Quelle anesthésie pour la thrombectomie ?

Louis Delamarre

MD. MSc

Hôpitaux de Toulouse

Rencontres d'Anesthésie Sanofi 2019

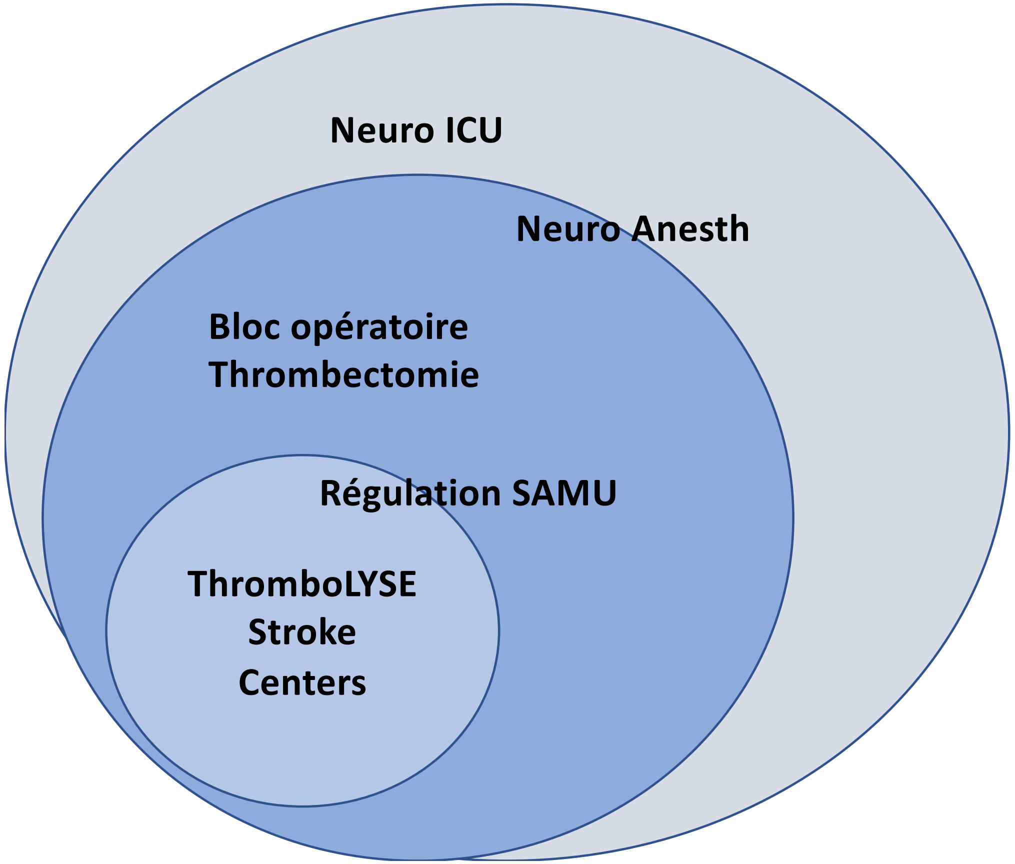
Conflits d’intérêt :

Aucun

PAS DE FORMULE MAGIQUE

SELECTIONNEZ LES BONS PATIENTS

L'AVC ischémique en 2019



Neuro ICU

Neuro Anesth

Bloc opératoire
Thrombectomie

Régulation SAMU

ThromboLYSE
Stroke
Centers

PRINCIPES :

TIMING

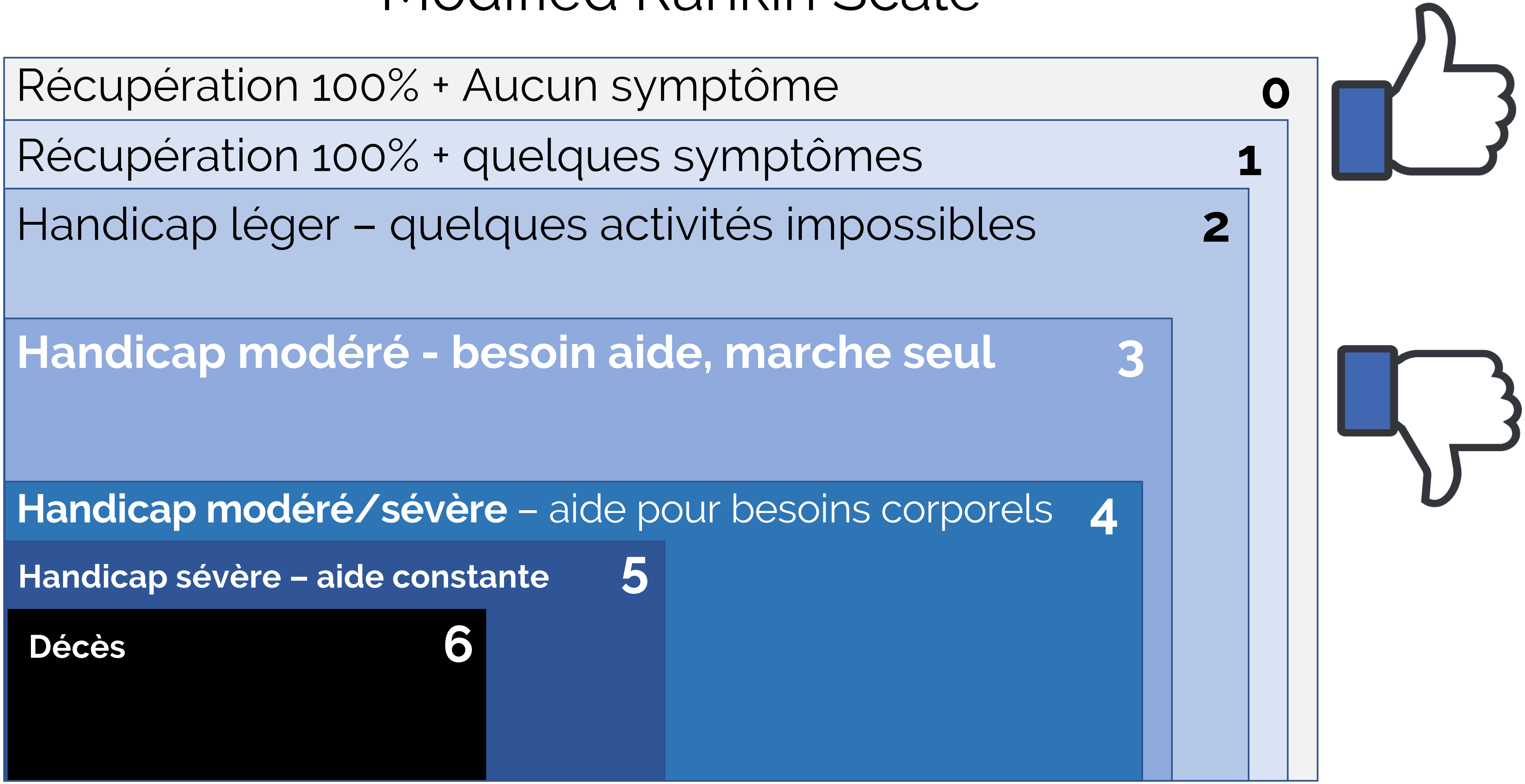
UNITES CRITIQUES SPECIALISEES

THROMBECTOMIE

HOMEOSTASIE CEREBRALE

= ANESTH-REA

Modified Rankin Scale



Récupération 100% + Aucun symptôme **0**

Récupération 100% + quelques symptômes **1**

Handicap léger – quelques activités impossibles **2**

Handicap modéré - besoin aide, marche seul **3**

Handicap modéré/sévère – aide pour besoins corporels **4**

Handicap sévère – aide constante **5**

Décès **6**

Broderick. Stroke. 2017

LES QUESTIONS :

Pourquoi l'AG est-elle néfaste ?

Pourquoi l'AG a toute sa place ?

Comment choisir la bonne stratégie ?

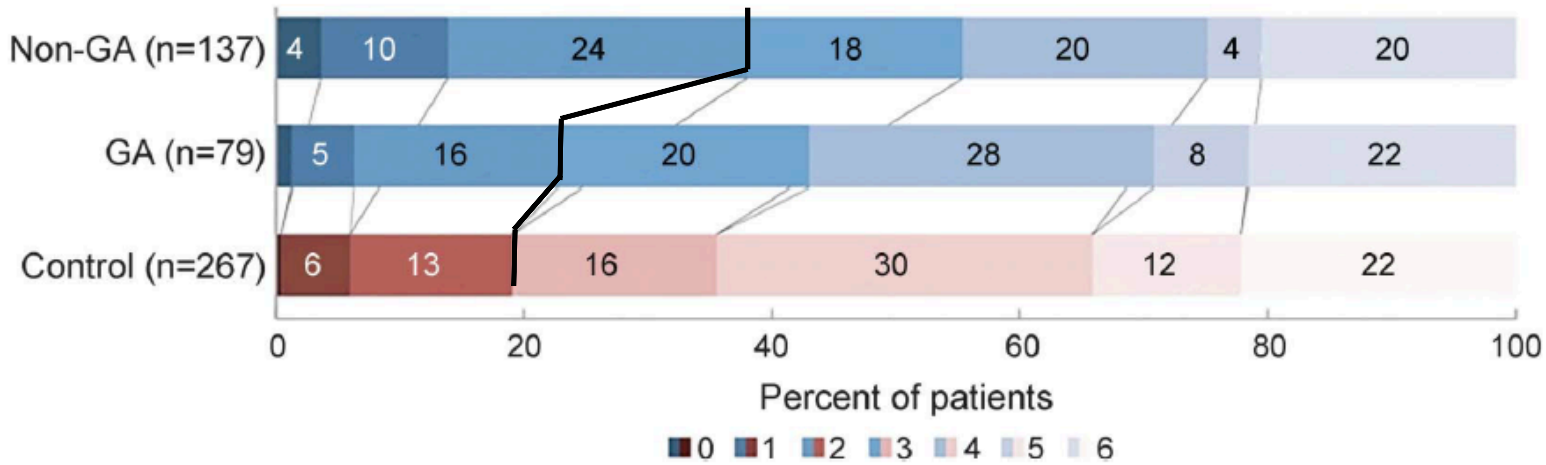
Quelle AG et quelle sédation ?

