

SÉDATION-ANALGÉSIE PROCÉDURALE (SAP) EN STRUCTURE D'URGENCE



28 MARS 2013

URGENCES CHIRURGICALES ET ISOLEMENT

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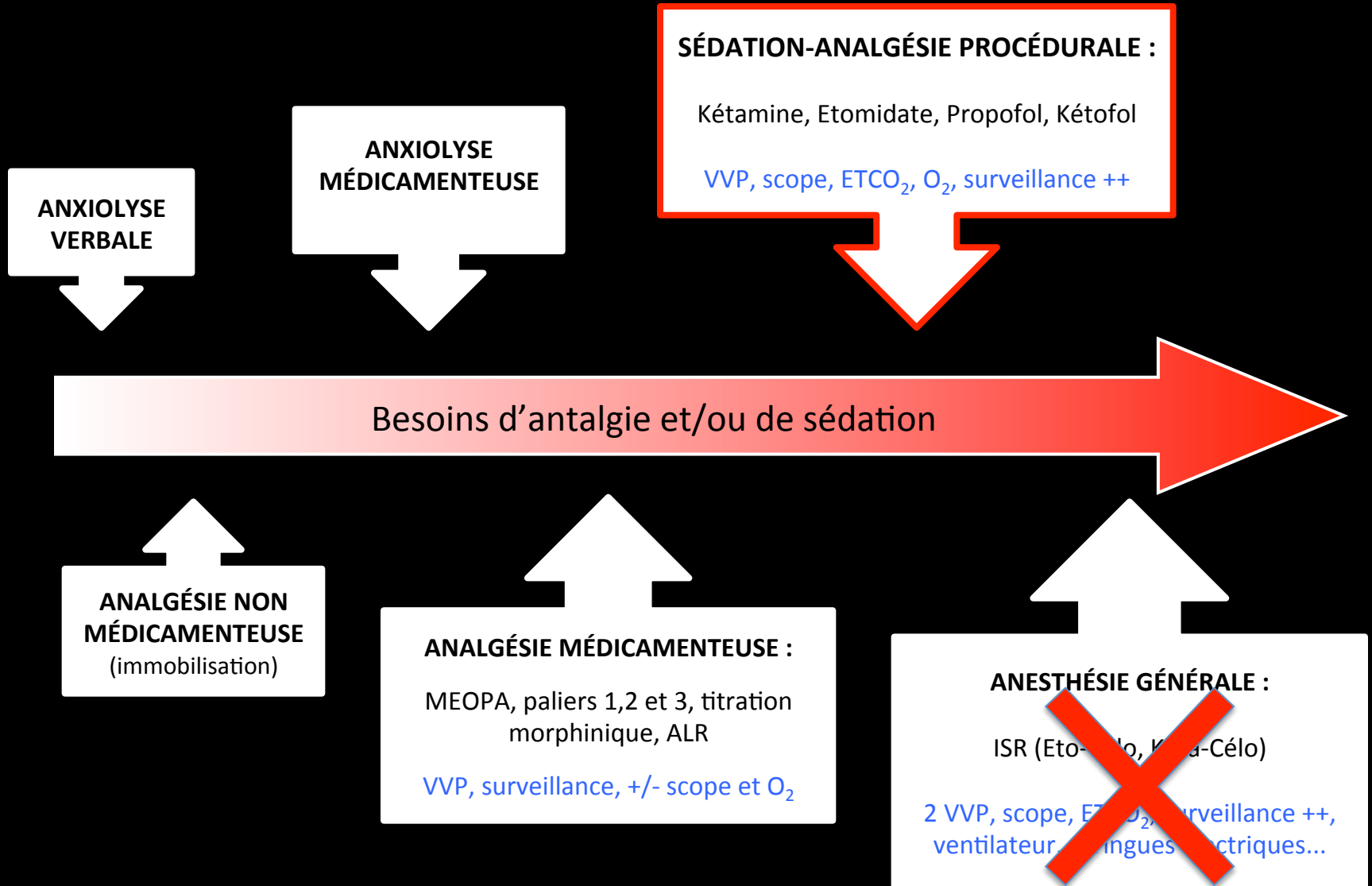
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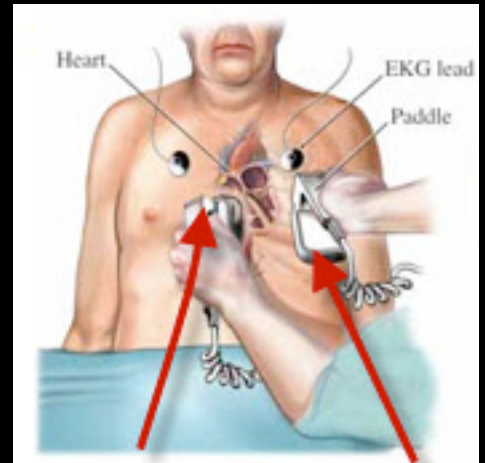
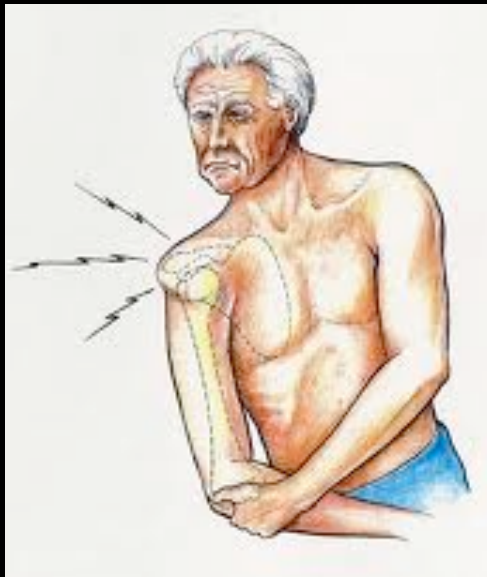


