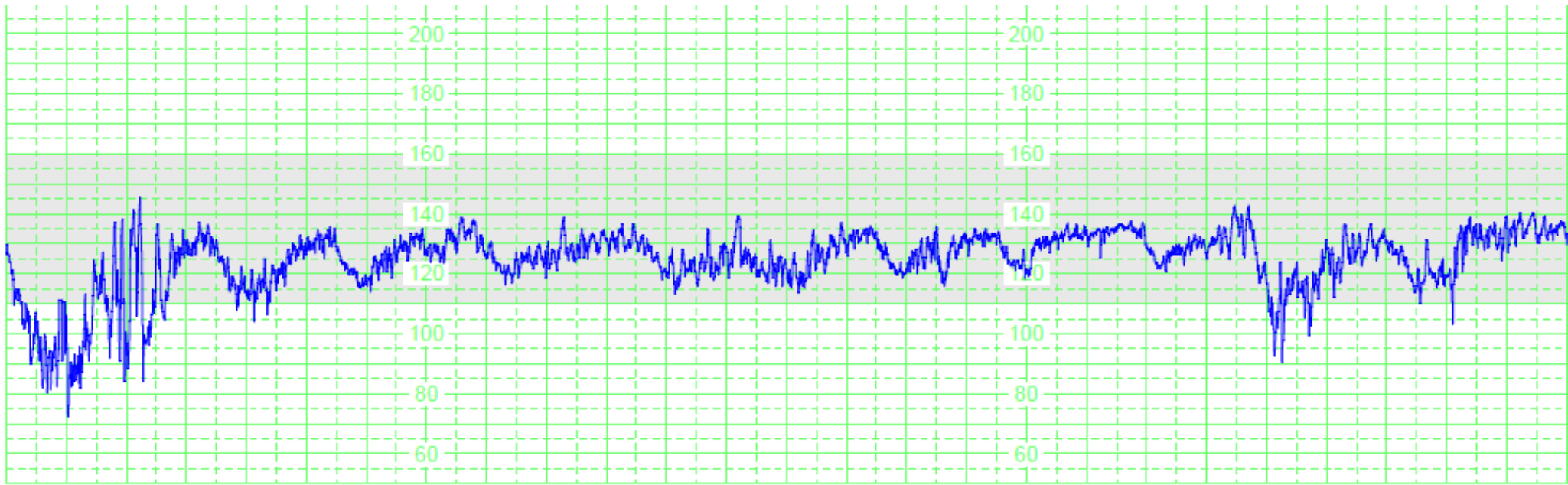
***Glucèmia <60mg**

- Sèrum Glucosat 10%

***NO OXIGENOTERÀPIA MATERNA**

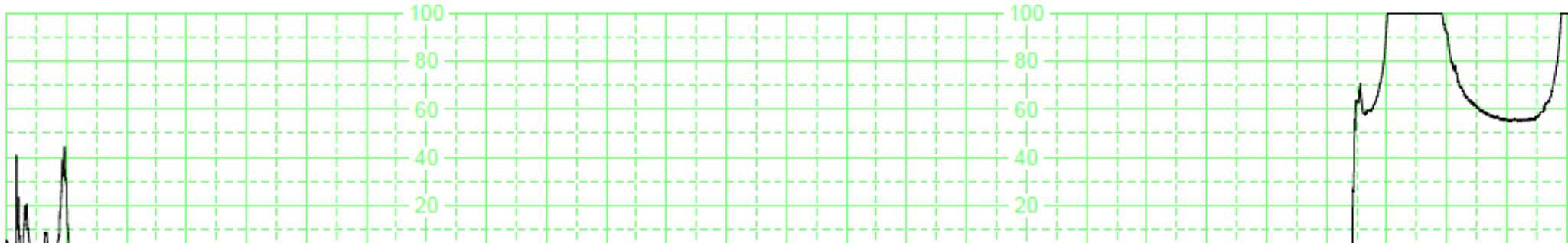
- En dones correctament oxigenades
- Fawole B et al., Garite TJ et al., NICE, ...*

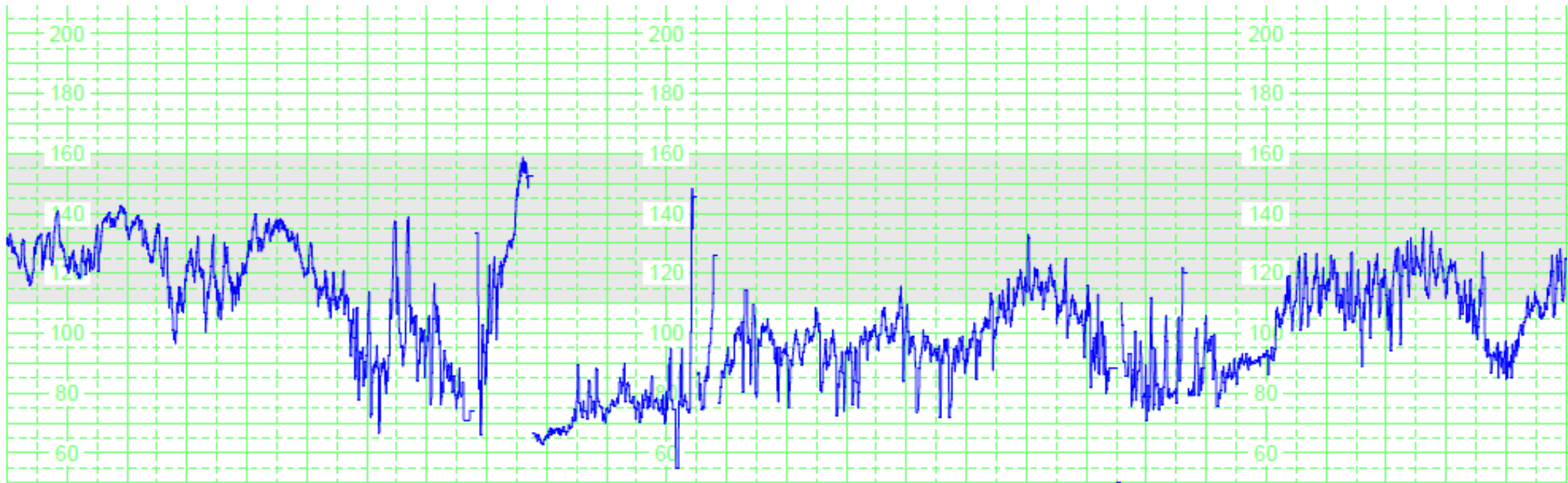




* 10:29:00 29/10/2017 1 cm/min

* 10:39:00

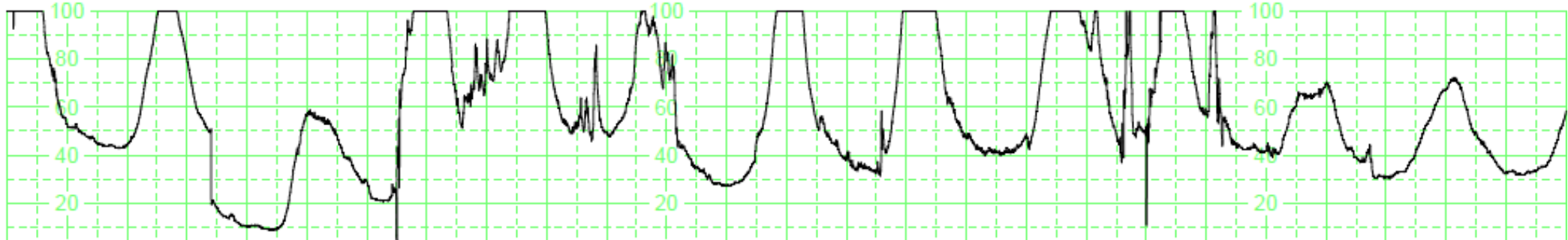


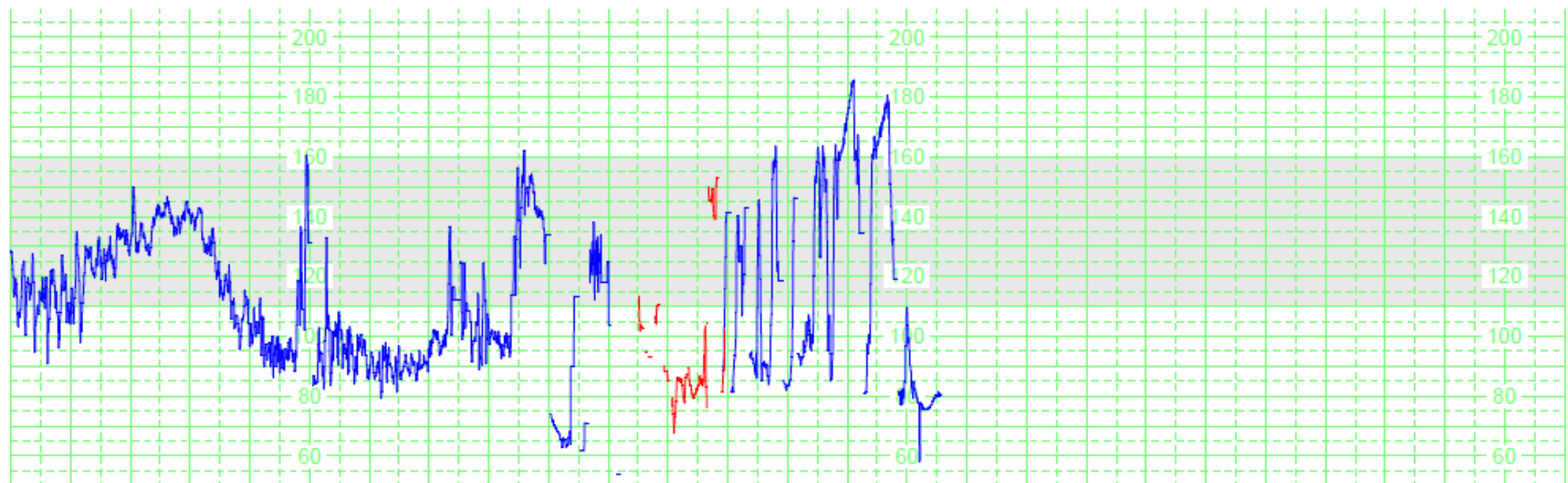


* 10:49:00 29/10/2017 1 cm/min

* 10:59:00

* 11:09:00

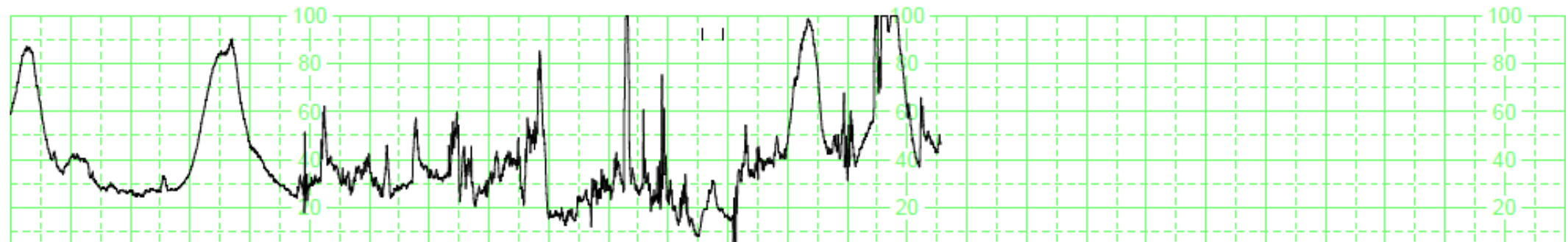




* 11:19:00 29/10/2017 1 cm/min

* 11:29:00

* 11:39:00

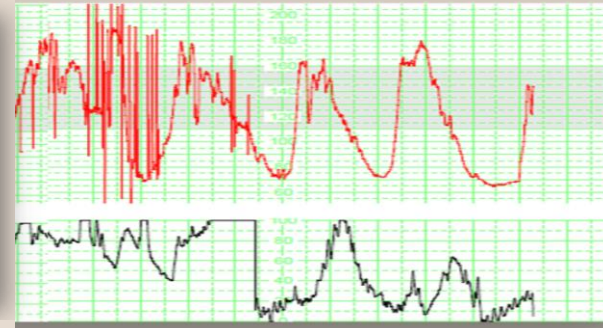
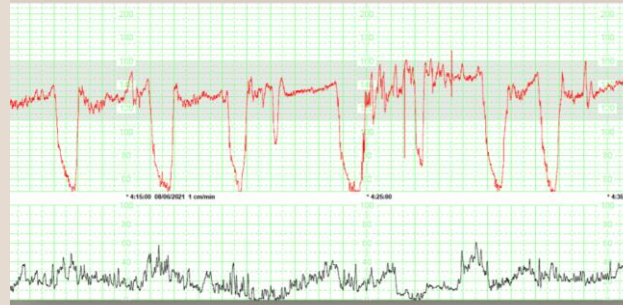


HIPÒXIA SUBAGUDA

Descens del pH: 0.01 unitats cada 2-4 min

Desacceleracions variables amb descens >60 bpm en >30% contraccions durant >30 min

CAUSA MÉS FREQUËNT: **HIPERESTIMULACIÓ UTERINA**



INDIVIDUALIZAR

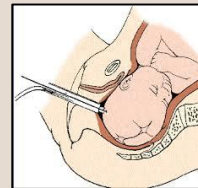


- ✓ D. Lat
- ✓ Stop oxitocina
- ✓ SF EV

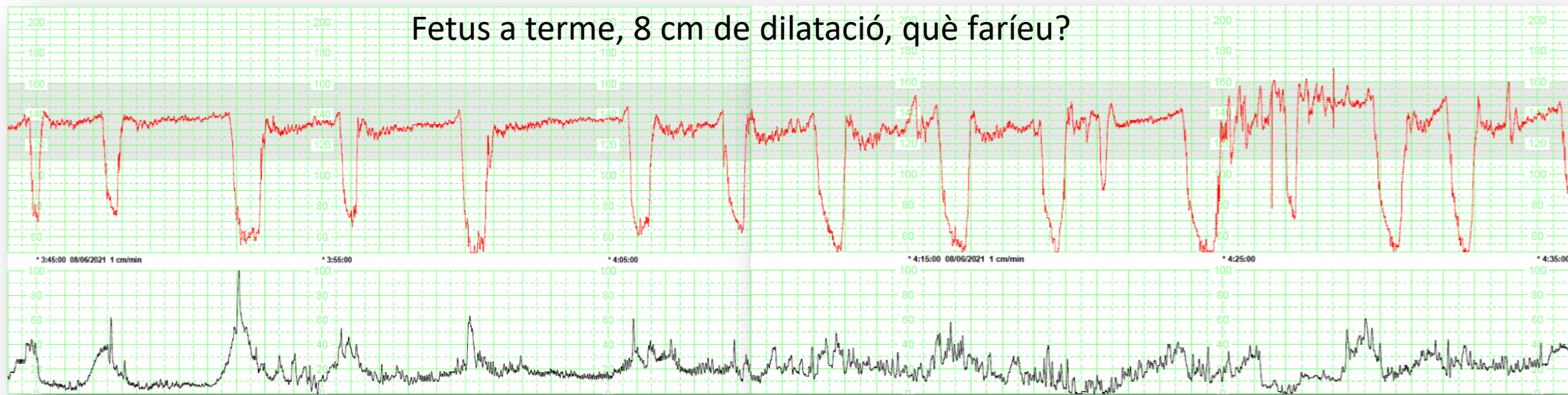
NO INSTRUMENTABLE

10-15 min

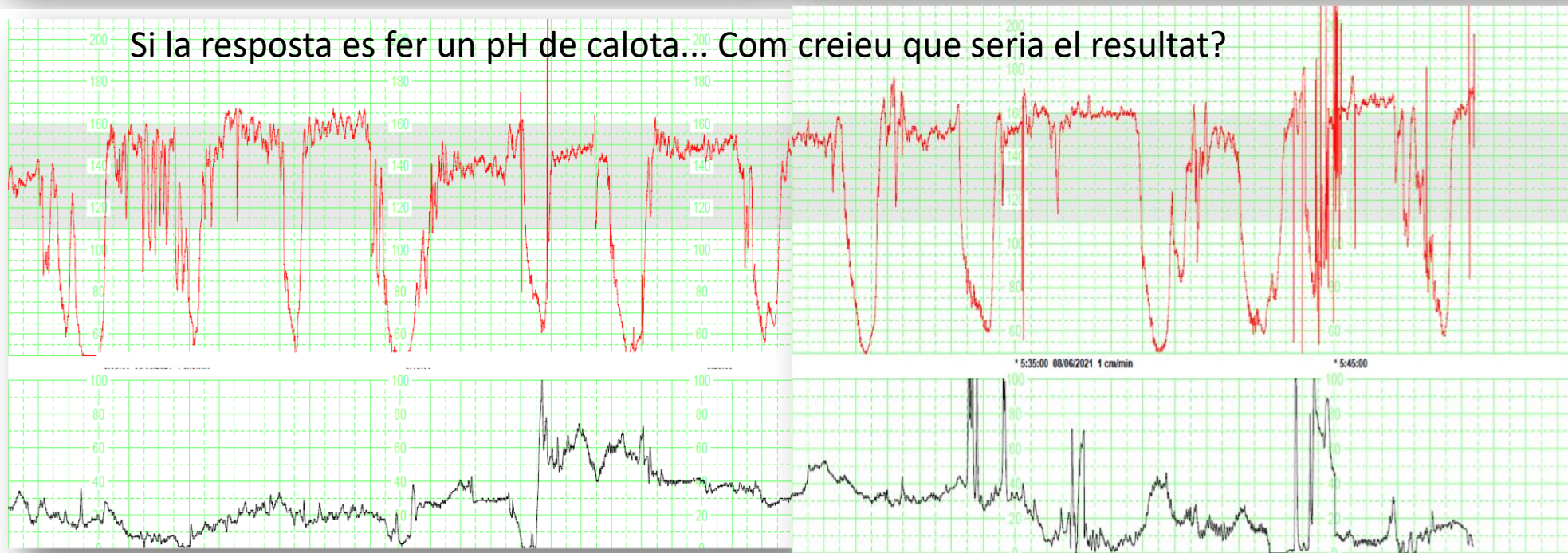
✓ Tocolítics



Fetus a terme, 8 cm de dilatació, què faríeu?

