A strange case of “cooling”

Stefanie Celen – UCL Saint-Luc

GBN/BVN Autumn Meeting

Thursday 10 November 2022

The BIRTH

Prenatal history

Polyhydramnios at last US

Maternal serologies negative; Rubeo, Toxo, CMV immunized

Peripheral hospital - Urgent ceasarean section due to decreased fetal movements/ fetal decelerations

Male newborn 37+6 weeks

2810 kg (p24), 34 cm HC (P54), 48 cm (P24)

Apgar 1 / 4 / 9

Apnoeic, bradycardic (Heart rate <100), hypotonic, no spontaneous movements

Neopuff (IPPV) 6 minutes

0 - 6 hours OF LIFE

Examination at 1 hour of life

Hypotonic infant

Thompsons Score 7

Sarnat Score 2

H1: pH 7,1 PC02 43 lactate 18 mmol/l BE -15.5

H3: PH 7,25 PC02 45 lactate 15 mmol/l BE -11.8

Comments?

What would you do next?

Saint Luc NICU protocol

Neuro NICU

Hypothermie thérapeutique

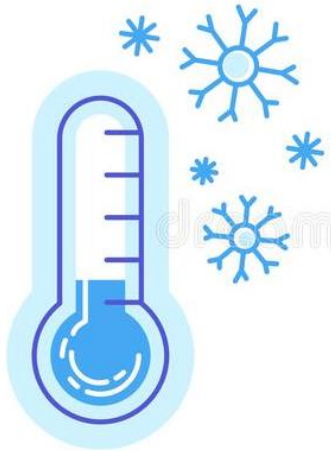
Critères d'admissibilité pour hypothermie:

Doit avoir les trois critères

I	Nouveau nés ≥ **35 semaines de gestation et < 6 heures de naissance**
II	Au moins un des critères suivants: **A. Apgar scores** • **< 5 à 10 minutes** **B. Réanimation prolongée à la naissance** Ex compressions thoraciques ou intubation ou ventilation avec masque > 10 minutes **C. Acidose importante** • **pH < 7.00** sang du cordon ou sang du patient dans les 60 minutes de la naissance **D. Base Excess** • **< -12 mmol/L** sur le sang du cordon ou dans les 60 minutes de la naissance.
III	**Encéphalopathie modérée ou sévère** (un ou plus critères dans les **6 heures** de la naissance) A. Léthargie B. Stupor ou coma C. Tonus anormal (hypotonie ou hypertonie) D. Réflexes pathologiques (DTR, gag, grasp) E. Succion absente ou faible F. Convulsions G. Etat d'hyper alerte progression d'encéphalopathie) H. aEEG de base pathologique et/ou convulsions.

7) **Laboratoire**
   - **Blood gas**
     - Faire les pH en faisant attention à corriger la température
     - Controller toutes les 6h pour les premieres 24 heures, ensuite chaque 12 heures
     - Eviter hypocapnie (goal **P_{CO_2}**: 45-55mmHg).
     - Eviter hyperoxie (goal >92-97% et paO2<100mmHg).
   - **Electrolytes**– fluctuations possibles pendant le cooling et le réchauffement.
     - Attention à la valeur du ***calcium***. Peut diminuer pendant le cooling
     - Attention à la valeur du ***magnesium***. Peut diminuer pendant le cooling
     - Attention à la ***glycémie***.
       - **Maintenir les valeurs ≥60 mg/dL**
     - Controller régulièrement le lactate, la créatinine, AST et ALT, ammoniaque
   - **COFO**
     - Attention à la thrombocytopénie
       - ✓
   - **Coagulation**
     - ***PT/PTT/INR***
     - ***D-dimers/Fibrinogen/Fibrin split products***

