



La chirurgie a été un
succès mais le patient
est mort de son
anesthésie...

**Morbidité et mortalité
en anesthésiologie**

Jean-Sébastien Lebon

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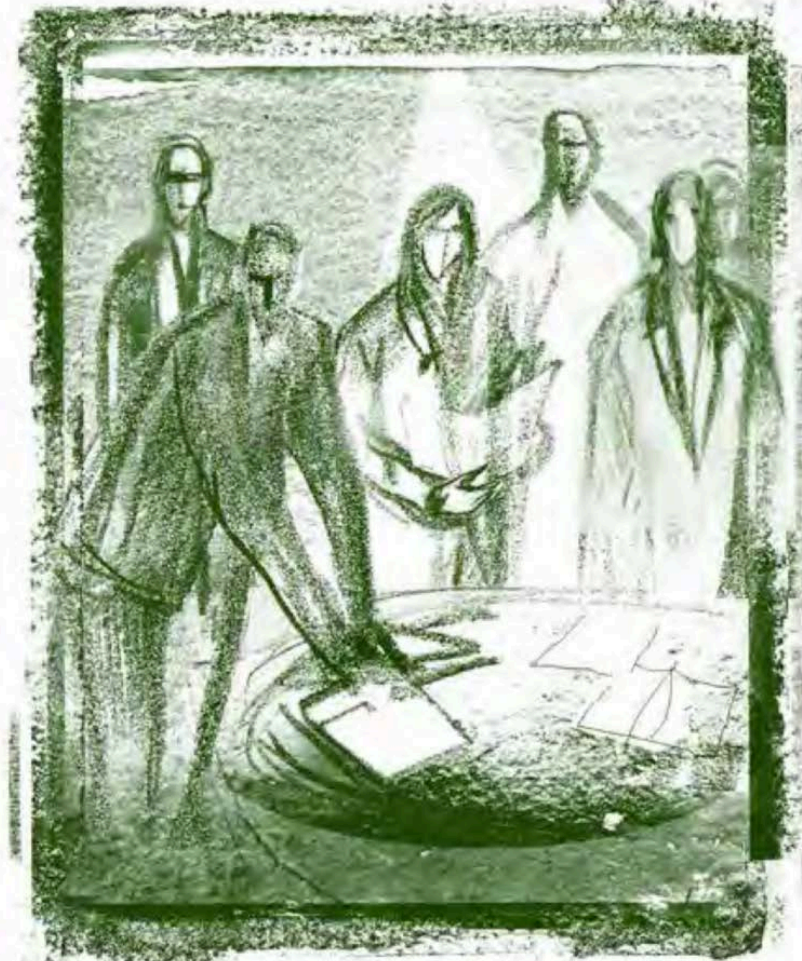
L'ÉVALUATION DE L'ACTE MÉDICAL

Guide d'exercice

du Collège des médecins du Québec



COLLÈGE DES MÉDECINS
DU QUÉBEC





CAIRS

Canadian Anesthesia Incident Reporting System

Tuesday, June 12, 2018

[Help](#)

[FRANÇAIS](#)

Welcome to the Canadian Anesthesia Incident Reporting System (CAIRS). CAIRS allows you to enter an incident into the CAIRS database.

[Report an Incident](#)

CAIRS News

Upcoming events

CAS Annual Meeting 2018 - Montreal, QC - June 15 to 18.

Come see us at the CAIRS booth and get a chance to take a guided tour!

The Canadian Anaesthesiologists Society (CAS) has developed the Canadian Anesthetic Incident Reporting System (CAIRS) with the assistance of the Australian and New Zealand Tripartite Anaesthetic Data Committee (ANZTADC). This program can be incorporated into hospital systems to assist anesthesiologists to report, evaluate and receive information regarding anesthetic incidents. The results of the incident analyses may be fed back into the system and so the 'loop' can be closed as part of a quality improvement system.

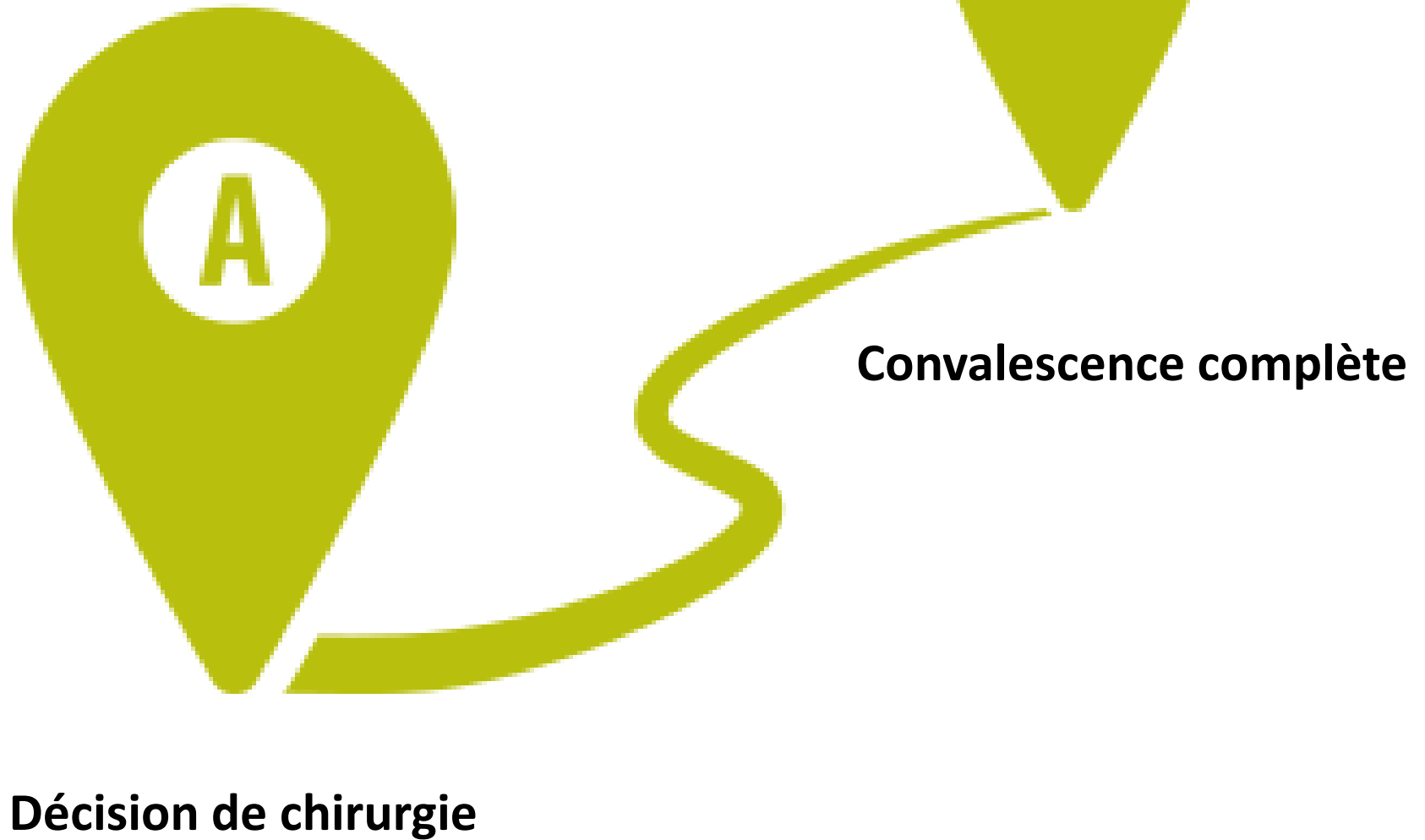




ANESTHÉSIOLOGIE



MÉDECINE PÉRIOPÉRATOIRE



ANESTHÉSIOLOGIE

*Spécialiste de la
période **opératoire***

- Éviter les poursuites
- Focus sur Mortalité
- Closed claims

MÉDECINE PÉRIOPÉRATOIRE

*Spécialiste de la
période **péri-opératoire***

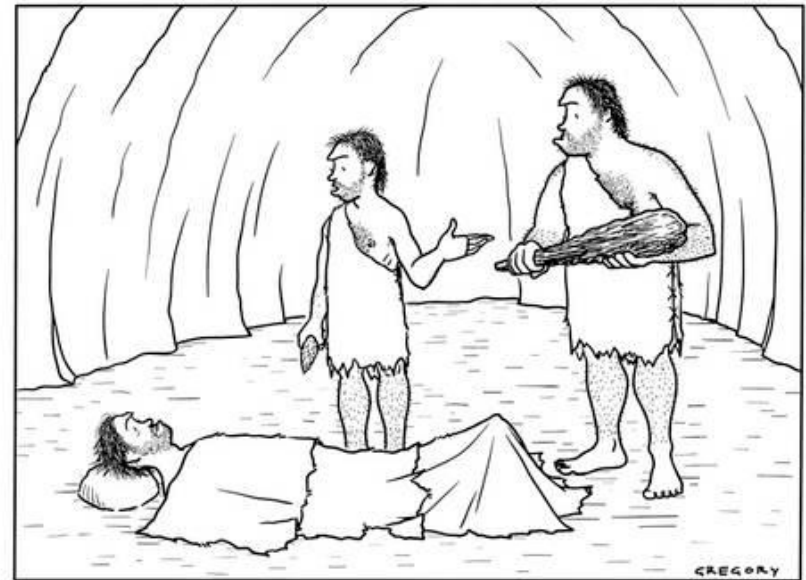
- Améliorer le devenir
- Focus sur la morbidité
- ERAS

MORBIDITÉ / MORTALITÉ

ANESTHÉSIOLOGIE

*Spécialiste de la
période **opératoire***

- Gestion des voies respiratoires
- Erreur de médicaments
- Positionnement et neuropathie périphérique
- Anesthésie obstétricale et douleur chronique
- Conscience situationnelle



"I'll be performing the operation, and this is the anesthesiologist."

Leading Causes of Anesthesia-Related Liability Claims in Ambulatory Surgery Centers

Darrell Ranum, JD, CPHRM, Anair Beverly, MB, BS, BSc,†
Fred E. Shapiro, DO,‡ and Richard D. Urman, MD, MBA, FASA§*

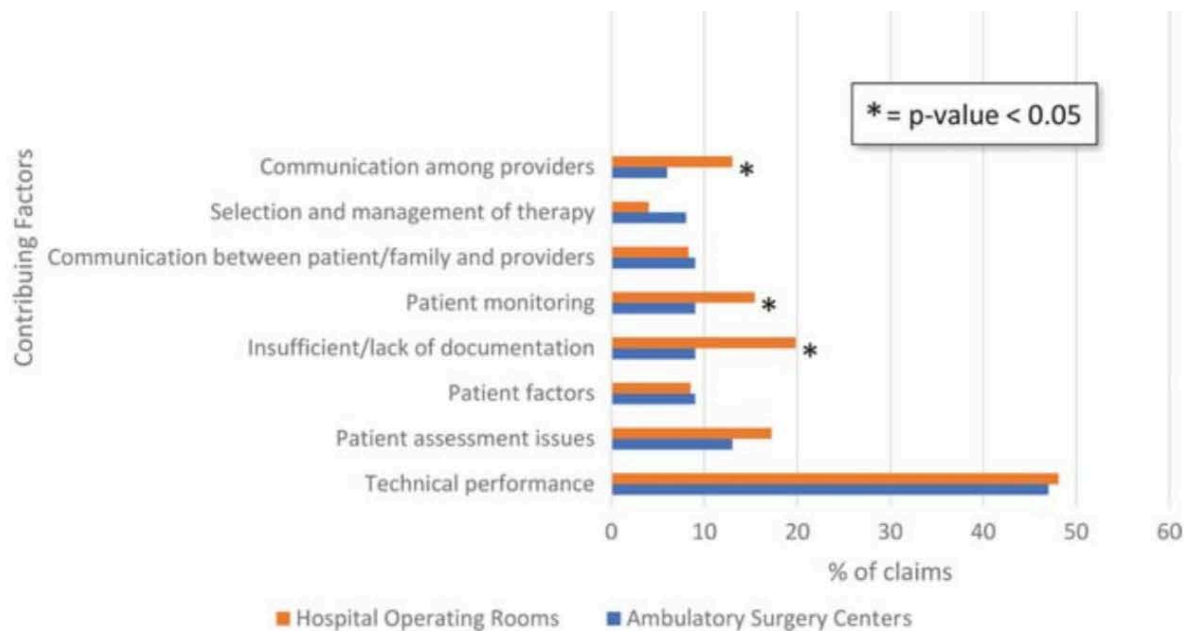
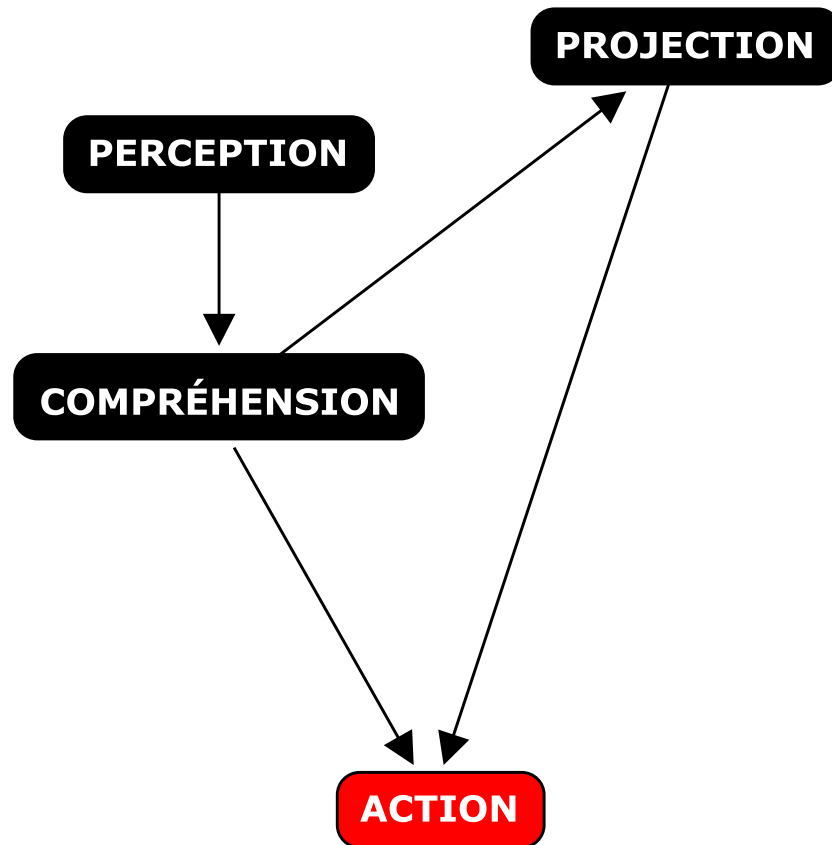


FIGURE 4. Contributing claims identified in claims from ASCs and HORs (2007–2014).