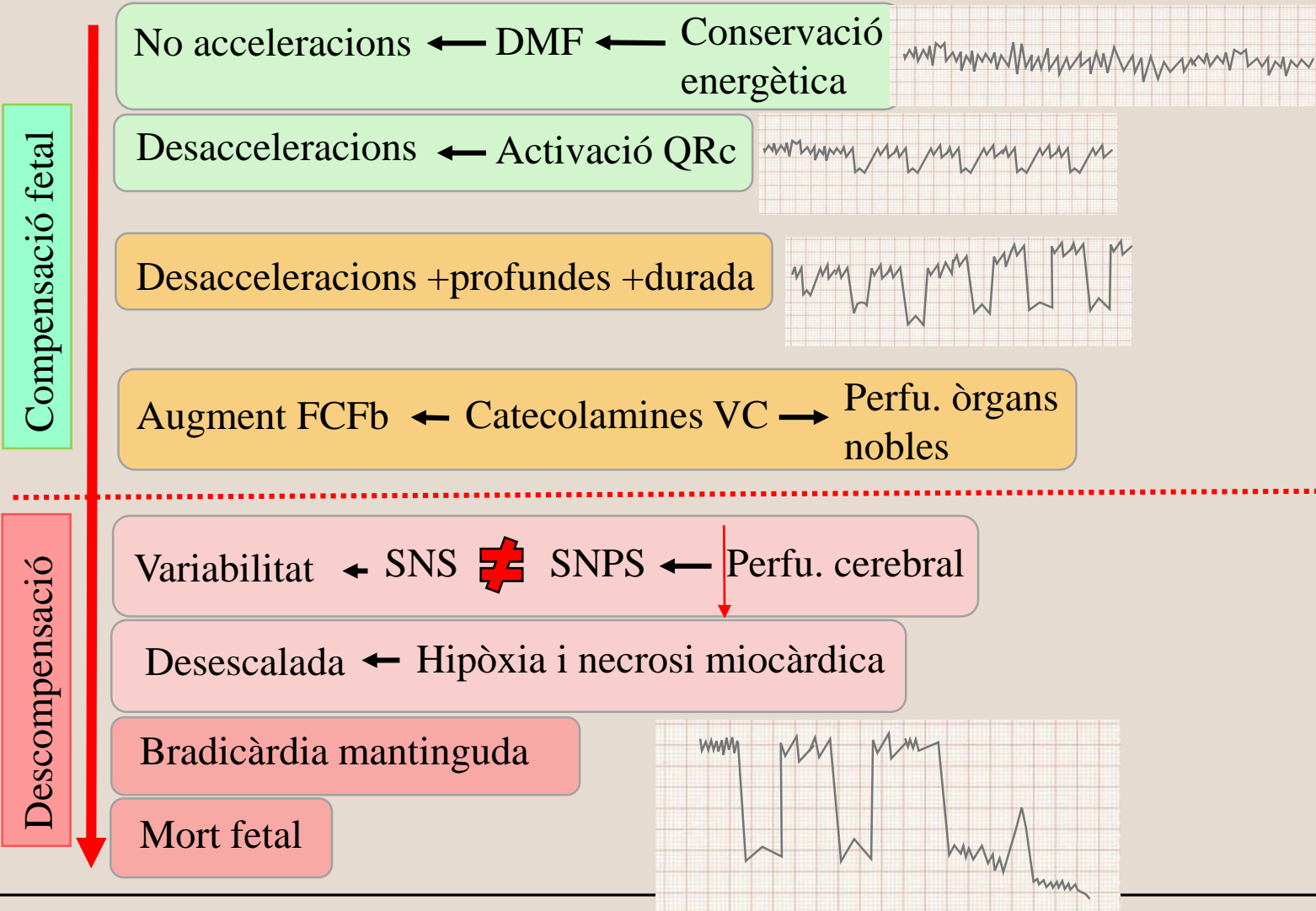


Si la resposta es fer un pH de calota... Com creieu que seria el resultat?



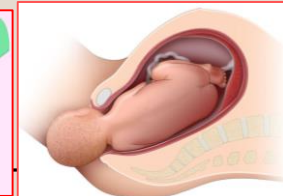
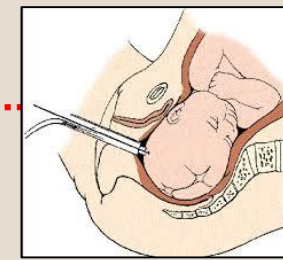
HIPÒXIA PROGRESIVA

Hipòxia que evoluciona durant hores

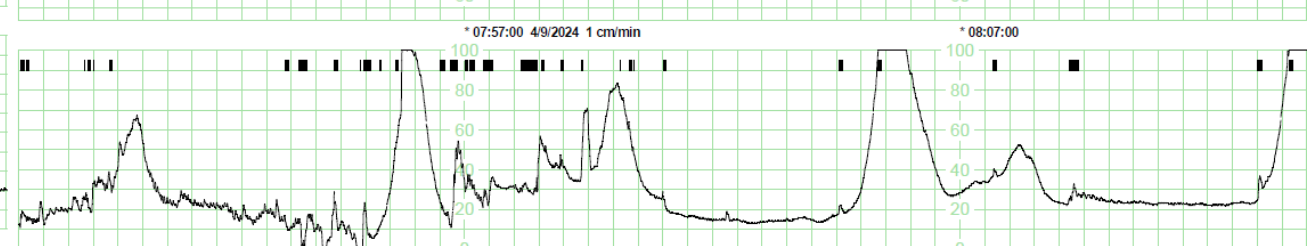
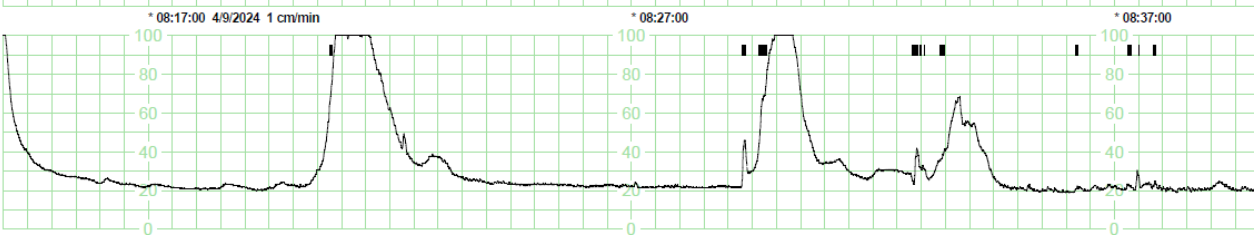
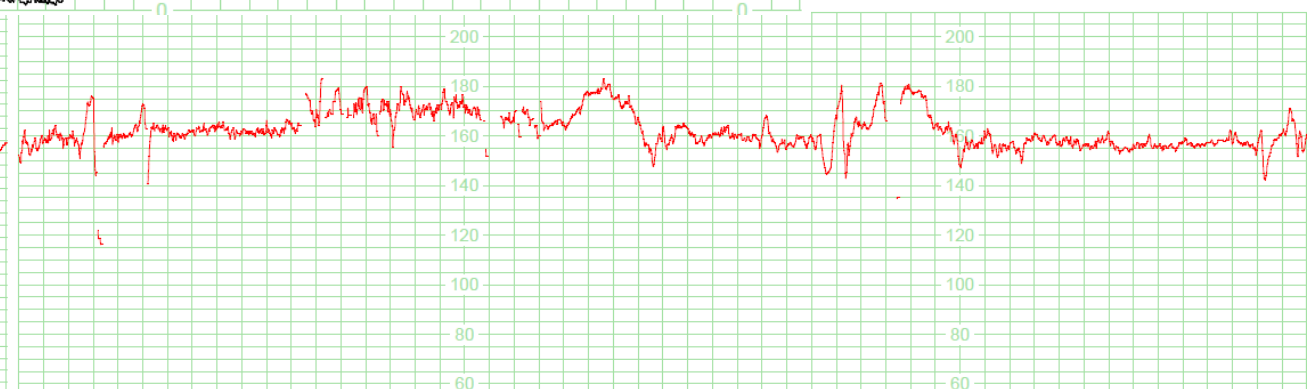
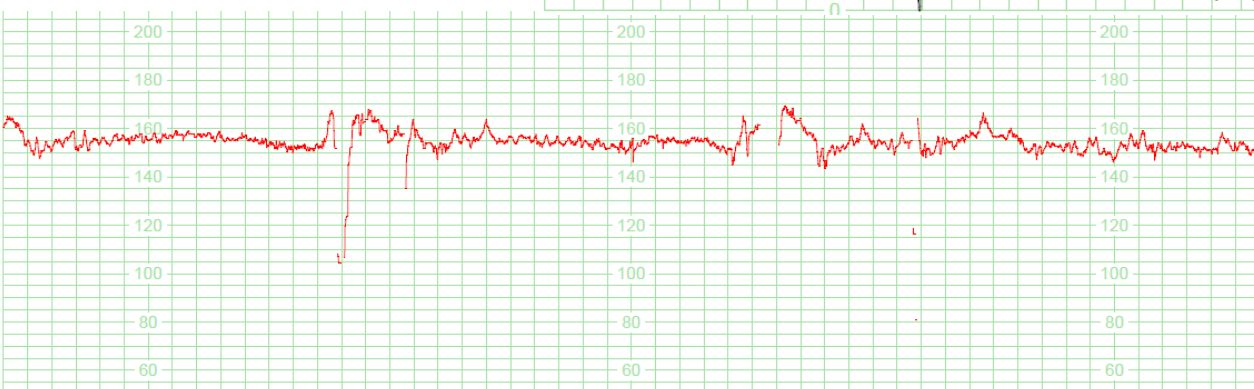
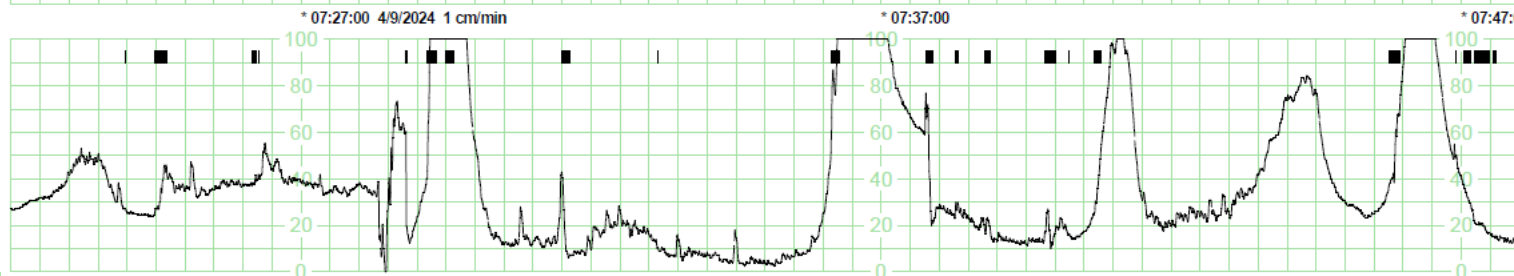


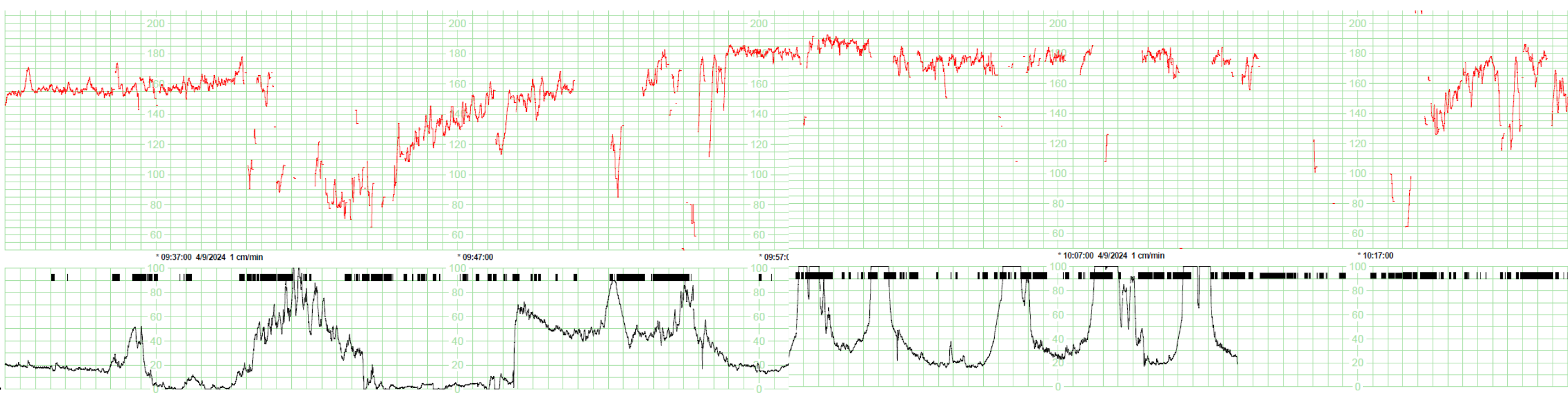
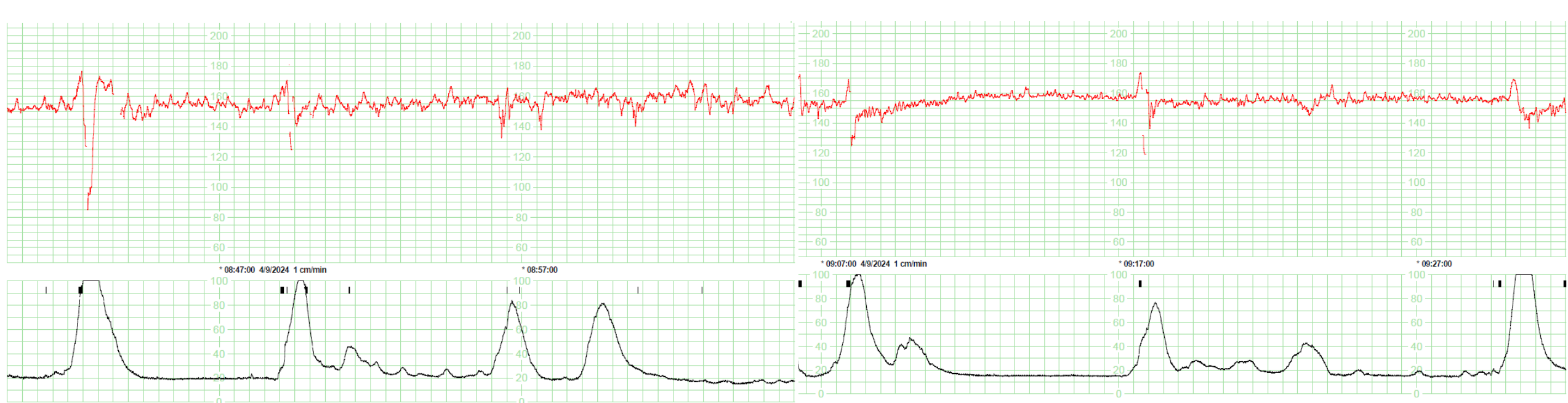
- ✓ D. Lat
- ✓ Stop oxitocina
- ✓ SF EV
- ✓ Tocolítics