UCLouvain



Cooling started

Transferred to St-Luc for Therapeutic hypothermia

Cooling started at 4 hours of life

Continous full video EEG

Transfused with Plasma

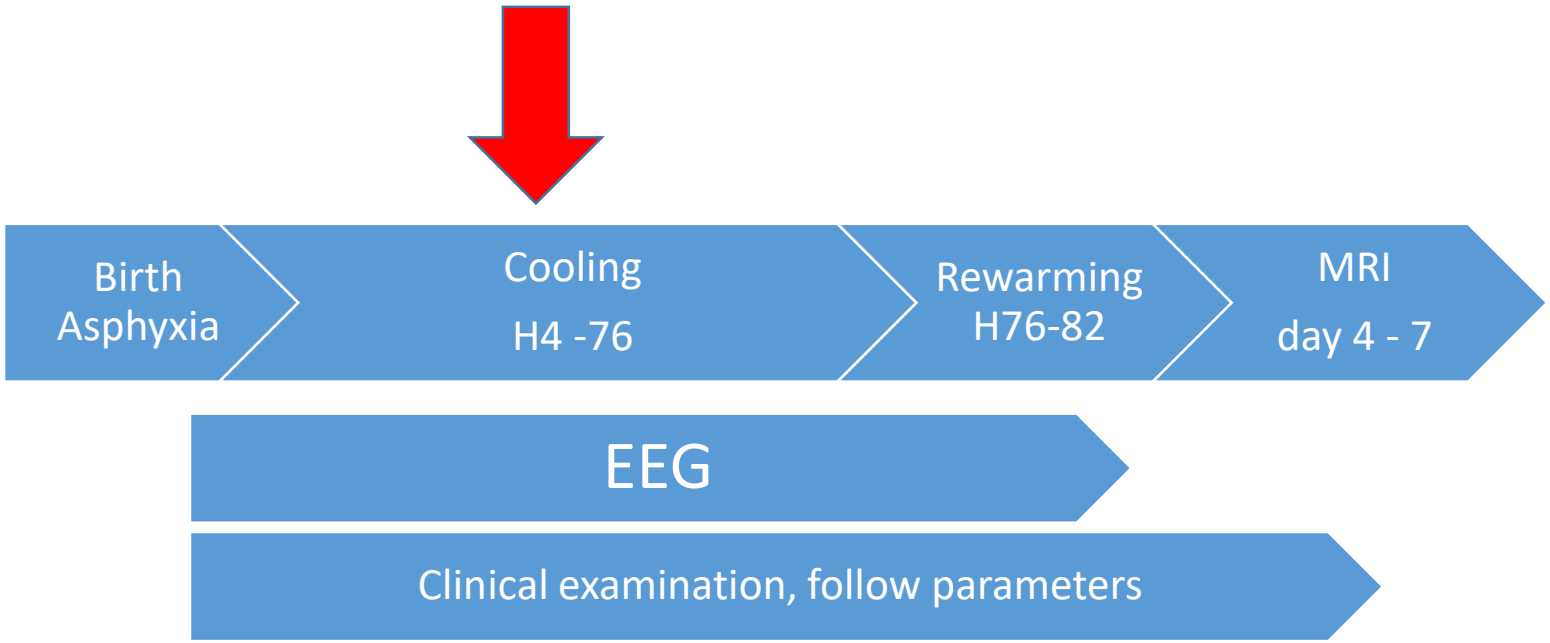
Konakion

Persistent hypotonia

Blood work at admission

Test	Result
Hemoglobine	19,4 g/dl
Platelet count	64 000/µl
WBC	4700/ µl
INR	2,65
APTT	67,4
PT	30,6
CRP	1,5 mg/dl