2010-2015 : L’AG est néfaste

The effect of anesthetic management during intra-arterial therapy for acute stroke in MR CLEAN

500 patients de l'étude MR CLEAN

Figure 2 **Modified Rankin Scale (mRS) score at 90 days by intention-to-treat groups**



Aucune recommandation ni données sur le management de l'AG

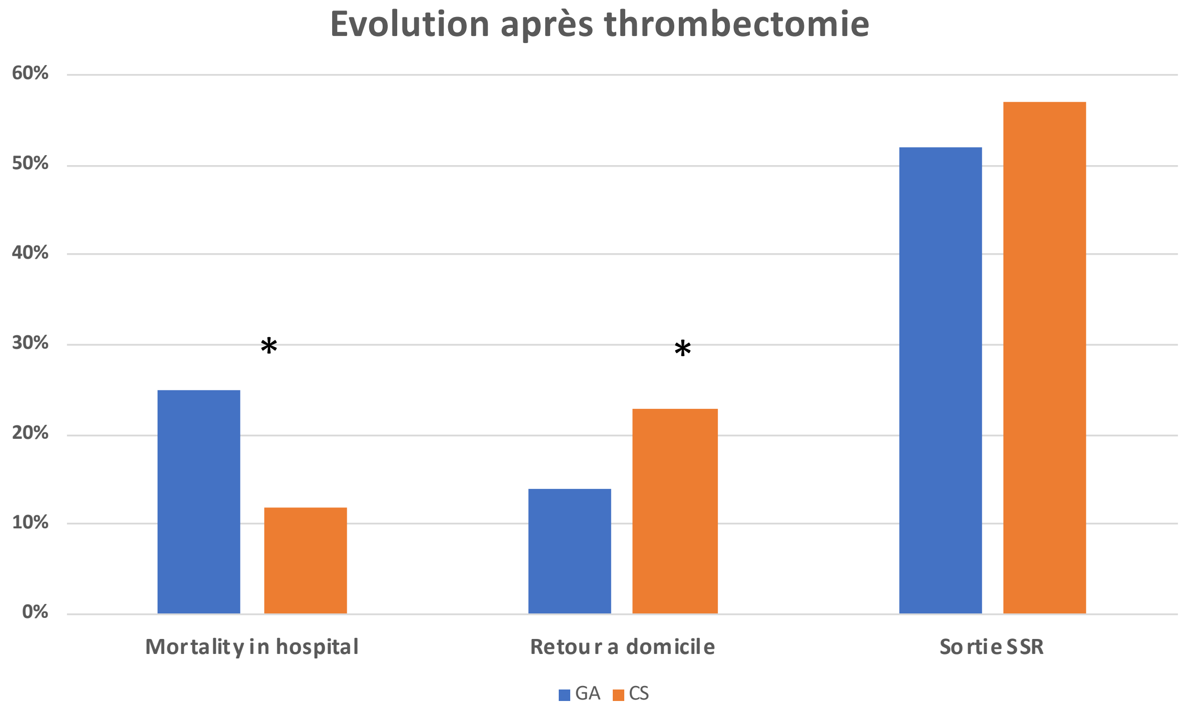
Neurology 87 August 16, 2016
Olvert A. Berkhemer, MD*

ORIGINAL RESEARCH

Conscious sedation versus general anaesthesia during mechanical thrombectomy for stroke: a propensity score analysis

Jennifer S McDonald,[1] Waleed Brinjikji,[1] Alejandro A Rabinstein,[2] Harry J Cloft,[1,3] Giuseppe Lanzino,[1,3] David F Kallmes[1,3]

Rétrospectif
Score de propension 1014 patients



Aucune donnée anesthésique

Base de données nationale : expertises variables

McDonald JS, *et al*. *J NeuroIntervent Surg* 2015;**7**:789–794.

Quels sont les biais de ces études ?

Etudes ancillaires d'études de neuro-radio

Rétrospectives

Population hétérogène : AVC VB, NIHSS…

Données anesth fiables ~ 0

Pourquoi l’AG est-elle néfaste?

TIME IS BRAIN

Reducing Door-to-Puncture Times for Intra-Arterial Stroke Therapy: A Pilot Quality Improvement Project

Brijesh P. Mehta, MD; Thabele M. Leslie-Mazwi, MD; Ronil V. Chandra, MBBS, FRANZCR; Donnie L. Bell, MD; Chung-Huan J. Sun, BS;
Joshua A. Hirsch, MD; James D. Rabinov, MD; Natalia S. Rost, MD, MPH; Lee H. Schwamm, MD; Joshua N. Goldstein, MD;
Wilton C. Levine, MD; Rishi Gupta, MD; Albert J. Yoo, MD

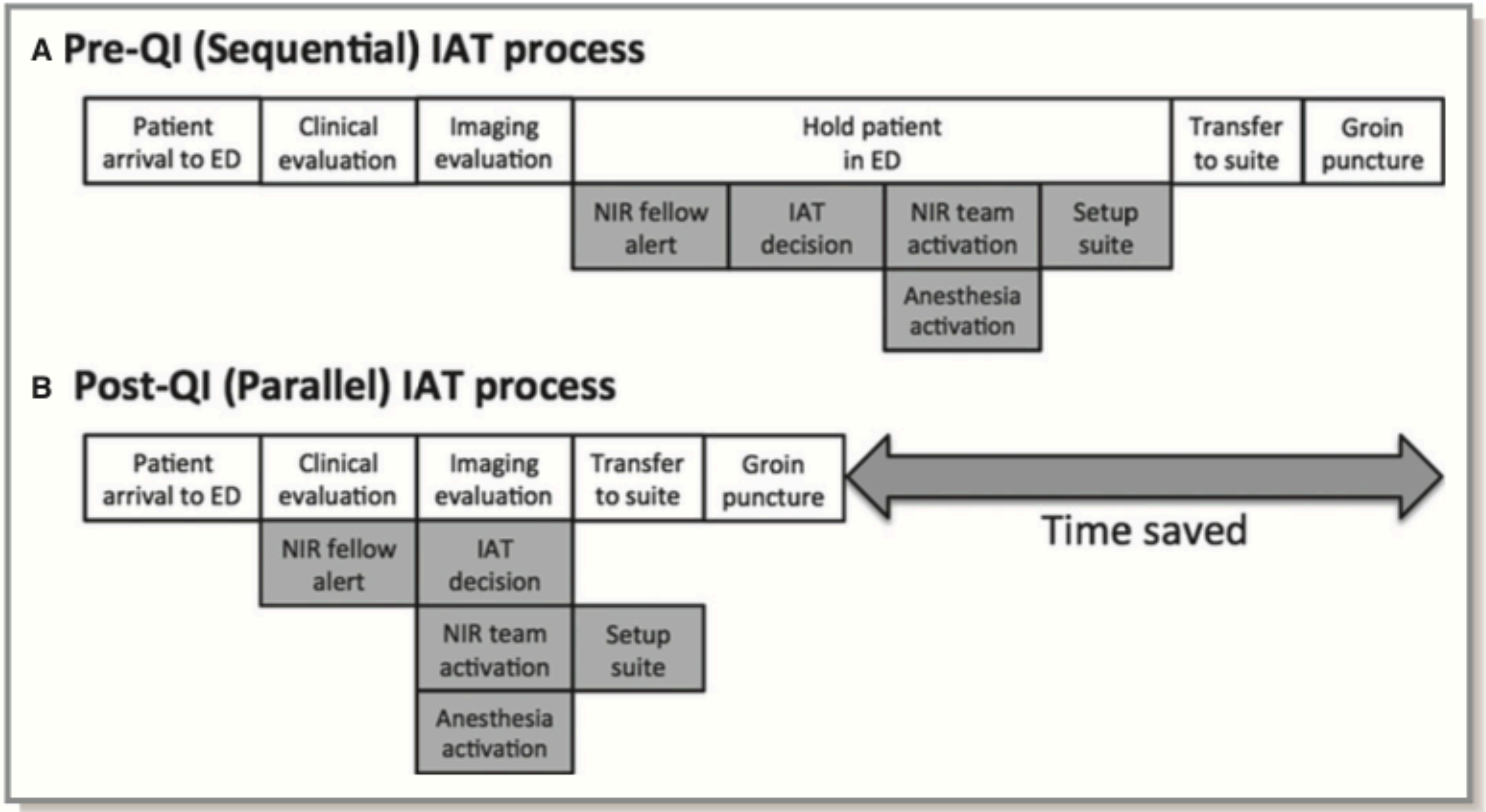

A Pre-QI (Sequential) IAT process
Patient arrival to ED
Clinical evaluation
Imaging evaluation
Hold patient in ED
Transfer to suite
Groin puncture
NIR fellow alert
IAT decision
NIR team activation
Setup suite
Anesthesia activation
B Post-QI (Parallel) IAT process
Patient arrival to ED
Clinical evaluation
Imaging evaluation
Transfer to suite
Groin puncture
Time saved
NIR fellow alert
IAT decision
NIR team activation
Setup suite
Anesthesia activation