SA PLACE DANS L'ANALGÉSIE-SÉDATION



DÉFINITION DE LA SAP

Analgésie + sédation modérée à profonde (mais brève) pour
rendre possibles et supportables des procédures très douloureuses



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Analgésie + sédation modérée à profonde (mais brève) pour **rendre possibles et supportables des procédures très douloureuses**

+ surveillance continue rapprochée du patient, car les molécules utilisées peuvent entraîner des complications hémodynamiques, respiratoires et comportementales importantes



INDICATIONS

Fracture déplacée et/ou ouverte +/- hyperalgique, à réduire

Luxation hyperalgique (+/- déficit vasculaire ou neurologique), à réduire

Lésion orthopédique dont la mobilisation est impossible
en l'absence d'une sédation analgésie importante

Désincarcération du patient (ou d'un de ses membres) impossible
en l'absence d'une sédation analgésie importante

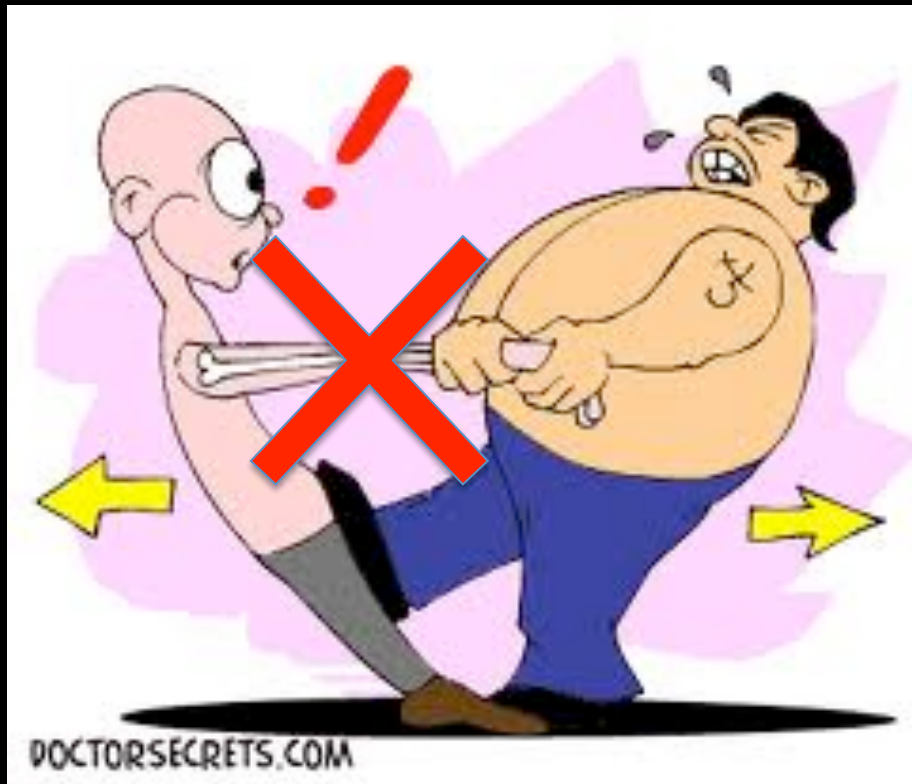
Défibrillation d'un TdR mal toléré (hors TV sans pouls ou FV !)

Liste non exhaustive...

NIVEAU DE SÉDATION RECHERCHÉ

SÉDATION LÉGÈRE : réponse normale aux commandes verbales ;
fonctions respiratoire et cardiovasculaire non affectées

SOUVENT INSUFFISANT...



NIVEAU DE SÉDATION RECHERCHÉ



NIVEAU DE SÉDATION RECHERCHÉ

SÉDATION MODÉRÉE : réponse adaptée aux commandes verbales +/- tactiles légères ; protection des VAS et ventilation adéquate maintenues sans intervention ; hémodynamique stable.

SÉDATION PROFONDE : ne répond qu'aux stimulations nociceptives fortes ; possibilité d'intervention pour maintenir la protection des VAS et une ventilation adéquate ; hémodynamique stable le plus souvent