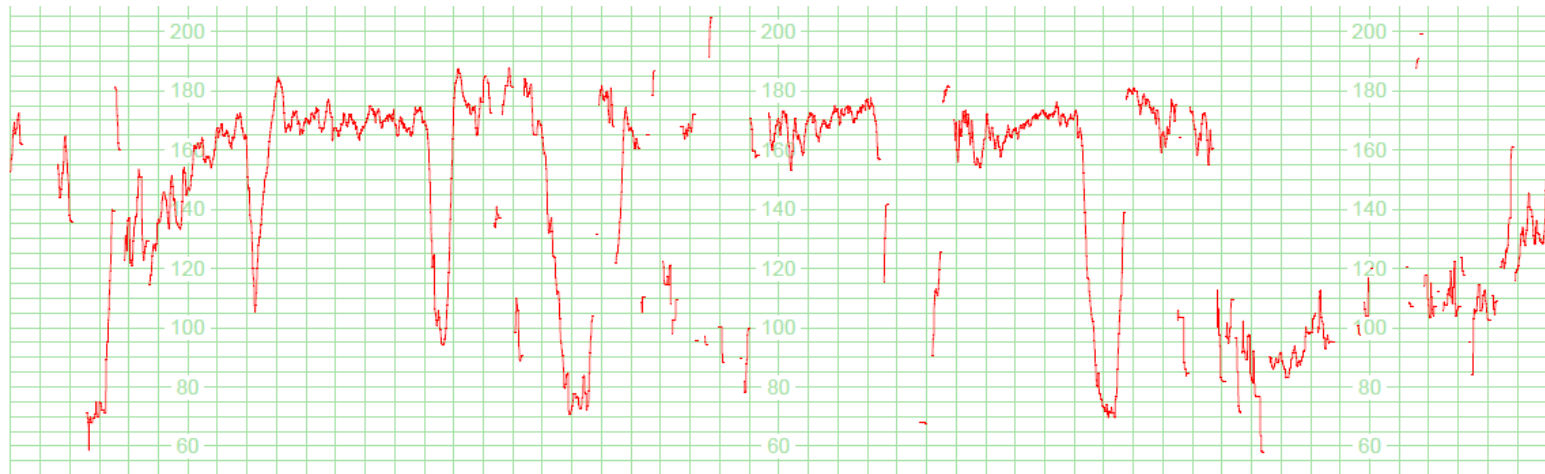
10 min o
<si empitjorament RCTG



20-40 min



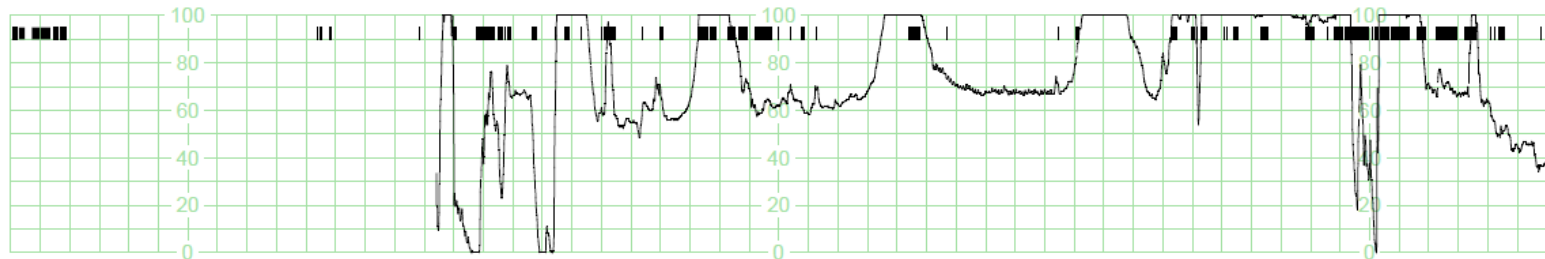




* 10:27:00 4/9/2024 1 cm/min

* 10:37:00

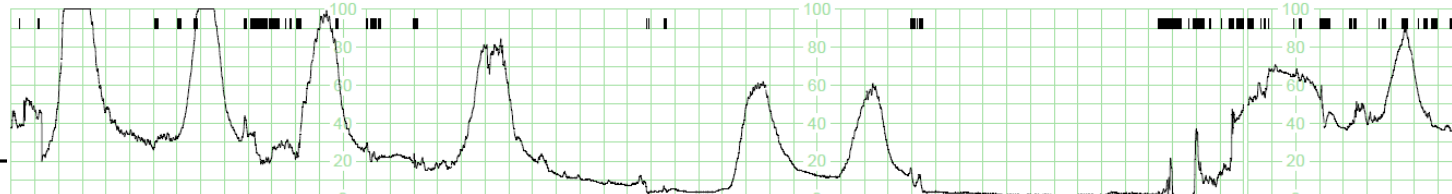
* 10:47:00

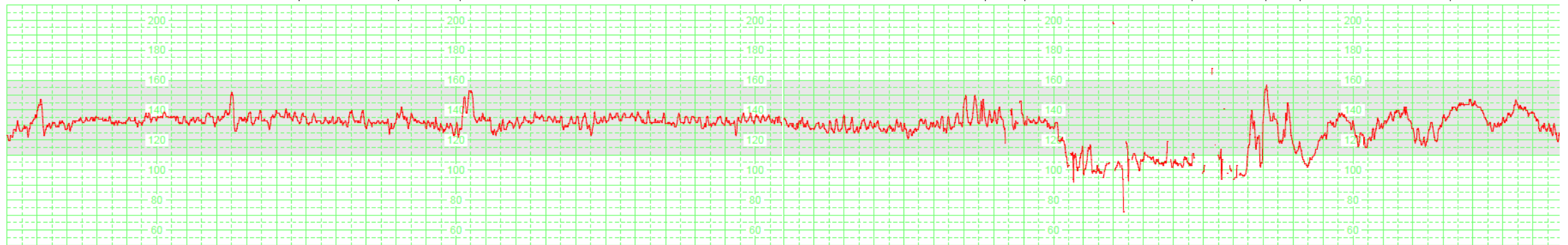


* 10:57:00 4/9/2024 1 cm/min

* 11:07:00

* 11:17:00 4/9/2024 1 cm/min





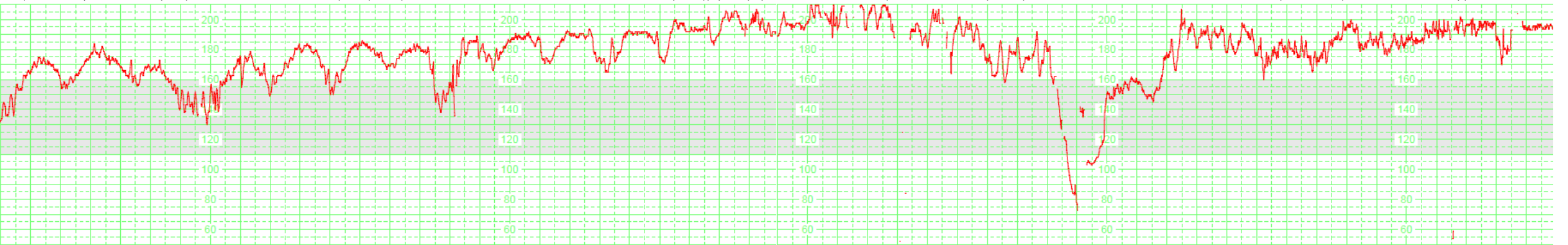
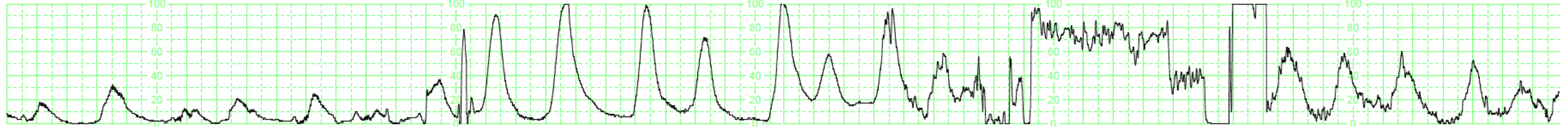
* 5:38:00 23/07/2018 1 cm/min

* 5:48:00

* 5:58:00

* 6:08:00 23/07/2018 1 cm/min

* 6:18:00



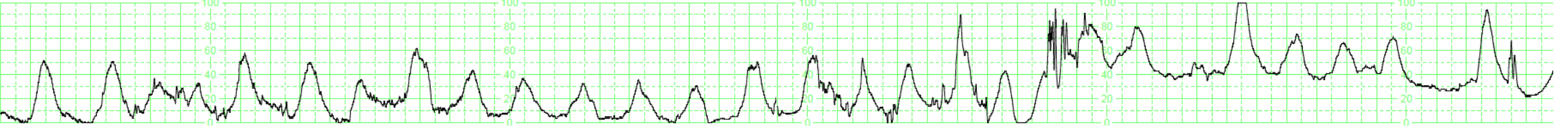
* 6:58:00 23/07/2018 1 cm/min

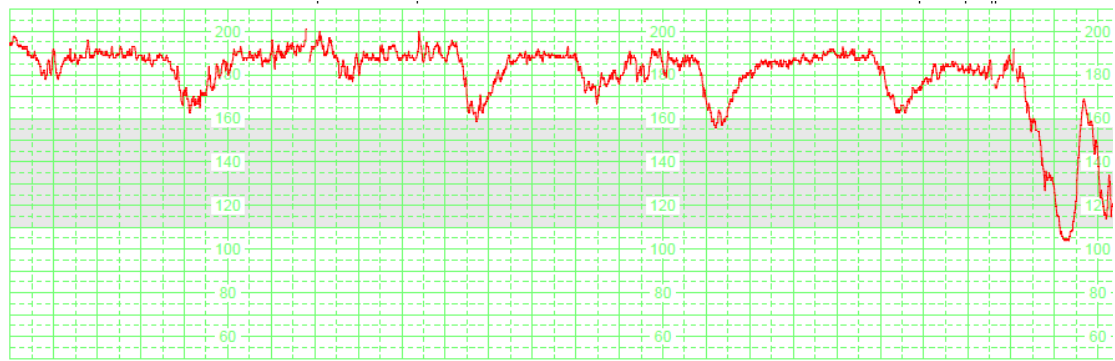
* 7:08:00

* 7:18:00 23/07/2018 1 cm/min

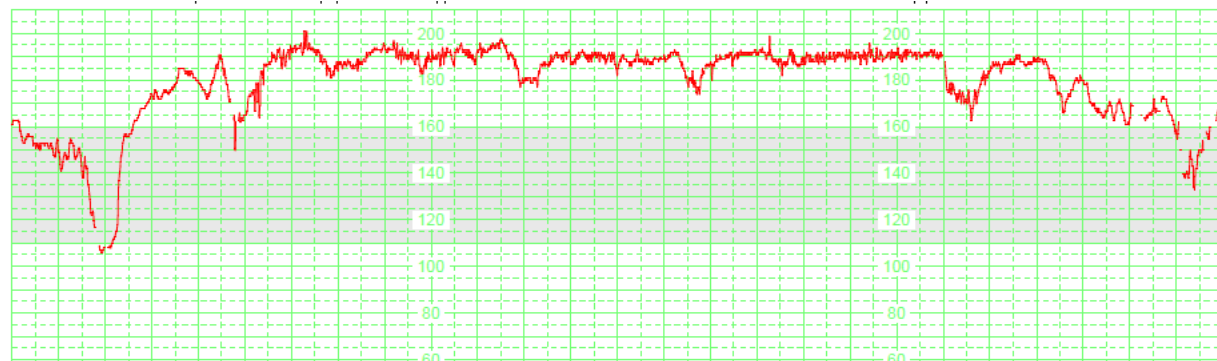
* 7:28:00

* 7:38:00





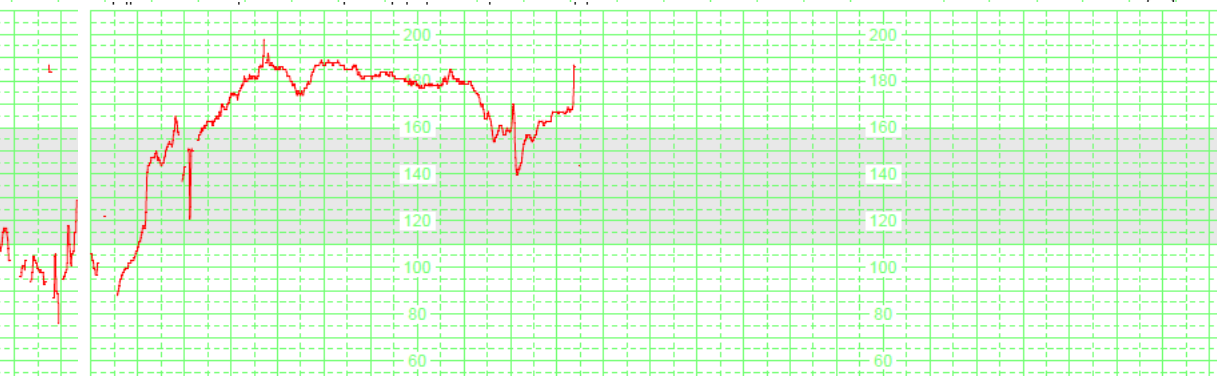
* 7:48:00 23/07/2018 1 cm/min



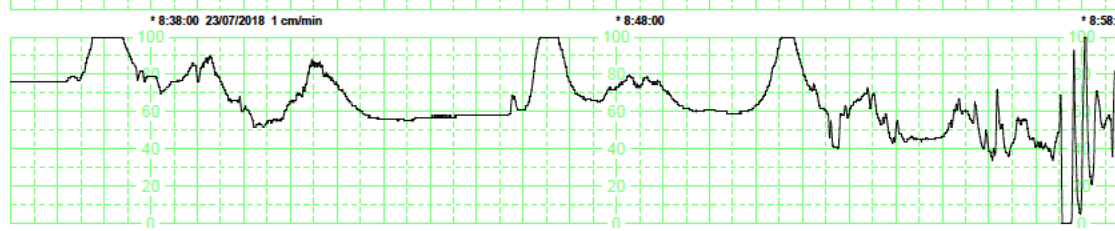
* 8:18:00 23/07/2018 1 cm/min



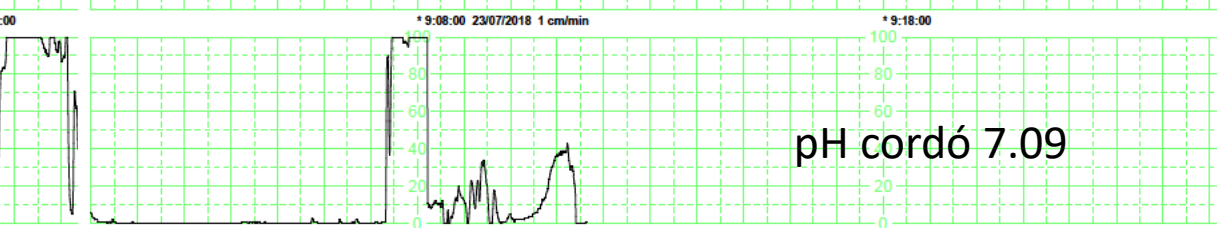
* 8:38:00 23/07/2018 1 cm/min



* 8:58:00



* 8:48:00



* 9:08:00 23/07/2018 1 cm/min

pH cordó 7.09

HIPÒXIA CRÒNICA

FCFb inadequada per EG, variabilitat disminuïda, poc reactiu + desacceleracions

CAUSA MÉS FREQUENT: **DÈFICIT AVANTPART**

Insuficiència placentària
Corioamnionitis
Anèmia fetal



Sospita al RCTG avant part si 1 o +:

- Variabilitat <5 durant >50 min

- FCF:

 - >160bpm durant >60 min

 - <110bpm durant >30 min

 - FCF inadequada per EG

- No acceleracions

- Desacceleracions sense contracció

Descartar
corioamnionitis o febre
materna

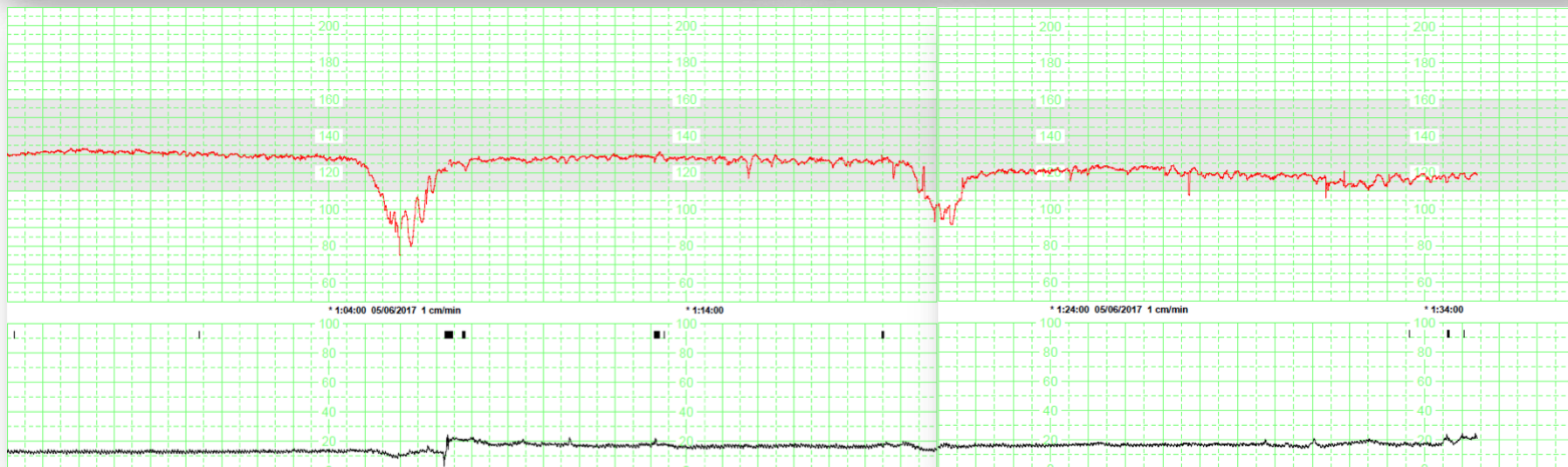
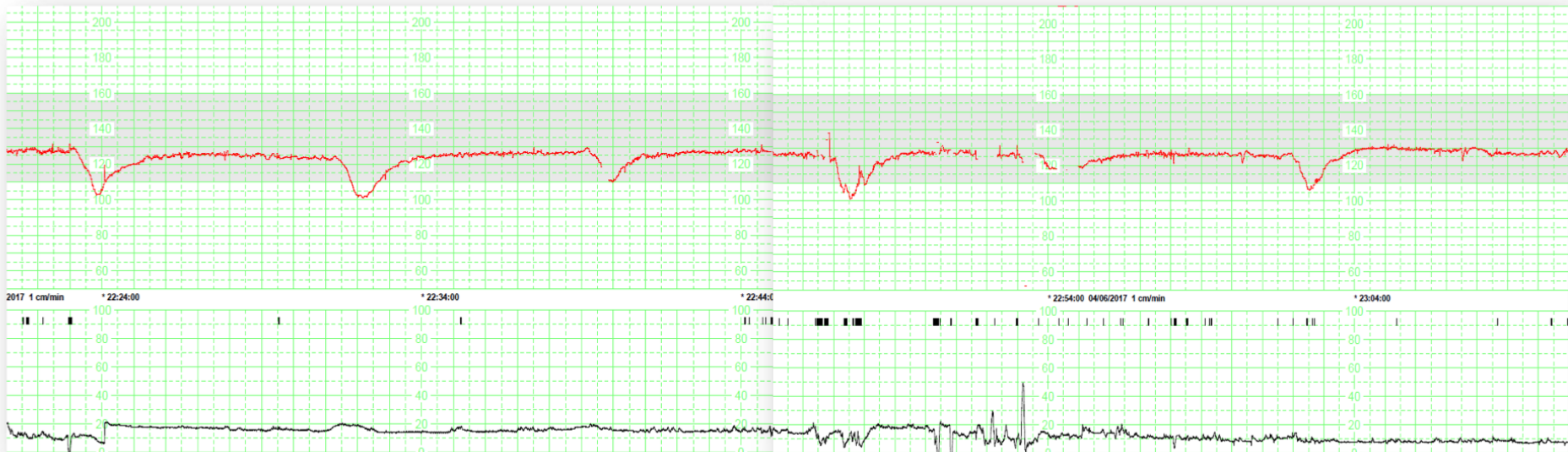
2 o + / desacceleracions espontànies



COM ACTUEM?

Valoració individualitzada

- Edat gestacional
- Context clínic:
 - Diagnòstic previ de CIR
 - Febre materna que no respon a tto
 - DMF
 - Aigües meconials
- Condicions: TV, DU

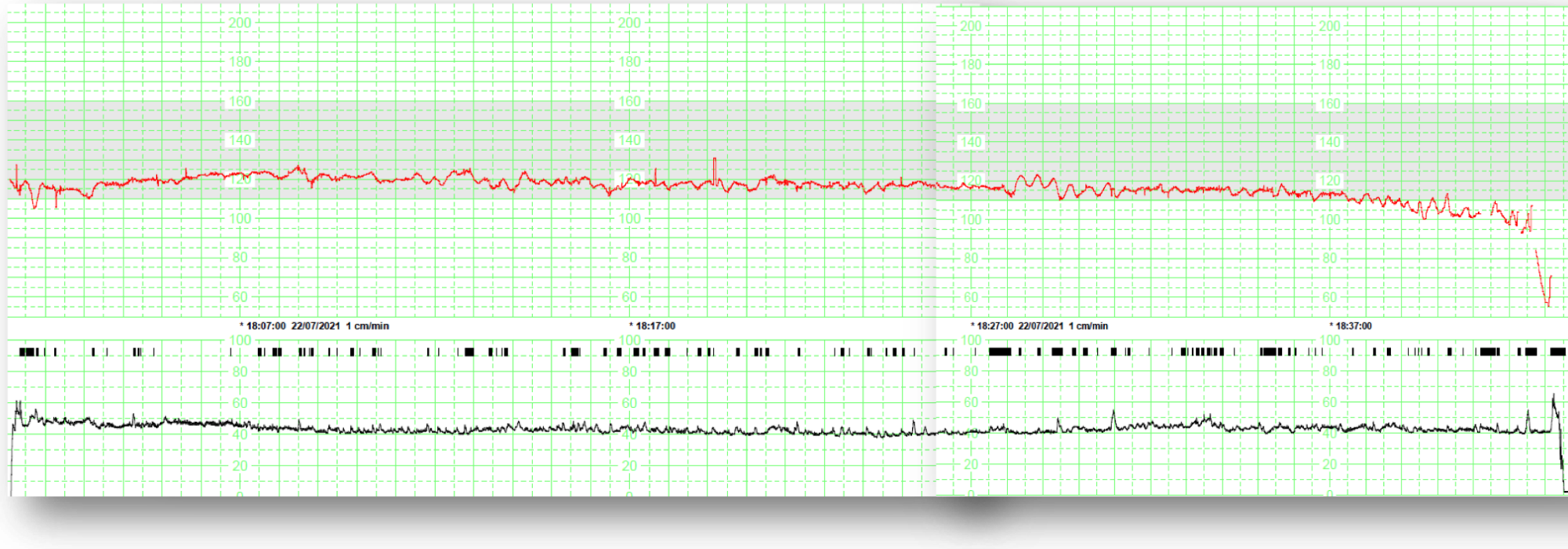


¿Cual sería la sospecha principal en este RCTG?

TEST BASAL planta. Hipoxia Crónica. CIR, Preeclampsia

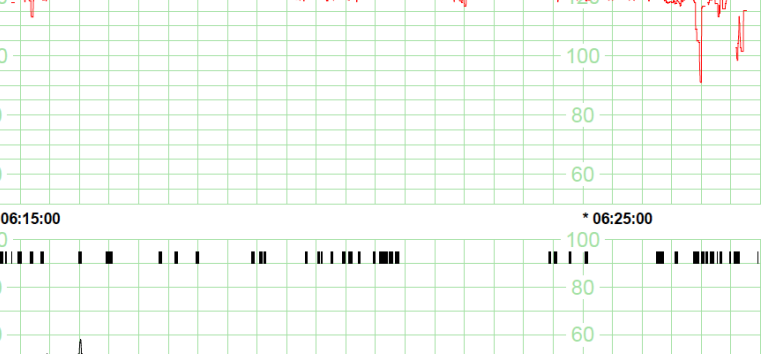
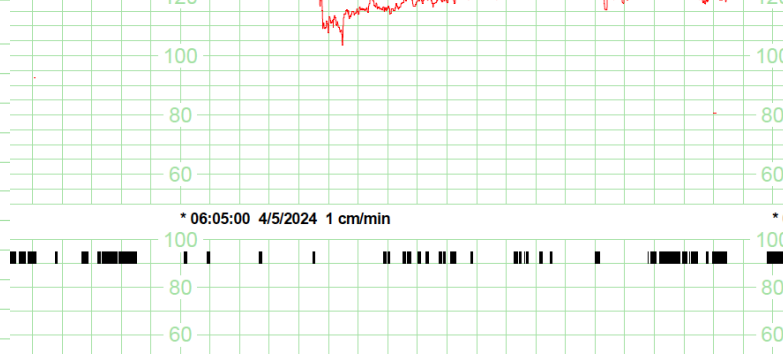
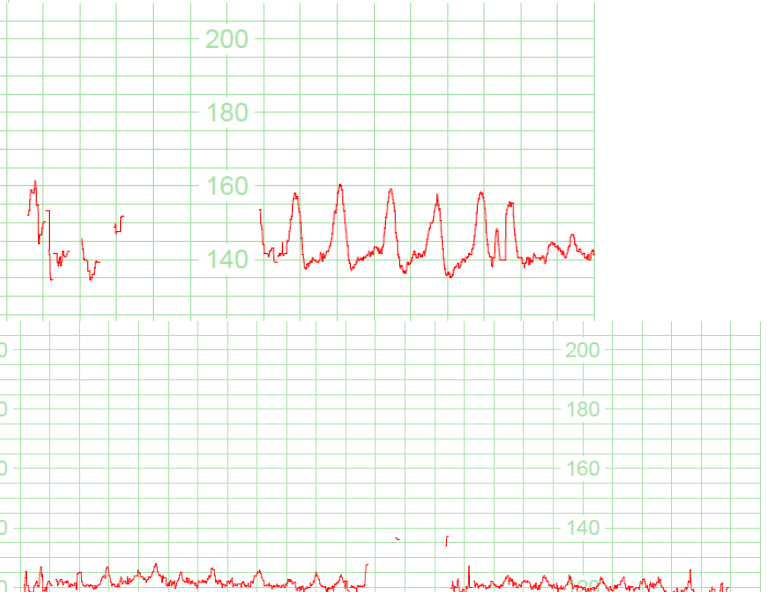
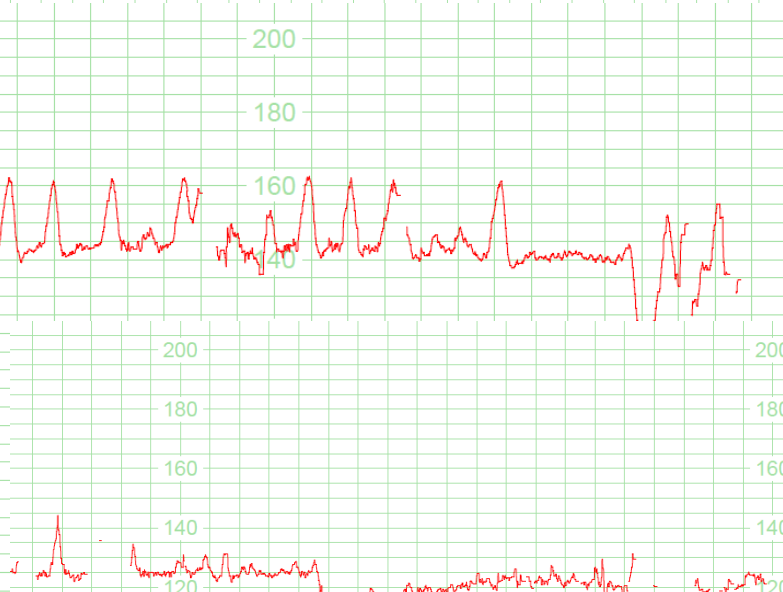
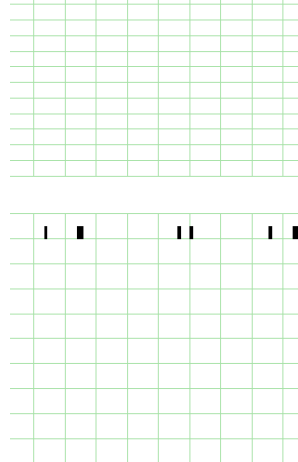
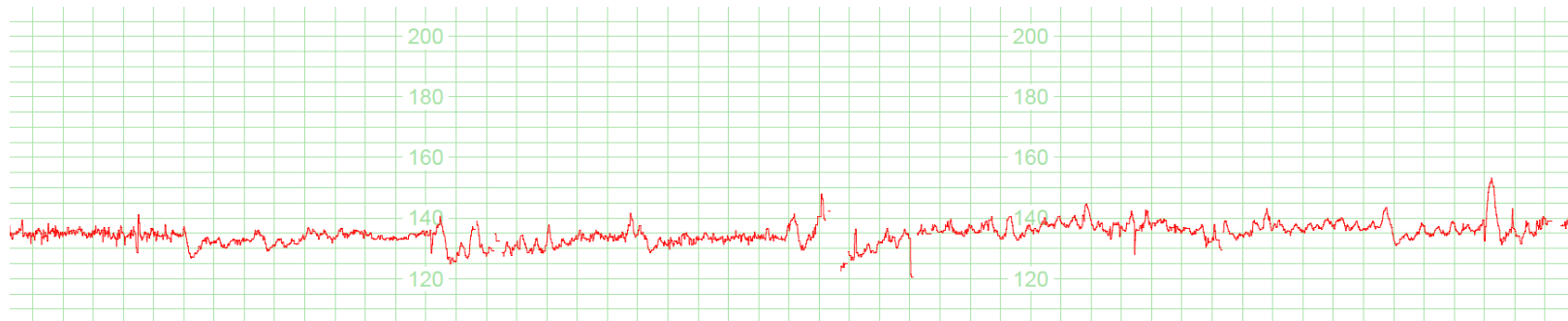
Cesárea RPBF. Cordón: 6.93

26 años. G1. 37+3 semanas. Acude a urgencias por <MF en las ultimas 24 horas. Se realiza test basal. No fiebre. No taquicardia materna.






¿Se trata de un patrón persistente?

¿Que causas debemos excluir?

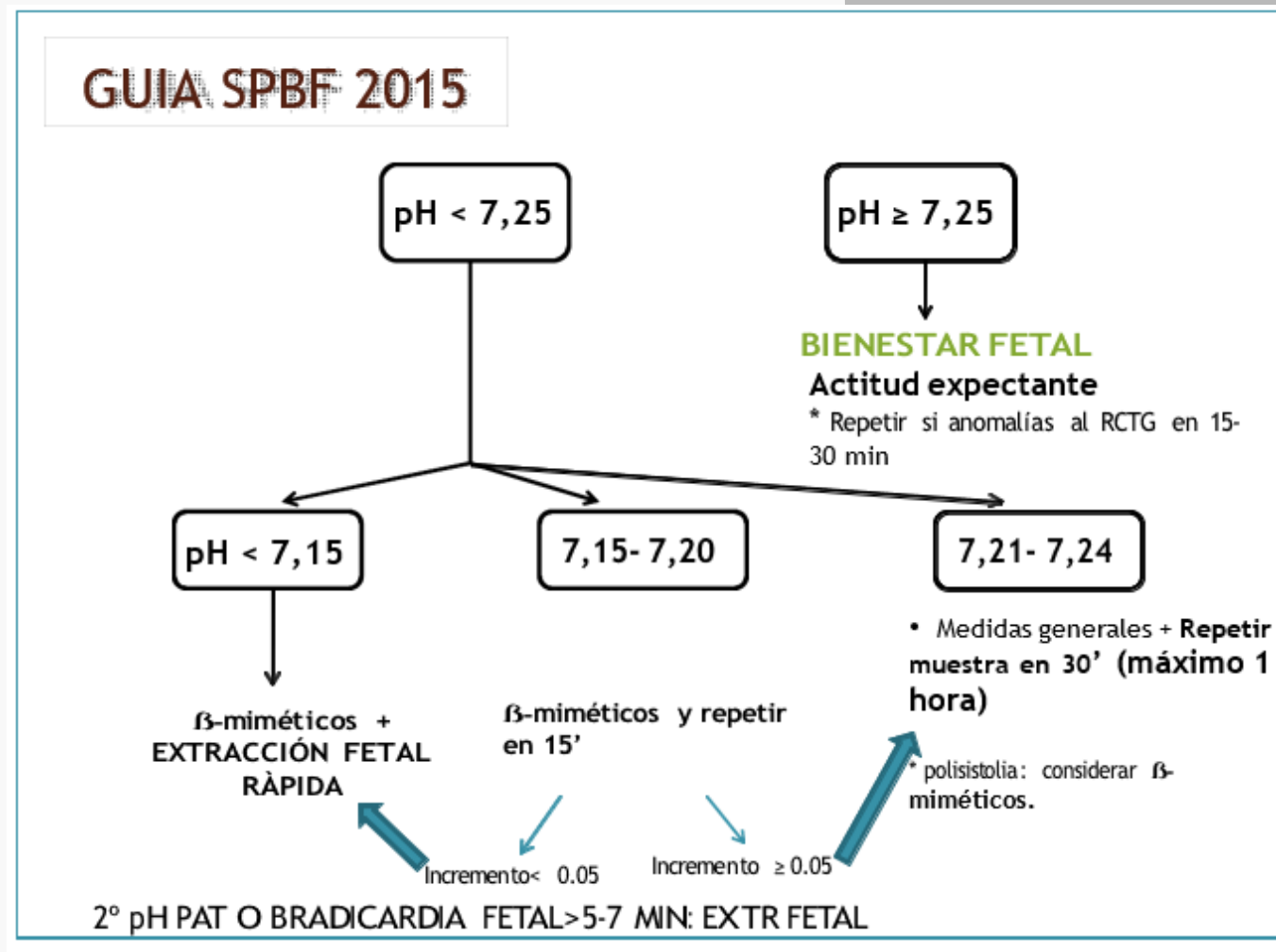


				3	6	9	12	30	
Hipoxia aguda	Deceleración > 3 minutos	STOP uterotónicos Decúbito lateral Parar los pujos Otras medidas*	Prolapso DPPNI Rotura uterina	Riesgo alto de acidosis - extracción					
Hipoxia subaguda	Deceleración >2/3 RCTG (30' min)		Iniciar tocolisis FC <60lpm Disminución variabilidad H. progresiva descompensada						
Hipoxia progresiva compensada	- Deceleraciones variables - Aumento de la línea basal > 10% - Variabilidad conservada		Iniciar tocolisis Iniciar tocolisis						Iniciar tocolisis pH calota fetal
Hipoxia progresiva descompensada	- Aumento de la profundidad/duración de la deceleración - Variabilidad aumentada o disminuida - Imposibilidad para volver a la línea de la FCFb		Iniciar tocolisis Iniciar tocolisis						Signos de descompensación pH calota fetal pH calota fetal
Patrón sinusoidal >30min			Iniciar tocolisis Bradicardia Patrón en escalera						pH calota fetal

*Corregir factores maternos: Hipotensión, hipovolemia, hipertermia, hipoglucemia. Estimulación de calota fetal ÚNICAMENTE en aquellos fetos con variabilidad disminuida y fuera de una deceleración.