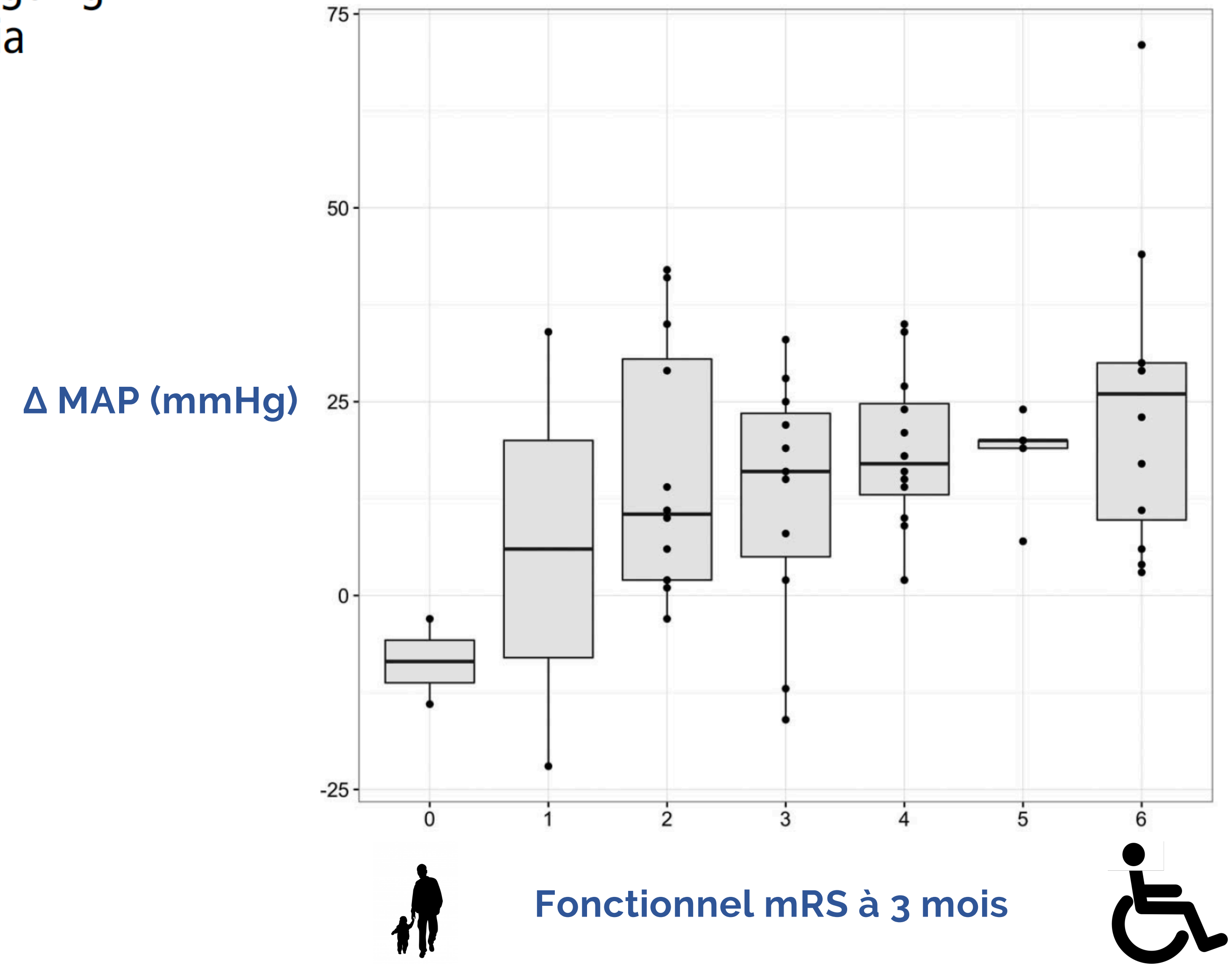
Figure 2. Comparison of IAT processes. Schematic highlighting delays to IAT for the sequential (A) and parallel (B) workflows. ED indicates emergency department; IAT, intra-arterial therapy; NIR, nuerointerventional radiology; QI, quality improvement.

HEMODYNAMIQUE

A decrease in blood pressure is associated with unfavorable outcome in patients undergoing thrombectomy under general anesthesia

60 patients sous AG

Cohorte MR CLEAN



Treurniet KM. *J NeuroIntervent Surg* 2018

Even Small Decreases in Blood Pressure during Conscious Sedation Affect Clinical Outcome after Stroke Thrombectomy: An Analysis of Hemodynamic Thresholds

Chaque baisse de PAM de 10 mmHg en dessous de 100 mmHg =

📶 risque de mauvais devenir de **+ 28%**

Recommandations NACC 2014 : PAS 140-180 mmHg jusqu'à reperfusion

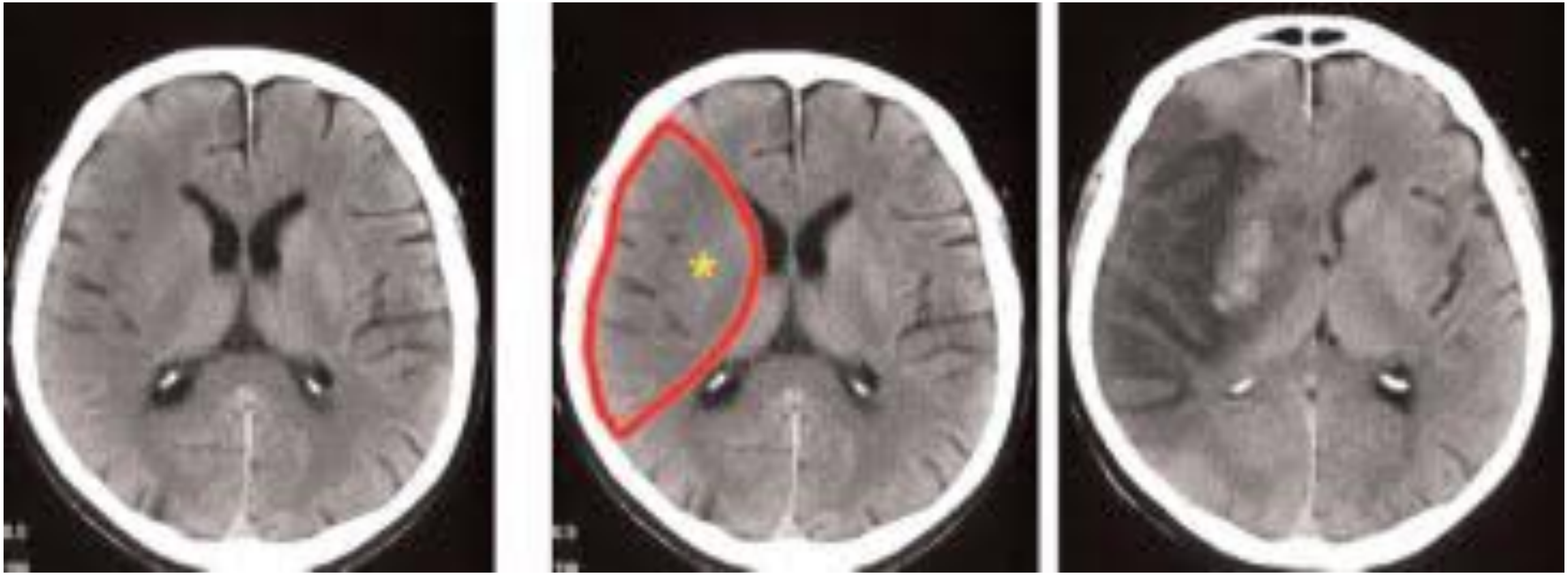
NIHSS <15 : Δ PAM importe peu -> 78% indépendance fonctionnelle