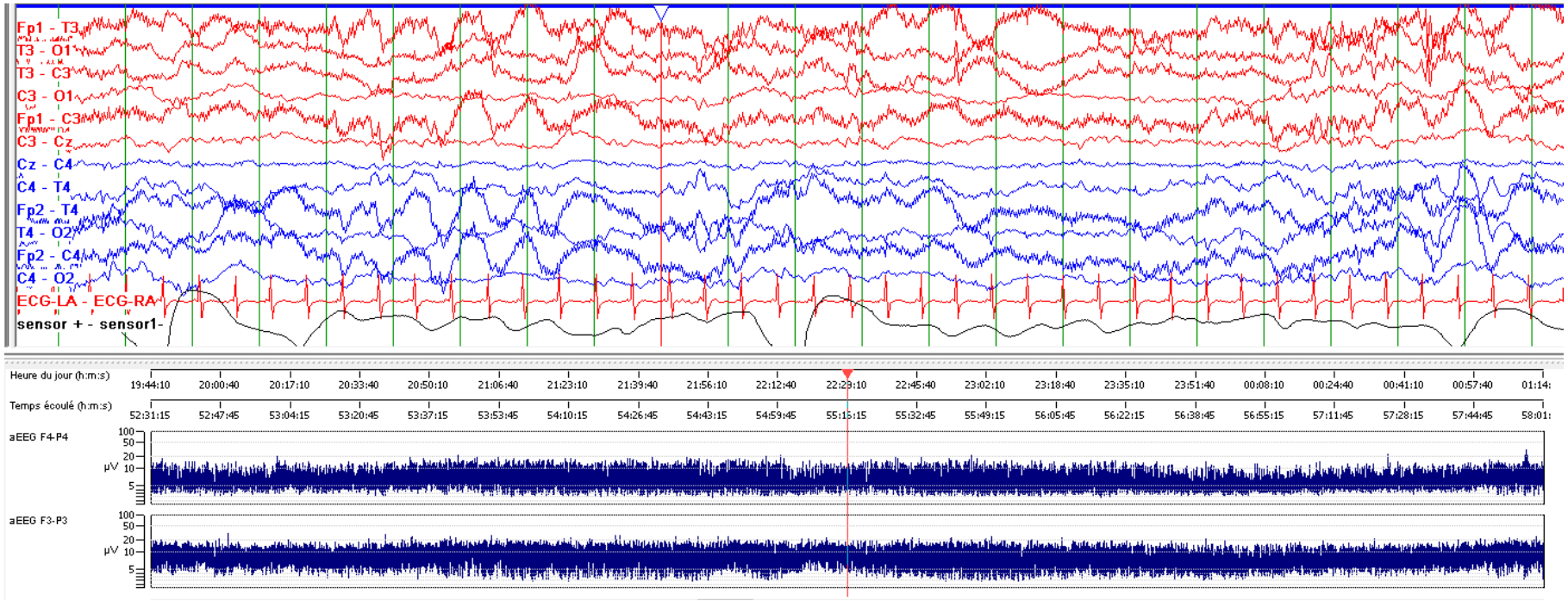
Cooling time line



Bloods planned every 24h as per protocol

Cooling continues

Normal EEG , good sleep wake cycle



Birth Asphyxia → Cooling H4 -76 → Rewarming H76-82 → MRI day 4 - 7

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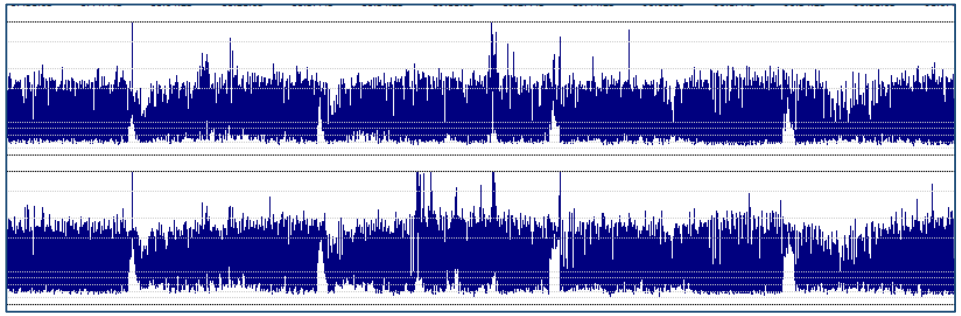
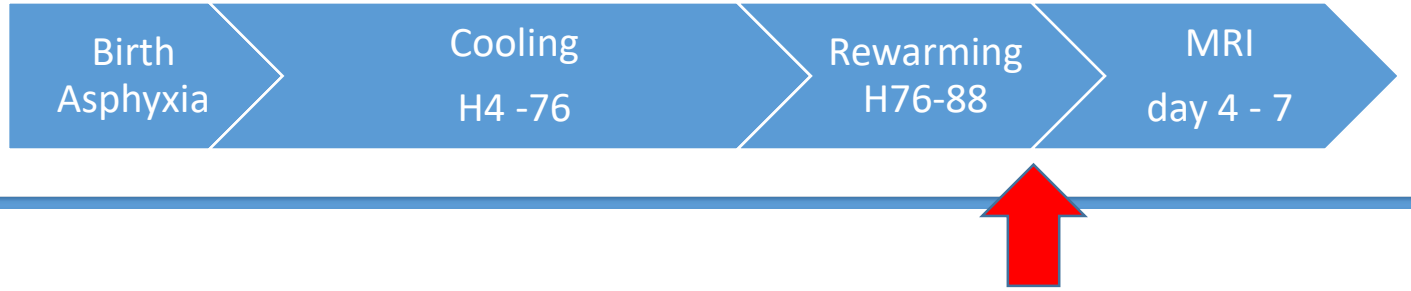
Re-warming

At 80 hours suddenly aEEG pattern modifies….



