Que retenir de 2022?

Le traumatisme crânien grave

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EA 7426 - Pathophysiology of Injury-Induced Immunosuppression - U. Lyon 1

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Aucun conflit d’intérêt

Traumatic brain injury: progress and challenges in prevention, clinical care, and research

Lancet Neurol 2022; 21: 1004–60

- Dose HTIC

NARRATIVE REVIEW

Management of moderate to severe traumatic brain injury: an update for the intensivist

Intensive Care Med (2022) 48:649–666

- Autorégulation / CPPopt
- Réanimation Générale

REVIEW

Intracranial pressure: current perspectives on physiology and monitoring

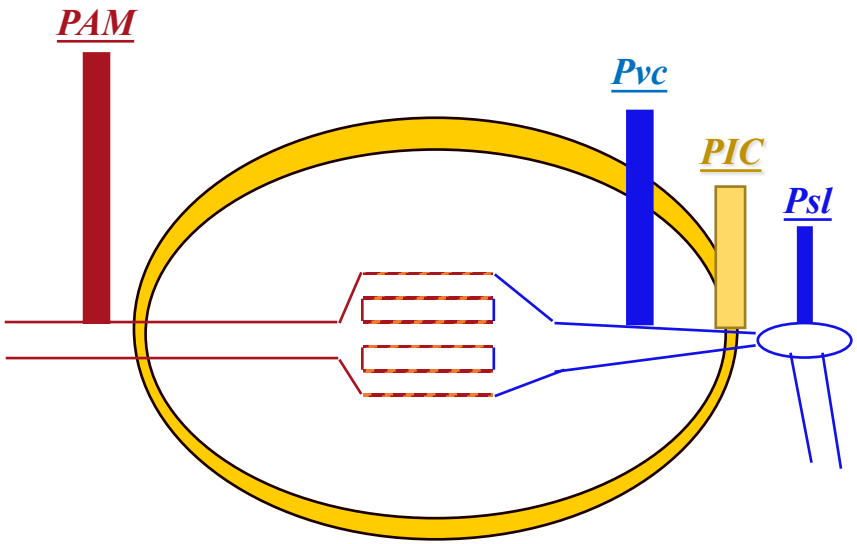
Intensive Care Med (2022) 48:1471–1481

- Fragilité (frailty)
- Perspectives

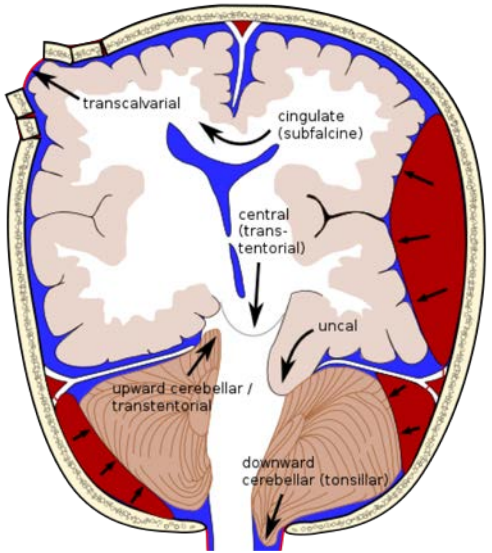
Travaux relatifs à la cohort CENTER-TBI

Collaborative European NeuroTrauma Effectiveness Research 2014-2018

HTIC



PAM > Pvc > PIC > Psl



Par RupertMillard — Brain herniation types.svg de Delldot, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=7825361

Monitorage PIC

***Panel* 3: Diagnosis of suspected intracranial hypertension**

Intracranial hypertension is suspected and treatment is recommended in the presence of one of the following major or two of the following minor criteria:

Major criteria

- Compressed cisterns (CT classification of Marshall diffuse injury III; see appendix p 12)
- Midline shift greater than 5 mm (Marshall diffuse injury IV)
- Non-evacuated mass lesion

Minor criteria

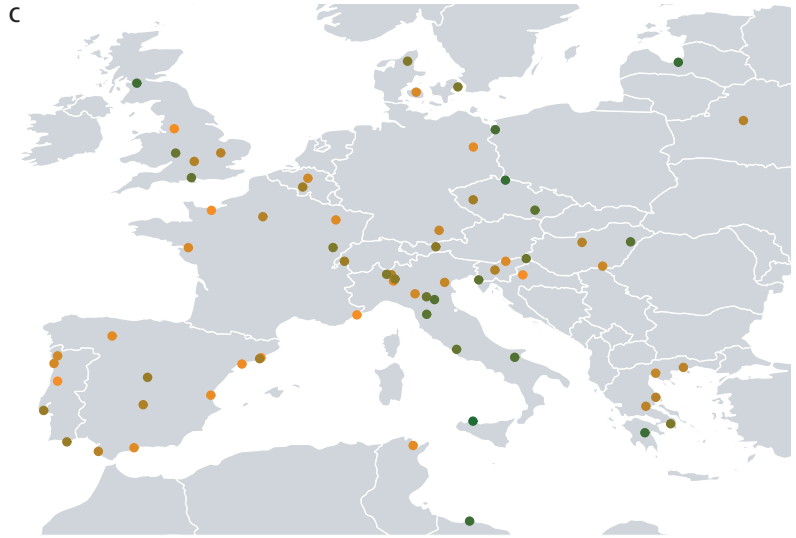
- Glasgow Coma sum motor score of 4 or less
- Pupillary asymmetry
- Abnormal pupillary reactivity
- CT classification of Marshall diffuse injury II (ie, basal cisterns are present with midline shift 0–5 mm or a high-density or mixed-density lesion of 25 cm^3 or less, or both)

Détection aggravation

Monitorage au cours des chirurgies non crâniennes

Evaluation des thérapeutiques

Etude SYNAPSE: monitorage PIC et intensité thérapeutique - Robba et al. Lancet Neurol 2021