SÉDATION DISSOCIATIVE : état cataleptique propre à la Kétamine, associant une analgésie profonde et une amnésie, tout en maintenant une protection des VAS, une respiration spontanée et une stabilité hémodynamique.

TOUT DÉPEND DES LÉSIONS, DU TERRAIN, ET DE LA DOULEUR DU PATIENT !!

NIVEAU DE SÉDATION RECHERCHÉ

En urgence, les pathologies et patients rencontrés requièrent très souvent une sédation modérée à profonde : **Ramsay 4 ou 5**

Ramsay 1 : patient anxieux, agité

Ramsay 2 : patient réveillé, coopérant, orienté et calme

Ramsay 3 : patient endormi mais répondant aux ordres

Ramsay 4 : patient endormi, mais réponse **nette** à la stimulation douloureuse

Ramsay 5 : patient endormi, réponse **faible** à la stimulation douloureuse

Ramsay 6 : ~~pas de réponse~~ aux stimulations

NIVEAU DE SÉDATION RECHERCHÉ

En urgence, les pathologies et patients rencontrés requièrent très souvent une sédation modérée à profonde : **Ramsay 4 ou 5**

Dépend de la lésion, des antécédents du patient, et de sa douleur !!

Ramsay 4 : patient endormi, mais réponse **nette** à la stimulation douloureuse

Ramsay 5 : patient endormi, réponse **faible** à la stimulation douloureuse

CONTRE-INDICATIONS

**SI PROCÉDURE DOULOUREUSE INDISPENSABLE EN URGENCE,
(menace vitale ou fonctionnelle immédiate) : PAS DE CONTRE-INDICATION ABSOLUE**

CONTRE-INDICATIONS RELATIVES (âge avancé, co-morbidités, VAS prévues difficiles) :
rapport bénéfice / risque ? molécule plus adaptée qu'une autre ? alternative ?