NIHSS 15 – 20 : PAM > 70 mmHg

NIHSS > 20 : PAM > 80 mmHg

Whalin. *AJNR* 2017

Réduire la PAS après revascularisation : 120-140 mmHg



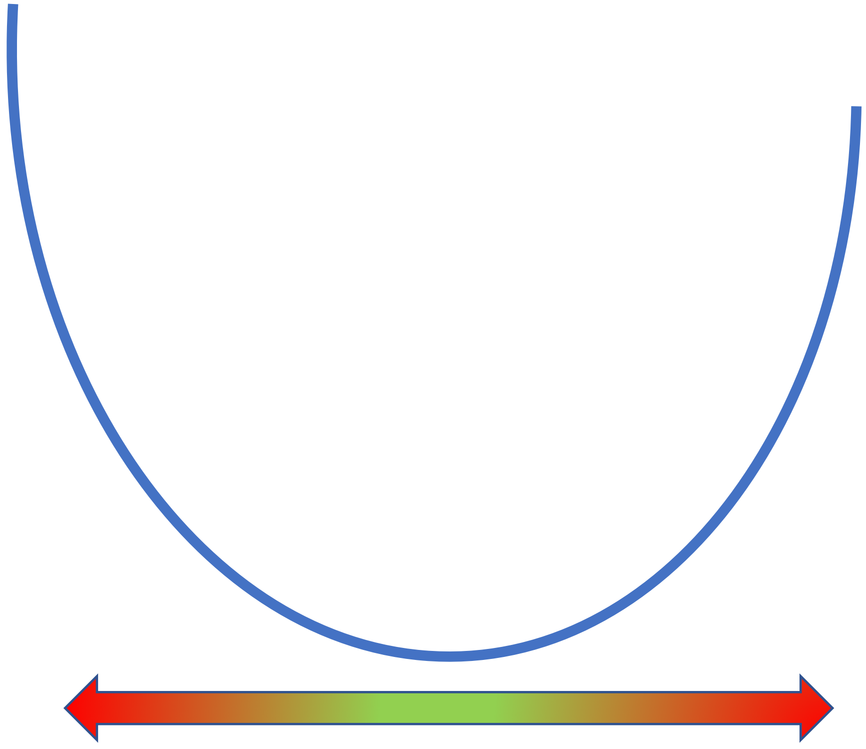
RESPIRATION

Pulmonary and circulatory parameter guided anesthesia in patients with ischemic stroke undergoing endovascular recanalization

Etude avant – après instauration protocole standardisé d'AG

📶 temps passé à EtCO2 40-45 mmHg => Devenir défavorable

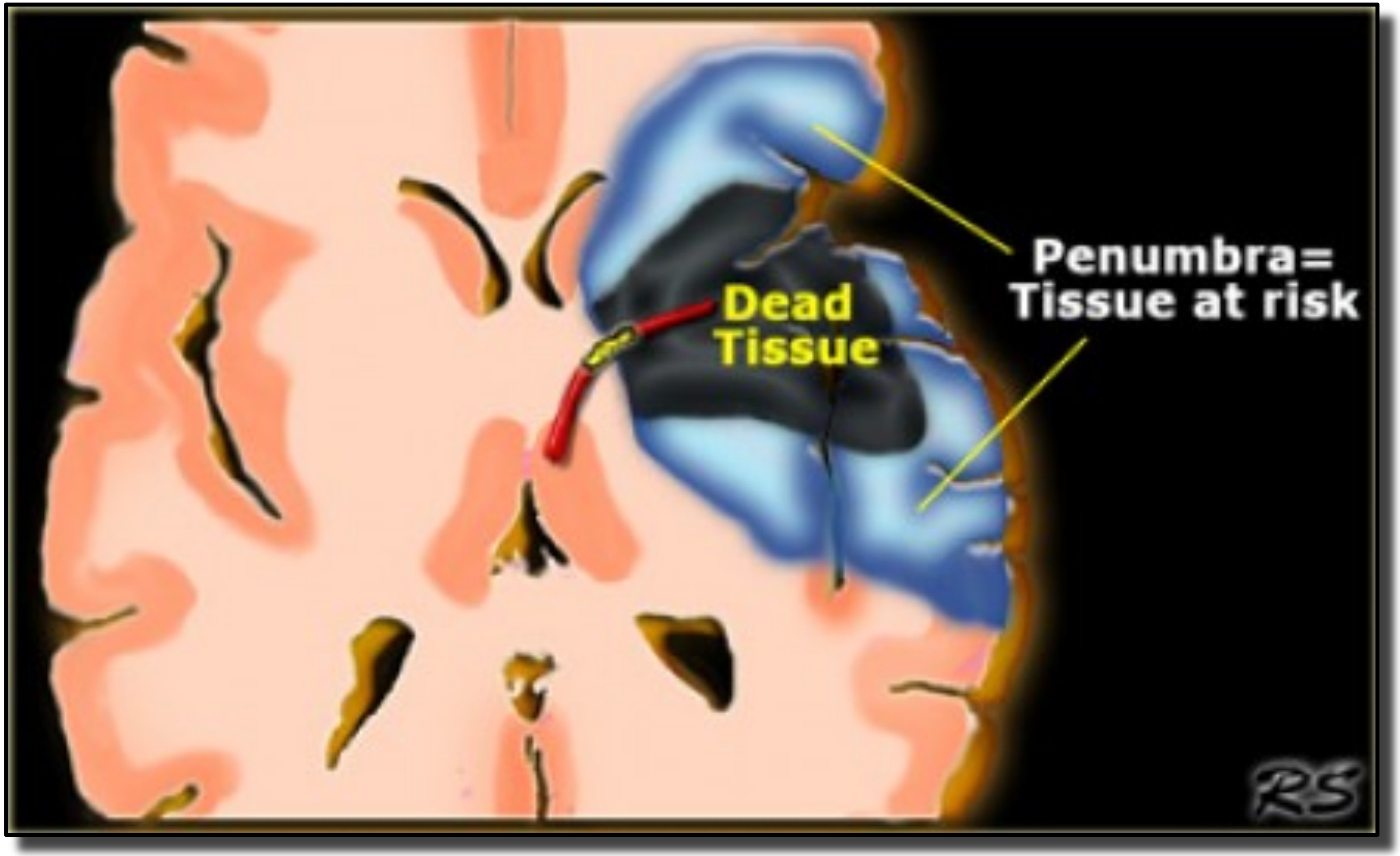
Takahashi et al.
Devenir défavorable à 32mmHg vs 35mmHg

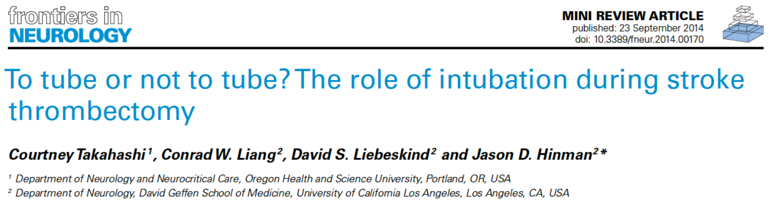


Mundiyanapurath. *J NeuroIntervent Surg* 2015

PENOMBRE ET COLLATERALES

Hypotension + Hypocapnie = DANGER


Dead Tissue
Penumbra= Tissue at risk
RS



frontiers in NEUROLOGY

MINI REVIEW ARTICLE
published: 23 September 2014
doi: 10.3389/fneur.2014.00170

To tube or not to tube? The role of intubation during stroke thrombectomy

*Courtney Takahashi[1], Conrad W. Liang[2], David S. Liebeskind[2] and Jason D. Hinman[2]**

[1] *Department of Neurology and Neurocritical Care, Oregon Health and Science University, Portland, OR, USA*
[2] *Department of Neurology, David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA, USA*

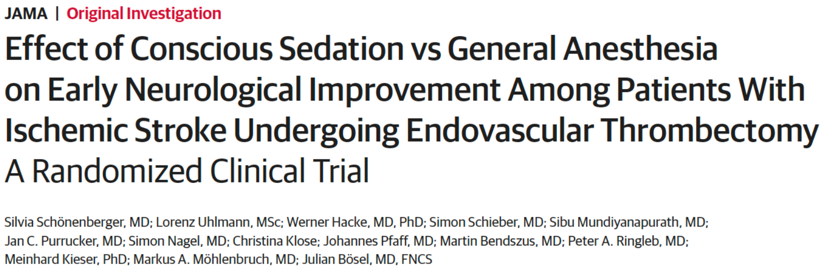
Hypotension

Facteurs MODIFIABLES

Hypocapnie

Délai

Pourquoi l’AG a toute sa place?



JAMA | Original Investigation

Effect of Conscious Sedation vs General Anesthesia on Early Neurological Improvement Among Patients With Ischemic Stroke Undergoing Endovascular Thrombectomy

A Randomized Clinical Trial

Silvia Schönenberger, MD; Lorenz Uhlmann, MSc; Werner Hacke, MD, PhD; Simon Schieber, MD; Sibu Mundiyanapurath, MD; Jan C. Purrucker, MD; Simon Nagel, MD; Christina Klose; Johannes Pfaff, MD; Martin Bendszus, MD; Peter A. Ringleb, MD; Meinhard Kieser, PhD; Markus A. Möhlenbruch, MD; Julian Bösel, MD, FNCS

NSN = 150 pour ΔNIHSS ≥ 4 pts à H24 en faveur de CS (interv.)