	Riesgo alto de acidosis - extracción
	Riesgo medio de acidosis
	Riesgo leve de acidosis

INTERPRETACIÓ pH DE CALOTA FETAL

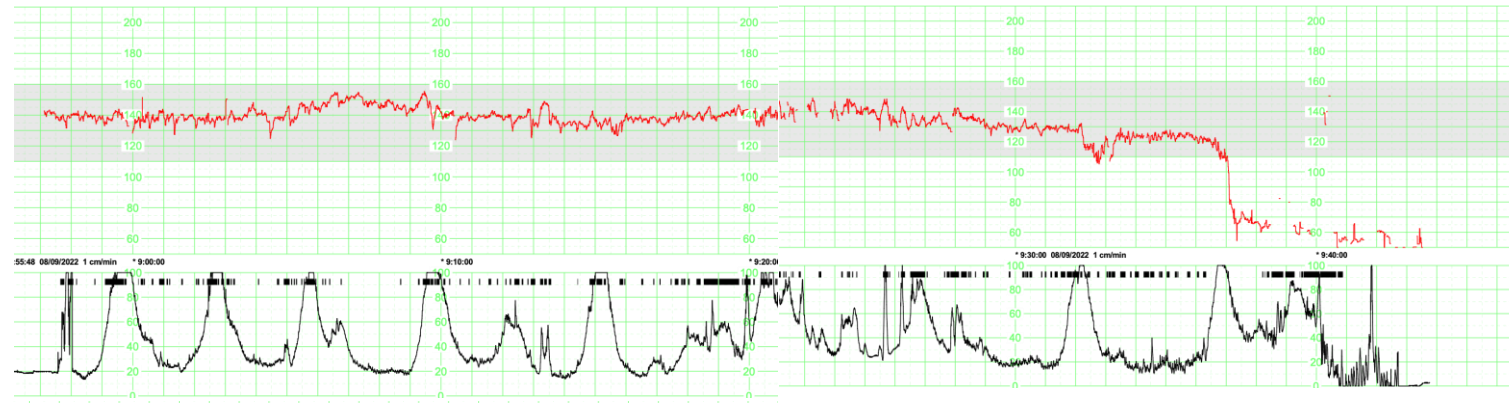


CONCLUSIONS

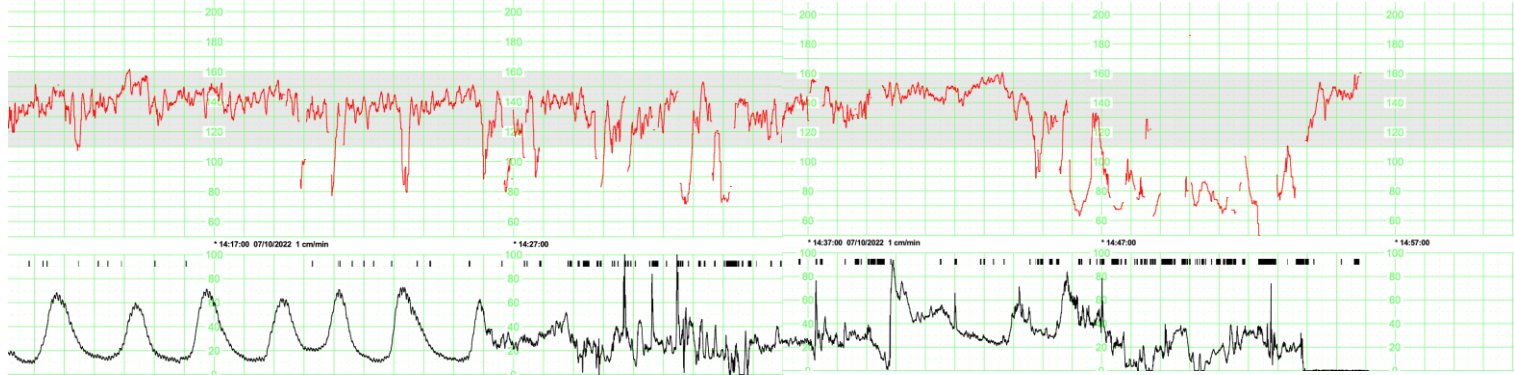
- Importància de la interpretació fisiopatològica d'un RCTG
- Importància de les mesures de reperfusió i temps de reperfusió
- Quan fer servir pH de calota fetal
- Importància d'aprendre i analitzar els RCTG també a posteriori
- Investigació en eines que permetin la detecció de l'acidosi neonatal

¿Cual tiene peor pH? ¿y mejor? ¿Creeis que alguno de ellos tendrá una acidosis?

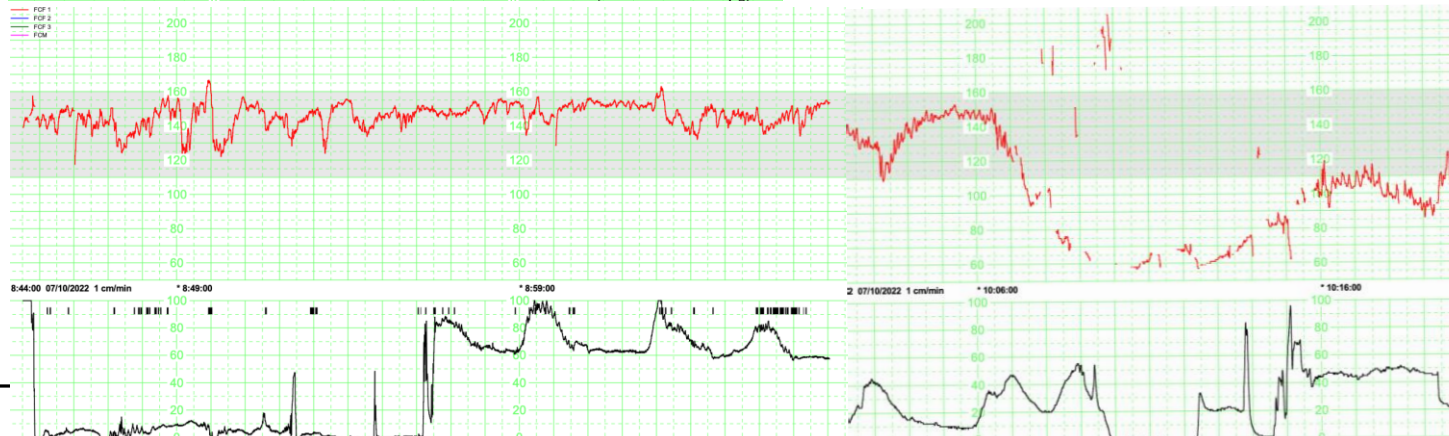
1



2

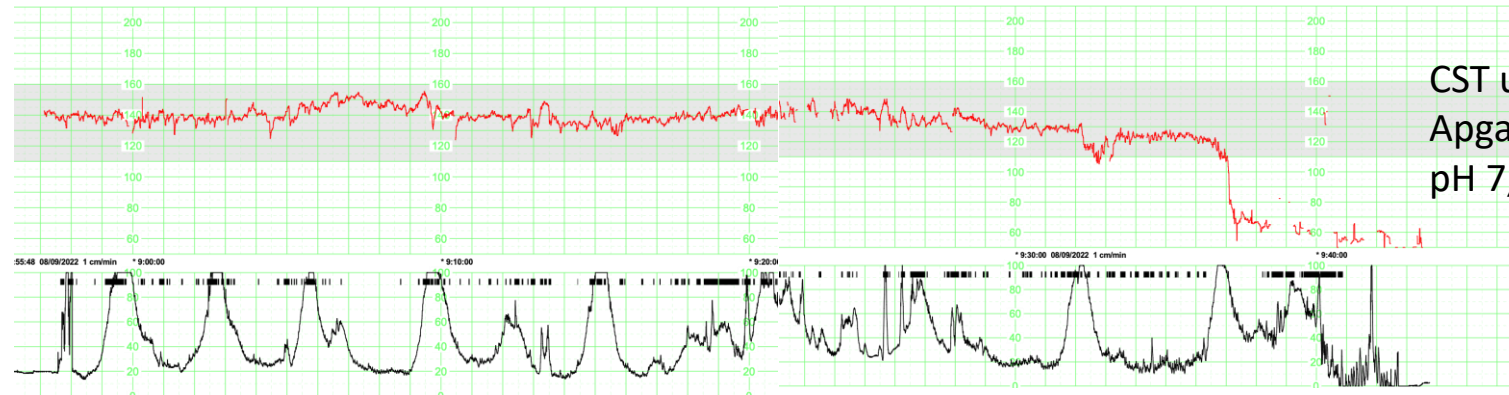


3



¿Cuál tiene peor pH? ¿y mejor? ¿Creéis que alguno de ellos tendrá una acidosis?

1



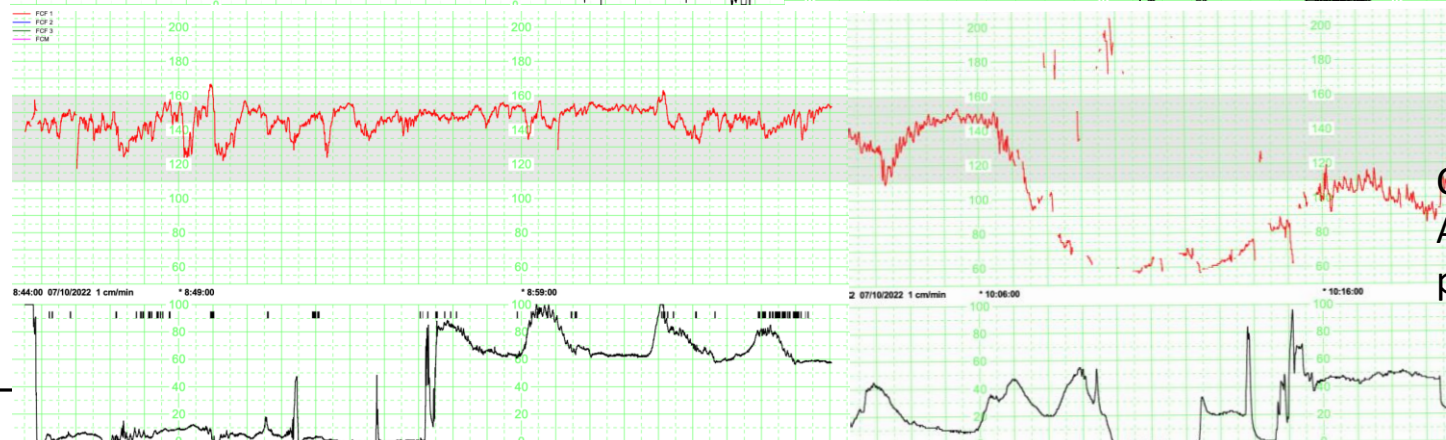
CST urgente
Apgar 8/10/10
pH 7,08/7,32

2



CST urgente
Apgar 9/10
pH 7,32

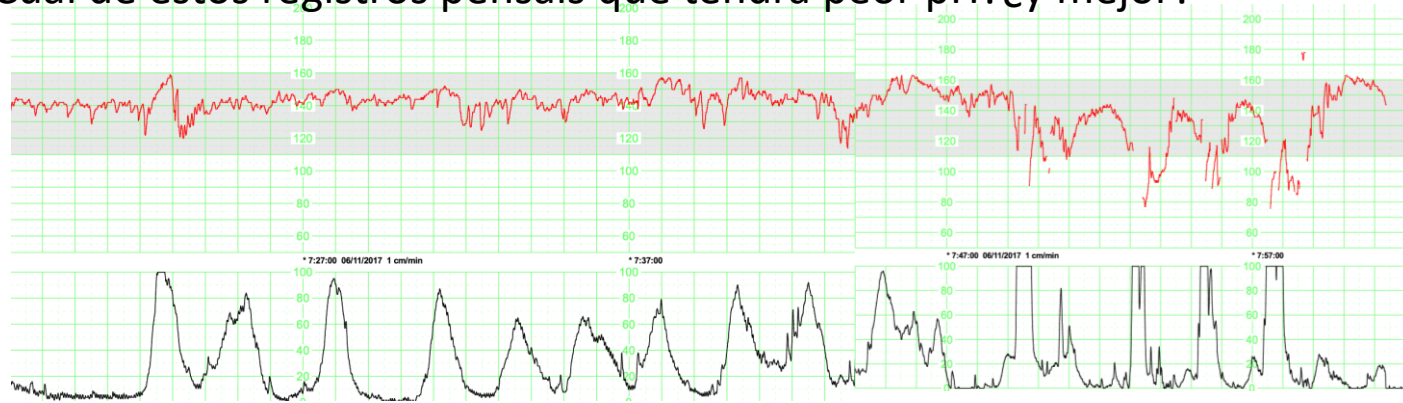
3



CST urgente
Apgar 9/10/10
pH 7,13

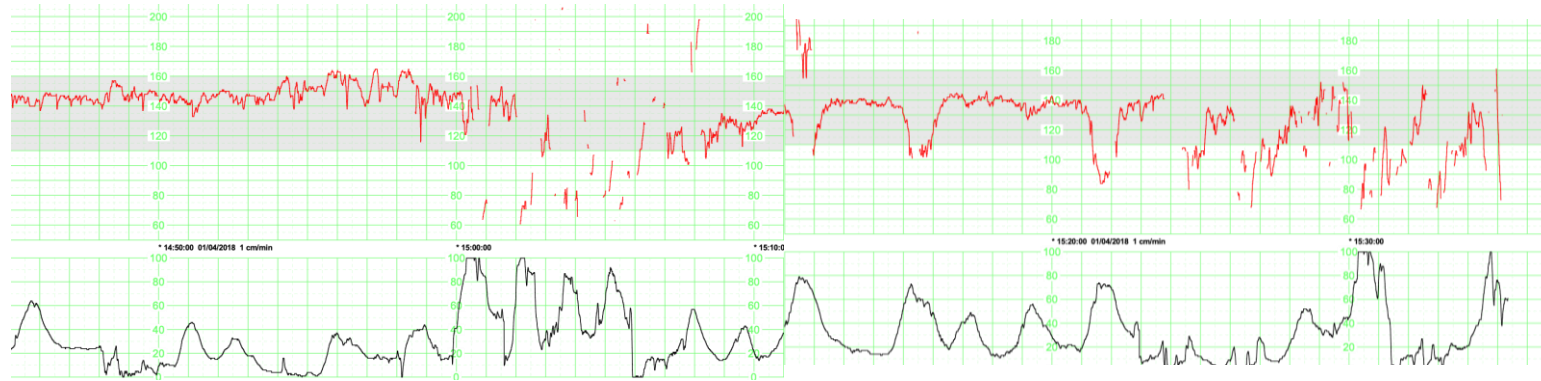
¿Cual de estos registros pensáis que tendrá peor pH? ¿y mejor?

1.