GÉNÉRALEMENT, ASA $\geq$ 3 = CONTRE-INDICATION RELATIVE

ASA 1 : patient sans anomalie systémique

ASA 2 : patient ayant une **anomalie systémique modérée** (ex : HTA, anémie, diabète contrôlé...)

ASA 3 : patient ayant une anomalie systémique **sévère** (asthme sévère, diabète mal contrôlé, pneumonie...)

ASA 4 : patient ayant une anomalie systémique **sévère représentant une menace vitale constante**

(ex : BPCO sévère, sepsis, insuffisance cardiaque, rénale, respi ou hépatique...)

ASA 5 : patient **moribond** dont la survie est improbable sans intervention (choc septique, traumatisé sévère...)

CONTRE-INDICATIONS

PAS D'ÂGE LIMITE MAIS **PRÉCAUTIONS ++ POUR LES PERSONNES ÂGÉES :**
doses plus faibles, réadministrations moins fréquentes, vitesse d'administration plus lente

Am J Emerg Med. 2011 Jun;29(5):541-4. doi: 10.1016/j.ajem.2009.12.017. Epub 2010 Apr 24.

ED procedural sedation of elderly patients: is it safe?

Weaver CS, Terrell KM, Bassett R, Swiler W, Sandford B, Avery S, Perkins AJ.

Our prospective, observational study of 868 EDPS patients included 50 patients aged at least 65 years. As we compared these elderly patients with those younger, we found **no significant difference in adverse events or procedure success rates.** The choice of medication was also similar between the age groups.

OUI MAIS :

There was a significant difference in the dose of medication given between the age groups, with the **older** age groups getting **lower doses.** Among patients in which propofol was the sole agent, the mean dose was 158 mg in the 18 to 49 age group, 124 mg in the 50 to 64 age group, and 106 mg in the at least 65 age group ($P < .001$).

PROPRIÉTÉS DE LA MOLÉCULE IDÉALE

Analgésie, amnésie, anxiolyse, myorelaxation

Parfaite sédation (de la sédation légère à l' AG selon un continuum linéaire)

Action rapide, durée brève

Pas ou peu d'effets indésirables, notamment cardiorespiratoires

Profil de sécurité identique à tous les âges

Plusieurs voies d' administration possibles (IM, IV, SC, IR, IN, PO...)

BIEN ENTENDU, LA MOLÉCULE IDÉALE N' EXISTE PAS !...

L'ASSOCIATION MORPHINE + MIDAZOLAM

Acad Emerg Med. 2005 Jun;12(6):508-13.

Adverse events associated with procedural sedation and analgesia in a pediatric emergency department: a comparison of common parenteral drugs.

Roback MG, Wathen JE, Bajaj L, Bothner JP.

	Ketamine Alone	Ketamine/Midazolam	Midazolam/Fentanyl	Midazolam Alone	Other*
No. of patients (%)	1,492 (59.7)	299 (12.0)	336 (13.4)	260 (10.4)	113 (4.5)

TABLE 3. Adverse Events by Drug Type

Sedation Drugs	Respiratory Adverse Events n (%); OR (95% CI)
Ketamine alone (n = 1,492) (reference group)	91 (6.1); 1
Ketamine/midazolam (n = 299)	30 (10); 1.72 (1.11, 2.65)
Midazolam/fentanyl (n = 336)	65 (19.3); 3.70 (2.62, 5.21)
Midazolam (n = 260)	15 (5.8); 0.94 (0.54, 1.66)
Other drugs/combinations (n = 113)	13 (11.5); 2.00 (1.08, 3.70)

Respiratory adverse events

=

SpO₂ < 90%, apnée,
laryngospasme

3 fois plus de dépression respiratoire sous Hypno + Fenta que sous Kéta. seule

0,7% d'apnée et 0,07% de laryngospasme sous Kétamine seule...