Résultats :

- 65% thrombolyse dans GA et CS

- Door-to-puncture sous AG : 10 min

- Conversion en AG : 14%

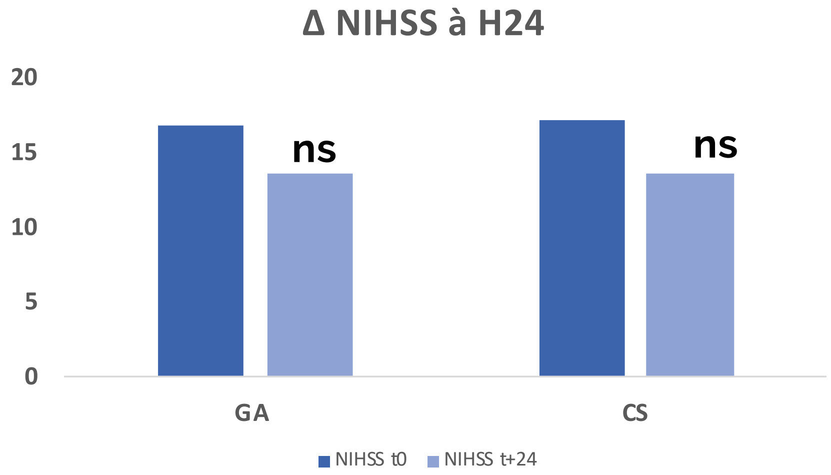
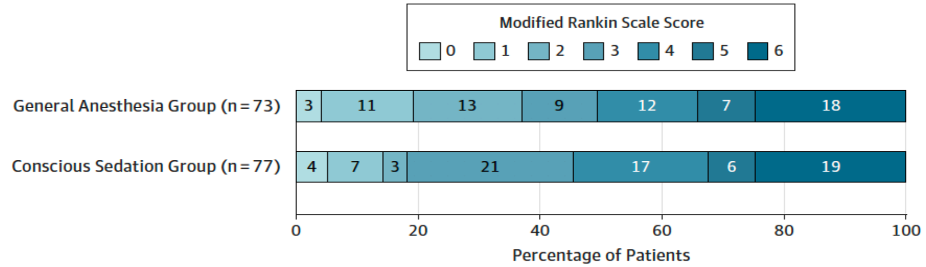
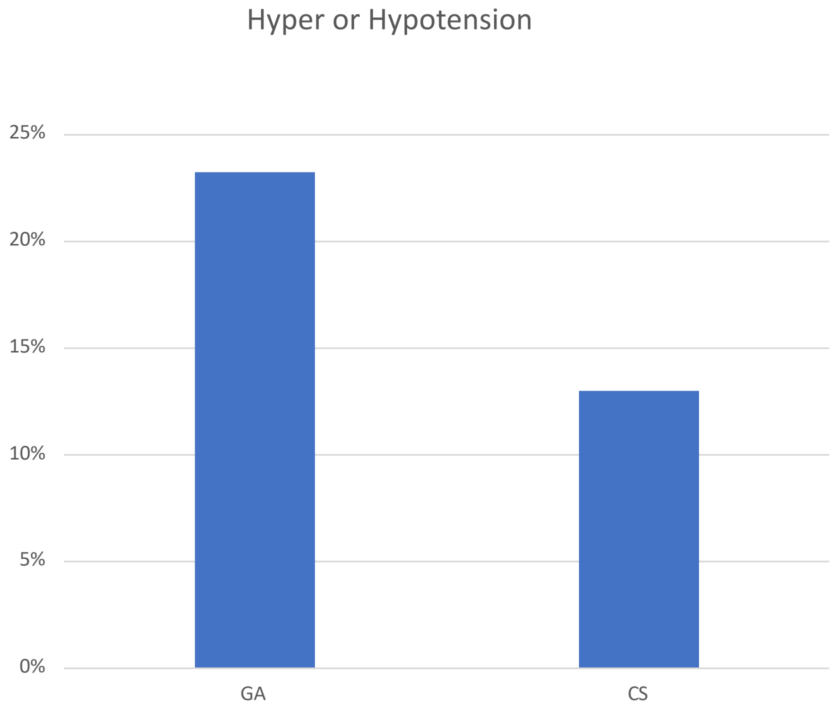


Figure 3. Functional Outcome at 90-Day Follow-up in the Intent-to-Treat Population



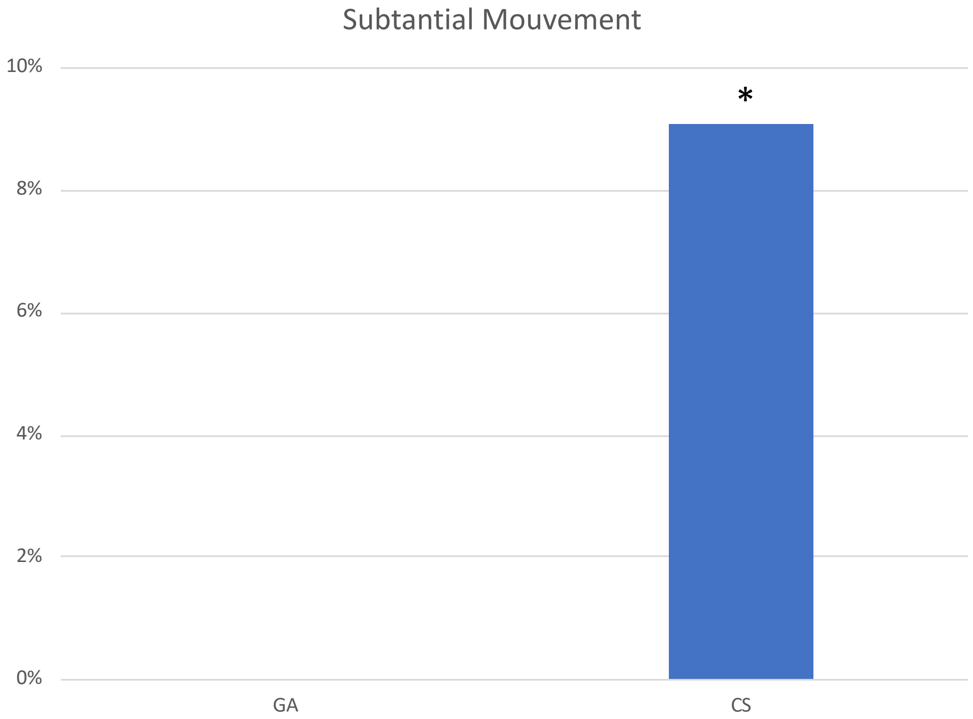
ns

SIESTA Study Schönenberger. JAMA 2017



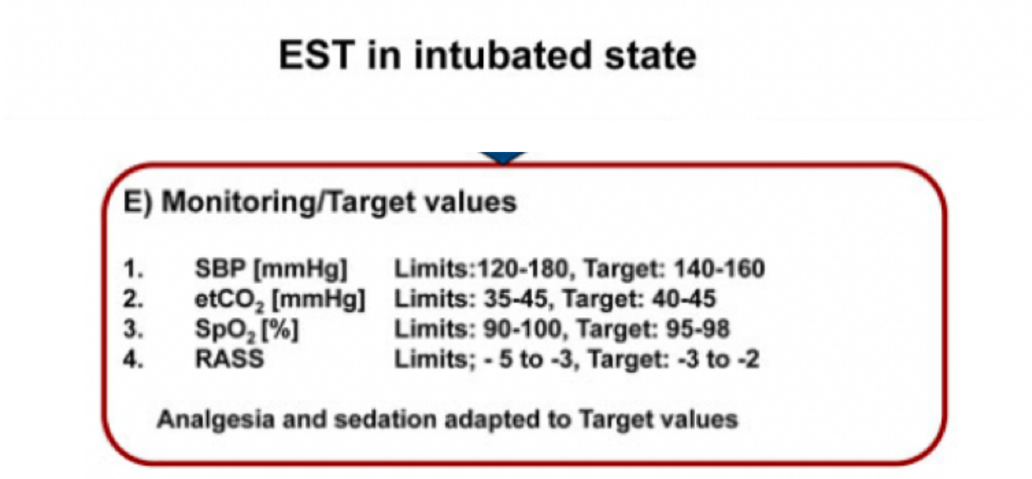
Hyper or Hypotension

ns



Subtantial Mouvement

SIESTA Study Schönenberger. JAMA 2017

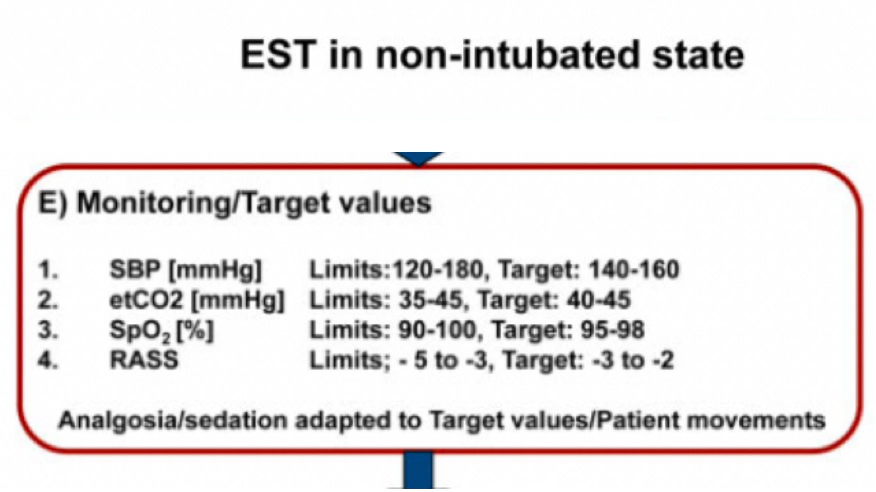


EST in intubated state

E) Monitoring/Target values

1.	SBP [mmHg]	Limits:120-180, Target: 140-160
2.	etCO$_2$ [mmHg]	Limits: 35-45, Target: 40-45
3.	SpO$_2$ [%]	Limits: 90-100, Target: 95-98
4.	RASS	Limits; - 5 to -3, Target: -3 to -2