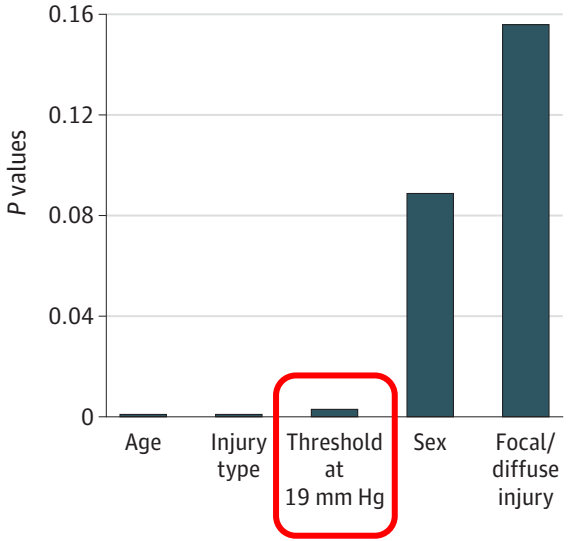


	6 month mortality*		Unfavourable outcome at 6 months (GOSE <5)†	
	Deaths (n)	Hazard ratio (95% CI)	Events (n)	Odds ratio (95% CI)
Patients with TBI				
Pupils both reactive	192	1·27 (0·87–1·85)	311	1·67 (1·27–2·20)
At least one unreactive pupil	184	0·31 (0·20–0·47)	249	0·53 (0·30–0·93)

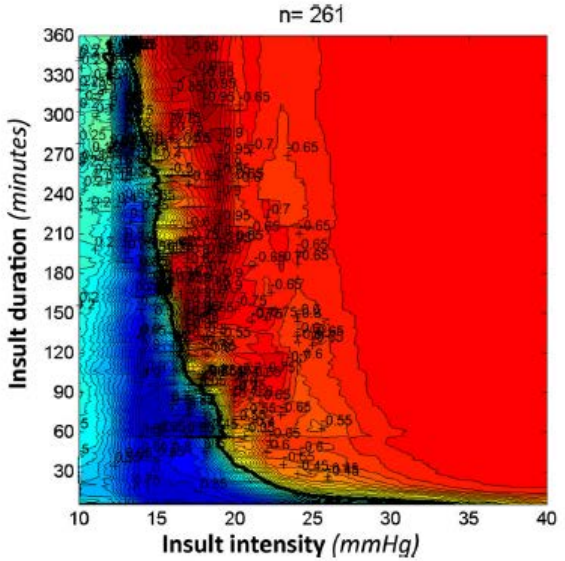
Increment in TIL of 1 point associated with a reduction in mortality (HR 0·94, 95% CI 0·91–0·98; p=0·0011)

Objectifs de PIC/dose d'HTIC

Dose HTIC / GOS 6 mois
Adultes: > 20 mmHg, > 37 min
Enfants : > 20 mmHg, > 8 min



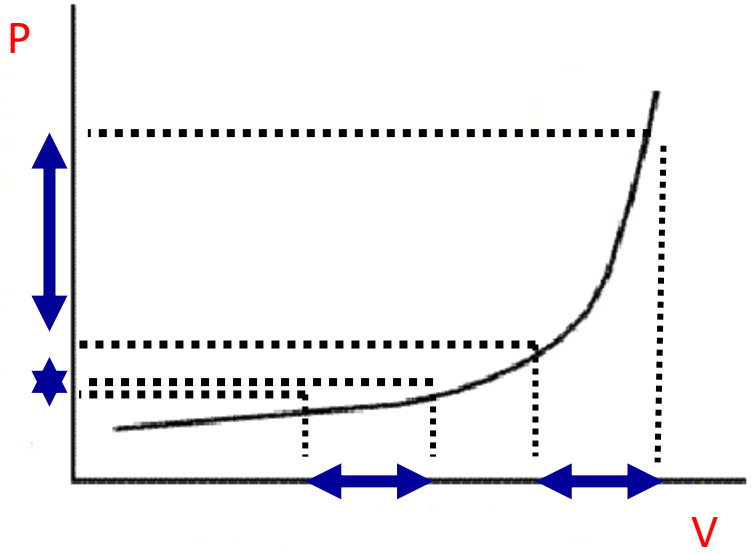
Hawryluk et al. JAMA Neurol 2020

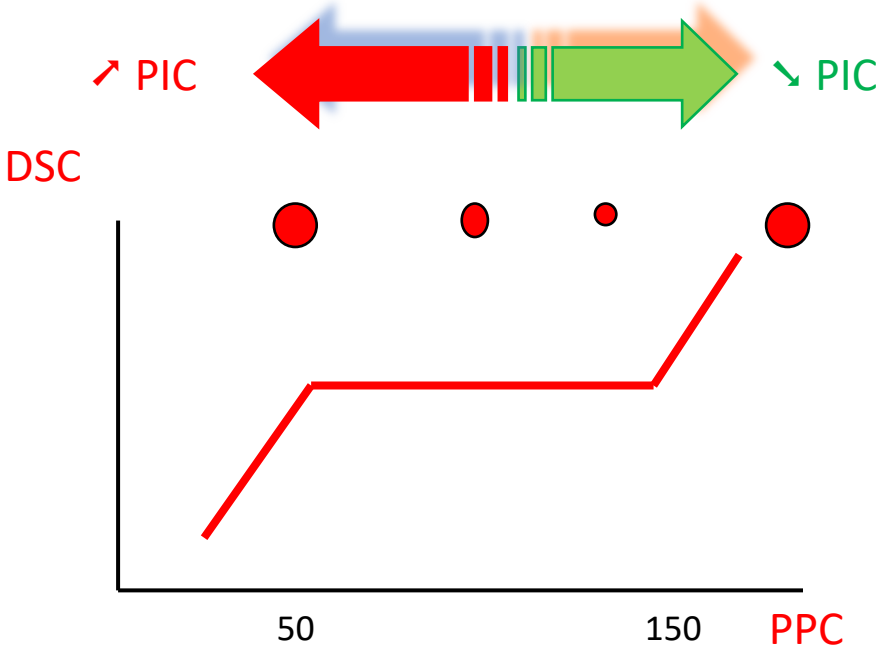


Development and External Validation of a Machine Learning Model for the Early Prediction of Doses of Harmful Intracranial Pressure in Patients with Severe Traumatic Brain Injury