Frequency and Type of Situational Awareness Errors Contributing to Death and Brain Damage

A Closed Claims Analysis

Christian M. Schulz, M.D., Amanda Burden, M.D., Karen L. Posner, Ph.D., Shawn L. Mincer, M.S.W., Randolph Steadman, M.D., Klaus J. Wagner, M.D., Karen B. Domino, M.D., M.P.H.



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- Closed Claims database 2002-2013
- 16 compagnies d'assurance de responsabilité professionnelle (33% des anesthésiologistes américains)
- 10 546 demandes de dédommagements
- Critères inclusion:
 - Procédure chirurgicale avec anesthésie ou procédure anesthésique excluant obstétrique et médecine de la douleur
 - Événements intraopératoire
 - 1 seul anesthésiste
 - Mortalité et dommage neurologique qui rencontre les critères d'inclusion de la Table 1

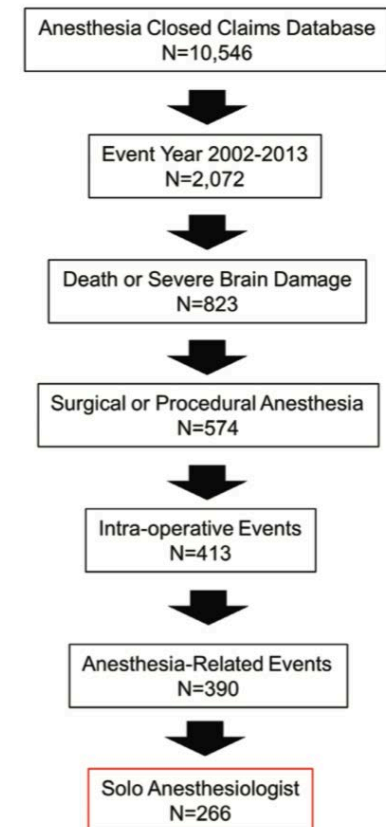


Table 1. Operationalized Definitions of Situational Awareness Error Levels

If there were SA errors at multiple levels, code the lowest level of anesthesia SA error.

Level 1: Perception: What is the information?

Key issue: Failure to gather information *via* history, physical exam, diagnostic tests, imaging, or monitors, including absence of monitor(s)

- Inadequate preoperative work-up (e.g., failure to question PO status or perform a more extensive cardiac evaluation)
- Limited monitoring (e.g., equipment defect/missing, failure to place an arterial line); missing information was deleterious (e.g., missing arterial line)
- Failure to monitor (missing EtCO₂; no SpO₂ reading; no arterial line; if there was no documentation that the patient was monitored, then assume the patient was not monitored—which *is* a level 1 error that does not **necessarily** have to result in a level 2 or 3 error and that does not **necessarily** have to contribute to death or brain damage)
- Failure to check (perceive) a specific detail of the patient history/chart/test results that normally prompts a specific procedure or action (e.g., failure to consider patient name, low hemoglobin)
- Information was wrong (e.g., a documented value was wrong), regardless of the cause of wrong information (e.g., due to human error or other reason)
- Nonawareness of the actions of other team members (such as the surgeon and nurses)
- Nonawareness of equipment function (including potential problems)
- Failure to communicate relevant information
- Hidden information (visual barrier, e.g., drapes)

Level 2: Comprehension: What does the information mean?

Key issue: Failure to *understand* the significance of information obtained from history, physical exam, diagnostic tests, imaging findings, or monitors. The information was available, but it was not understood or misunderstood. If a decision (or a lack of decision, as illustrated by missing reactions/nonactions) turns out wrong in face of a deteriorating event that occurred (just) in the past.

- Failure to make the correct diagnosis
- Failure to comprehend the cause and meaning of information (e.g., heart rate that is not within normal limits, 300–400ml filling drains in few minutes—empty, drains continue to fill—reasonable physician would conclude patient is bleeding, likely need to draw labs, give blood, possibly return to OR)
- If there is information that patient is deteriorating and reasonable clinician would make diagnosis and act/react—if the physician(s) in case do not react in such a manner, conclude that this diagnosis not made/failed to comprehend

Level 3: Projection: What is likely to occur?

Key issue: Failure to forecast future events or scenarios based on a high-level understanding of the situation; failure to forecast potential outcomes based upon a chosen plan; poor planning for future events or poor/absence back-up plan.

If a decision turns out wrong in face of unanticipated events (e.g., well-known complications) that occur in the future: Level 3.

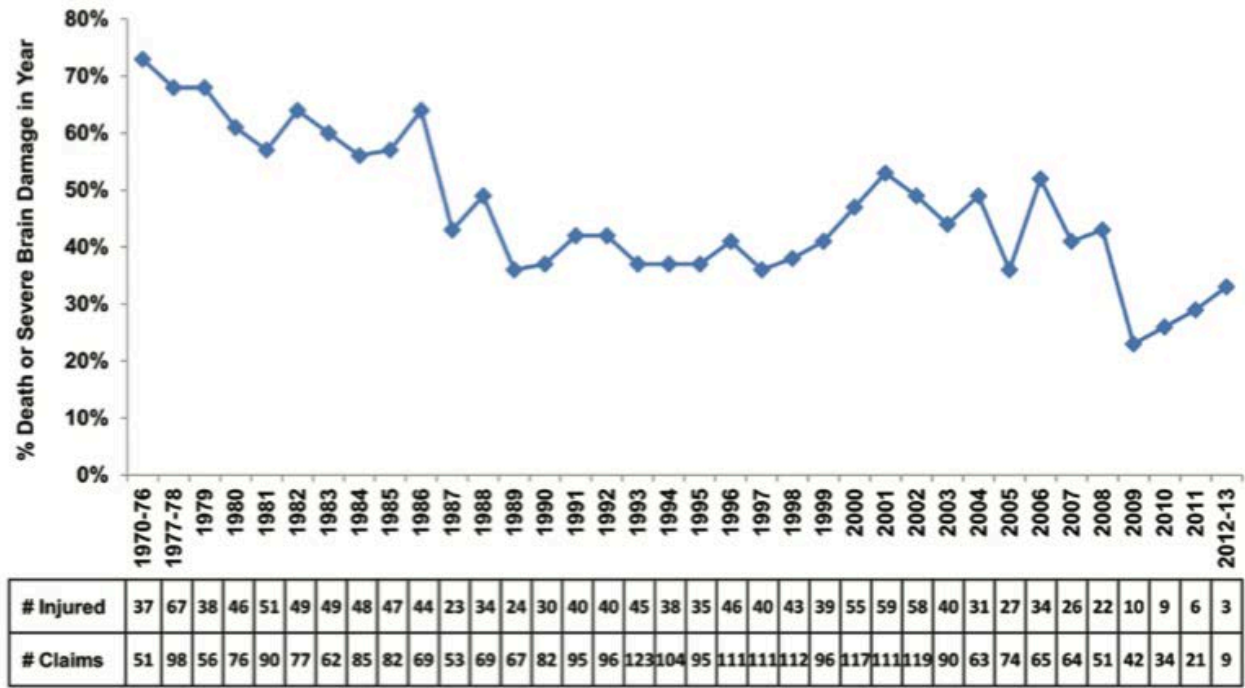
- Poor anesthetic plan (e.g., routine anesthesia plan for patient with known complex medical history or known significant comorbidities; office-based anesthesia for patient with significant comorbidities; or failure to plan for possible difficult airway in patient with obvious risk)
- Proactive measures were not taken adequately, although the deterioration was likely to occur or not surprising, retrospectively
- Failure to call for help to manage likely future complication/problems

EtCO₂ = end-tidal carbon dioxide; OR = operating room; PO = postoperative; SA = situational awareness; SpO₂ = peripheral capillary oxygen saturation.

Frequency and Type of Situational Awareness Errors Contributing to Death and Brain Damage

A Closed Claims Analysis

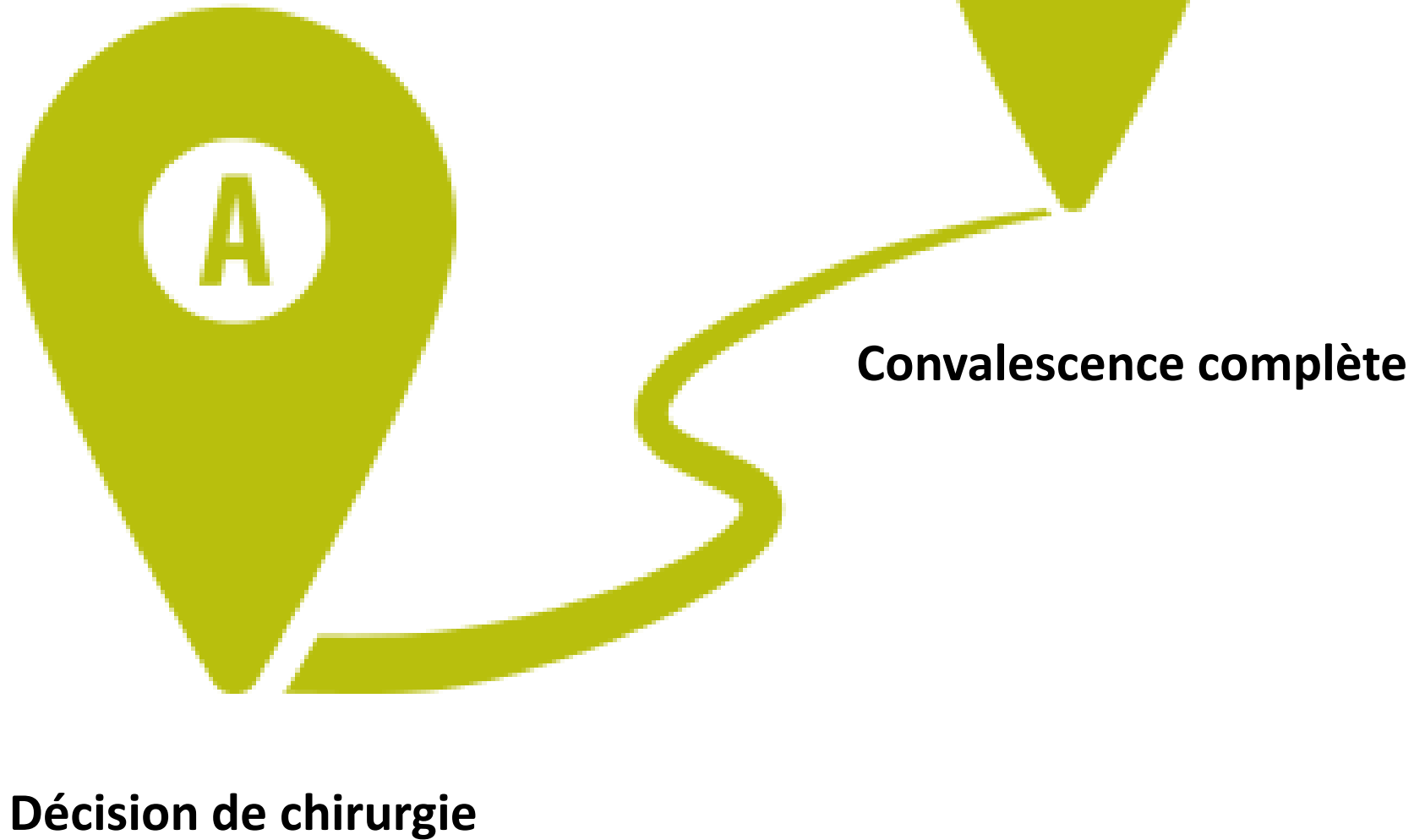
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Conscience situationnelle
198/266 (74%)

Perception 42%
Compréhension 29%
Projection 29%

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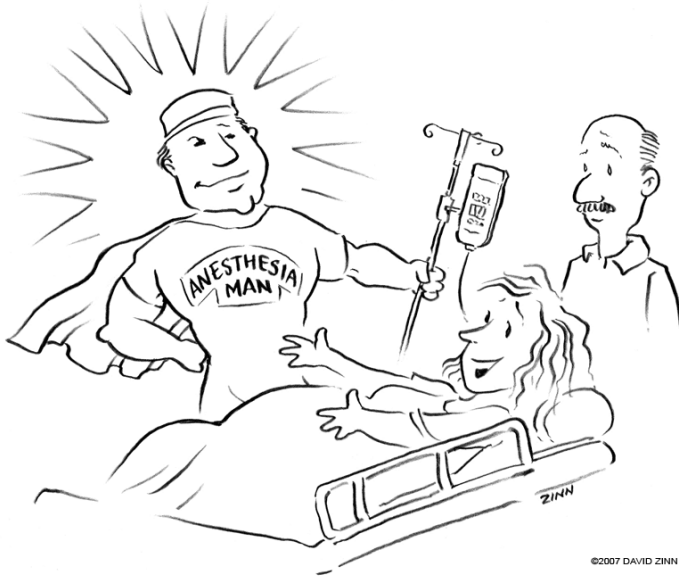


WITH
GREAT POWER COMES
GREAT RESPONSIBILITY

MORBIDITÉ / MORTALITÉ

MÉDECINE PÉRIOPÉRATOIRE

*Spécialiste de la
période **péri-opératoire***



- Évaluation pré-opératoire et optimisation du patient
- Évaluation de la perfusion des organes cibles
- Évaluation de la profondeur et **des effets neurologiques de l'anesthésiologie**
- Évaluation de la douleur, gestion des opiacés et place de la régionale
- Évaluation de l'état volémique et gestion des fluides
- Évaluation de l'hémostase et la gestion des produits sanguins
- Gestion de la ventilation...