Analgesia and sedation adapted to Target values



EST in non-intubated state

E) Monitoring/Target values

1.	SBP [mmHg]	Limits:120-180, Target: 140-160
2.	etCO2 [mmHg]	Limits: 35-45, Target: 40-45
3.	SpO$_2$ [%]	Limits: 90-100, Target: 95-98
4.	RASS	Limits; - 5 to -3, Target: -3 to -2

Analgosia/sedation adapted to Target values/Patient movements

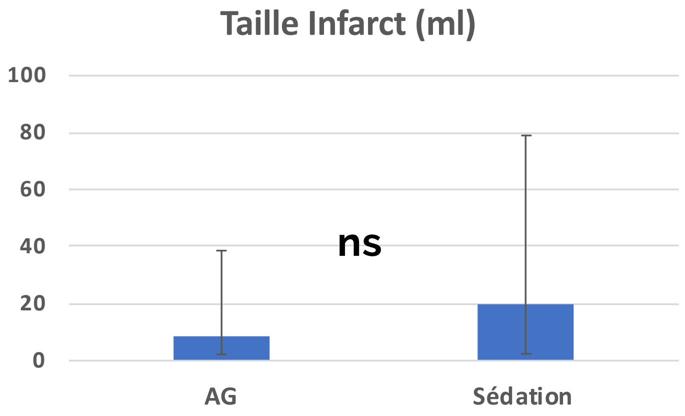
SIESTA Study Schönenberger, 2016

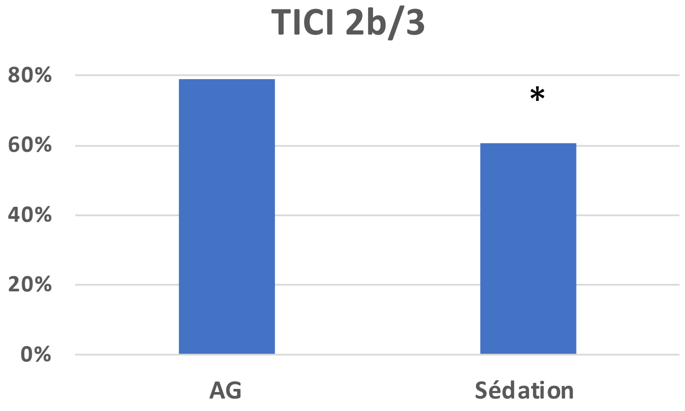
JAMA Neurology | Original Investigation

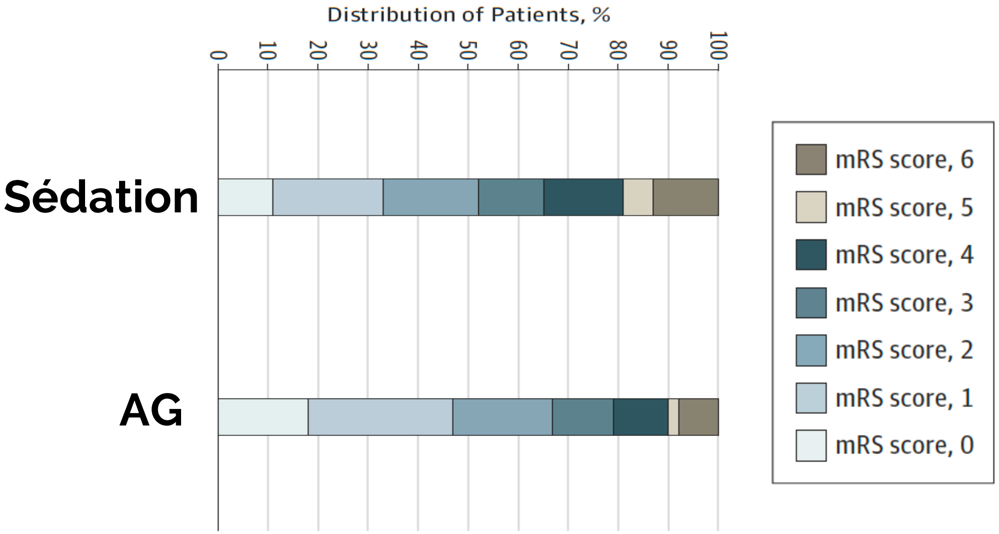
Effect of General Anesthesia and Conscious Sedation During Endovascular Therapy on Infarct Growth and Clinical Outcomes in Acute Ischemic Stroke
A Randomized Clinical Trial

128 patients – Monocentrique

CJP : Taille infarctus à J3







Indépendance fonctionnelle a 3 mois : ***ns***

GOLIATH Study Simonsen. JAMA Neurol. 2018

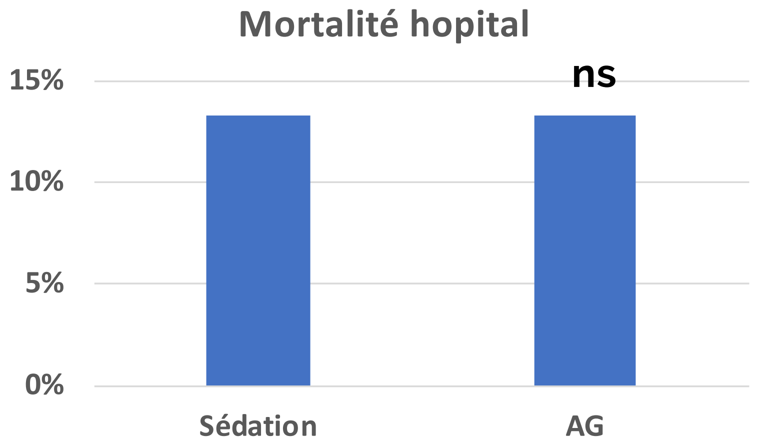
General Anesthesia Versus Conscious Sedation for Endovascular Treatment of Acute Ischemic Stroke

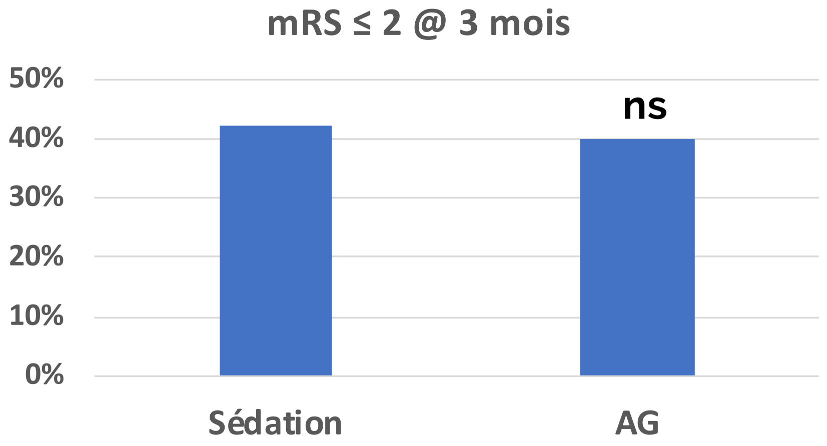
The AnStroke Trial (Anesthesia During Stroke)

90 patients (1:1)
Exclusion : AVC VB, HIP, mRS ≥4

Per op
PaCO2 : ns

PAM AG < Sédation





AnSTROKE Study Löwhagen Hendén. Stroke 2017

AMETIS study @AmetisStudy · Mar 17

Fin des inclusions dans l’étude AMETIS! Un grand merci aux patients et aux équipes. Désormais dans l’attente des résultats de la 1ère etude multicentrique portant sur la PEC anesthésique des thrombectomies pour AVCi de la circulation antérieure.

Translate Tweet
GIF
1
2
7

JAMA Neurology | **Original Investigation**

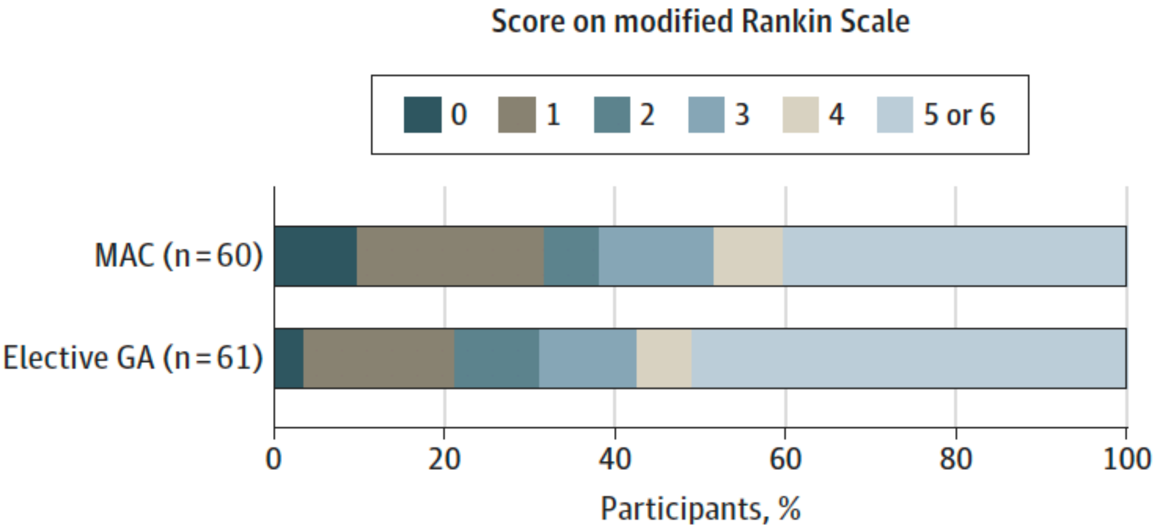
Monitored Anesthesia Care vs Intubation for Vertebrobasilar Stroke Endovascular Therapy