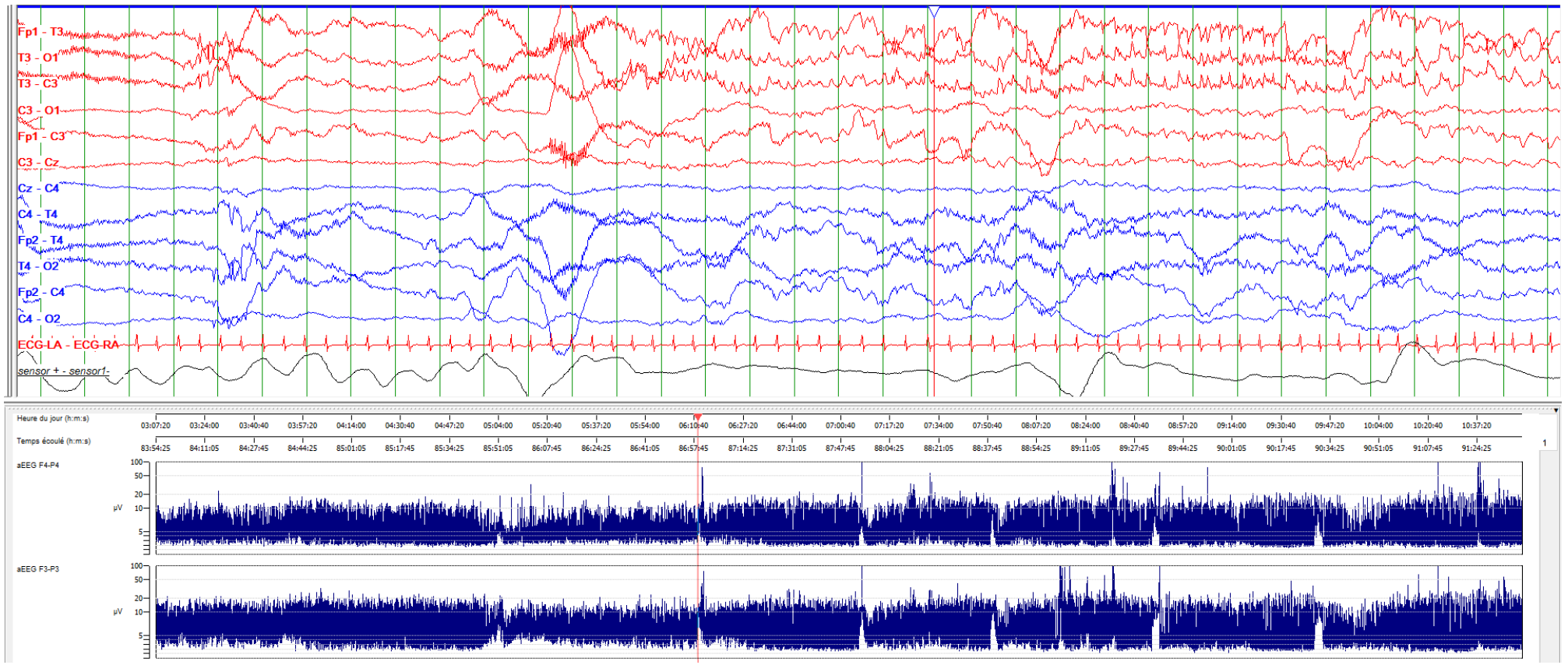
Clinical examination: Persistent hypotonia, new onset frequent desaturations, no clinical seizures