L'ASSOCIATION MORPHINE + MIDAZOLAM

Acad Emerg Med. 2007 Jan;14(1):41-6. Epub 2006 Aug 31.

Procedural sedation in the community emergency department: initial results of the ProSCED registry.

Sacchetti A, Senula G, Strickland J, Dubin R.

Department of Emergency Medicine, Our Lady of Lourdes Medical Center, Camden, NJ, USA. a.sacchetti@att.net

Cases using either ketamine or propofol exhibited the fewest complications, while those using fentanyl, hydromorphone, or midazolam demonstrated the highest complication rates.

POUR LA SÉDATION PROCÉDURALE, A ABANDONNER !!!

**Sédation profonde de mauvaise qualité, trop de complications
par rapport aux solutions « modernes » (Kétamine, Etomidate, Propofol, Kétofol)**

**Association à haut risque de dépression respiratoire, notamment tardivement,
lorsque la réduction est faite et que la surveillance s'est « relâchée »...**

L' ÉTOMIDATE

MOLÉCULE SÉDATIVE ET AMNÉSIANTE MAIS PAS D' ANALGÉSIE
PAS OU PEU DE MYORELAXATION

0,1 mg/kg en IVL sur 30 à 60 s +/- 0,05 mg / kg/ 3 à 5 min si besoin

Efficacité quasi immédiate pour une durée d' action de 5 à 15 min

Maintient une bonne stabilité hémodynamique

Myoclonies parfois importantes, pouvant gêner la procédure

Dépression respiratoire fréquente (jusqu'à 9% de prise au BAVU)

Insuffisance surrénalienne ?

LA KÉTAMINE

MOLÉCULE SÉDATIVE, AMNÉSIANTE ET ANALGÉSIQUE
PAS DE MYORELAXATION

Obéit à la loi « on-off » : aux alentours de 1 mg/kg, la confusion et la DTS laissent place à la **sédation dite dissociative**, « déconnectant » le SNC des stimulus extérieurs (douleur, sons, vision...) : véritable état d'isolement sensoriel

Préserve les réflexes des voies aériennes, et maintien la fonction respiratoire

Effets psychodysléptiques parfois gênants

Inhibe la recapture des catécholamines : **augmente TA et FC**

NB : dans la R.F.E. SFAR-SFMU de 2010,
utilisation préconisée de la kétamine
pour réduction de luxation et/ou fracture :

morphinique en titration IV, associée à du MEOPA
et/ou de la kétamine (0,5 à 1 mg/kg IV en titration).

LA KÉTAMINE

Ann Emerg Med. 2011 May;57(5):449-61. Epub 2011 Jan 21.

Clinical practice guideline for emergency department ketamine dissociative sedation: 2011 update.

Green SM, Roback MG, Kennedy RM, Krauss B.

Department of Emergency Medicine, Loma Linda University Medical Center and Children's Hospital, Loma Linda, CA 92354, USA.

Recommandations « EBM » (112 réf. biblio.) pour la SAP sous kétamine :

Rather than displaying the dose-response continuum observed with all other procedural sedation and analgesia agents, ketamine dissociation appears at a dosing threshold of approximately 1.0 to 1.5 mg/kg intravenously (IV) or 3 to 4 mg/kg intramuscularly (IM). In smaller doses, ketamine exhibits analgesia and disorientation. Once the dissociative threshold is

readily achieved by administration of a single IV or IM loading dose, and the only need for titration, in contrast to other sedatives, is to maintain the dissociative state over time.

American College of Emergency Physicians: "A trance-like cataleptic state characterized by profound analgesia and amnesia, with retention of protective airway reflexes, spontaneous respirations, and cardiopulmonary stability,"

2 CONTRE-INDICATIONS ABSOLUES : âge < 3 mois et psychose (connue ou suspectée)

CONTRE-INDICATIONS RELATIVES (à relativiser !) : risque de laryngospasme (stimulation pharynx, chir/sténose trachéale, asthme sévère), **ATCD cardiovasculaire** (I. cardiaque, HTA ou angor sévères), HTIC, masse cérébrale, glaucome ou plaie du globe, porphyrie, dysthyroïdie

LA KÉTAMINE

Ann Emerg Med. 2011 May;57(5):449-61. Epub 2011 Jan 21.