Rétrospectif – Pittsburg + Atlanta
215 patients -> 63 paires appariées

Sédation dans 36%

Conversion en AG dans 13%

Figure 2. Functional Outcome at 90 Days According to the Score on the Modified Rankin Scale

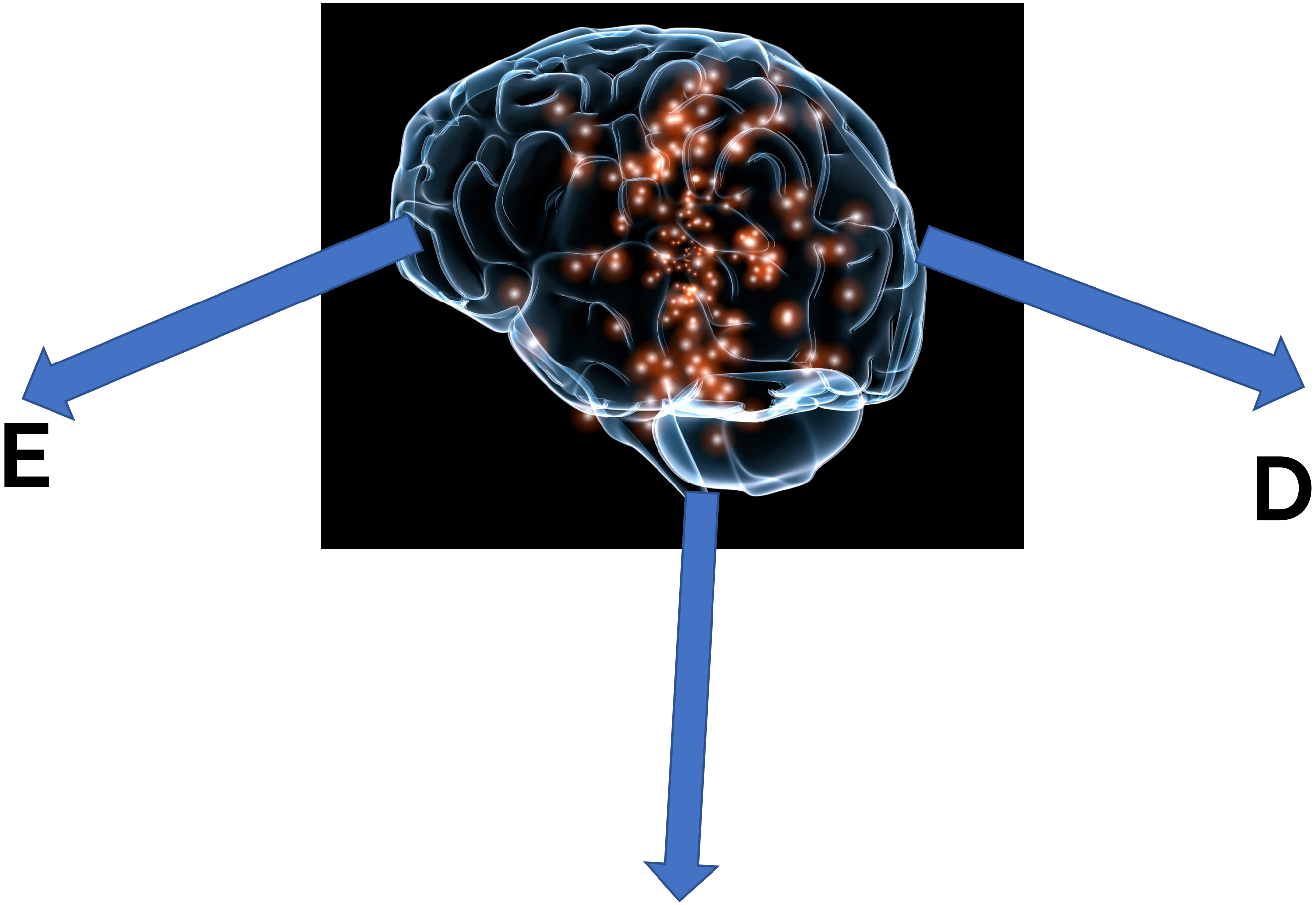


Shift analysis as assessed by the Wilcoxon signed rank test, *P* = .19. MAC indicates monitored anesthesia care and GA indicates general anesthesia.

Jadhav. JAMA Neurol. 2017

Comment choisir la bonne anesthésie?

A QUI AI-JE AFFAIRE ???



GAUCHE

DROIT

VERTEBRO-BASILAIRE

1/ DEFINIR LE RISQUE D'ECHEC DE LA SEDATION

A

MAINTIEN AUTONOME DE L'AIRWAY ?

REGURGITATION ?

B

MAINTIEN D'UNE VENTILATION ADEQUATE ?

HYPOXEMIE ?

HYPOVENTILATION ?

(C)

D

QUEL HEMISPHERE ?

COOPERATION / APHASIE ?

EST-CE QU'IL ME COMPREND ?

EST-CE QU'IL PEUT ME REPONDRE ?

SIGNES D'HTIC / AVC MALIN ?

EN PRATIQUE ON FAIT QUOI ?

RISQUE FORT	RISQUE MOYEN	FAIBLE RISQUE
Agité GCS ≤ 8 VA non protégées / Inhalation Bulbaire / N. crâniens Hypoventilation / Hypoxémie Anatomie vascu difficile	Aphasie NIHSS >20 Risque d'AVC Malin AVC vertébro-basilaire Comorbidités majeures	Alerte + Coopérant Hémisphère non-dominant

Anesthésie Générale ISR
Contrôle PA et $EtCO_2$

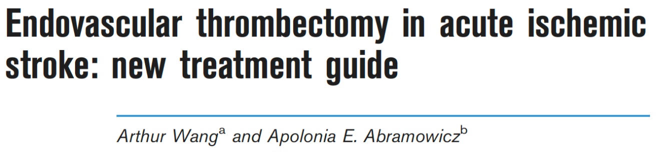
←

Jugement clinique
Avoir un plan B prêt
Equipe anesth expérimentée

Sédation
Analgésie
Contrôle TA

Modifié d'après Dakhal, Schönenberger, Shan

QUELLE AG?



Endovascular thrombectomy in acute ischemic stroke: new treatment guide

Arthur Wang[a] and Apolonia E. Abramowicz[b]

SIESTA, *JAMA*. 2016	**AnSTROKE, *Stroke*. 2017**	**GOLIATH, *JAMA*. 2018**
Propofol + Rémifentanil	Propofol + Sévo + Rémifentanil	Propofol + Alfentanil + **Suxamethonium**

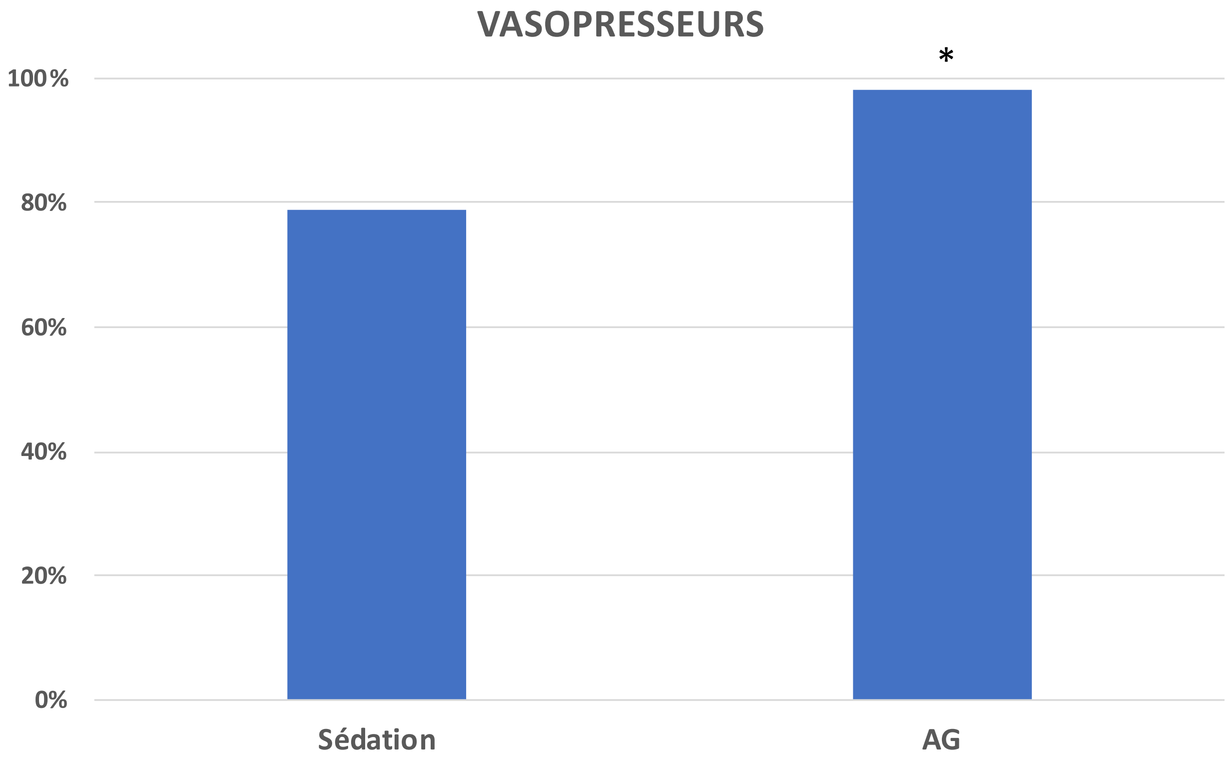
ISR

Wang. *Curr. Opin. Anesthesiol.* 2018

AMINES

General Anesthesia Versus Conscious Sedation for Endovascular Treatment of Acute Ischemic Stroke

The AnStroke Trial (Anesthesia During Stroke)



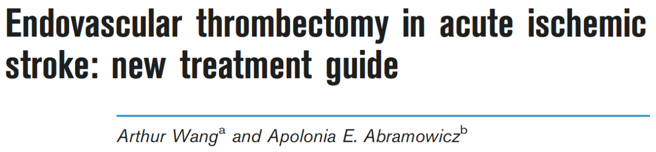
Noradrénaline

- KTA ?