Carra et al. J Neurotrauma 2022

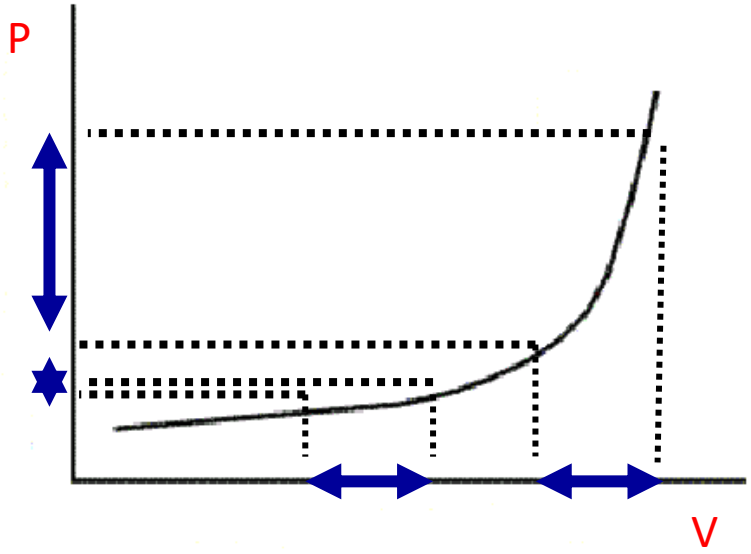
Optimisation de la Perfusion cérébrale-autorégulation

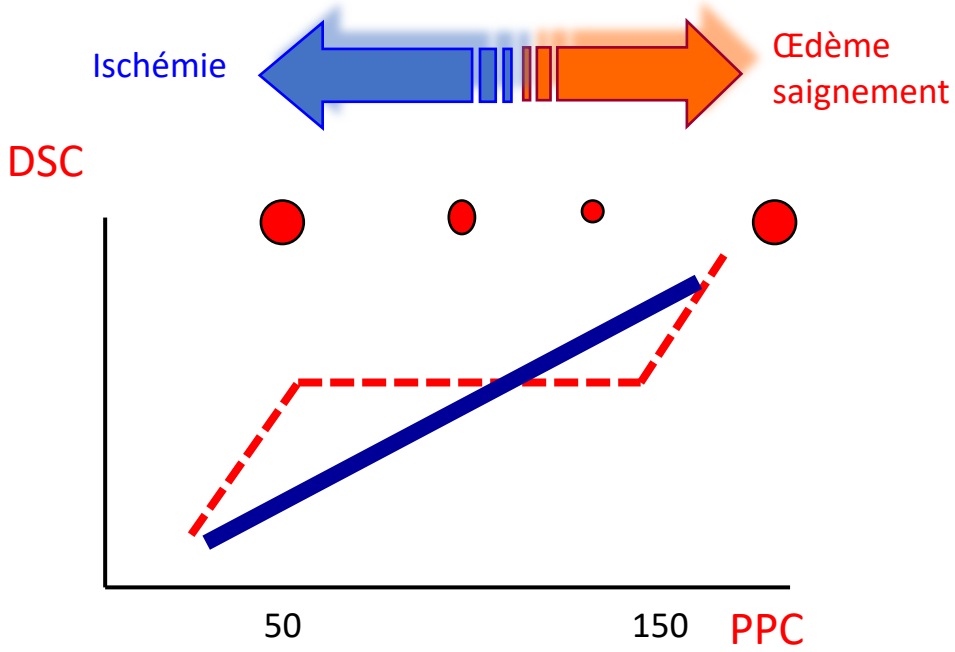




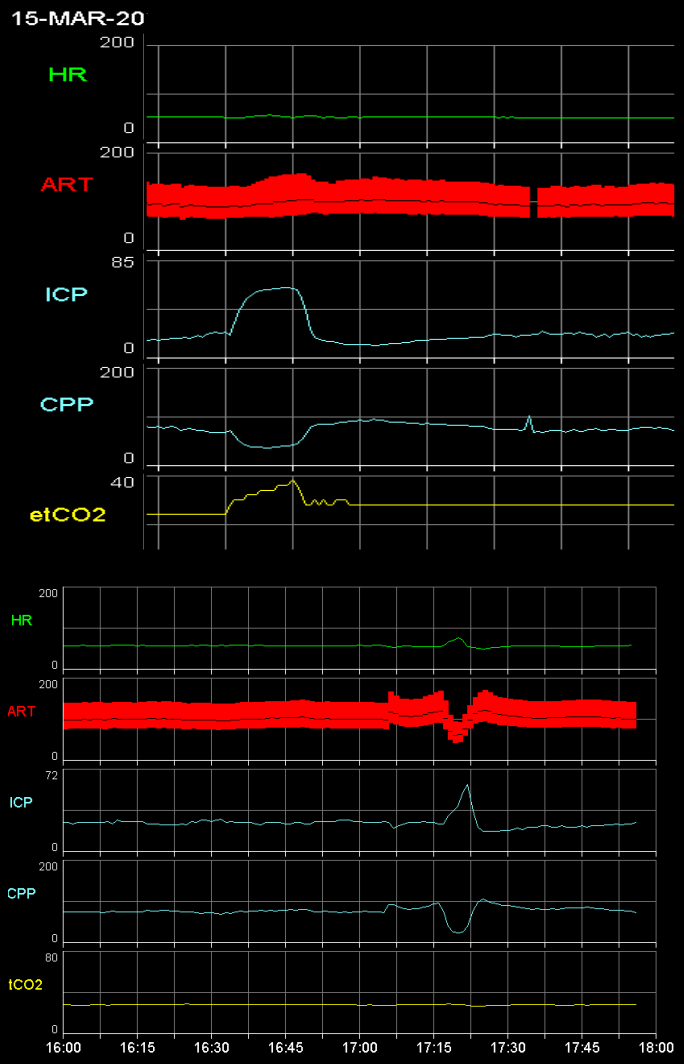
$Vol_{parench.} + Vol_{LCR} + Vol_{sang} = C$