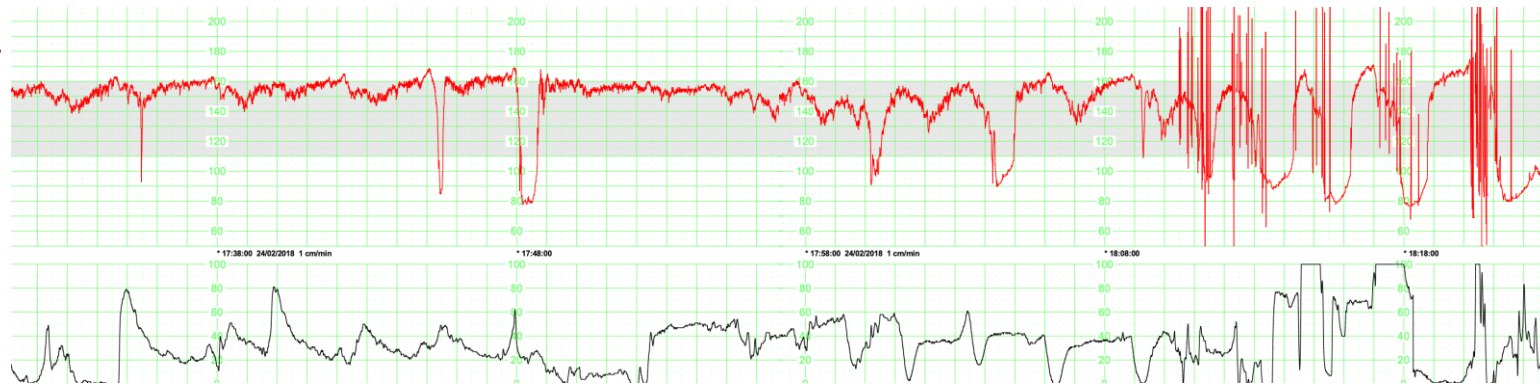
pH 7,23

2.



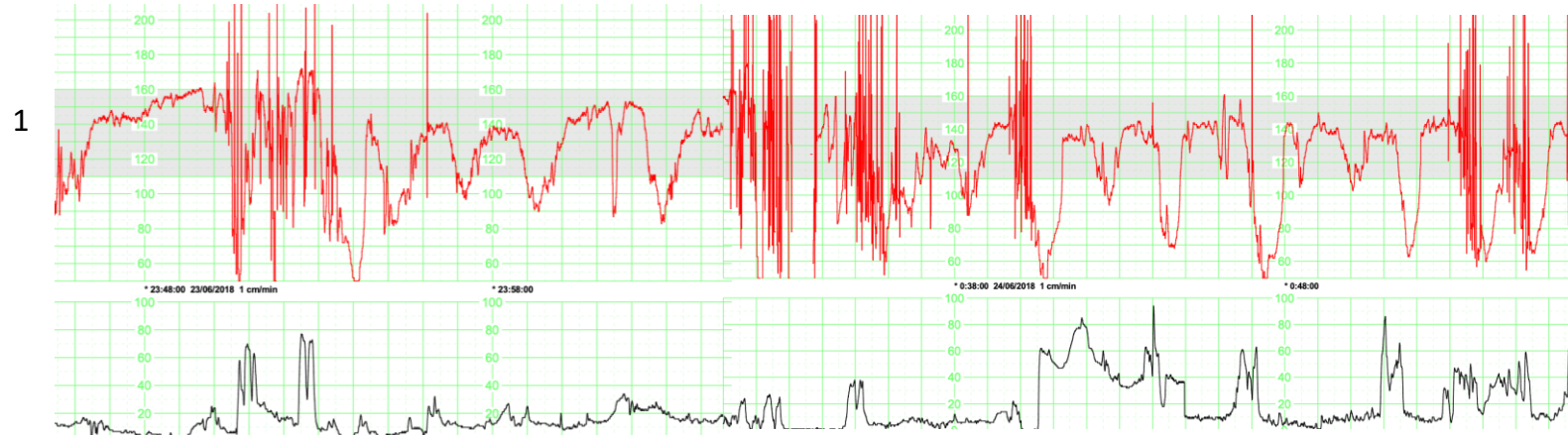
pH 7,15

3.



pH 7,13

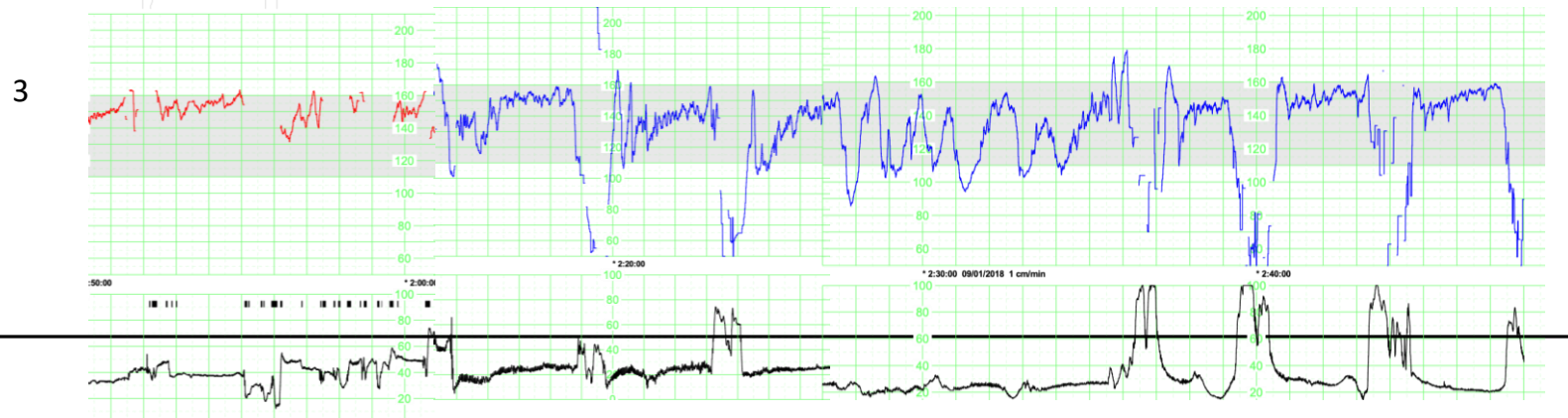
¿Cual de estos registros pensáis que tendrá peor pH? ¿y mejor?



pH 6,94



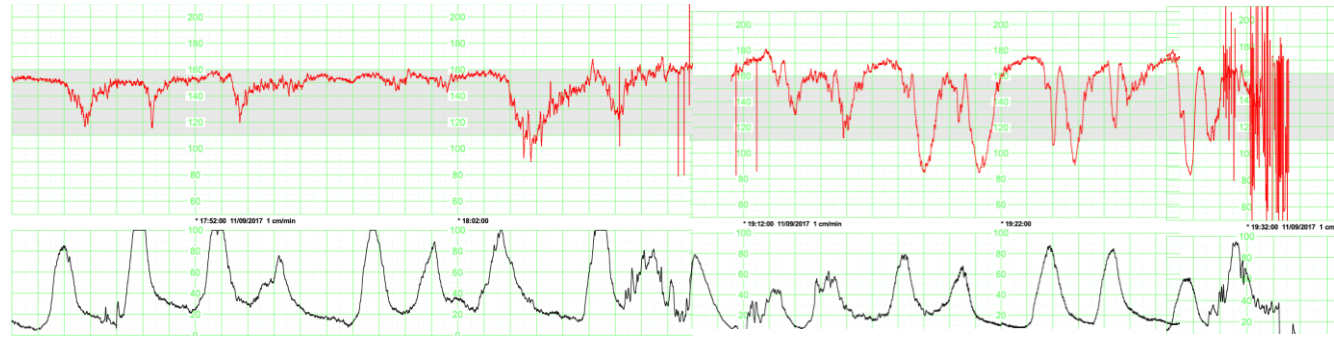
pH 7,04



pH 7,02

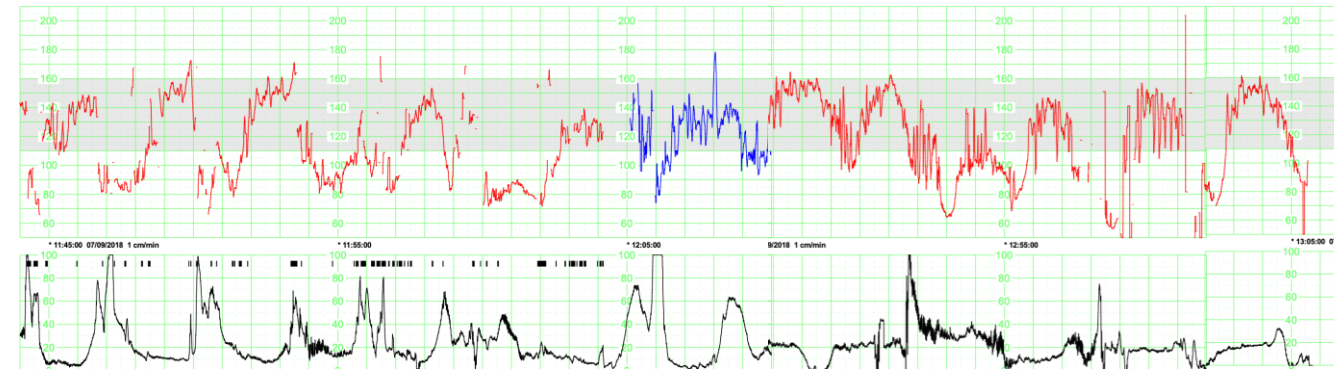
¿Cual de estos registros pensáis que tendrá peor pH? ¿y mejor? ¿Alguno menor a 7? ¿y alguno mayor?

1.



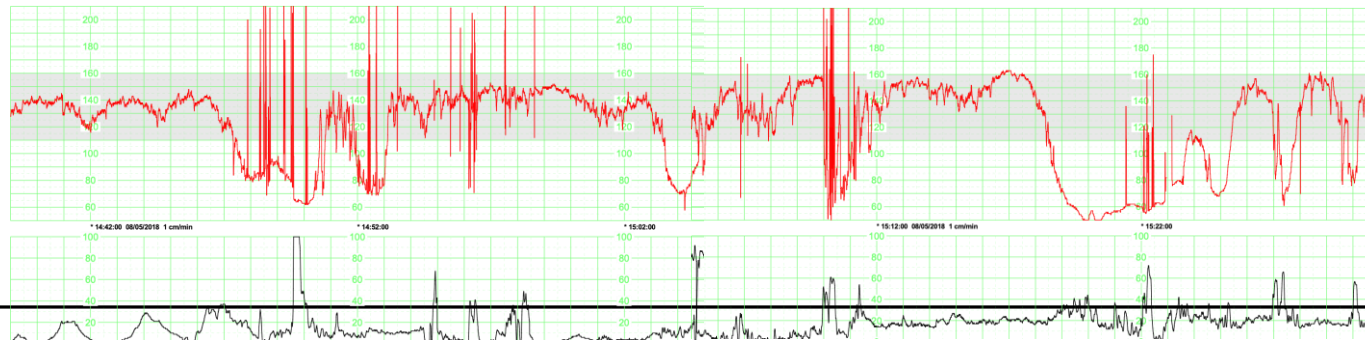
pH 7,04

2.

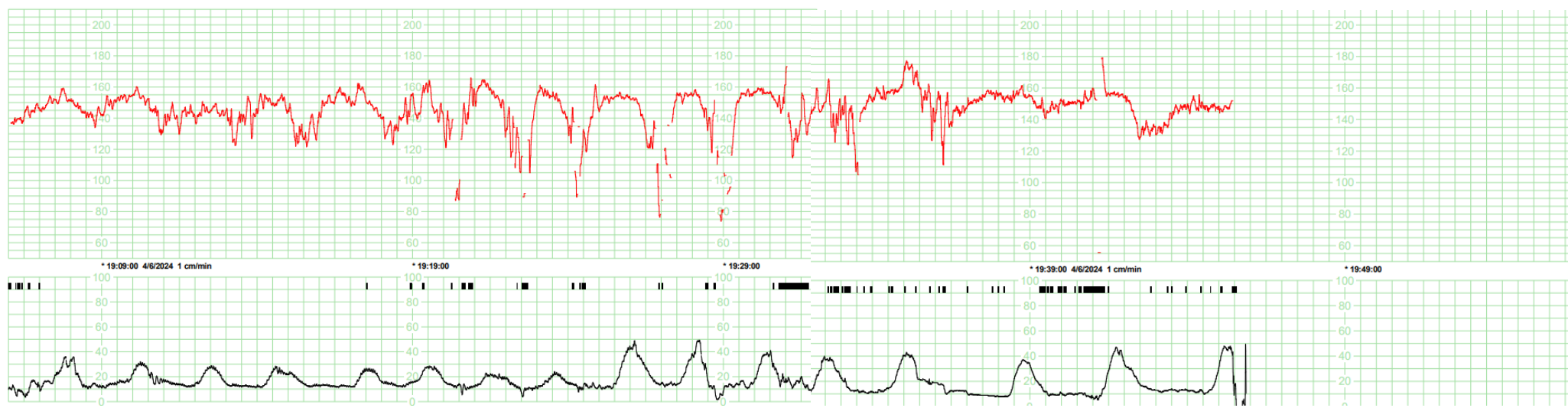
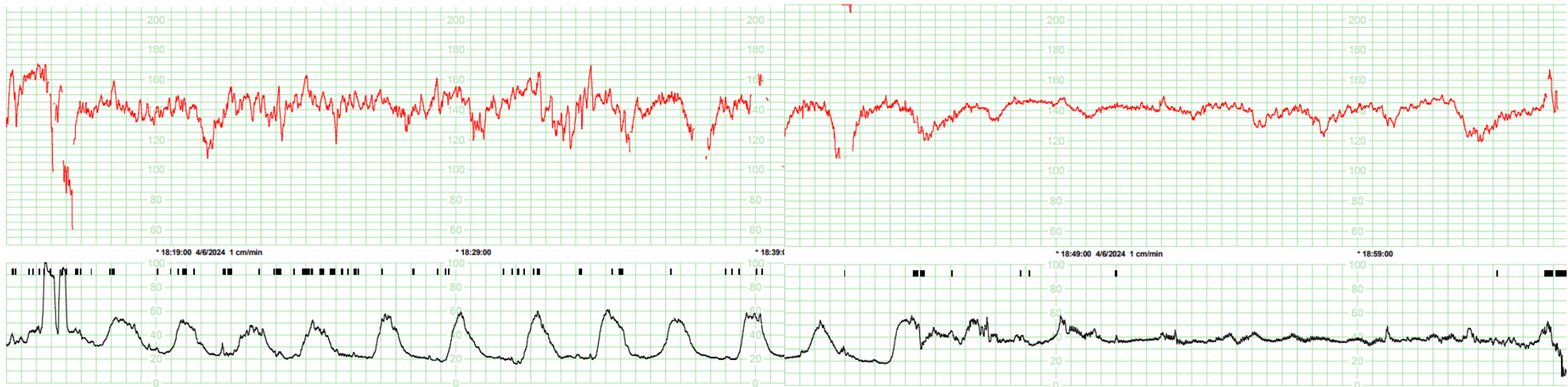


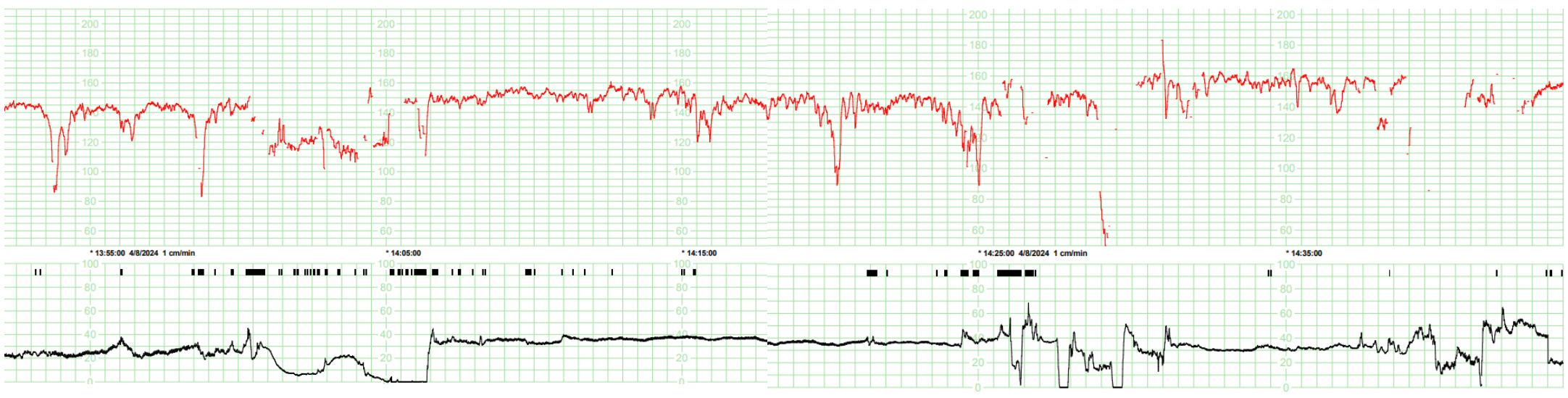
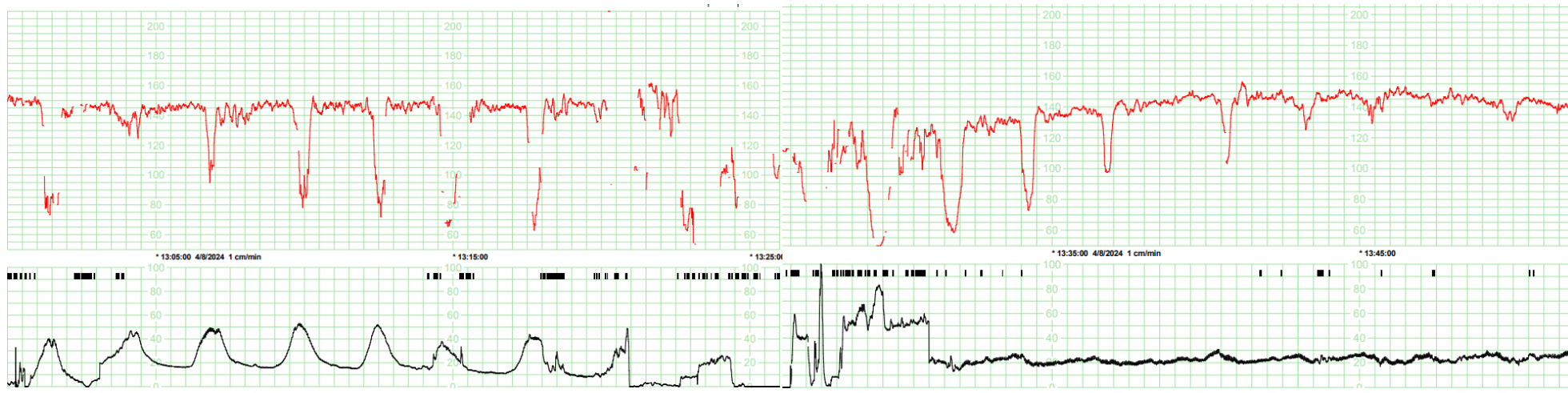
pH 6,88