Postoperative Cognitive Dysfunction and Noncardiac Surgery

Lisbeth A. Evered, PhD,*† and Brendan S. Silbert, MB, BS*†

Évolution de l'évaluation des atteintes neurologiques post-opératoire

1888	Savage décrit « Insanity after anesthesia »
1956	Papper et Turville rapporte que 7% des patients âgés sont irrationnels après une chirurgie
1975	Introduction du Mini-Mental (MMSE)
1980	Études in-vitro et animales démontrant la neurotoxicité et neuroplasticité des agents anesthésiques
1980	Test neuro-psychologique et introduction du terme POCD
1998	International Study of Postoperative Cognitive Dysfunction
2000	Études cliniques en chirurgie non-cardiaque
2010	Monitoring neurologique périopératoire
2010	Résonance magnétique fonctionnelle
2018	Effet spécifique de l'anesthésiologie

Long-term postoperative cognitive dysfunction in the elderly: ISPOCD1 study

J T Moller, P Cluitmans, L S Rasmussen, P Houx, H Rasmussen, J Canet, P Rabbitt, J Jolles, K Larsen, C D Hanning, O Langeron, T Johnson, P M Lauven, P A Kristensen, A Biedler, H van Beem, O Fraidakis, J H Silverstein, J E W Beneken, J S Gravenstein, for the ISPOCD investigators*

Risk factor	1 week		3 months	
	Number of patients	Patients with POCD	Number of patients	Patients with POCD
Age (years)				
60–69	586	135 (23%)	532	37 (7%)
≥70	425	123 (29%)	378	4 (14%)
Complication				
Hypoxaemia*	115	30 (26%)	98	11 (11%)
Hypotension†	229	60 (26%)	214	51 (9%)
Respiratory complication	99	40 (40%)	88	12 (14%)
Infectious complication	91	30 (33%)	138	12 (9%)
Second operation	24	13 (54%)	50	7 (14%)
Duration of anaesthesia (min)				
≤120	196	35 (18%)	179	2 (11%)
121–240	503	121 (24%)	448	40 (9%)
≥241	312	103 (33%)	283	4 (11%)
Education				
Less than high school	576	156 (27%)	518	47 (9%)
High school	290	75 (26%)	260	26 (10%)
More than high school	145	31 (21%)	132	16 (12%)
Benzodiazepines before surgery	116	33 (28%)	105	5 (5%)

POCD=postoperative cognitive dysfunction.
*One or more episodes of oxygen saturation ≤80% for >2 min.
†One or more episodes of mean arterial pressure ≤60% for ≥30 min.
Table 3: Proportion of patients with postoperative cognitive dysfunction at 1 week and 3 months by risk factor

It established that objective cognitive dysfunction as determined by a battery of neuropsychological testing was present in nearly **10% of elderly individuals at 3 months after noncardiac surgery** (3,4% in UK population).

Because both perioperative blood pressure and hypoxemia were monitored continually, these time- honored **physiological perturbations were eliminated as the cause of POCD.**

The study found associations **of POCD with increasing age and fewer years of education.**

Predictors of Cognitive Dysfunction after Major Noncardiac Surgery

Terri G. Monk, M.D., M.S., B. Craig Weldon, M.D.,† Cyndi W. Garvan, Ph.D.,‡ Duane E. Dede, Ph.D.,§ Maria T. van der Aa, M.S.,|| Kenneth M. Heilman, M.D.,# Joachim S. Gravenstein, M.D.***

Table 6. Summary Statistics for the Predictors of Cognitive Decline at Hospital Discharge

Predictor	POCD (n = 367)	No POCD (n = 654)	P Value
Age, yr	51.9 ± 17.3	49.4 ± 16.5	0.027
Years of education	13.2 ± 2.4	13.7 ± 2.8	0.013
ASA physical status			0.020
I	31 (3)	102 (10)	
II	194 (19)	337 (33)	
III	132 (13)	204 (20)	
IV	10 (1)	11 (1)	
Surgery category			0.001
Minimally invasive*	40 (4)	347 (34)	
Intraabdominal/thoracic	214 (21)	143 (14)	
Orthopedic	113 (11)	164 (16)	
Duration of hospital stay, days	6.6 ± 16.3	4.8 ± 5.9	0.0003
Delirium during hospital stay	15 (1.5)	11 (1.1)	0.046
Opioid use <24 h before test	324 (32)	265 (26)	0.010

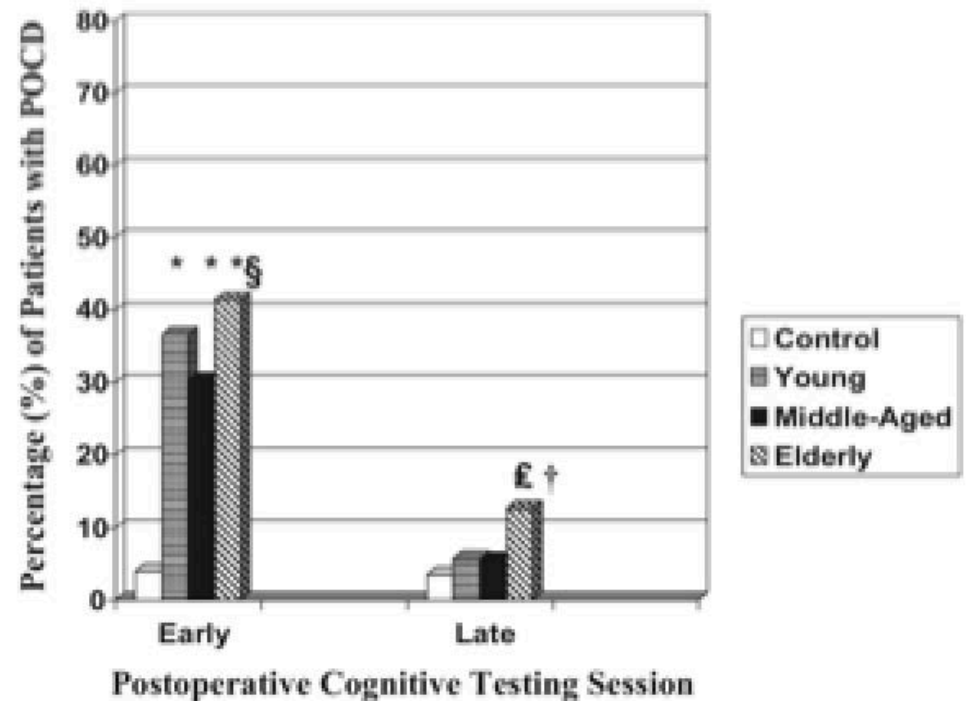
Predictors of Cognitive Dysfunction after Major Noncardiac Surgery

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Facteur de risque POCD 3 mois

Analyse multivariée

- Âge
- Année de scolarité
- ASA
- Durée du séjour hospitalier
- **POCD au congé**
- AVC sans séquelle



Long-term Consequences of Postoperative Cognitive Dysfunction

Jacob Steinmetz, M.D.,* Karl Bang Christensen, Ph.D.,† Thomas Lund, Ph.D.,‡ Nicolai Lohse, M.D., Ph.D.,§ Lars S. Rasmussen, M.D., D.M.Sc., Ph.D.,|| and the ISPOCD Group#

Table 2. Consequences of Postoperative Cognitive Dysfunction

	n	Time at Risk, Patient Years	Number of Events	Hazard Ratio (95% CI)	P Value
All-cause mortality*					
POCD at 1 week	119	1,029	54	0.91 (0.68–1.23)	0.55
No POCD at 1 week	492	3,867	206	1.00	
POCD at 3 months	57	412	32	1.63 (1.11–2.38)	0.01
No POCD at 3 months	539	4,449	217	1.00	
Labor market withdrawal†					
POCD at 1 week	29	100	16	2.26 (1.24–4.12)	0.01
No POCD at 1 week	169	791	40	1.00	
POCD at 3 months	11	41	4	1.17 (0.42–3.28)	0.76
No POCD at 3 months	183	849	51	1.00	
Nursing home placement					
POCD at 1 week	119	1,008	5	0.61 (0.24–1.58)	0.31
No POCD at 1 week	492	3,815	29	1.00	
POCD at 3 months	57	404	4	1.45 (0.51–4.10)	0.49
No POCD at 3 months	539	4,377	31	1.00	