Re-warming

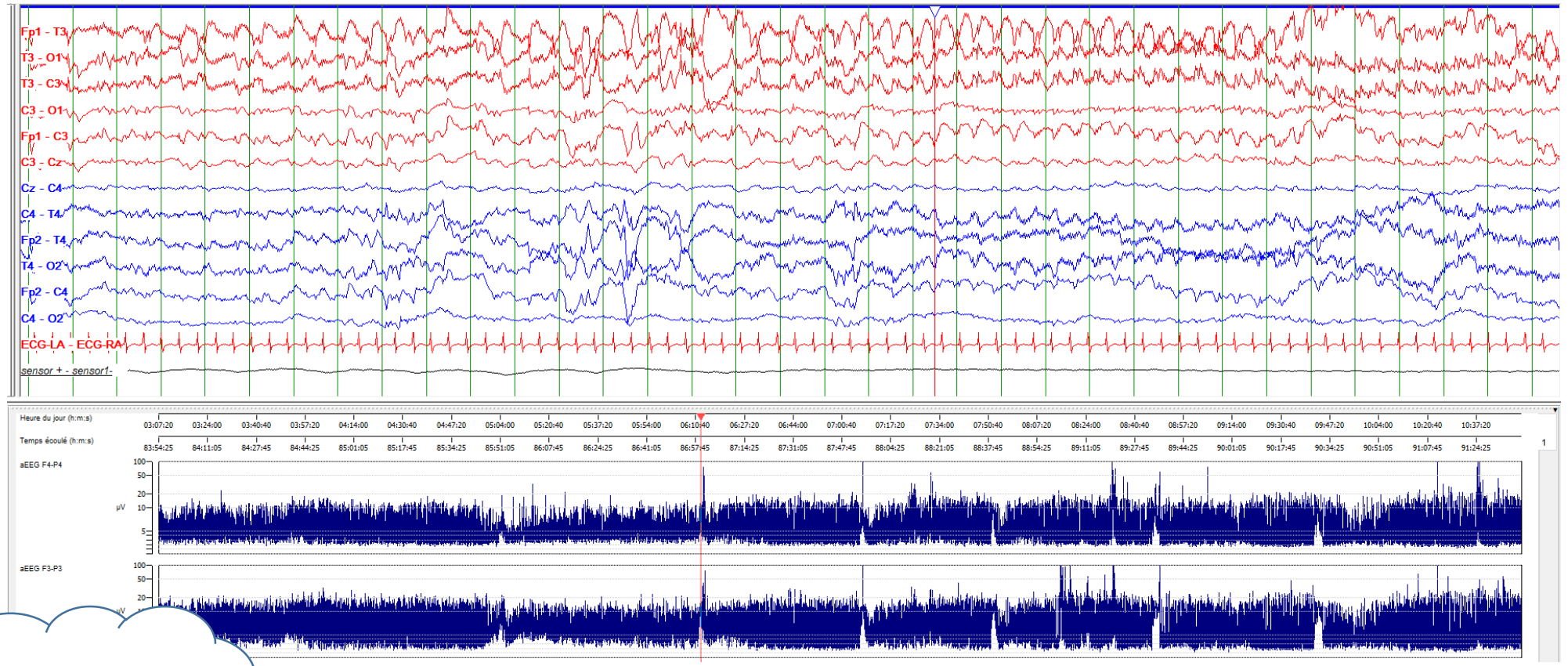
Dr. E. Carapancea

EEG



Re-warming

Apnea and desaturations



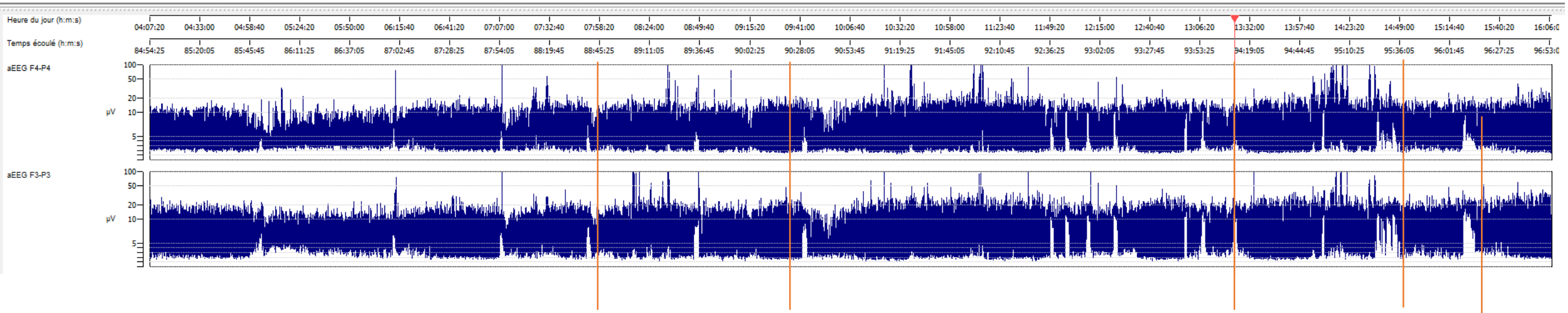
What is happening?

Question for the audience

When is the most common time for an asphyxiated neonate to convulse?

1. First 12 hours
2. First 24 hours
3. 24- 72 hours
4. During re-warming
5. After the first week of life

Treatment



PB IV
20 mg/kg

PHT IV
20 mg/kg

PHT IV
10 mg/kg

MDZ cont IV
0.05 mg/kg/h
+
Intubation

MDZ cont IV
0.1 mg/kg/h

Seizure-free

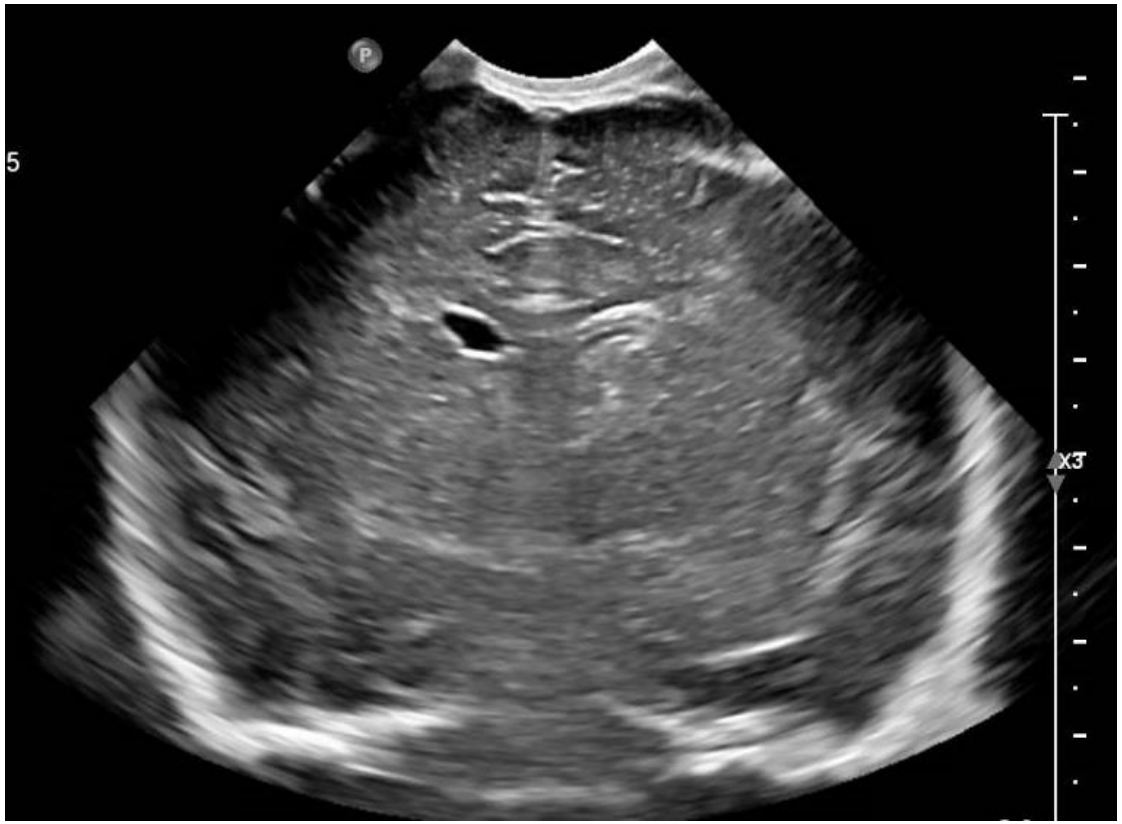
“Rather strange case of cooling”