Optimisation de la Perfusion cérébrale – alteration de l'autorégulation





$Vol_{parench.} + Vol_{LCR} + Vol_{sang} = C$


15-MAR-20
HR
200
0
ART
200
0
ICP
85
0
CPP
200
0
etCO2
40
HR
200
0
ART
200
0
ICP
72
0
CPP
200
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tCO2
80
0
16:00
16:15
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17:00
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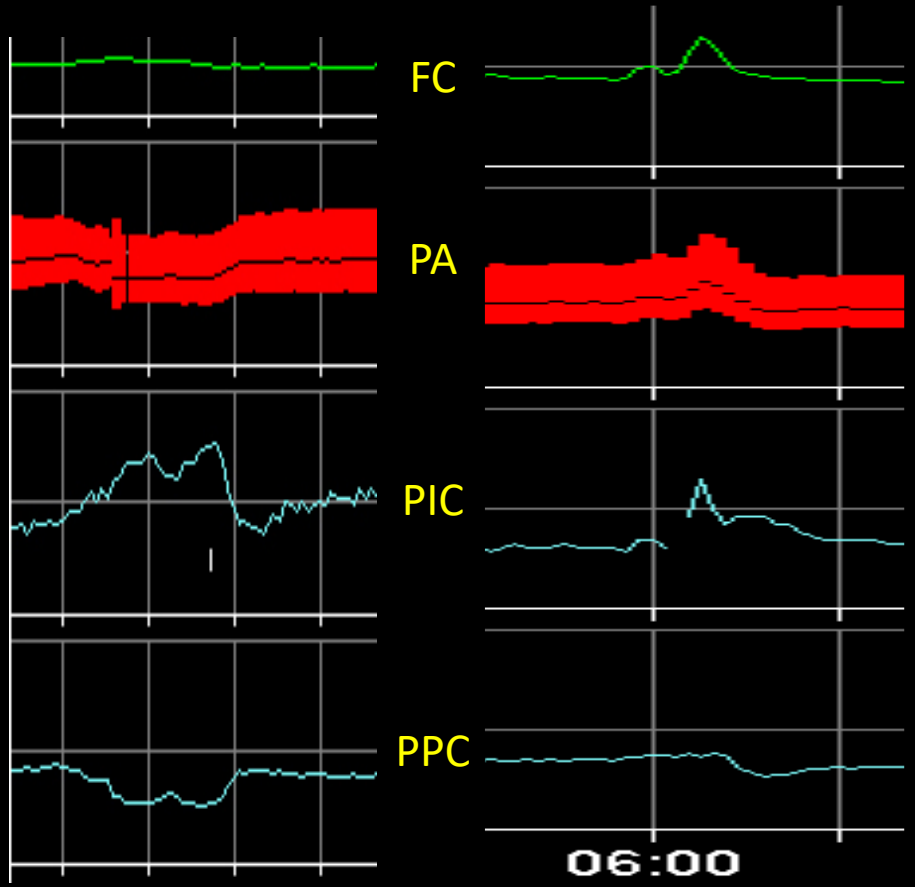
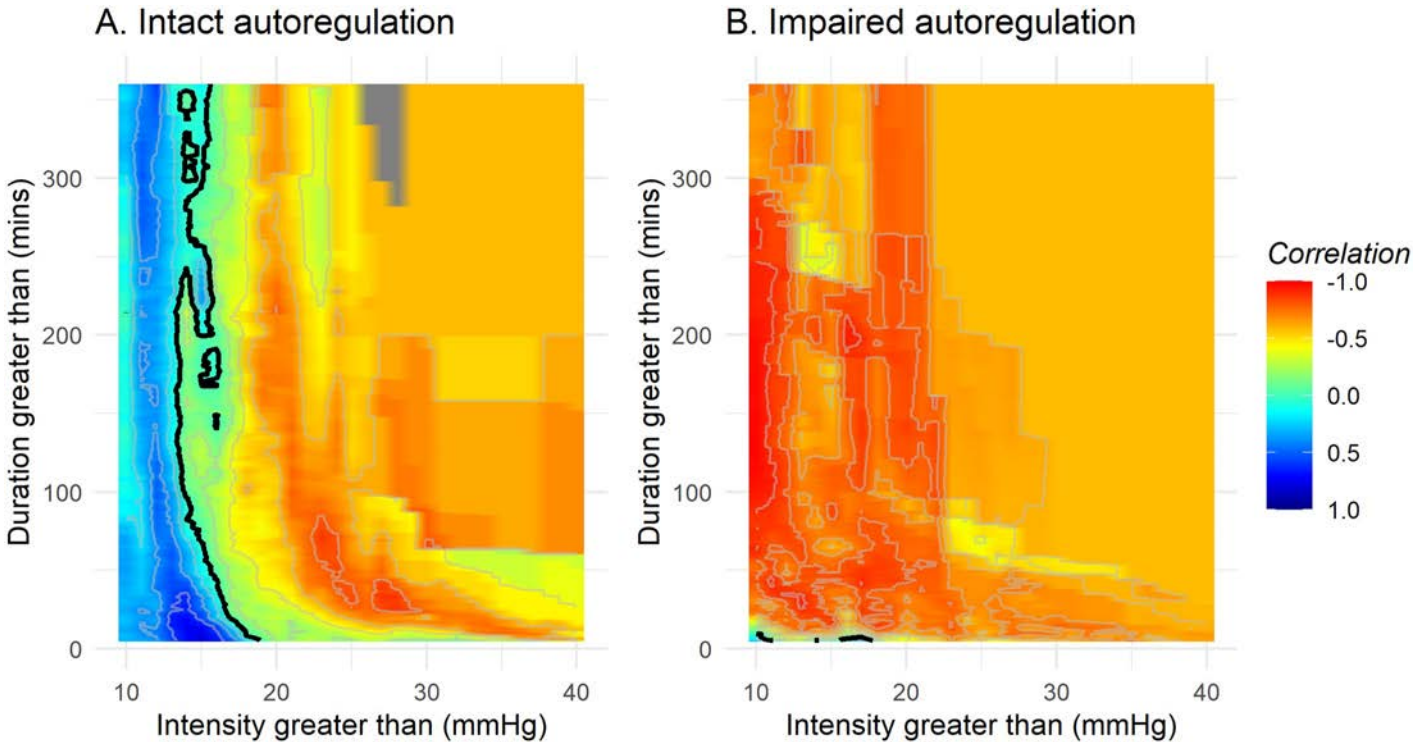
18:00