Long-term Consequences of Postoperative Cognitive Dysfunction

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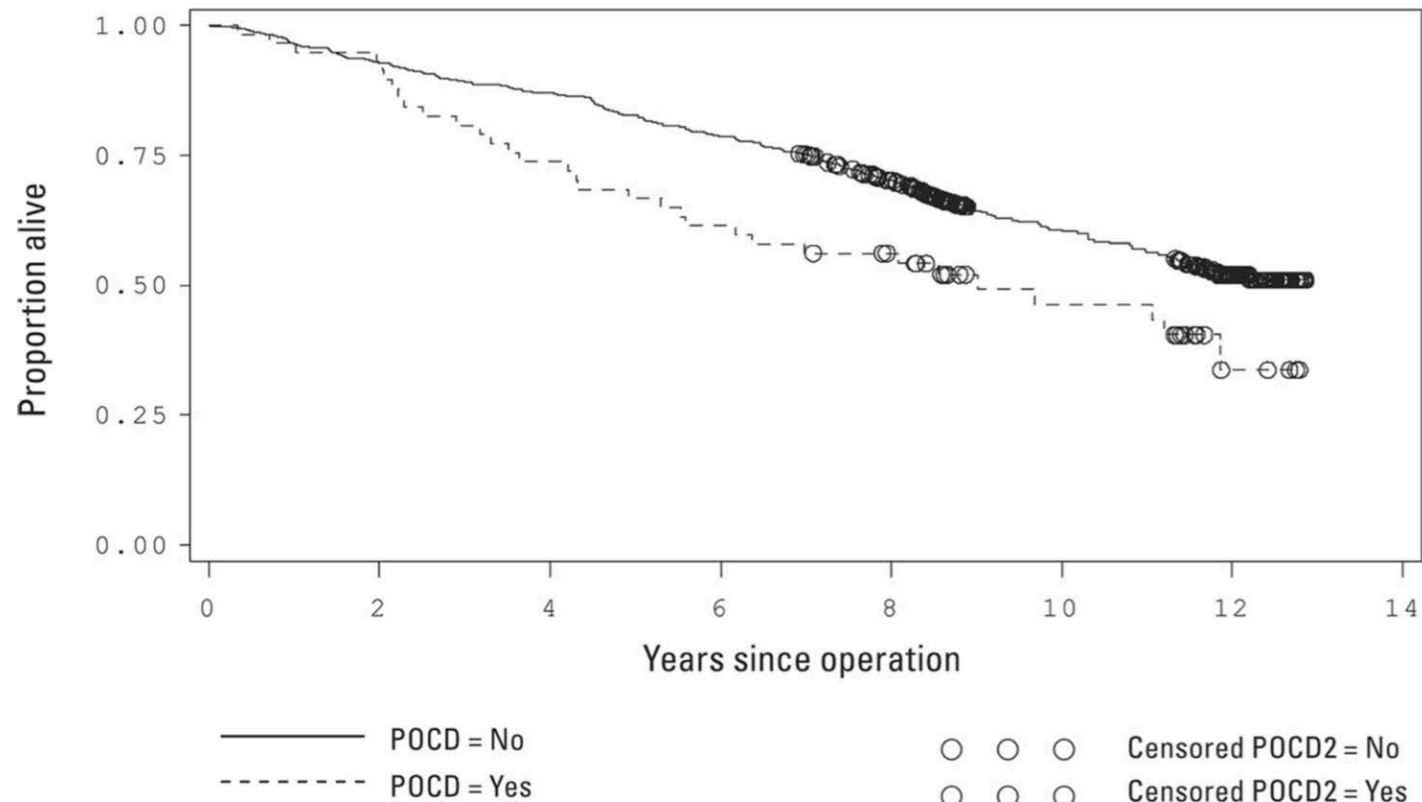
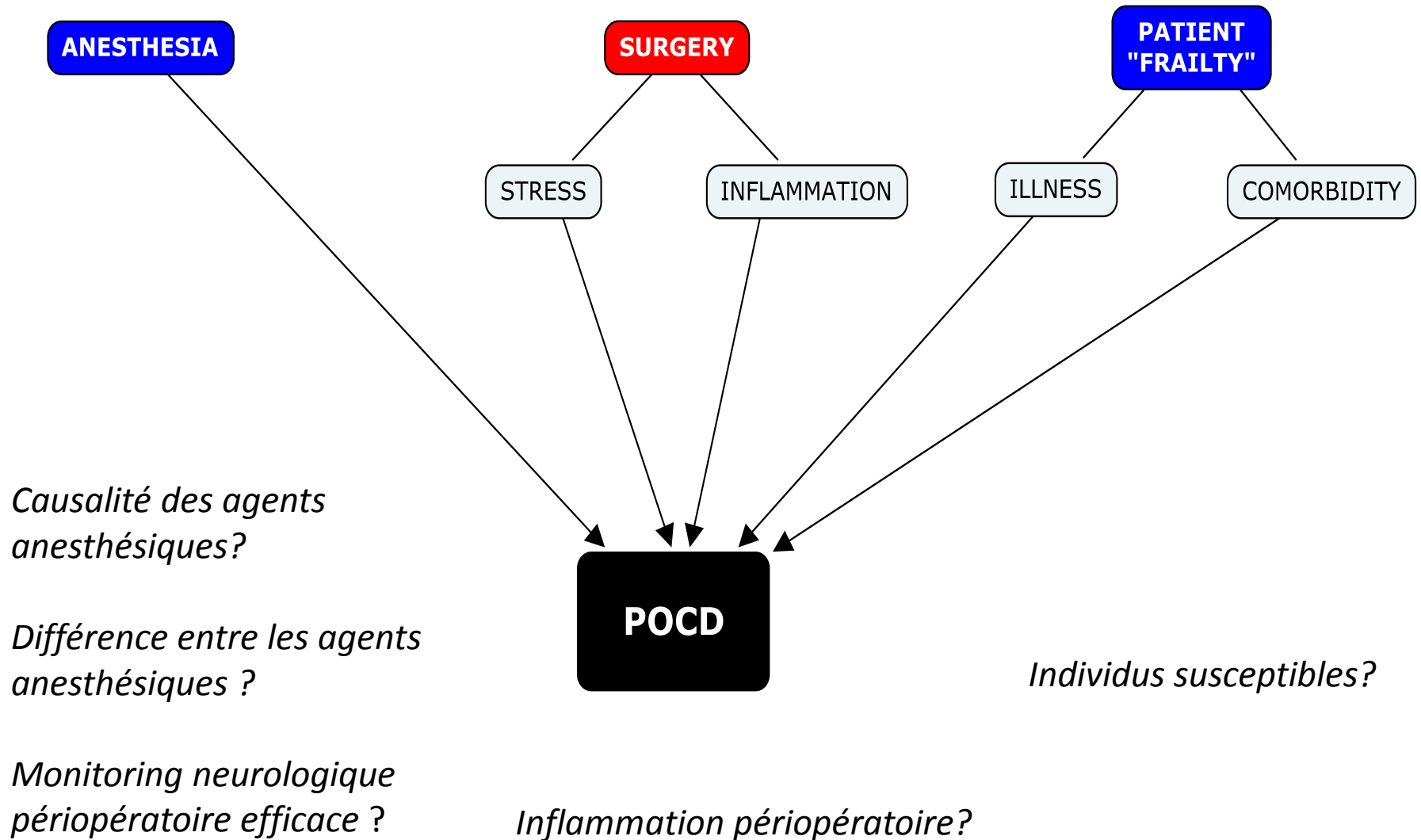


Fig. 2. Survival of patients (n = 596) according to the presence of postoperative cognitive dysfunction (POCD) or not as assessed 3 months after noncardiac surgery. Circles are censored observations.

ASA 2018 Patient Safety Initiative



Preexisting Cognitive Impairment Is Associated with Postoperative Cognitive Dysfunction after Hip Joint Replacement Surgery

Brendan Silbert, M.B., B.S., F.A.N.Z.C.A., Lisbeth Evered, B.Sc., M.Biostat., Ph.D., David A. Scott, M.B., B.S., F.A.N.Z.C.A., Ph.D., Stephen McMahon, M.B.B.S., F.R.A.C.S.(Orth), F.A.(Orth), Peter Choong, M.B., B.S., M.D., F.R.A.C.S., David Ames, B.A., M.D., F.R.C.Psych., F.R.A.N.Z.C.P., Paul Maruff, Ph.D., Konrad Jamrozik, Ph.D.†

Table 3. Prevalence of Preexisting Cognitive Impairment and Incidence of Postoperative Cognitive Dysfunction and Cognitive Decline

	PreCI (n = 96)	No PreCI (n = 204)	<i>P</i> Value	95% CI Difference
Day 7				
POCD	23/91 (25.3%)	26/195 (13.3%)	0.012	12% (2%, 22%)
95% CI	16.7%, 35.5%	8.9%, 18.9%		
3 months				
POCD	13/87 (14.9%)	14/197 (7.1%)	0.039	7.8% (1%, 16%)
95% CI	8.2%, 24.2%	3.9%, 11.6%		
12 months				
Cognitive decline	5/83 (9.4%)	2/188 (1.1%)	<0.001	8.3% (2%, 15%)
95% CI	2.0%, 13.5%	0.1%, 3.8%		

Incidence of postoperative cognitive dysfunction after general or spinal anaesthesia for extracorporeal shock wave lithotripsy

B. S. Silbert^{1,2*}, L. A. Evered^{1,2} and D. A. Scott^{1,2}

Table 2 Neuropsychological testing of participants and controls at baseline. Data are mean (SD). Tests are: CERAD-AVLT, Consortium to Establish a Registry for Alzheimer's Disease Auditory Verbal Learning Test; DSST, Digit Symbol Substitution Test; TMTA, Trail Making Test Part A; TMTB, Trail Making Test Part B; COWAT, Controlled Oral Word Association Test; CERAD, Consortium to Establish a Registry for Alzheimer's Disease-semantic fluency (animals); GPD, Grooved Peg Board Test, Dominant; GPND, Grooved Peg Board Test, Non-dominant. Adjusted *P*-value is based on the Holmes–Bonferroni correction for multiple comparisons

	GA (n=50)	Spinal (n=48)	Controls (n=26)	GA vs spinal, adjusted <i>P</i> -value	GA vs controls, adjusted <i>P</i> -value	Spinal vs controls, adjusted <i>P</i> -value
CERAD-AVLT (n)	17.5 (4.5)	16.9 (3.6)	18.5 (3.7)	0.43	0.99	0.35
TMTA (s)	53.3 (22.7)	54.7 (22.3)	45.7 (14.2)	0.76	0.50	0.35
TMTB (s)	121.7 (50.9)	131.1 (62.5)	95.3 (44.9)	0.41	0.18	0.07
DSST (n)	36.5 (13.1)	36.4 (12.3)	41.4 (10.0)	0.97	0.50	0.35
COWAT (n)	31.8 (11.8)	32.1 (11.9)	41.8 (13.9)	0.89	0.01	0.02
CERAD-fluency (n)	17.7 (4.7)	17.6 (4.7)	20.7 (4.9)	0.85	0.07	0.07
GPD (s)	87.5 (18.1)	93.3 (27.6)	84.1 (15.2)	0.22	0.99	0.35
GPND (s)	95.8 (27.6)	108.9 (56.1)	93.8 (18.6)	0.15	0.99	0.35

Cognitive function after sevoflurane- vs propofol-based anaesthesia for on-pump cardiac surgery: a randomized controlled trial

J. Schoen*, L. Husemann, C. Tiemeyer, A. Lueloh, B. Sedemund-Adib, K.-U. Berger, M. Hueppe and M. Heringlake

Table 1 Anaesthesia protocol in the study groups. CPB, cardiopulmonary bypass; MAC, mean alveolar concentration; BIS, bispectral index

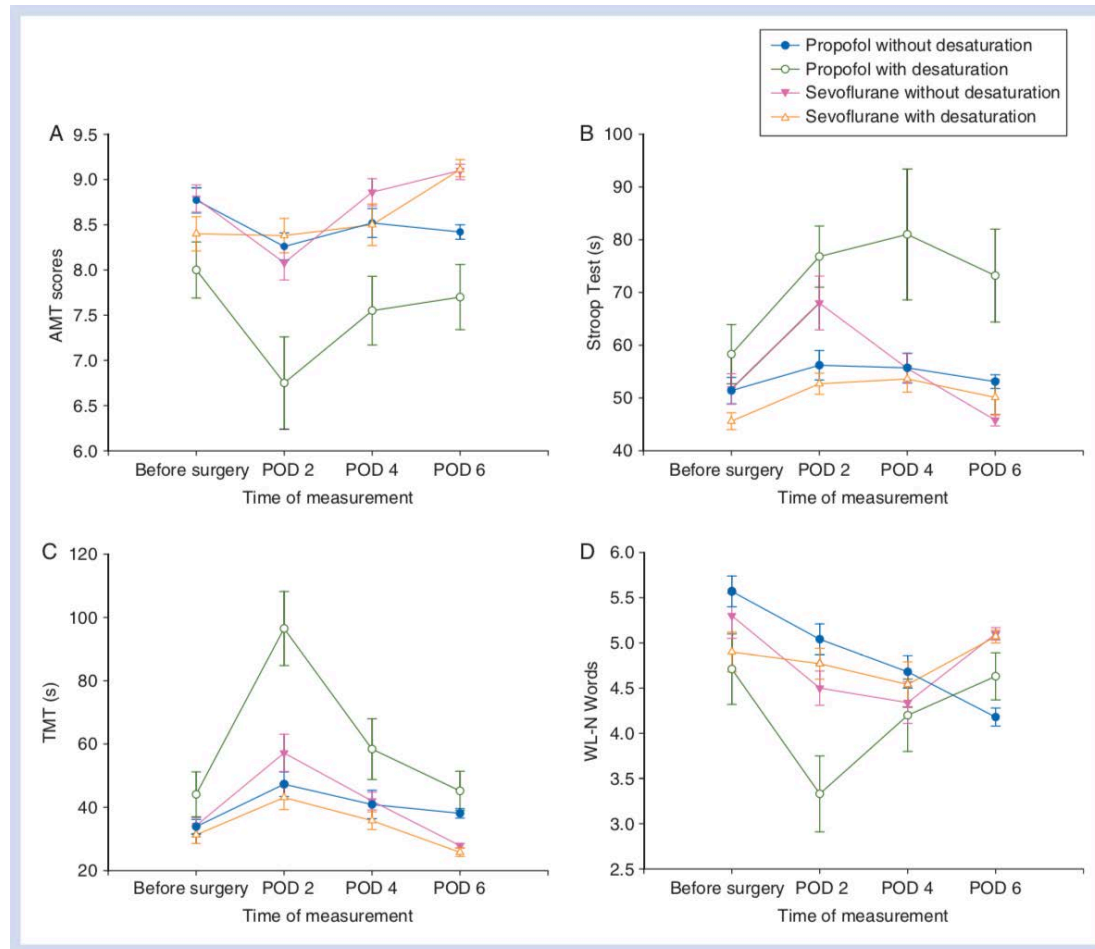
	I.V. group (PROP)	Volatile group (SEVO)
Induction of anaesthesia	Etomidate 0.2–0.3 mg kg ⁻¹ , sufentanil 1 µg kg ⁻¹ , pancuronium 0.07–0.1 mg kg ⁻¹	
Maintenance of anaesthesia before and after CPB	Remifentanil 0.2–0.25 µg kg ⁻¹ min ⁻¹ , propofol 3–5 mg kg ⁻¹ h ⁻¹ achieving a BIS of 40–50	Remifentanil 0.2–0.25 µg kg ⁻¹ min ⁻¹ , sevoflurane 0.6–1 MAC (age-adapted) achieving a BIS of 40–50
During CPB	Propofol 3–5 mg kg ⁻¹ h ⁻¹ according to BIS (aim 40–50)	

Table 2 Definition of major organ system complications. AMT, Abbreviated Mental Test; CI, cardiac index; ICU, intensive care unit

Organ system complication	Definition
Brain	AMT <6 at any of the 3 postoperative measurements and/or focal cerebral deficit
Kidney	Increase in creatinine >0.3 mg dl ⁻¹ within 48 h
Heart	CI <2.5 for more than 2 h during ICU stay and/or need for noradrenalin >0.5 mg h ⁻¹ and/or dobutamine >25 mg h ⁻¹ and/or milrinone >1.2 mg h ⁻¹ at any time during ICU stay
Lung	Need for mechanical ventilation for more than 12 h and/or need for reintubation

Cognitive function after sevoflurane- vs propofol-based anaesthesia for on-pump cardiac surgery: a randomized controlled trial

J. Schoen*, L. Husemann, C. Tiemeyer, A. Lueloh, B. Sedemund-Adib, K.-U. Berger, M. Hueppe and M. Heringlake



BIS-guided Anesthesia Decreases Postoperative Delirium and Cognitive Decline

Matthew T.V. Chan, MBBS, FANZCA, Benny C.P. Cheng, MBBS, FHKCA,†
Tatia M.C. Lee, PhD,‡ Tony Gin, MD, FRCA, FANZCA,* and the CODA Trial Group*

TABLE 4. Postoperative Cognitive Outcomes

	BIS Group	Routine Care Group	Odds Ratio (95% CI)	<i>P</i>
Cognitive failure questionnaire at 3 mo after surgery No./total no. (%)	29/412 (7.0%)	31/423 (7.3%)	0.95 (0.41-1.98)	0.14
Delirium No./total no. (%)	70/450 (15.6%)	109/452 (24.1%)	0.58 (0.41-0.80)	0.01
Postoperative cognitive dysfunction 1 wk after surgery No./total no. (%)	83/382 (21.7%)	93/401 (23.1%)	0.92 (0.66-1.29)	0.06
3 mo after surgery No./total no. (%)	42/412 (10.2%)	62/423 (14.7%)	0.62 (0.39-0.97)	0.02

BIS indicates bispectral index.