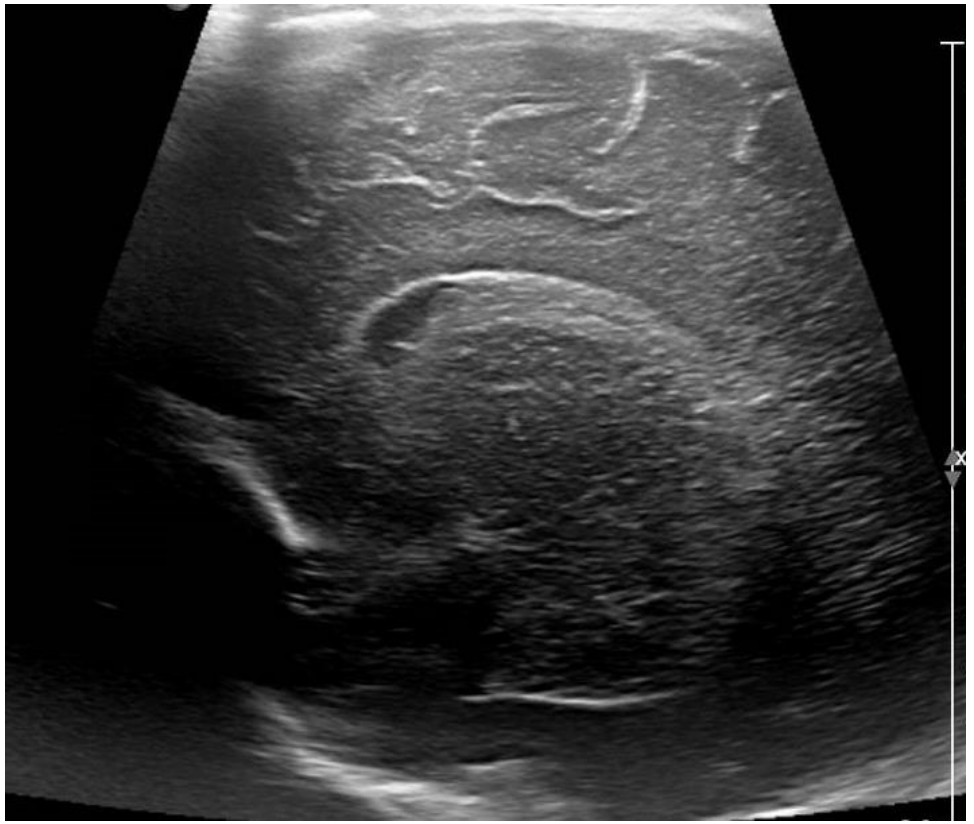
Reviewing the bloodwork

	at admission	at 24h	at 48h	at 72h	at 82h	at 96h	at 6 days
Test	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Hemoglobine	19,4 g/dl	21,7 g/dl	20 g/dl	20,4 g/dl	18 g/dl	16,9g/dl	16,5 g/dl
Platelet count	64 000/µl	54 000/µl	44 000/µl	24 000/µl	39 000/µl	12000/µl	105 000/µl
WBC	15,940/µl	4700/µl	3800/µl	3400/µl	3640/µl	4100/µl	5600/µl
INR	2,65	1,73	1,9	1,5	1,36	1,3	-
CRP	1,5 mg/dl			9,7 mg/L	8,7 mg/L		13,5 mg/L