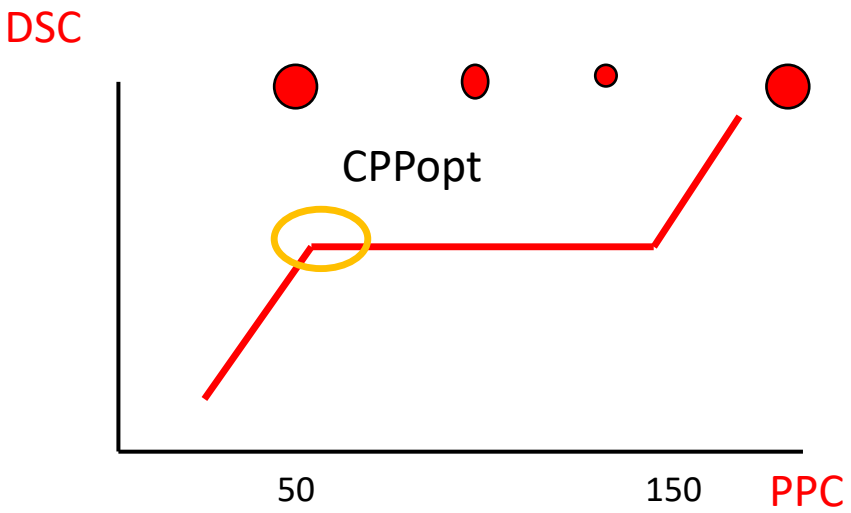

FC
PA
PIC
PPC
06:00

Impact of duration and magnitude of raised intracranial pressure on outcome after severe traumatic brain injury: A CENTER-TBI high-resolution group study

Åkerlund et al, PlosOne 2020



Optimisation de la Perfusion cérébrale- CPPopt



ORIGINAL WORK

Cerebrovascular Autoregulation Monitoring in the Management of Adult Severe Traumatic Brain Injury: A Delphi Consensus of Clinicians

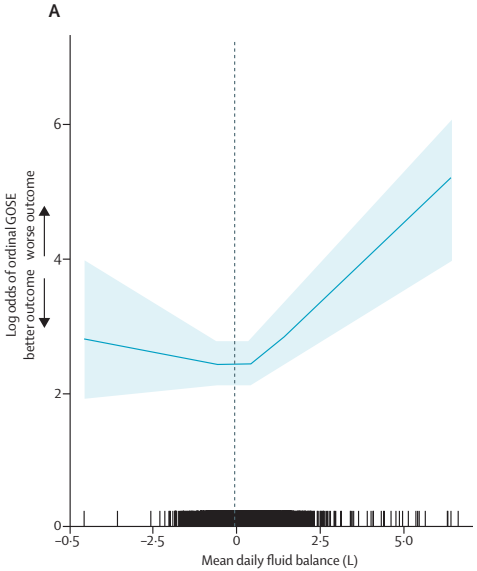
No consensus

Table 2 Statements of no consensus

No (section)	Statement of no consensus	Score expressing agreement with making a statement of no consensus (round 3)
1 (3)	There is no consensus on the manner how information on CA status should be used in clinical practice	100%
2 (4)	There is no consensus regarding sufficient accuracy of any CA assessment method that can be used in clinical practice	87.5%
3 (4)	There is no consensus regarding sufficient reproducibility of any CA assessment method used in clinical practice	87.5%
4 (4)	There is no consensus regarding sufficient validity of any CA assessment method used in clinical practice	87.5%
5 (4)	There is no consensus on the safety of implementing CA status in clinical practice	87.5%

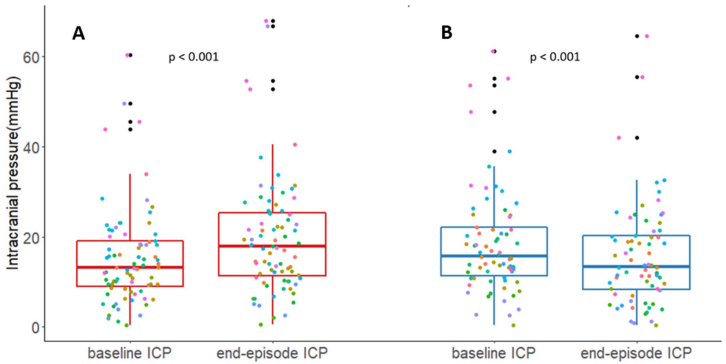
Depreitere et al, Neuro Crit Care 2021

CENTER-TBI and OzENTER-TBI cohorts



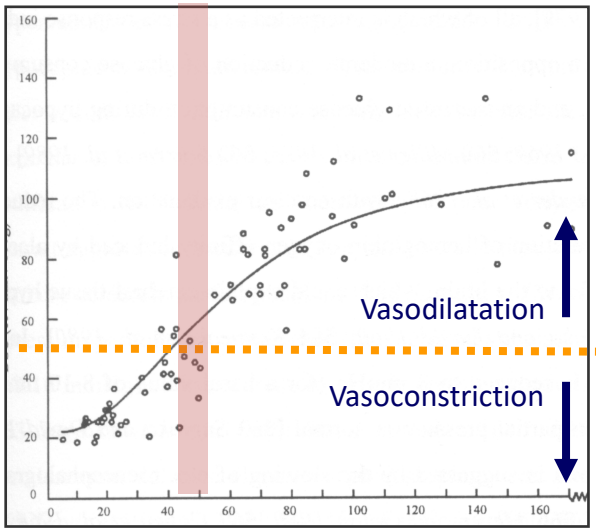
Wiegers et al. Lancet Neurol 2021

CENTER-TBI cohort



Birg et al. Neuro Crit care 2021

DSC (ml/min/100 g)