Processed electroencephalogram and evoked potential techniques for amelioration of postoperative delirium and cognitive dysfunction following non-cardiac and non-neurosurgical procedures in adults (Review)

Punjasawadwong Y, Chau-in W, Laopaiboon M, Punjasawadwong S, Pin-on P

Figure 4. Forest plot of comparison: I Processed EEG versus clinical signs guided anaesthesia, outcome: I.I POD.

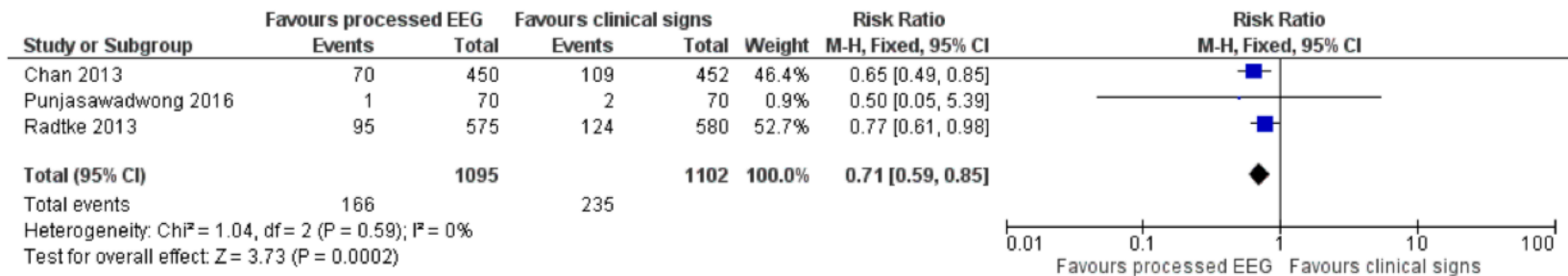


Figure 5. Forest plot of comparison: I Processed EEG versus clinical signs guided anaesthesia, outcome: I.2 POCD at one week.

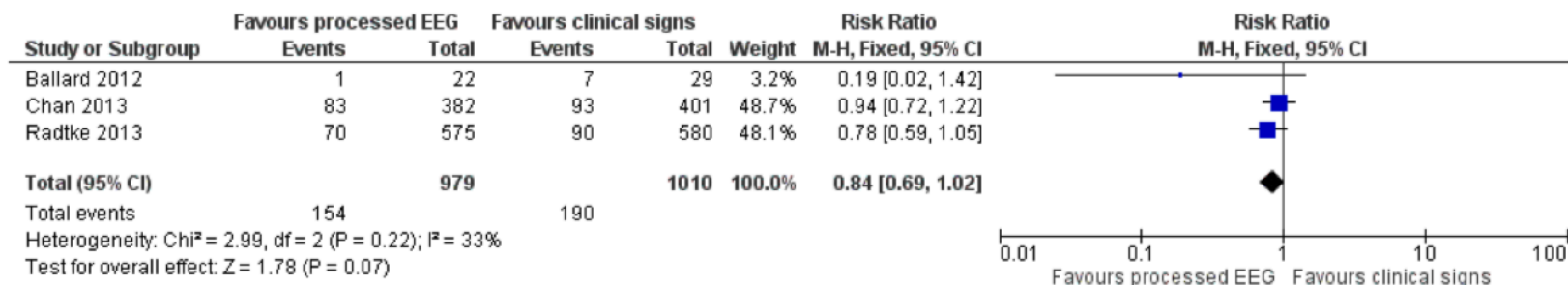
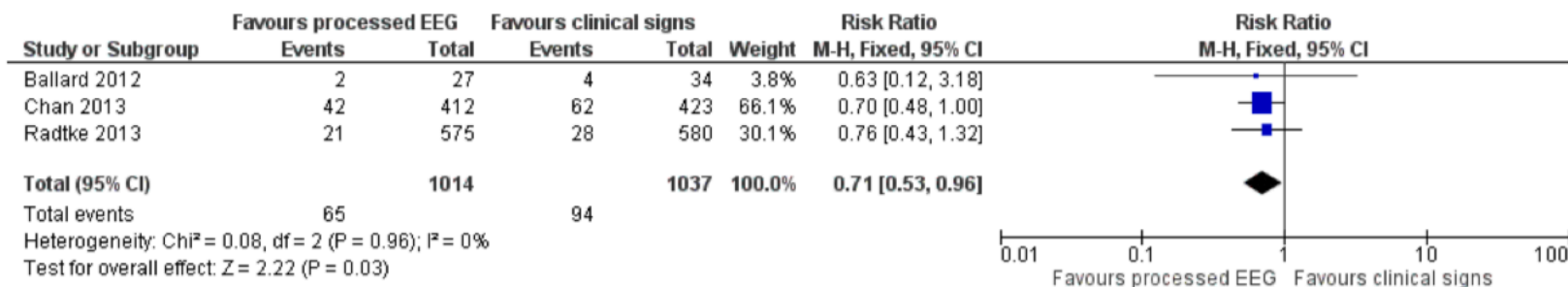


Figure 6. Forest plot of comparison: I Processed EEG versus clinical signs guided anaesthesia, outcome: I.3 POCD at 12 weeks.



Delineating the Trajectory of Cognitive Recovery From General Anesthesia in Older Adults: Design and Rationale of the TORIE (Trajectory of Recovery in the Elderly) Project

Joshua S. Mincer, MD, PhD,*† Mark G. Baxter, PhD,*‡§ Patrick J. McCormick, MD, MEng,* Mary Sano, PhD,†|| Arthur E. Schwartz, MD,* Jess W. Brallier, MD,* Heather G. Allore, PhD,¶ Bradley N. Delman, MD,# Margaret C. Sewell, PhD,|| Prantik Kundu, PhD,#|| Cheuk Ying Tang, PhD,#|| Angela Sanchez, BS,* and Stacie G. Deiner, MD, MS*§**

- Patient de 40-80 ans
- Pas de chirurgie
- AG 120 min
- 76 volontaires sains (19 patients par décade)
 - ASA 1-2
 - Pas de dysfonction cognitive pré-op

Table 2. Timeline of Anesthesia, Cognitive Testing, and Neuroimaging										
	T – 1 d	T0	T + 15	T + 60	T + 1 d	T + 3 d	T + 7 d	T + 30 d	T + 6 mo	T + 12 mo
Consent	X									
PQRS	X		X	X	X	X	X	X	X	X
Cognitive	X				X		X	X		
MRI		X		X	X		X			
Anesthesia		X								

Abbreviations: MRI, magnetic resonance imaging; PQRS, Postoperative Quality of Recovery Scale.

Delineating the Trajectory of Cognitive Recovery From General Anesthesia in Older Adults: Design and Rationale of the TORIE (Trajectory of Recovery in the Elderly) Project

Joshua S. Mincer, MD, PhD,*† Mark G. Baxter, PhD,*‡§ Patrick J. McCormick, MD, MEng,* Mary Sano, PhD,†|| Arthur E. Schwartz, MD,* Jess W. Brallier, MD,* Heather G. Allore, PhD,¶ Bradley N. Delman, MD,# Margaret C. Sewell, PhD,|| Prantik Kundu, PhD,#|| Cheuk Ying Tang, PhD,#|| Angela Sanchez, BS,* and Stacie G. Deiner, MD, MS*§**

- AG standardisée
 - 2 mg/kg propofol à l'induction
 - Masque laryngé
 - Sevo pour maintenir BIS 40-60
 - Vasopresseurs pour maintenir TAM 20%
 - Pas de narcotiques, benzos et relaxants musculaires

Table 4. Neuroimaging

Modality	Function
Anatomical MRI	Anatomical template for functional scans Rule out intracranial pathology before anesthesia
Task-based fMRI (N-Back)	Evoked functional activation in awake participant
Resting-state fMRI	Resting-state (not evoked) functional connectivity in awake and anesthetized participant
Diffusion tensor imaging	Structural connectivity as supported by axonal bundle formations
Arterial spin labeling	Regional cerebral blood flow

Abbreviation: fMRI, functional magnetic resonance imaging.

Table 3. Cognitive Testing

Function	NIH Toolbox Test	Paper/Pencil Test
Executive function and attention	Dimensional change card sort test Flanker inhibitory control and attention test	Trails A/B
Episodic memory	Picture sequence memory test	CVLT Logical memory
Language	Picture vocabulary test Oral reading recognition test	Category fluency
Processing speed	Oral symbol digit test	
Working memory	List sorting working memory test	

Abbreviations: CVLT, California verbal learning test; NIH, National Institutes of Health.

*If you are not
keeping score,
you are only
practising...*



Vince Lombardi

Morbidité et mortalité en anesthésiologie

Conclusions

- Le processus d'évaluation de la qualité de l'acte est indispensable à l'amélioration des soins dispensés aux patients.
- L'anesthésiologiste comme médecin périopératoire a une responsabilité accrue dans le devenir de son patient.
- L'évaluation de la qualité de l'acte en anesthésiologie doit être faite indépendamment de celle faite en chirurgie.
- La morbidité et la mortalité associées aux gestes techniques diminuent avec le développement de la technologie mais les erreurs secondaires à la conscience situationnelle reste stable.
- L'évaluation des atteintes cognitives est un bon exemple. Le lien de causalité avec l'anesthésiologie doit être élucidé pour définir les efforts nécessaires pour les détecter précocement et diminuer leur incidence au minimum.



Leading Causes of Anesthesia-Related Liability Claims in Ambulatory Surgery Centers

Darrell Ranum, JD, CPHRM, Anair Beverly, MB, BS, BSc,†
Fred E. Shapiro, DO,‡ and Richard D. Urman, MD, MBA, FASA§*

TABLE 1. National Association of Insurance Commissioners Injury Severity Scale

NAIC Injury Severity Scale	Descriptions
Low severity	
1. Emotional only	
2. Temporary insignificant	Lacerations, contusions, minor scars, rash, no delay in recovery
Medium severity	
3. Temporary minor	Infections, fractures, missed fractures, recovery delayed
4. Temporary major	Burns, surgical material left in patient, drug adverse effect, recovery delayed
5. Permanent minor	Loss of fingers, loss or damage to organs, nondisabling injuries
High severity	
6. Permanent significant	Deafness, loss of limb, loss of eye, loss of one kidney or lung
7. Permanent major	Paraplegia, blindness, loss of two limbs, brain damage
8. Permanent grave	Quadriplegia, severe brain damage, lifelong care or fatal prognosis
9. Death	

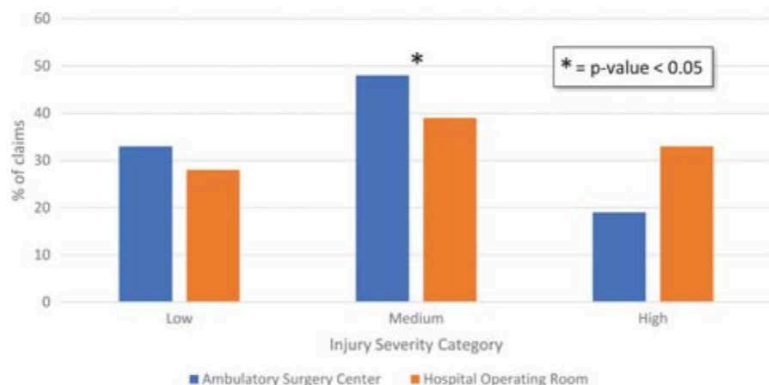


FIGURE 1. Anesthesia closed claims by injury severity category (2007–2014).

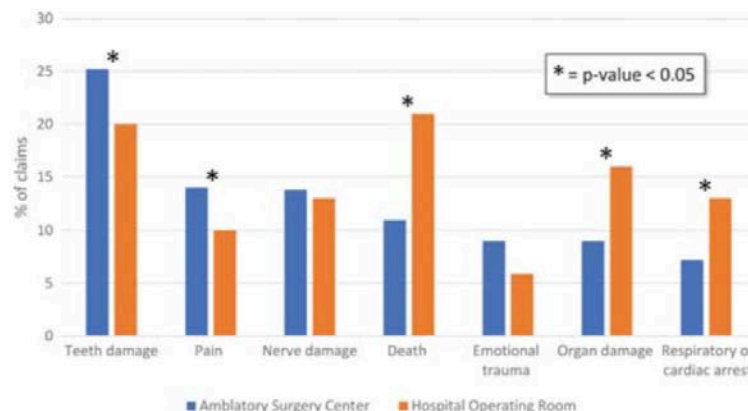


FIGURE 2. Injuries most frequently sustained from injuries from ASCs versus HORs (2007–2014).