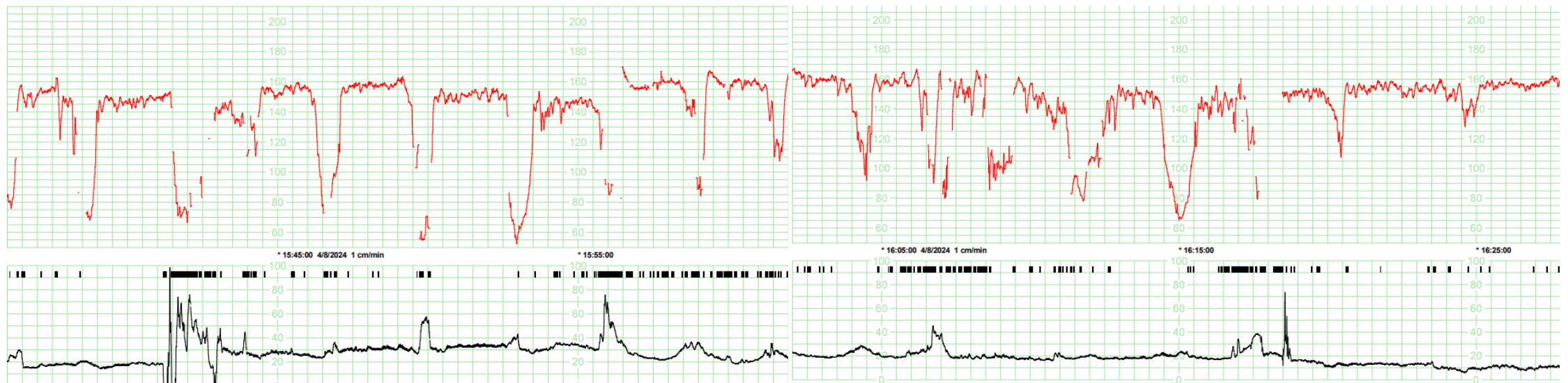
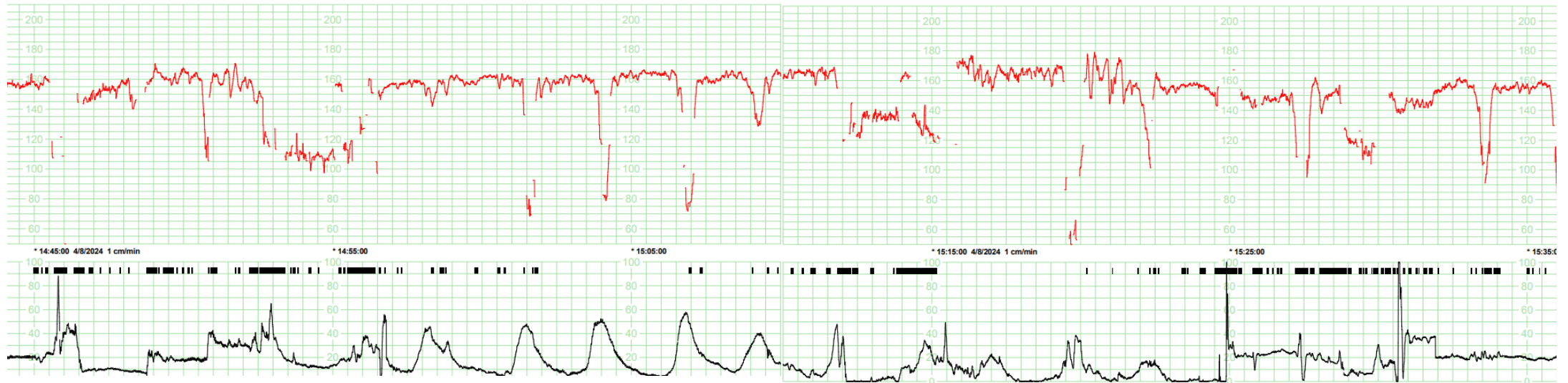
3.

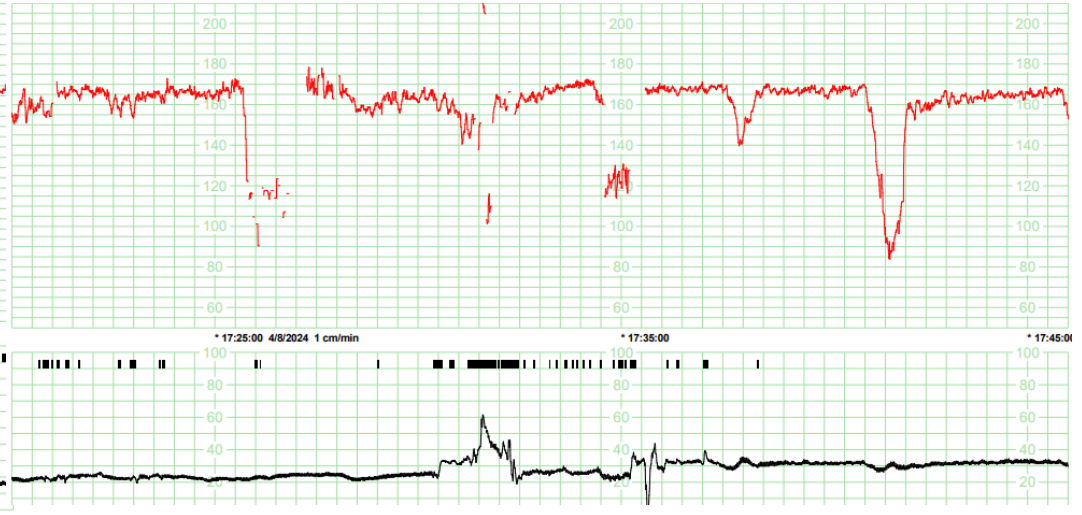
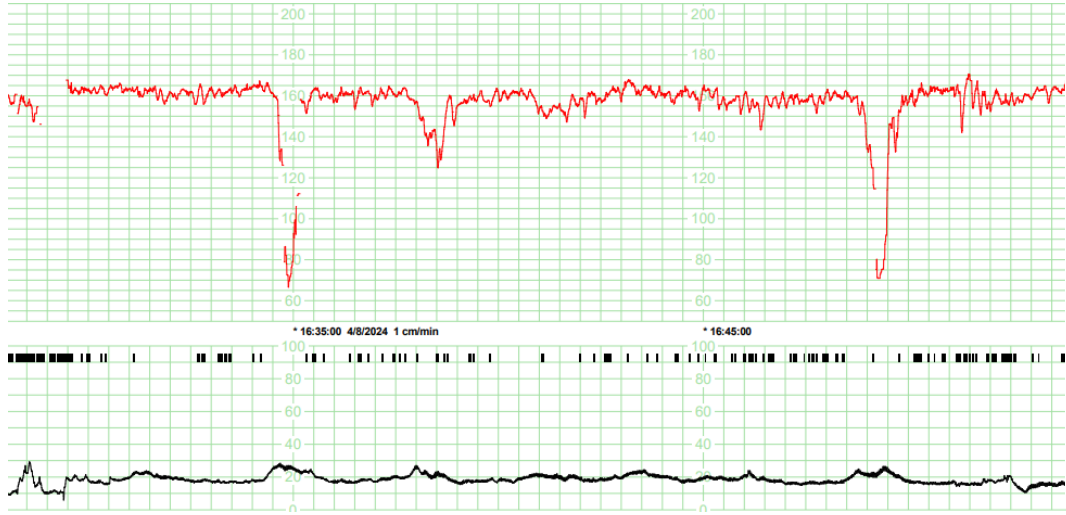


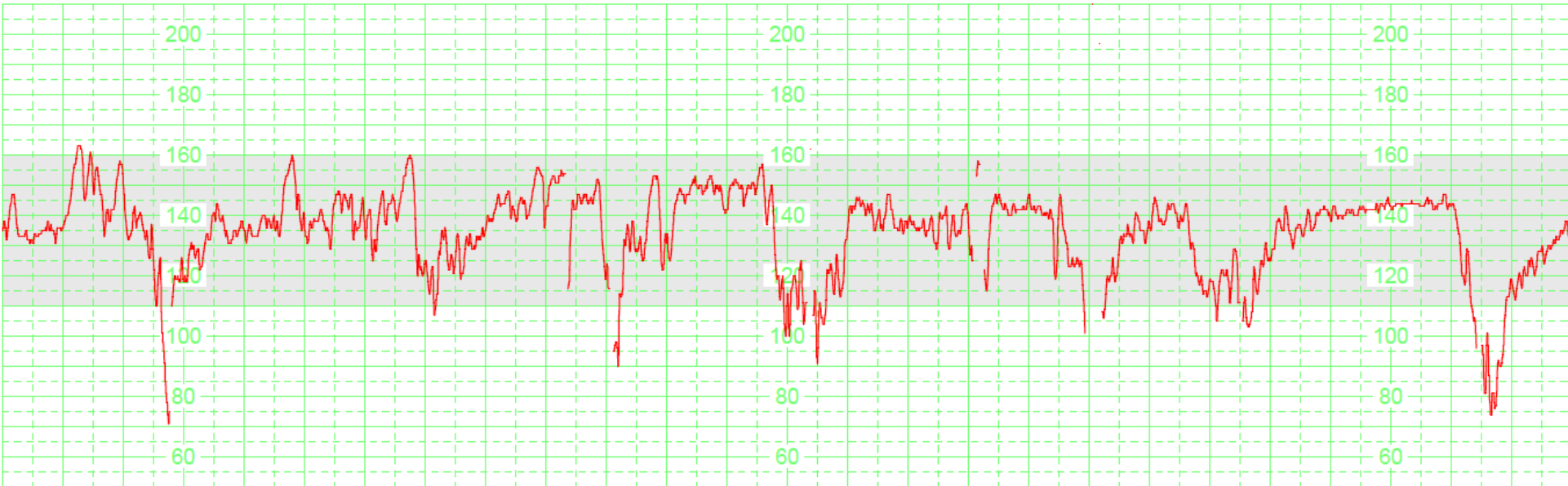
pH 7,15







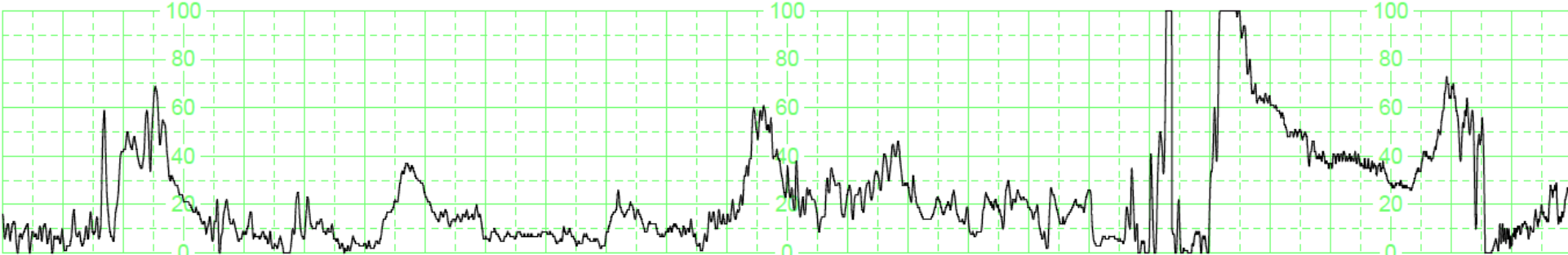


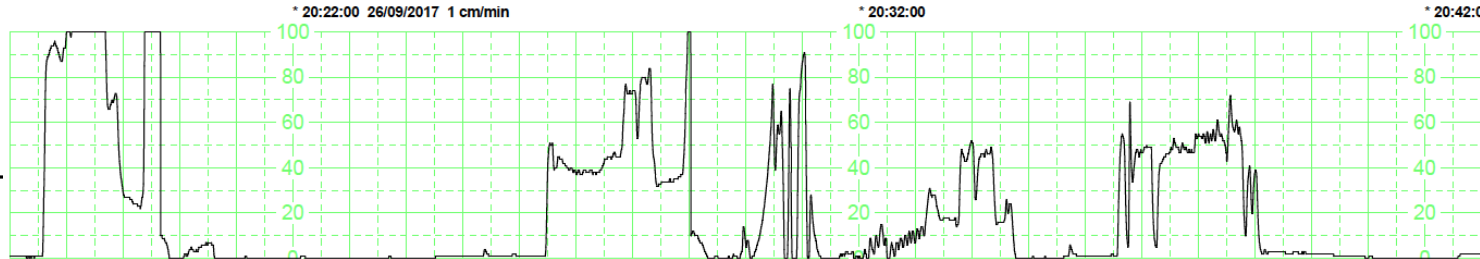
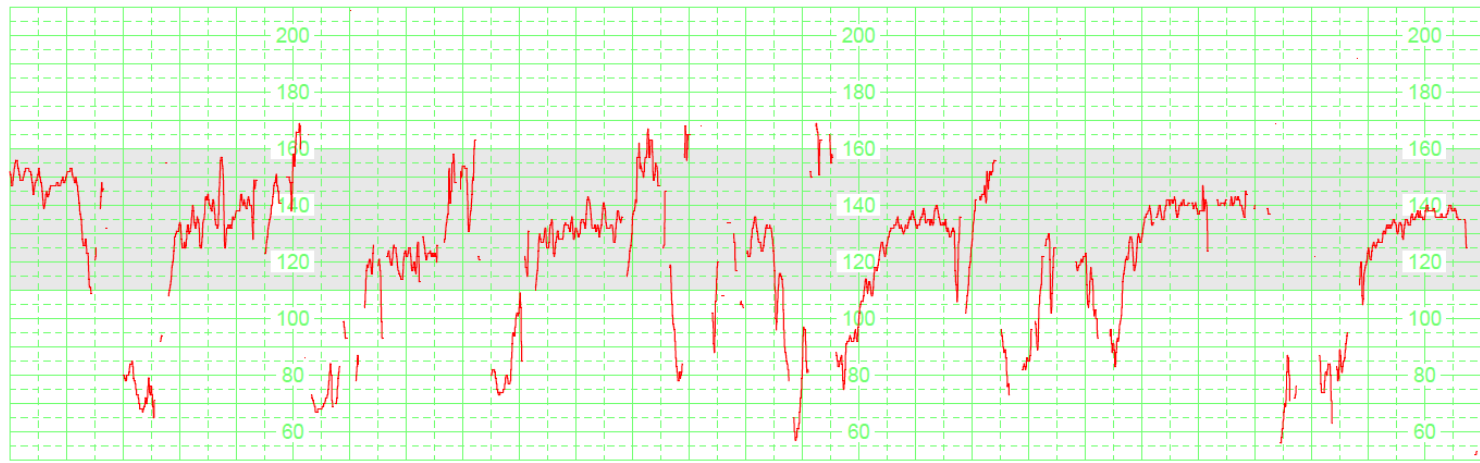
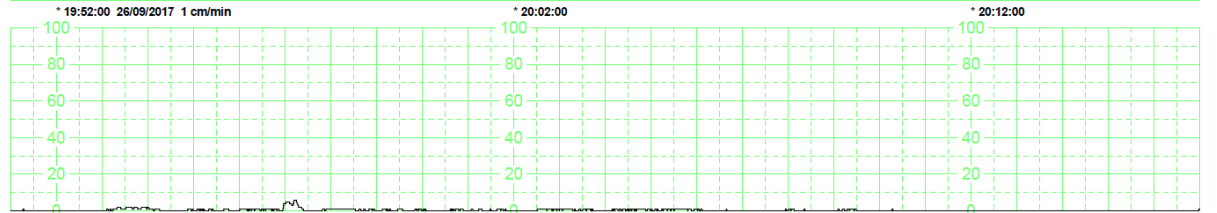
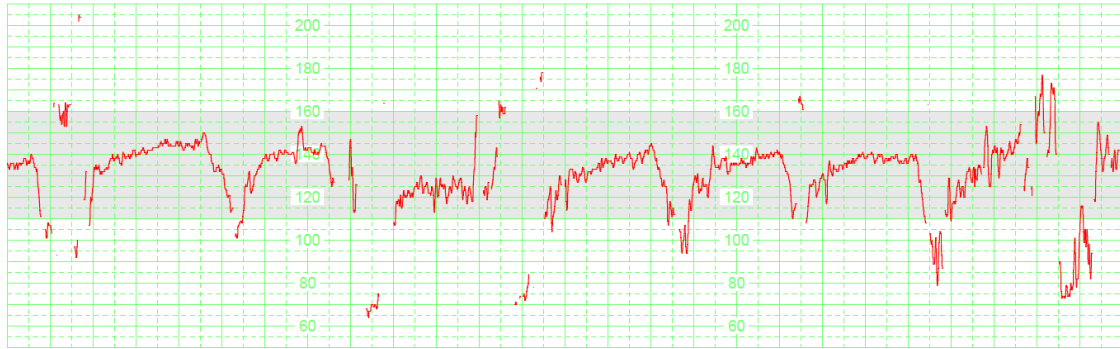