PaCO2 (mmHg)

⬇PaCO2 de1mmHg ↔⬇3% du DSC

Neuro-monitorage multi-modal: centre expert

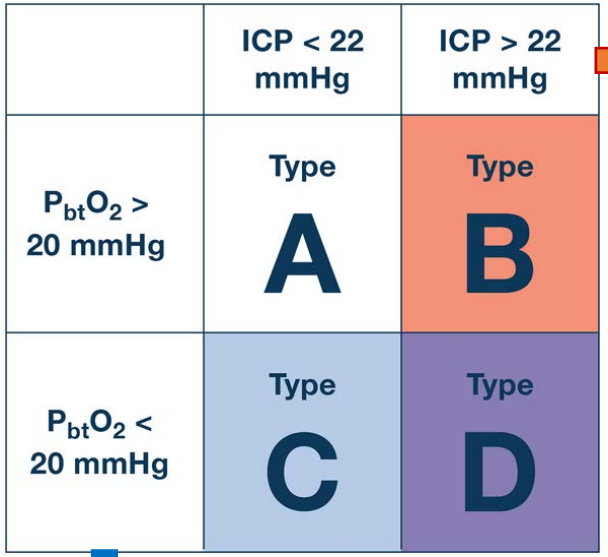
PtiO2?... Devenir?

Microdialyse

EEG continu

Cortical spreading depression

Biomarkers: discordance ou devenir



Optimisation PPC
Optimisation PCO2
osmothérapie
DVE
EEG
Phenobarbital
Craniectomie décompressive

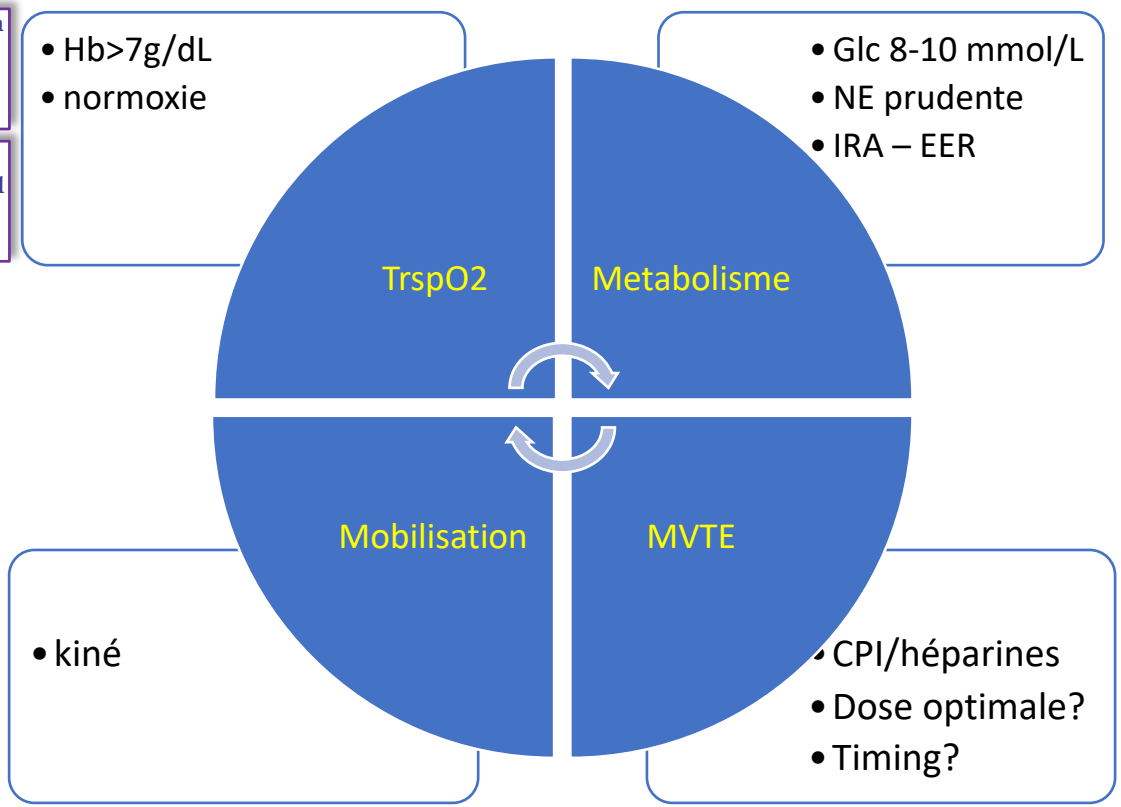
Optimisation PPC
Hypocapnie?
Optimisation sédation
EEG
Anémie?