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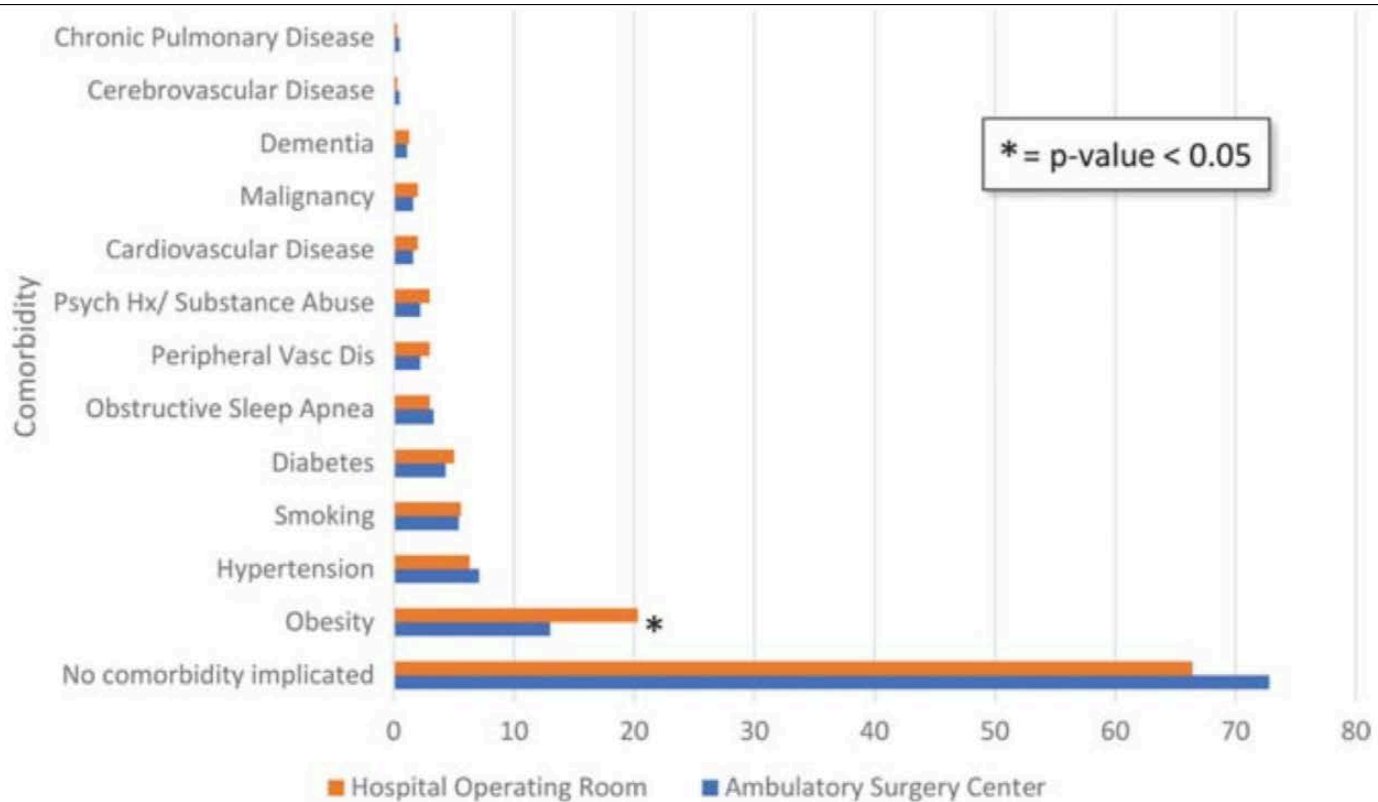


FIGURE 6. Comorbidities identified as contributing factors in anesthesia claims in ASCs and HORs (2011–2014).

Postoperative Opioid-induced Respiratory Depression

A Closed Claims Analysis

Lorri A. Lee, M.D., Robert A. Caplan, M.D., Linda S. Stephens, Ph.D., Karen L. Posner, Ph.D., Gregory W. Terman, M.D., Ph.D., Terri Voepel-Lewis, Ph.D., R.N., Karen B. Domino, M.D., M.P.H.

Table 1. Characteristics of Respiratory Depression Claims*

Characteristic	n (%)
Female (n = 91)	52 (57)
Obese (n = 71)	47 (66)
ASA physical status 1–2 (n = 87)	55 (63)
Age (mean $\pm$ SD), yr, (n = 85)	50 $\pm$ 17.7
Patient $\geq$ 50 yr old (n = 85)	37 (44)
History of chronic opioid use	7 (8)
OSA diagnosis	15 (16)
High risk of OSA†	8 (9)
Lower extremity surgery	38 (41)

Postoperative Opioid-induced Respiratory Depression

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Table 2. Medication Factors Associated with Respiratory Depression

	n (%)
Routes of Opioid Therapy	
PCA only	17 (18)
Neuraxial only	16 (17)
Other only*	16 (17)
Multimodal†	43 (47)
Continuous infusion of opioids	42 (46)
Interaction of opioid and nonopioid sedative medications	31 (34)
More than one physician prescribing (n = 91)	30 (33)
Excessive opioid dose	15 (16)

Table 3. Postoperative Opioids by Routes of Administration*

	All Claims (n = 92)	Neuraxial† (n = 36)	PCA (n = 49)	IV bolus (n = 49)
	n (%)	n (%)	n (%)	n (%)
Opioid				
Morphine	59 (64)	17 (47)	33 (67)	29 (59)
Fentanyl	23 (25)	19 (53)	2 (4)	5 (10)
Meperidine	22 (24)	1 (3)	6 (12)	14 (29)
Hydromorphone	23 (25)	0 (0)	14 (29)	13 (27)
Other‡	11 (12)	4 (12)	1 (2)	1 (2)
Continuous infusion of opioids				
Yes §		27 (75)	16 (33)	
No		9 (25)	4 (8)	
Unknown		0 (0)	29 (59)	

Postoperative Opioid-induced Respiratory Depression

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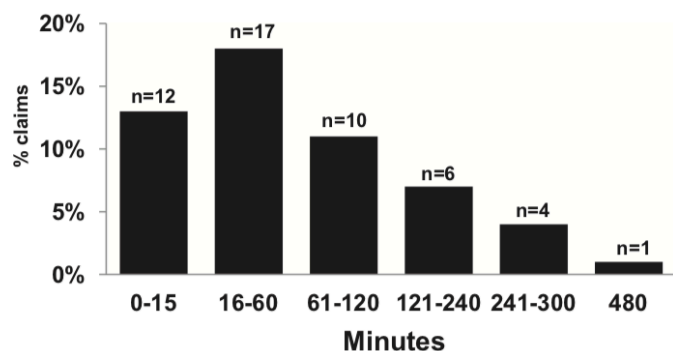


Fig. 1. Time between last nursing check and discovery of opioid-induced respiratory depression (RD). Claims with unknown timing (n = 39) and not applicable (at home, n = 3) not shown.

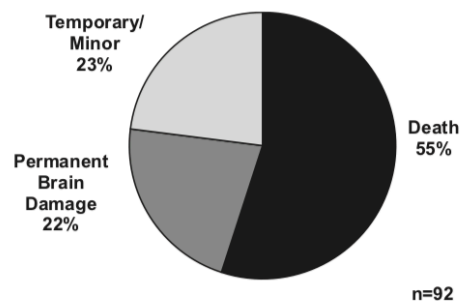


Fig. 2. Severity of injury in opioid-induced respiratory depression (RD) claims. More than half (55%) of the RD claims were associated with death, and approximately one quarter (22%) were associated with severe brain damage.

Table 4. Timing, Monitoring, and Nursing Assessments*

	n (%)
Timing of RD event	
Day of surgery	81 (88)
Within 2 h of arrival on floor†	12 (13)
Monitoring	
Pulse oximetry‡	30 (33)
No respiratory monitoring	53 (58)
Supplemental oxygen in use before event	14 (15)
Nursing assessments and patient status	
Patient experienced heavy snoring before event§	14 (15)
Patient experienced somnolence before event (n = 91)	56 (62)
Inadequate nursing checks (n = 89)	28 (31)

Claims for compensation after injuries related to airway management: a nationwide study covering 15 years

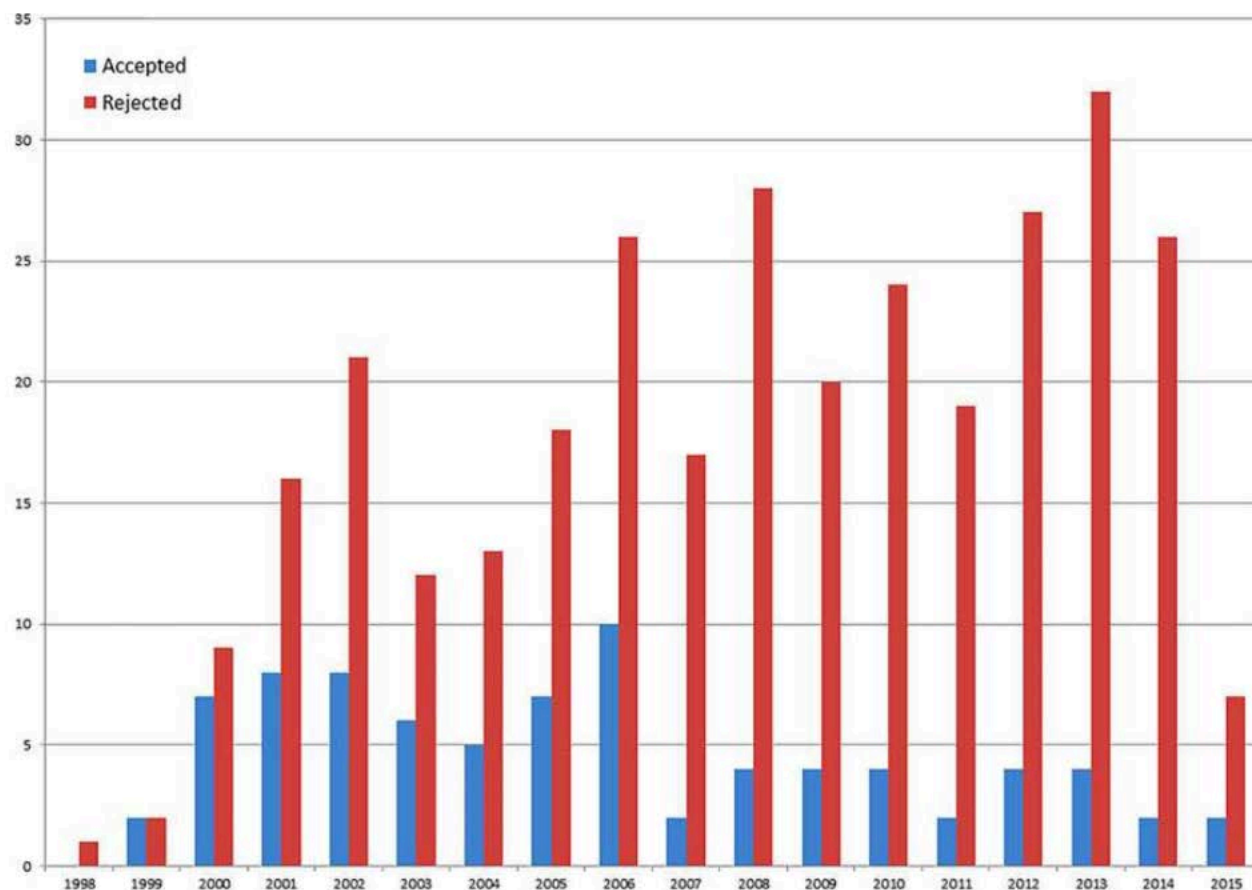
I. Fornebo¹, K. A. Simonsen², I. R. K. Bukholm^{1,3} and U. E. Kongsgaard^{1,4} 

¹Medical Faculty, Oslo University, Oslo, Norway

²Department of Medical Experts, The Norwegian system of Compensation to Patients (NPE), Oslo, Norway

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Claims for compensation after injuries related to airway management: a nationwide study covering 15 years

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⁴Department of Anaesthesiology, Division of Emergencies and Critical Care, Oslo University Hospital, Oslo, Norway

Table 1 Categories of injuries for the 359 non-severe and 41 severe injuries.

	Categories of injuries	Number of claims
Non-severe injuries	Dental injury	326
	Soft tissue damage	28
	Temporomandibular joint damage	5
	Total	359
Severe injuries	Failed intubation	13
	Misplaced endotracheal tube	9
	Aspiration	9
	Miscellaneous	10
	Total	41

Table 3 Reasons for rejection and acceptance of compensation (all patients).