- VVC ?

AnSTROKE Study Löwhagen Hendén. Stroke 2017

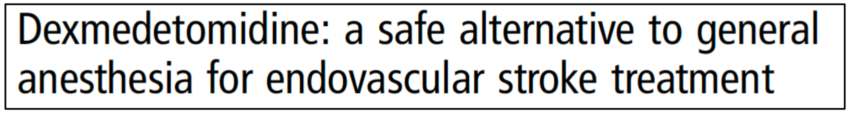
QUELLE SEDATION ?



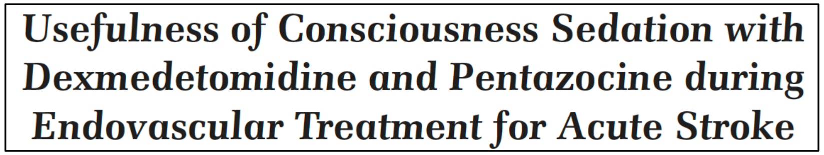
Endovascular thrombectomy in acute ischemic stroke: new treatment guide

Arthur Wang[a] and Apolonia E. Abramowicz[b]

SIESTA, *JAMA*. 2016	**AnSTROKE, *Stroke*. 2017**	**GOLIATH, *JAMA*. 2018**
Propofol + Rémifentanil	Rémifentanil	Propofol + Fentanyl bolus



Dexmedetomidine: a safe alternative to general anesthesia for endovascular stroke treatment



Usefulness of Consciousness Sedation with Dexmedetomidine and Pentazocine during Endovascular Treatment for Acute Stroke

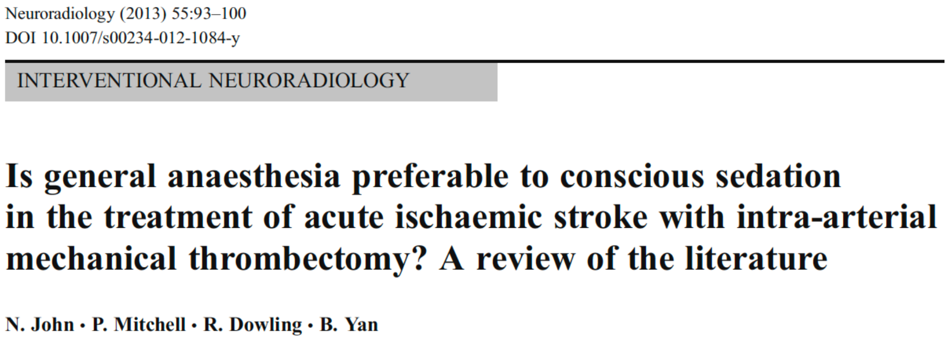
Dose :
IVSE débuté à 0.3 - 0.5 µg/kg/h

Entretien max : 1.0 µg/kg/h

+/- bolus : 0.5 µg/kg IVL sur 5 min *si hémodynamique stable*

Whalin. *J NeuroIntervent Surg* 2014
Nii, *Neurol Med Chir.* 2018

PAIN



Neuroradiology (2013) 55:93–100
DOI 10.1007/s00234-012-1084-y

INTERVENTIONAL NEURORADIOLOGY

Is general anaesthesia preferable to conscious sedation in the treatment of acute ischaemic stroke with intra-arterial mechanical thrombectomy? A review of the literature

N. John · P. Mitchell · R. Dowling · B. Yan

Céphalées sévères = 61%

- Ballon

- Manipulation du KT / vsx cérébraux

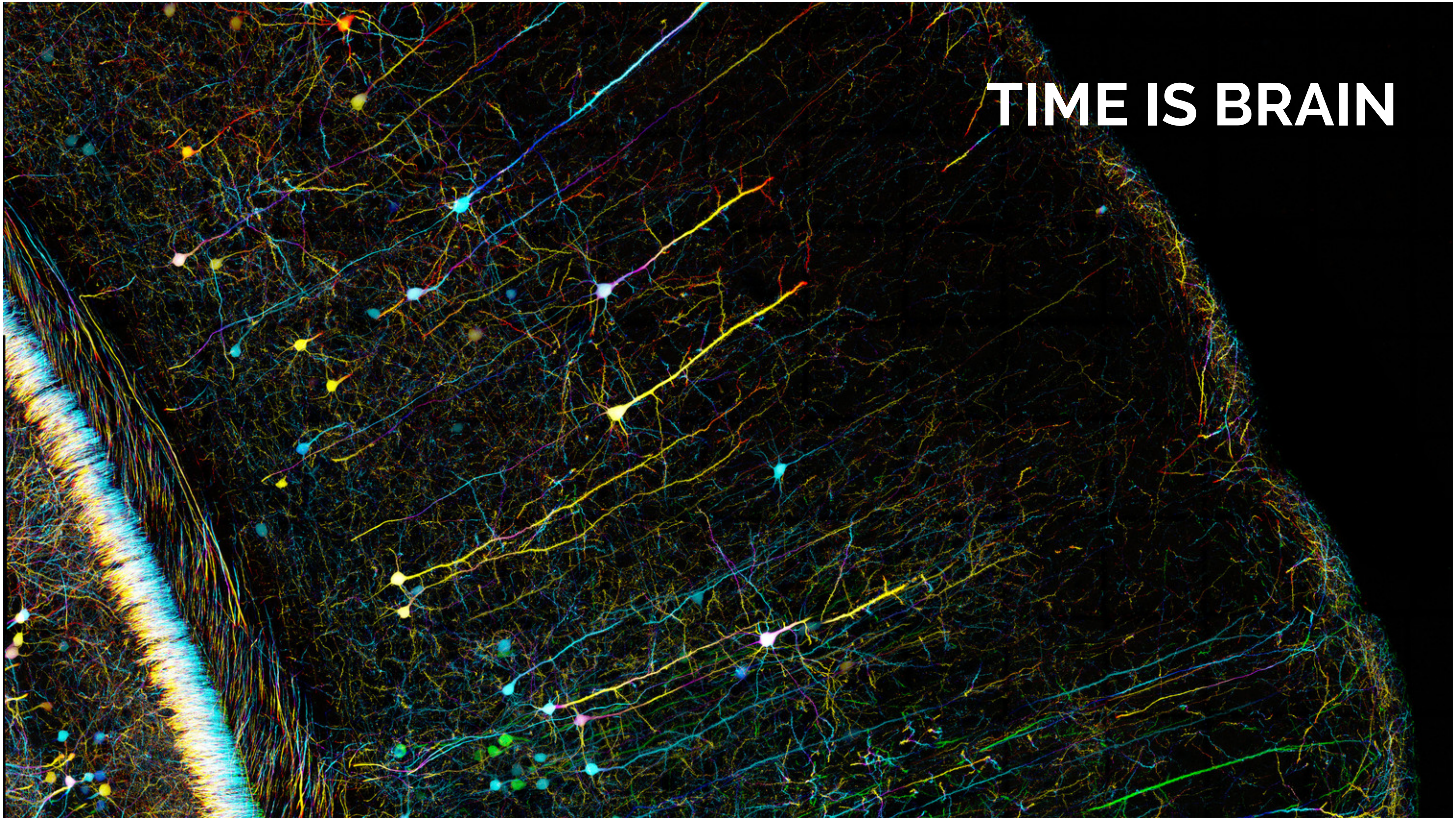
Les chiffres à retenir

MORTALITE dans l'AVC thrombectomisable	**15-25 %**
Indépendance fonctionnelle à 3 mois	**50 %**
Revascularisation correcte (TICI 2b/3)	**75 %**

Ilyas. World Neurosurg. 2018

Conversion Sédation – AG	**15 %**
Objectif EtCO2	**35 - 40 mmHg**
Objectifs tensionnels	
Pendant revascularisation	TAS 140 – 180 mmHg PAM > 70 mmHg
Après revascularisation	PAS 120 – 140 mmHg
Utilisation vasopresseurs	**Sédation : 30% / AG 80-90%**

Ilyas. World Neurosurg. 2018



TIME IS BRAIN