Chesnut et al, ICM 2020

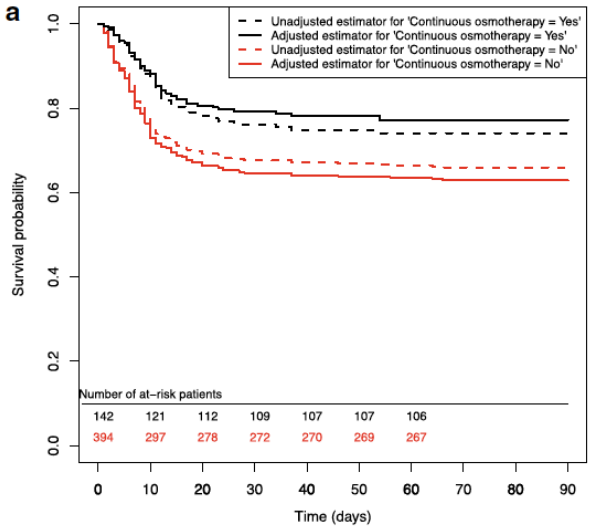
Réanimation Générale et neuroprotection

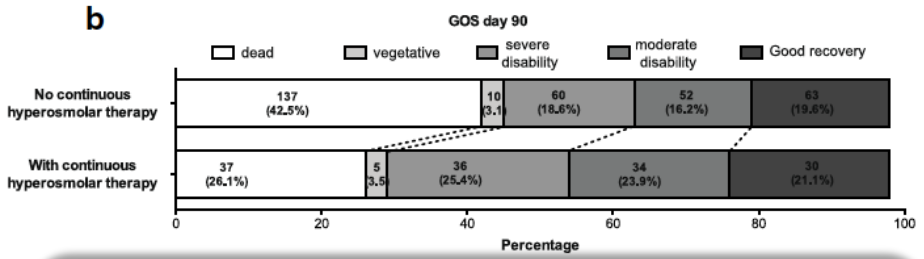
BMJ Open Haemoglobin transfusion threshold in traumatic brain injury optimisation (HEMOTION): a multicentre, randomised, clinical trial protocol

BMJ Open Multicentre observational study on practice of ventilation in brain injured patients: the VENTIBRAIN study protocol



Asehnoune et al. CCare 2017



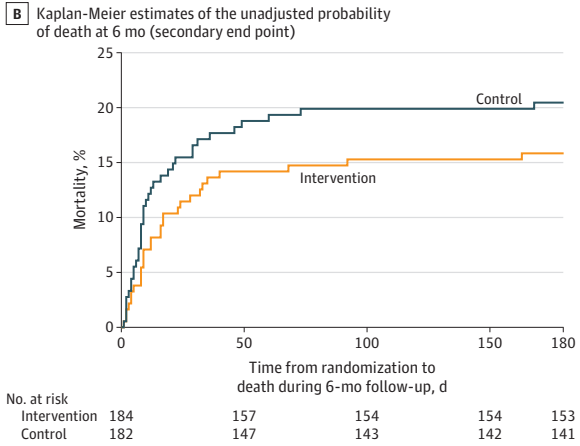


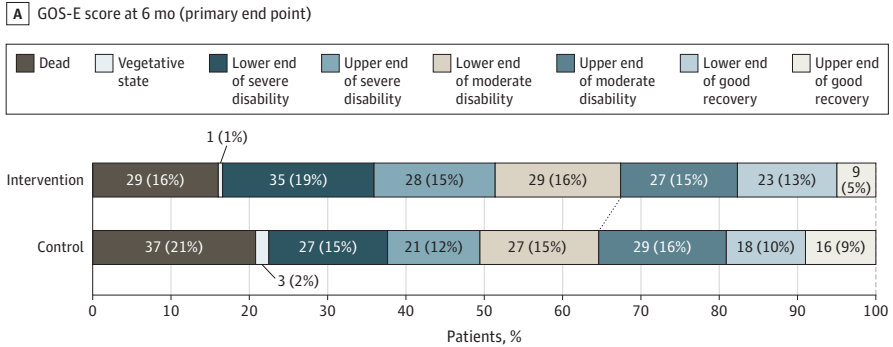
Etude prospective

Osmothérapie continue (SSH 20%)