	Decisions of claims	Number
Non-severe injuries		
Compensation rejected	Lack of causal relationship	56
	Care found to be adequate	247
Compensation accepted	Substandard care	51
	The reasonable rule	5
Severe injuries		
Compensation rejected	Lack of causal relationship	9
	Care found to be adequate	6
	No financial loss	2
Compensation accepted	Substandard care	18
	The reasonable rule	6

Perioperative Peripheral Nerve Injury After General Anesthesia: A Qualitative Systematic Review

Jason Chui, MBChB, FANZCA,* John M. Murkin, MD, FRCPC,* Karen L. Posner, PhD,† and Karen B. Domino, MD, MPH†

Table 3. Patient and Case Characteristics, Severity of Injury, and Liability in Peripheral Nerve Injury Versus Other Malpractice Claims^a

	No. (%) of Peripheral Nerve Injury Claims (n = 420)	No. (%) of Other Claims (n = 3034)	P
Male (n = 3438)	248 (59)	1475 (49)	<.01
Adult	416 (99)	2778 (92)	<.01
ASA physical status I–II (n = 3140)	246 (67)	1393 (50)	<.01
Emergency (n = 3293)	38 (9)	482 (17)	<.01
Age (y) (n = 3417): mean [SD]	47 [14]	46 [20]	.55
Surgical procedures			.269
Spine	60 (14)	391 (13)	
Orthopedic (nonspine)	59 (14)	522 (17)	
Cardiac	38 (9)	211 (7)	
Neurosurgery	7 (2)	59 (2)	
All other	256 (61)	1851 (61)	
Surgical position (n = 3206)			<.01
Supine	239 (59)	2120 (76)	
Lithotomy	63 (16)	158 (6)	
Prone	48 (12)	305 (11)	
Other	53 (13)	220 (8)	
Severity of injury			<.01
Temporary	162 (39)	1036 (34)	
Permanent nondisabling	156 (37)	306 (10)	
Permanent/disabling or death ^a	102 (24)	1692 (56)	
Liability			
Appropriate anesthesia care (n = 3029)	334 (91)	1540 (58)	<.01
Anesthesia payment made (n = 2532)	80 (30)	1104 (49)	<.01
Anesthesia payment amount: median (interquartile range)	\$80,250 (\$33,500–\$285,650)	\$262,500 (\$81,500–\$718,100)	<.01

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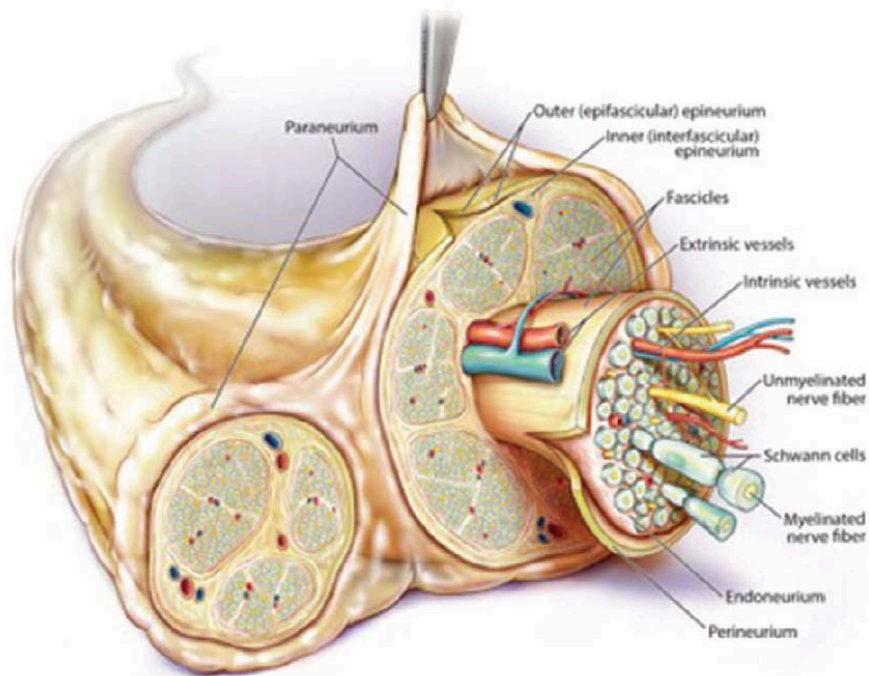


Table 4. Types of Peripheral Nerve Injuries, Severity of Injury, and Related Events in Anesthesia Malpractice Claims

	No. (%) of Peripheral Nerve Injury Claims (n = 420)
Most common nerve injuries	
Brachial plexus	150 (36)
Ulnar	126 (30)
Radial	35 (8)
Median	44 (10)
Sciatic	43 (10)
Femoral	15 (4)
Related events	
No event identified ^a	163 (39)
Positioning or padding	126 (30)
Preexisting neuropathy	30 (7)
Surgery	25 (6)
Nature of event unclear ^a	25 (6)
Peripheral line infiltration	19 (5)
Other	32 (8)
Central venous catheter	8 (2)
Other equipment	12 (3)
Surgery or patient condition	3 (1)
Patient fell/dropped	2 (<0.5)
Miscellaneous	7 (2)

A Contemporary Analysis of Medicolegal Issues in Obstetric Anesthesia Between 2005 and 2015

Vesela P. Kovacheva, MD, PhD,*† Ethan Y. Brovman, MD,† Penny Greenberg, RN, MS,‡ Ellen Song, BA,‡ Arvind Palanisamy, MD, FRCA,§ and Richard D. Urman, MD, MBA†

Table 2. Analysis of Class of Injury

	Maternal Death/Brain Injury		Maternal Major and Minor Injury		Maternal Nerve Injury		Newborn Death/Brain Injury		Significance <i>P</i>
	N = 16 ^a		N = 23		N = 58		N = 10 ^a		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Age	32.3 ± 7.3	...	29.1 ± 6.1	...	29.2 ± 6.2	...	23.2 ± 4.0	...	.07
Delivery mode									.01
Vaginal	4	25.00	6	26.09	40	68.97	3	30.00	
Cesarean	12	75.00	16	69.57	18	31.03	7	70.00	
N/A	0	0.00	1	4.35	0	0.00	0	0.00	
Anesthesia type									.01
Epidural	9	56.25	17	73.91	51	87.93	6	60.00	
Spinal	2	12.50	1	4.35	6	10.34	0	0.00	
CSE	0	0.00	0	0.00	1	1.72	0	0.00	
General anesthesia	4	25.00	2	8.70	0	0.00	2	20.00	
N/A	1	6.25	3	13.04	0	0.00	2	20.00	
Contributing factors									
Delay	5	31.25	3	13.04	3	5.17	5	50.00	
Documentation	1	6.25	1	4.35	5	8.62	0	0.00	
Communication	0	0.00	6	26.09	6	10.34	2	20.00	
Improper management	1	6.25	0	0.00	0	0.00	0	0.00	
Newborn resuscitation	0	0.00	0	0.00	0	0.00	3	30.00	
Medication error	0	0.00	1	4.35	0	0.00	0	0.00	

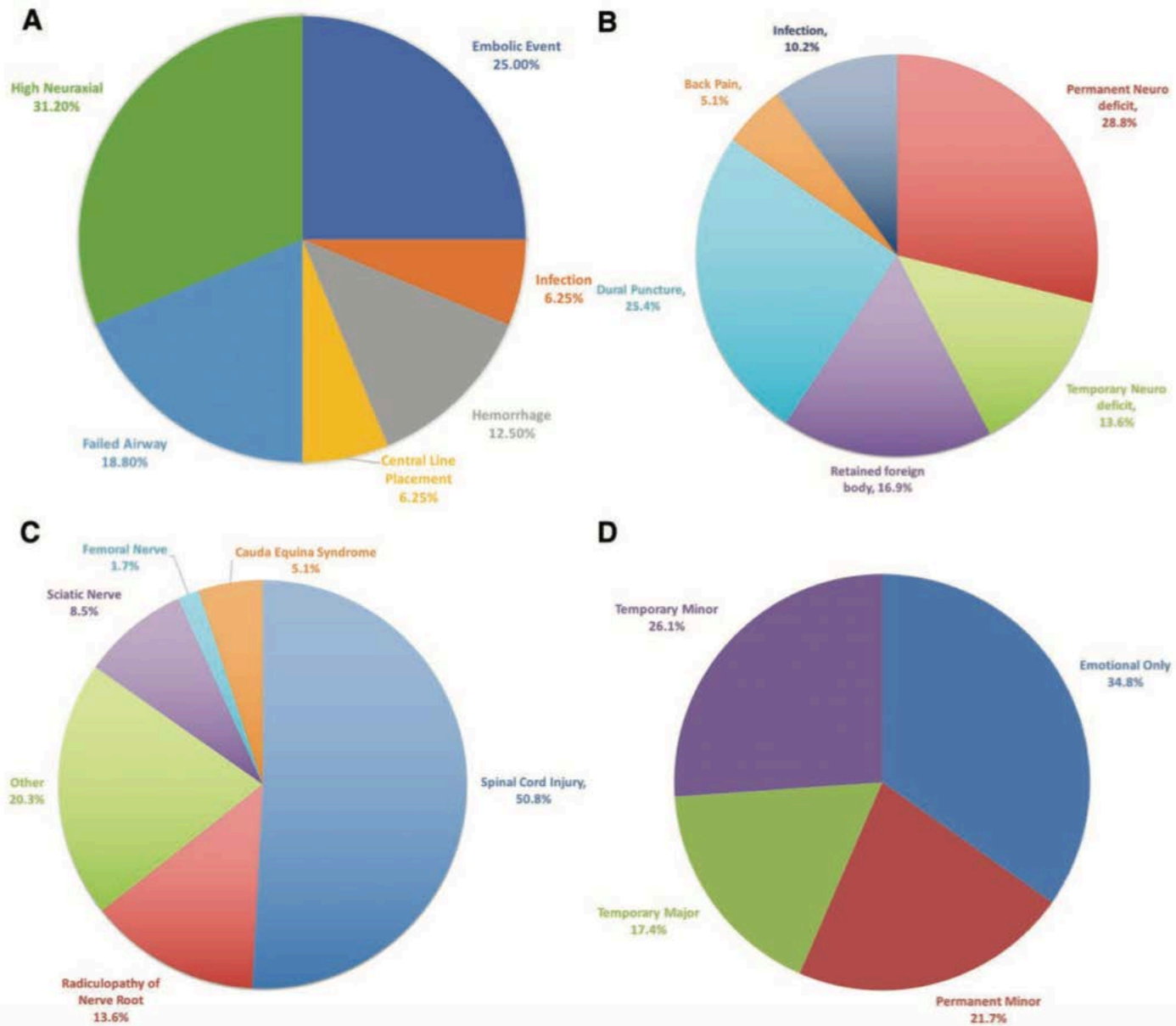
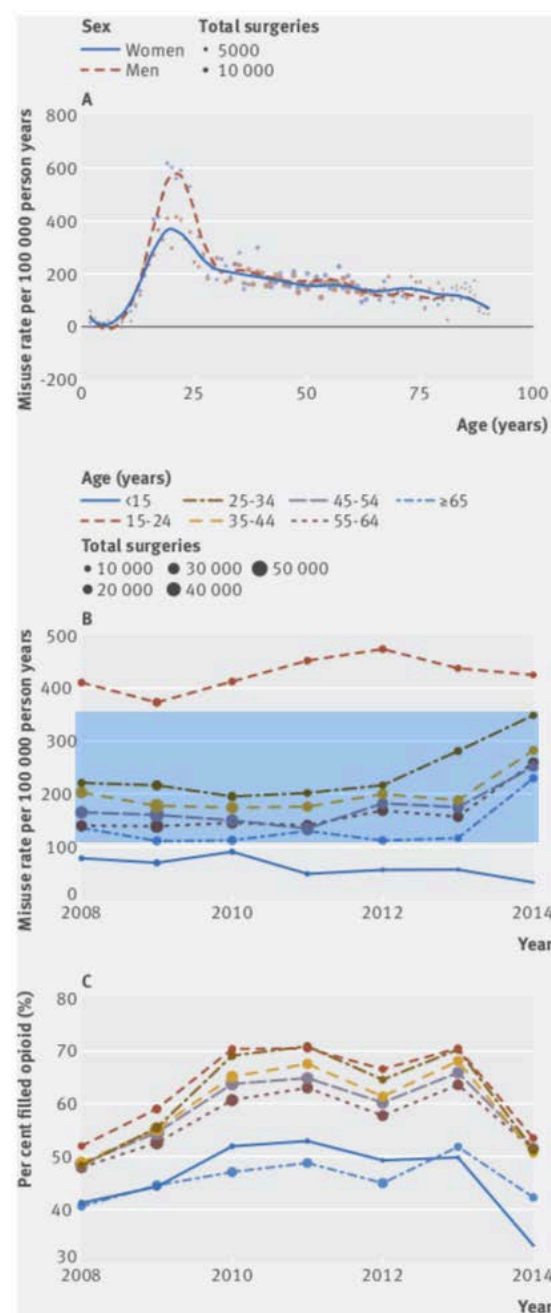


Figure 1. Analysis of type of injury. A, Causes for maternal death and brain damage, N = 16. B, Types of maternal nerve injury, N = 58. C, Anatomic location of maternal nerve injury, N = 58. D, Analysis of severity of major and minor maternal injury, N = 23.