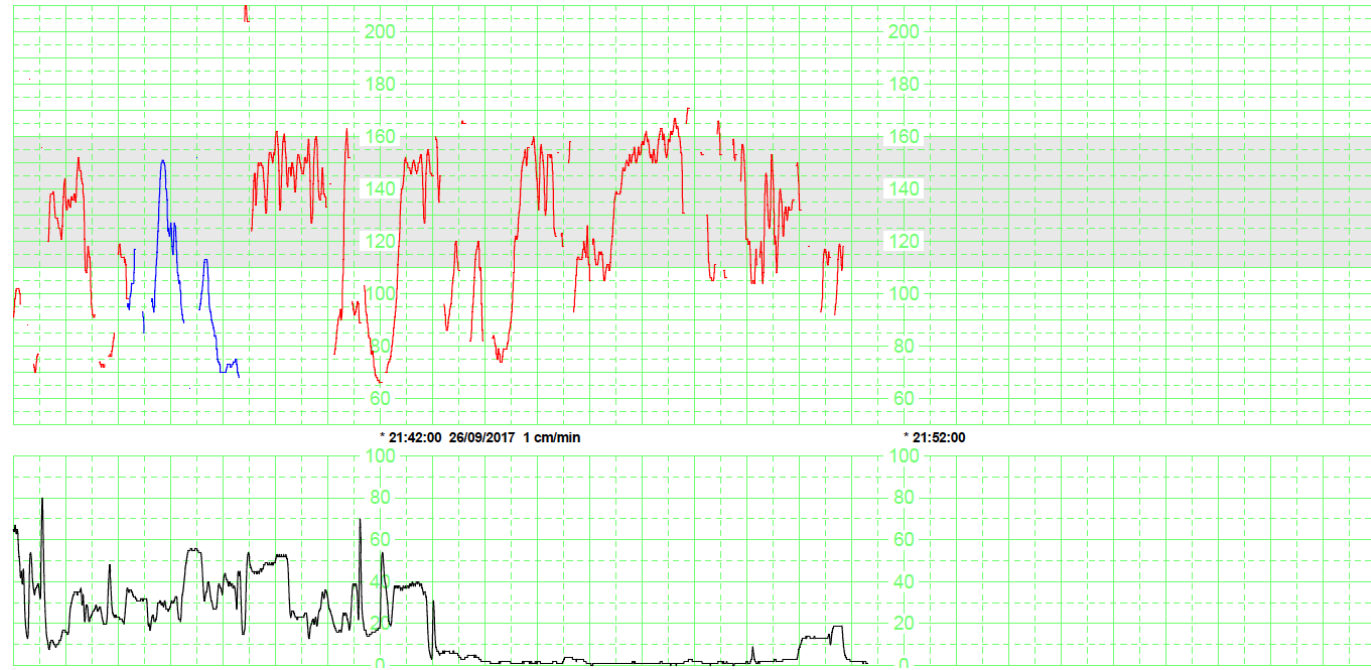
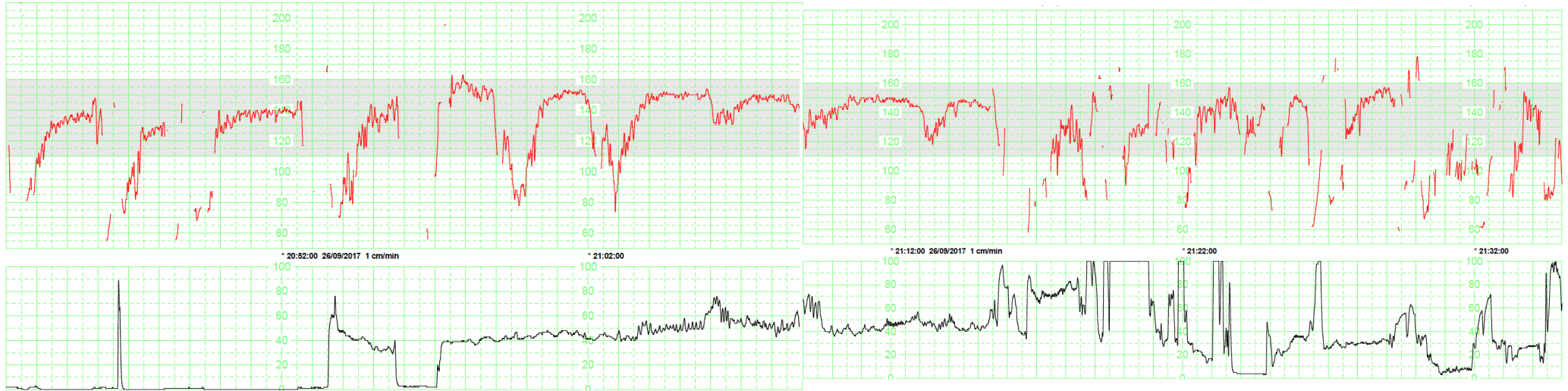
* 19:02:00 26/09/2017 1 cm/min

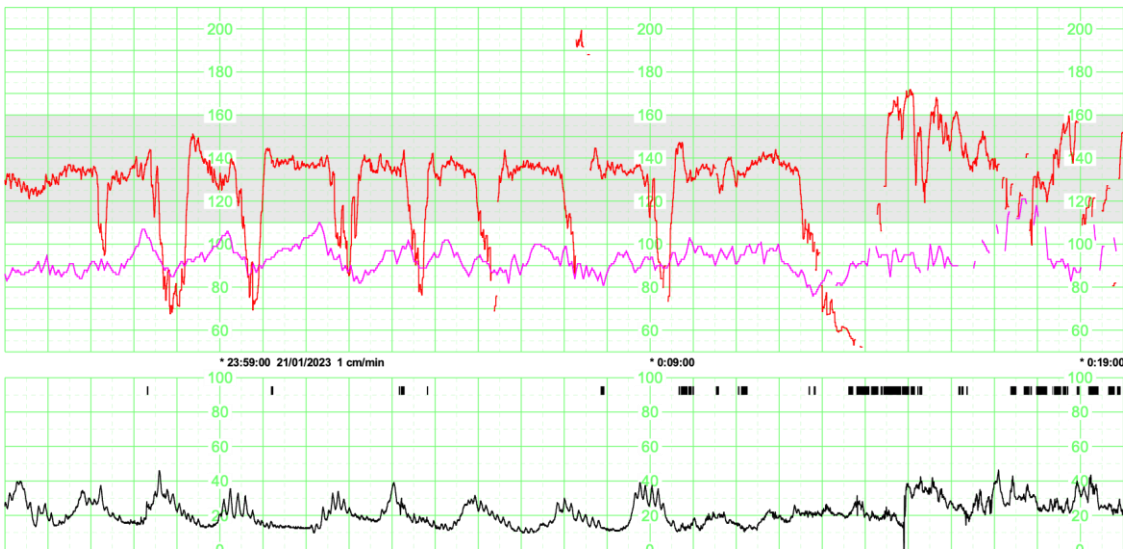
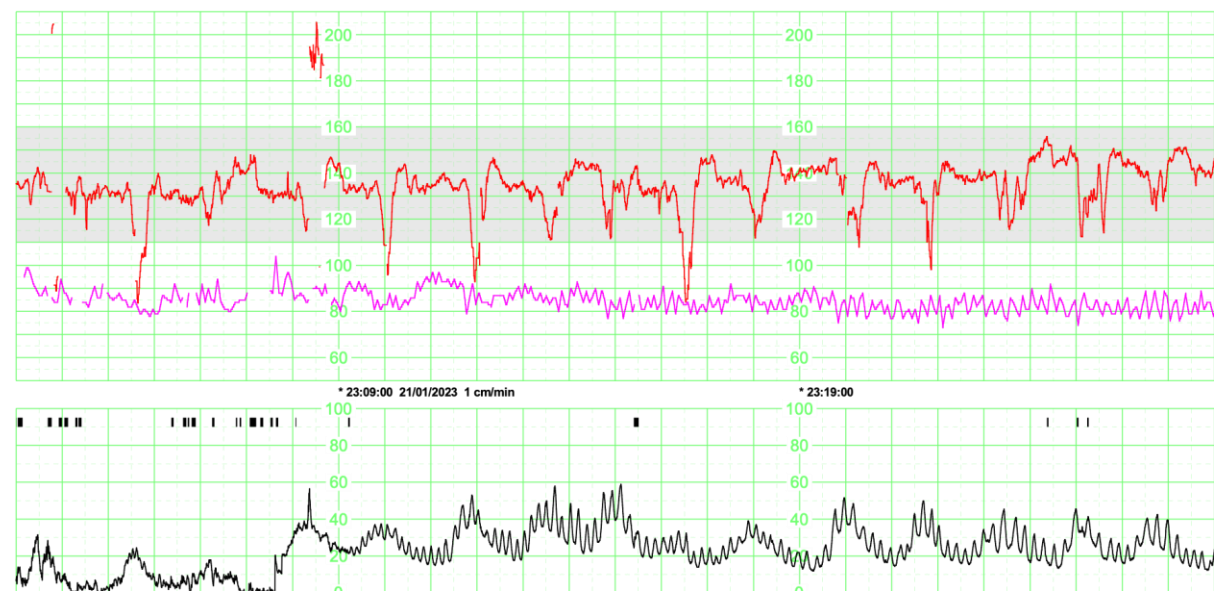
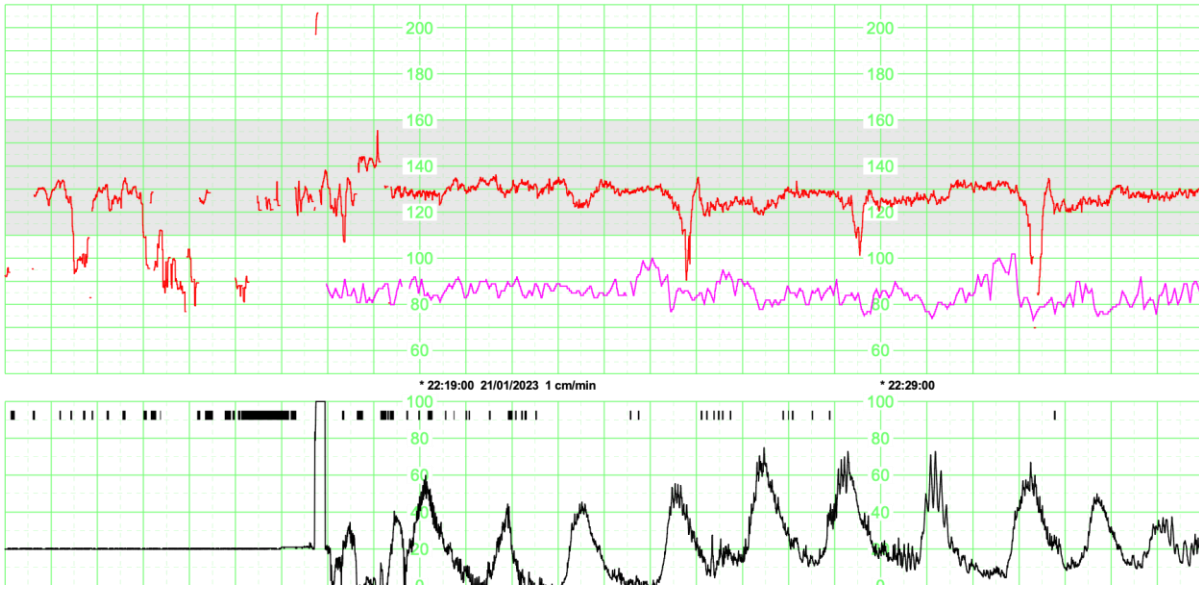
* 19:12:00

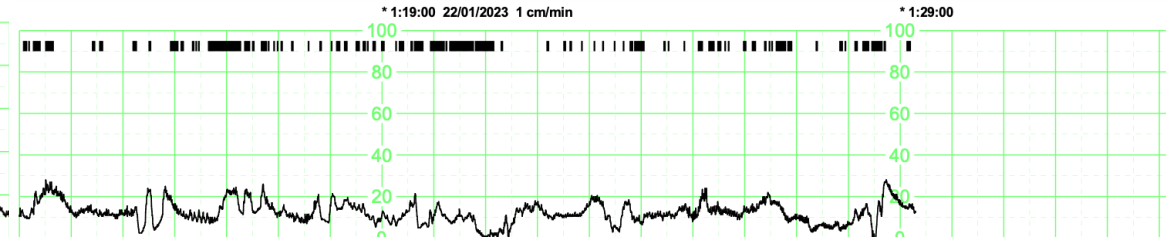
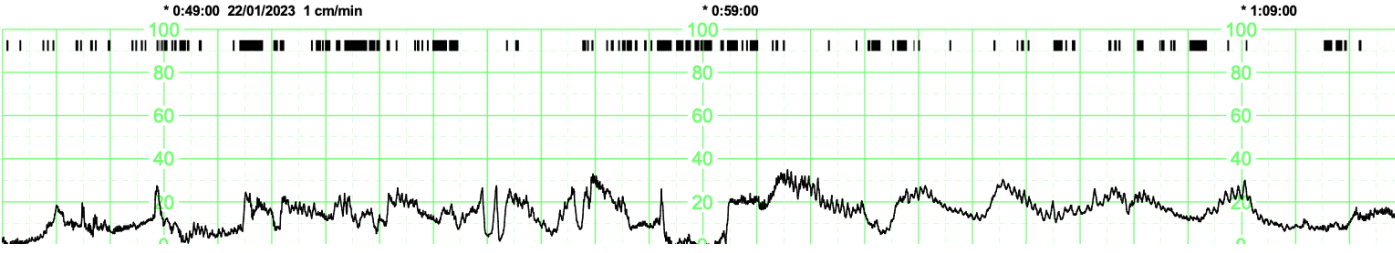
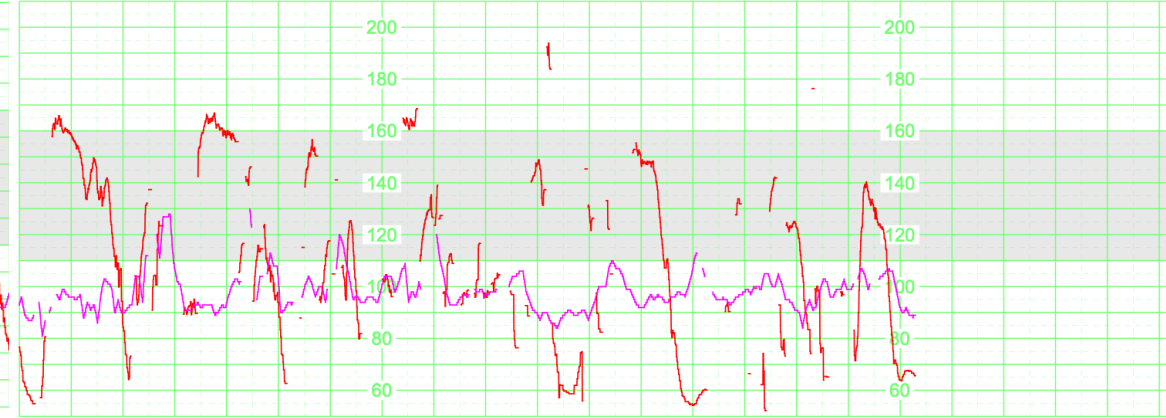
* 19:22:00











Diferències amb el RCTG anterior?