- Outcome
- Moins de recours à la craniectomie, hypocapnie

Roquilly et al. JAMA 2021



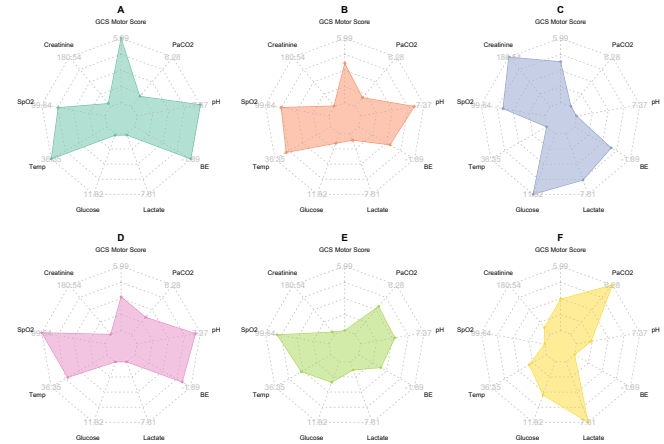


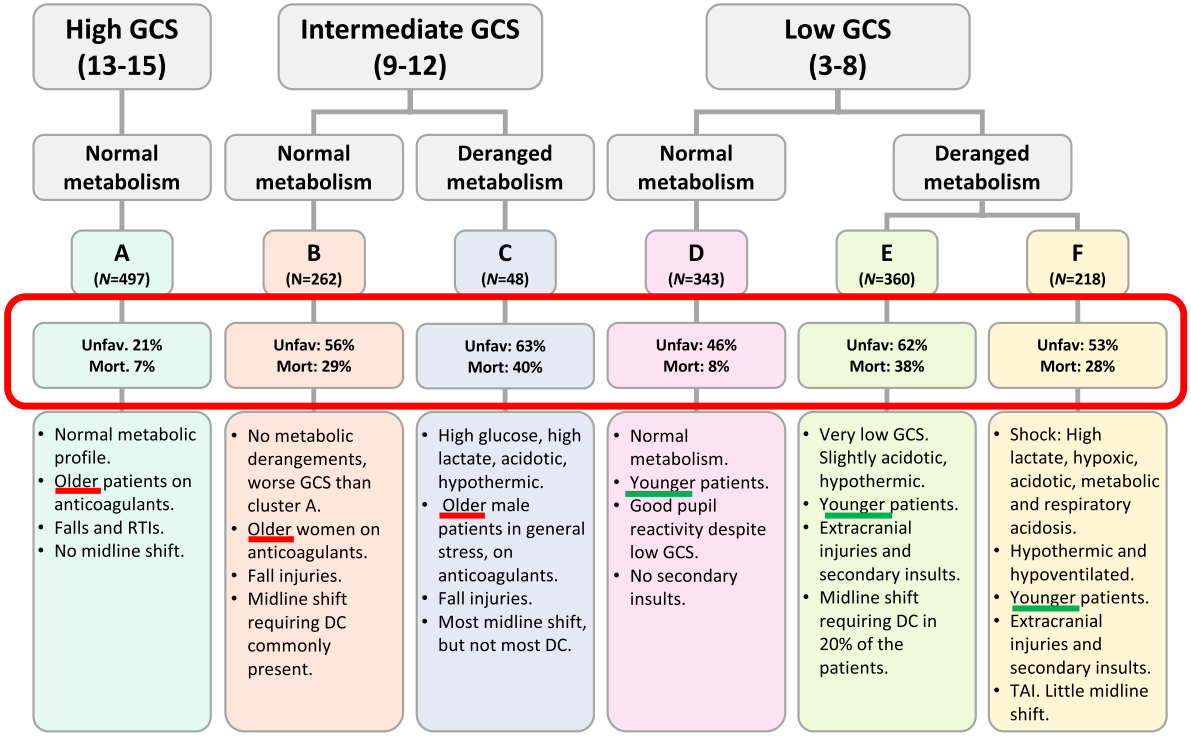
Clustering identifies endotypes of traumatic brain injury in an intensive care cohort: a CENTER-TBI study

Åkerlund et al, Crit Care 2022

9 variables à 24h:
Non supervisé

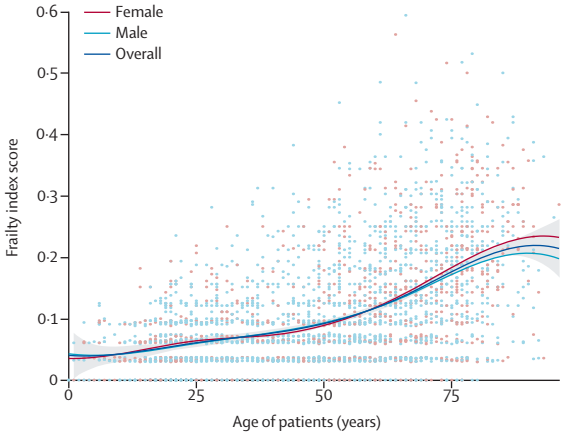
GCS motor score
Lactate
SpO2
Creatinine
Glucose
base excess
pH
PaCO2
body temperature





PIC	16%	86%	85%	93%	98%	90%
IOT	46%	58%	40%	52%	63%	45%

Cohorte CENTER-TBI
Index de fragilité



Patients in ICU (n=1649)			WARD Patients in Admission (n=1178)		
Variables	**Cumulative OR (95%CI)**	**p**	**Variables**	**Cumulative OR (95%CI)**	**p**
FI⁺	1.03 (1.02-1.04)	<0·0001	**FI⁺**	1.04 (1.03-1.06)	<0·0001
Age	1.03 (1.02-1.03)	<0·0001	**Age**	1.01 (1.01-1.02)	0.001 2

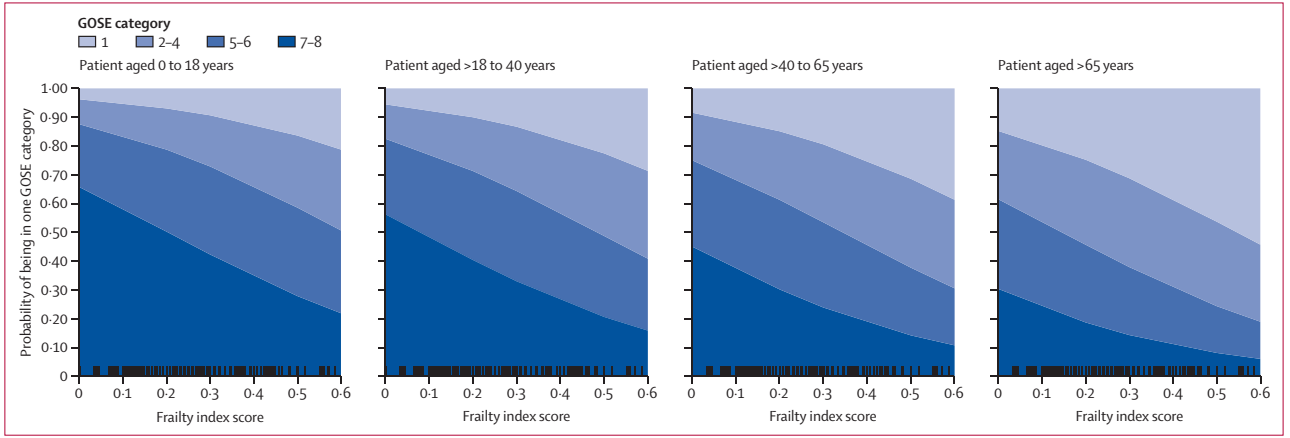


Figure 3: **Stacked probability of being in one of the four GOSE categories, by age and frailty index score**
Each vertical black line represents one patient. Dead=GOSE 1. Vegetative state and severe disability, including lower-severe and upper-severe disability=GOSE 2–4. Moderate disability, including lower-moderate and upper-moderate disability=GOSE 5–6. Good recoveries, including lower and upper good recovery=GOSE 7–8. GOSE=extended Glasgow Outcome Scale.

Galimberti et al. Lancet Neurol 2022

TCG - Que retenir de 2022?

- Besoin de revue et d'actualisation des recommandations
- Prise en charge personnalisée – autoregulation – CPPopt
- Prise en charge médicale de l'HTIC
- Perspectives:
  - Réanimation de neuroprotection: impact des désordres métaboliques
  - PEC des patients fragiles