Postsurgical prescriptions for opioid naive patients and association with overdose and misuse: retrospective cohort study

Gabriel A Brat,^{1,2} Denis Agniel,¹ Andrew Beam,¹ Brian Yorkgitis,³ Mark Bicket,⁴ Mark Homer,¹ Kathe P Fox,⁵ Daniel B Knecht,⁵ Cheryl N McMahon-Walraven,⁵ Nathan Palmer,¹ Isaac Kohane¹



Drugs:

Hydrocodone	275 292	1695
Oxycodone	205 559	1432
Codeine	35 041	148
Mixed	30 803	324
Tramadol	11 721	70
Hydromorphone	9600	123

Fig 2 | Misuse of and prescription rates for opioids per 100 000 person years across ages and sex over time by cohort

Postsurgical prescriptions for opioid naive patients and association with overdose and misuse: retrospective cohort study

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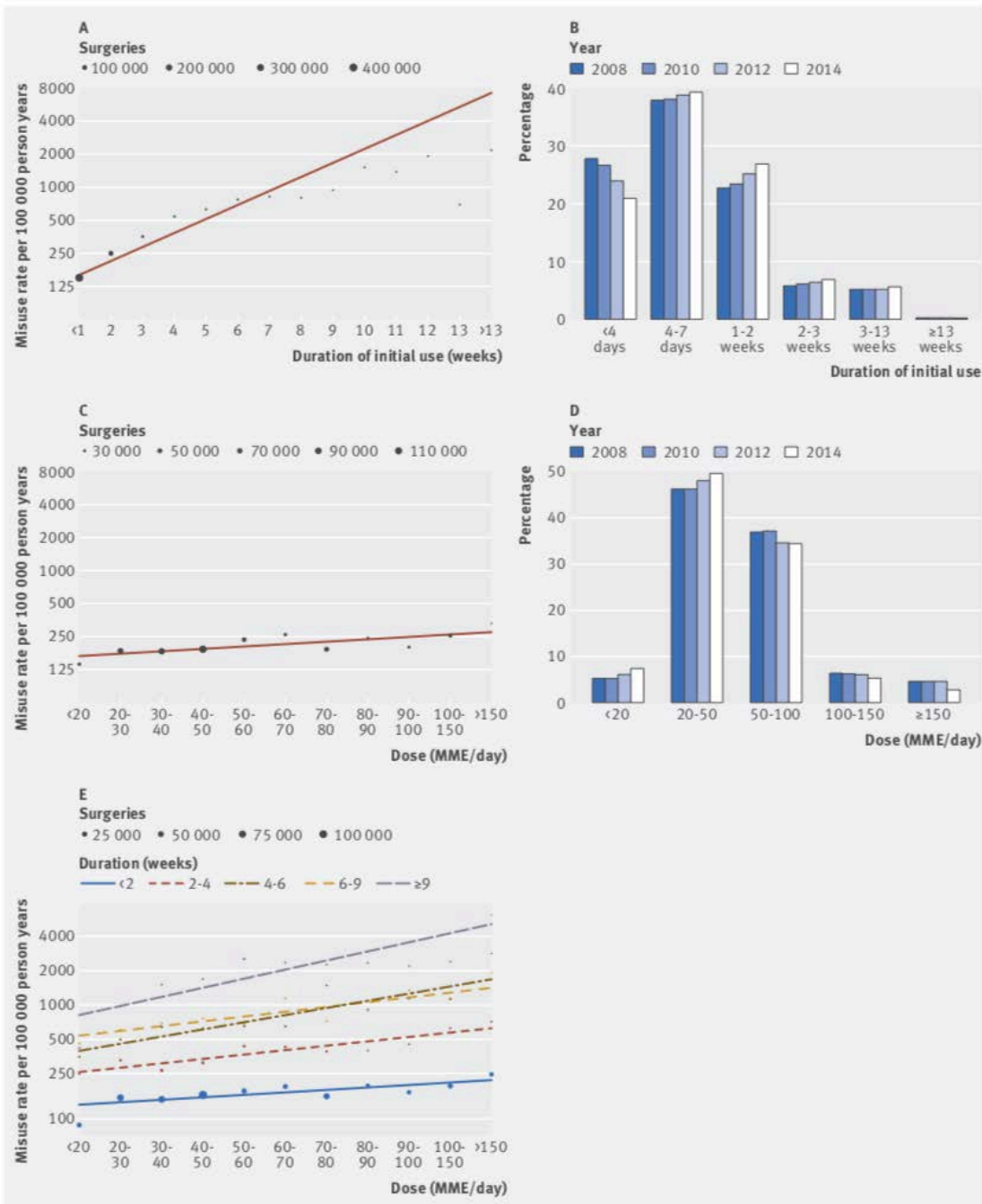


Fig 3 | Postsurgical rates of misuse by dosage and duration of opioid prescription. MME=morphine milligram equivalent

BMJ 2018;

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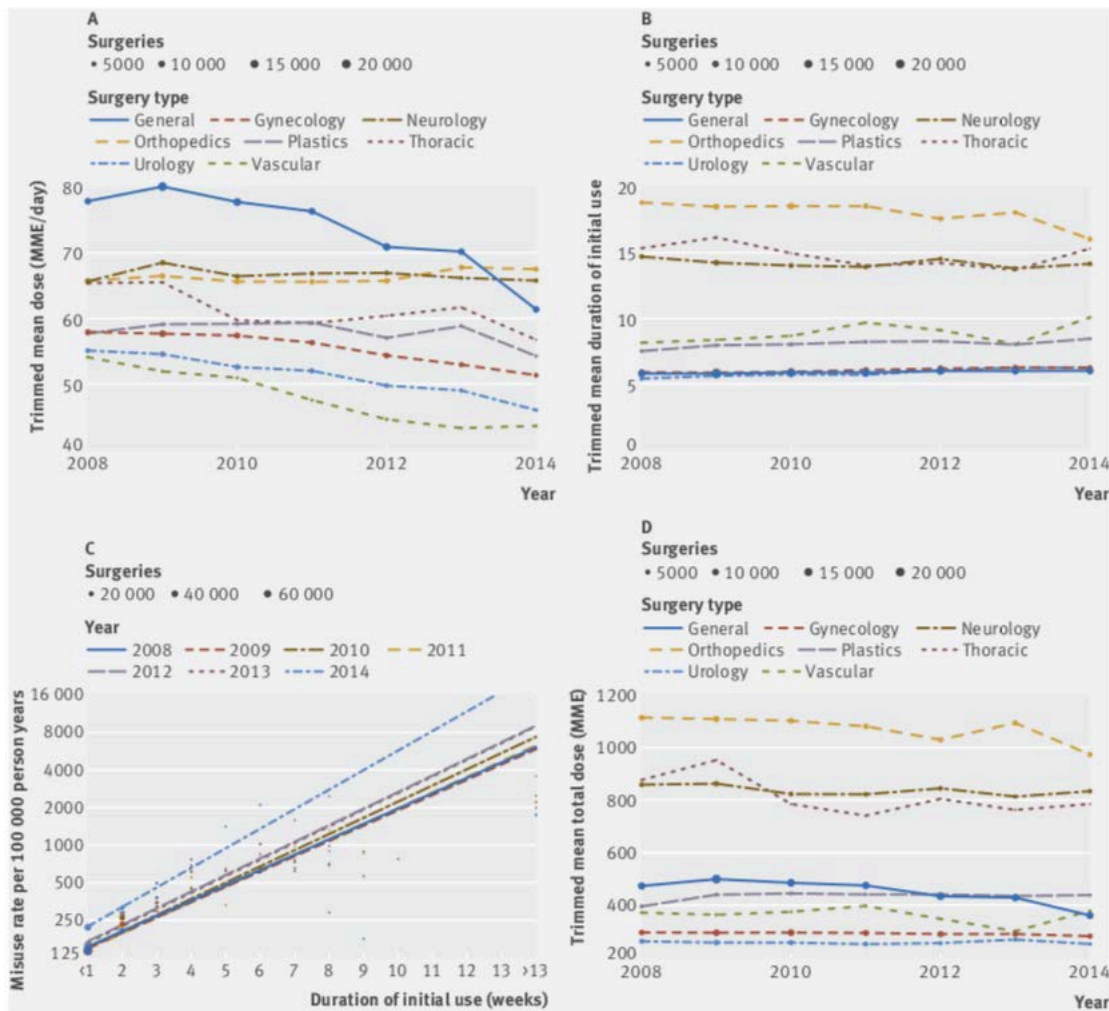


Fig 4 | Temporal effects and sensitivity analysis for opioid use. MME=morphine milligram equivalent

BMJ 2018;

Frequency and Type of Situational Awareness Errors Contributing to Death and Brain Damage

A Closed Claims Analysis

Christian M. Schulz, M.D., Amanda Burden, M.D., Karen L. Posner, Ph.D., Shawn L. Mincer, M.S.W., Randolph Steadman, M.D., Klaus J. Wagner, M.D., Karen B. Domino, M.D., M.P.H.

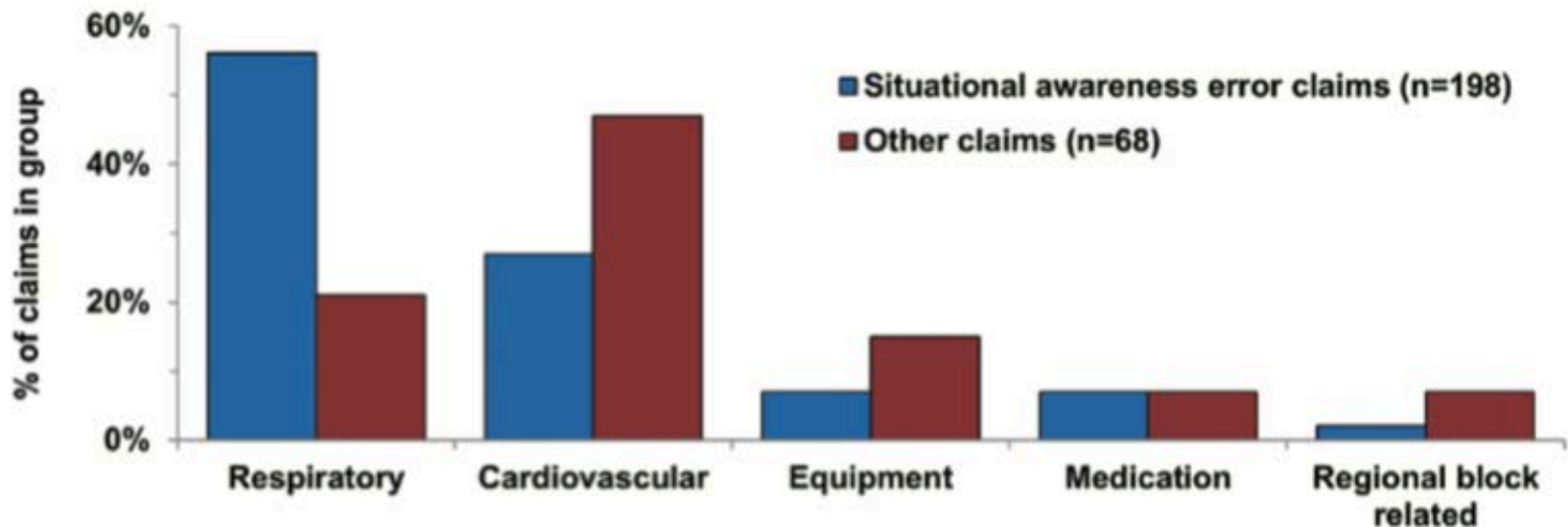
Table 2. Patient and Case Characteristics

	SA Error Claims, N (% of 198)	Other Claims, N (% of 68)	P Value
Male	108 (55 %)	42 (62 %)	0.300
Adult	189 (95 %)	66 (97 %)	0.735
Age, yr, mean [SD]	50 [18]	56 [17]	0.023
Obese (n = 214)	89 (54 %)	23 (47 %)	0.389
ASA physical status III–V (n = 264)	125 (64 %)	50 (74 %)	0.143
Emergency (n = 263)	45 (23 %)	14 (21 %)	0.783
Outpatient (n = 260)	59 (31 %)	12 (18 %)	0.045
Primary anesthetic			0.053
General anesthesia	143 (72 %)	57 (84 %)	
Monitored anesthesia care	46 (23 %)	7 (10 %)	
Regional anesthesia	9 (5 %)	4 (6 %)	
Most common damaging events*			< 0.01
Respiratory events	111 (56 %)	14 (21 %)	
Inadequate oxygenation/ventilation	48 (24 %)	2 (3 %)	
Difficult intubation	21 (11 %)	4 (6 %)	
Pulmonary aspiration	20 (10 %)	6 (9 %)	
Cardiovascular events	53 (27 %)	32 (47 %)	
Hemorrhage	19 (10 %)	8 (12 %)	
Myocardial infarction	0 (0 %)	4 (3 %)	
Pulmonary embolus	0 (0 %)	4 (6 %)	
Payment made (n = 265)	169 (85 %)	31 (46 %)	< 0.001
Median payment	\$567,450	\$387,000	0.163
Interquartile range	\$263,250–\$1,096,500	\$191,400–\$937,500	

Frequency and Type of Situational Awareness Errors Contributing to Death and Brain Damage

A Closed Claims Analysis

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Perception

- Monitoring respiratoire surtout durant sédation
- Histoire anesthésique incomplète

*Histoire complète
WHO checklist
Dossier informatique
Monitoring adapté*

Compréhension

- Mauvaise interprétation du niveau de difficulté lors de l'intubation et absence de changement de technique
- Faible taux de reconnaissance de l'hémorragie

*Appel à l'aide
Formation avec simulation*

Frequency and Type of Situational Awareness Errors Contributing to Death and Brain Damage

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Projection

- Anticipation inadéquate du risque de gestion des voies aériennes difficiles
- Anticipation inadéquate du risque d'aspiration
- Mauvaise planification de l'anesthésie en dehors de la salle d'opération
- Anticipation inadéquate du risque d'incendie

*Histoire complète
Programme de
formation
Examen oral et étude de cas
Programme de simulation*