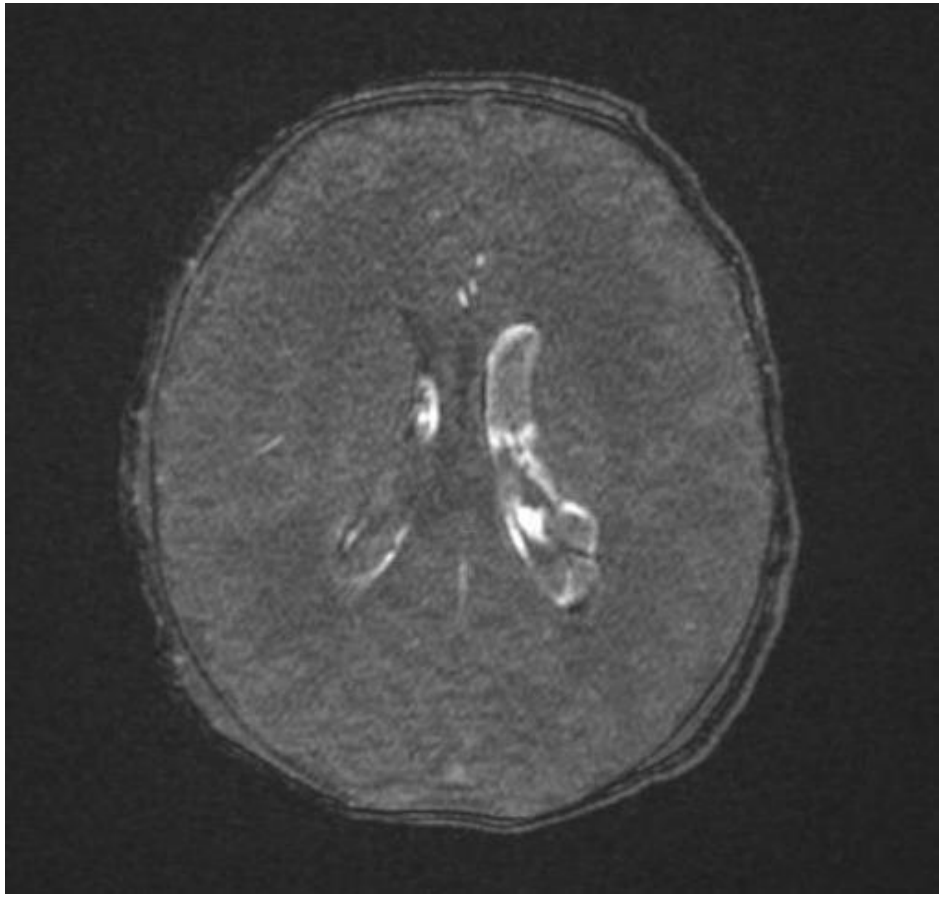
Seizures

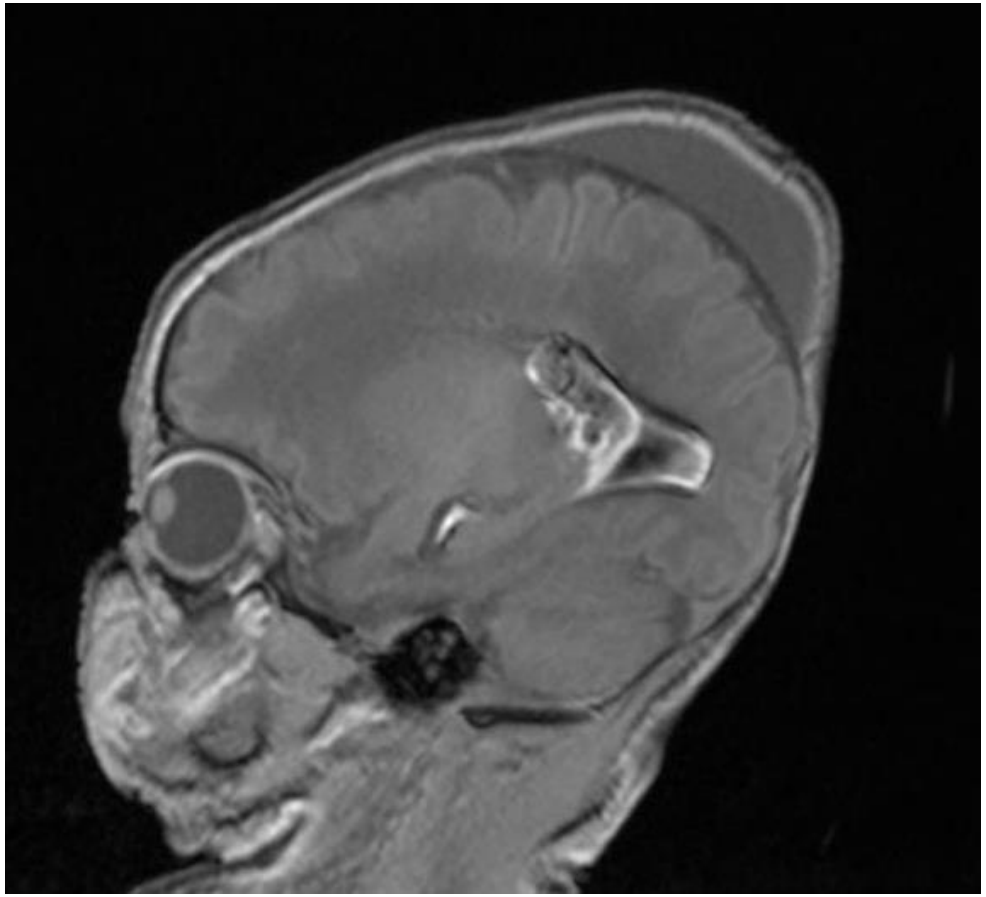
Reviewing the images..





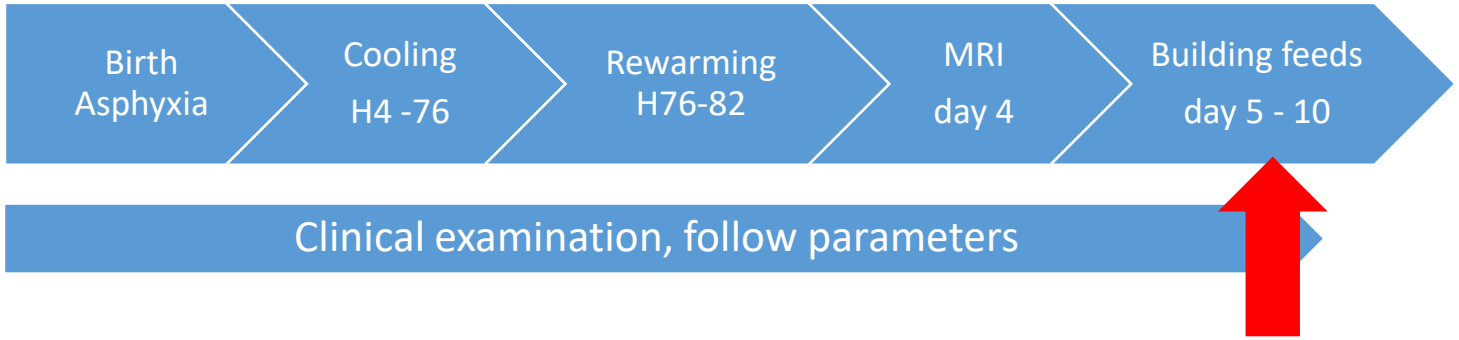
Reviewing the images..





Birth Asphyxia → Cooling H4 -76 → Rewarming H76-88 → MRI day 4 - 7

Time flies .....



Day 6 of life

Infant unwell

Persistent tachycardia 170/min – Fever 38°C

Septic looking infant

Pale/Gray, cold extremities, capillary refill time 4 sec

BP 65/30 (45) mmHg

Antibiotics started: cefotaxime and vancomycin

- Bloodwork and hemoculture
- LP: negative cell count
- Urine: negative sediment

Test	Result
Hb	15,9
PLT	88000/µl
WBC	9000/µl
CRP	14,3 mg/dl
Lactate	3

Cardiac ultrasound

Ejection fraction 55%
Myocarditis with left coronary dilatation
Biventricular dysfunction
Cardiac decompensation

Test	Result
Troponine	154 ng/L
CK-MB	45,96 µg/L
NT Pro BNP	139 811 pg/ml

⟶ Dobutamine started

When things do not make sense…
go back to the drawing room

Abnormal

neurological exam

Bicytopenia

Persistent coagulopathy

Plasma transfusions: day 0,1,2,3

Seizures on day 3

Normal EEG

Cardiogenic Shock with myocarditis
need for dobutamine support

Suggestions ?

Viral differential workup for myocarditis

Day 9 of life

Lumbar puncture → CMV positive

- Hemoculture
- Urine CMV culture
- Nasal aspirate

} CMV positive

Guthrie (performed on day 3) analysed → CMV positive

Follow up

Infant was started on intravenous Ganciclovir for 14 days

↳ changed to Valganciclovir orally

No chorioretinitis at opthalmology screen

Normal hearing screen

Slow improvement

Discharged on oral valganciclovir

6 months treatment completed → doing well on follow up

Take home messages

Think out of the box

Common things occur commonly but…

if things do not ‘fit’ go back to the start and follow the clues!

CMV remains common

CMV immune mothers can re-seroconvert (2%)!

Perinatal infection may result in a severe burden of disease (10%)

The Neuro NICU team