Clinical practice guideline for emergency department ketamine dissociative sedation: 2011 update.

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Recovery reactions. The ability of ketamine to induce hallucinatory reactions—both pleasant and unpleasant—during recovery is legendary. Although these so-called emergence reactions are rarely disturbing in children (1.4% incidence of reactions judged clinically important in the large meta-analysis),³ their incidence in adults varies widely (0% to 30%).^{4,12,16} The ED

single controlled trial in ED adults found that midazolam pretreatment (0.03 mg/kg IV) significantly reduced the incidence of recovery agitation by 17%

midazolam prophylaxis appears a reasonable but nonmandatory option

There is inconclusive evidence that phrasing the dissociative experience in positive terms before sedation can decrease the risk of unpleasant recovery reactions,⁷³⁻⁷⁵ and it is a common (but yet-unproven) practice to encourage patients to “plan” pleasant intrasedation dreams.^{74,75}



When unpleasant ketamine-associated recovery reactions do rarely occur, they can be rapidly and reliably diminished with titrated benzodiazepines.^{4,12,16,19,20,36,71,83,84}

Respiratory depression. Respiratory depression and apnea are unusual with ketamine and are transient when they do occur. Although most commonly associated with rapid IV

LE PROPOFOL

MOLÉCULE SÉDATIVE ET AMNÉSIANTE MAIS PAS D' ANALGÉSIE
MYORELAXANT, ANTIÉMÉTIQUE

Hypotension artérielle et dépression respiratoire : fréquentes mais brèves

En France : R.F.E SFAR-SFMU de 2010 :

« si une sédation profonde est nécessaire en complément de l'analgésie, notamment pour la réduction d'une luxation, le recours à un anesthésiste doit être privilégié. En cas d'indisponibilité d'un anesthésiste, les experts proposent l'administration lente et titrée de Propofol, à faible posologie (1 à 1,5 mg/kg IV, à diminuer chez le sujet âgé et/ou fragile) »

Aux USA en 1996 :

Acad Emerg Med. 1996 Mar;3(3):234-8.

The use of propofol for sedation in the emergency department.

Swanson ER, Seaberg DC, Mathias S.

University of Pittsburgh Affiliated Residency in Emergency Medicine, PA, USA. swanson@med.pitt.edu



CONCLUSION:

Given its rapidity of onset and elimination, it may become a useful agent to EPs for i.v. sedation in the ED.

LE PROPOFOL

Ann Emerg Med. 2007 Aug;50(2):182-7, 187.e1. Epub 2007 Feb 23.

Clinical practice advisory: Emergency department procedural sedation with propofol.

Miner JR, Burton JH.

Department of Emergency Medicine, Hennepin County Medical Center, Minneapolis, MN, USA.

Recommandations « EBM » (67 réf. biblio.) pour la SAP sous propofol :

Propofol is contraindicated in any patient with known or suspected allergy to propofol, eggs, or soy products.³¹

Age. Lower doses of propofol are required to achieve a defined endpoint in patients older than 55 years and in debilitated patients,³¹ likely because of higher peak serum levels

Patients with depleted intravascular volume, such as those patients with dehydration or **blood loss**, are a higher risk group for propofol-associated hypotension during sedation and should ideally have their volume optimized before the procedure.^{12,36,39}

In a recent series, Burton et al⁵ noted that only 3.5% of 792 ED propofol patients experienced blood pressure decreases of greater than 20%, and each of these occurrences resolved promptly and without sequelae.

the most common doses studied in the ED setting are an initial bolus of 1.0 mg/kg, followed by 0.5 mg/kg every 3 minutes as needed to achieve or maintain sedation (same in adults and children).^{4-9,12,25}

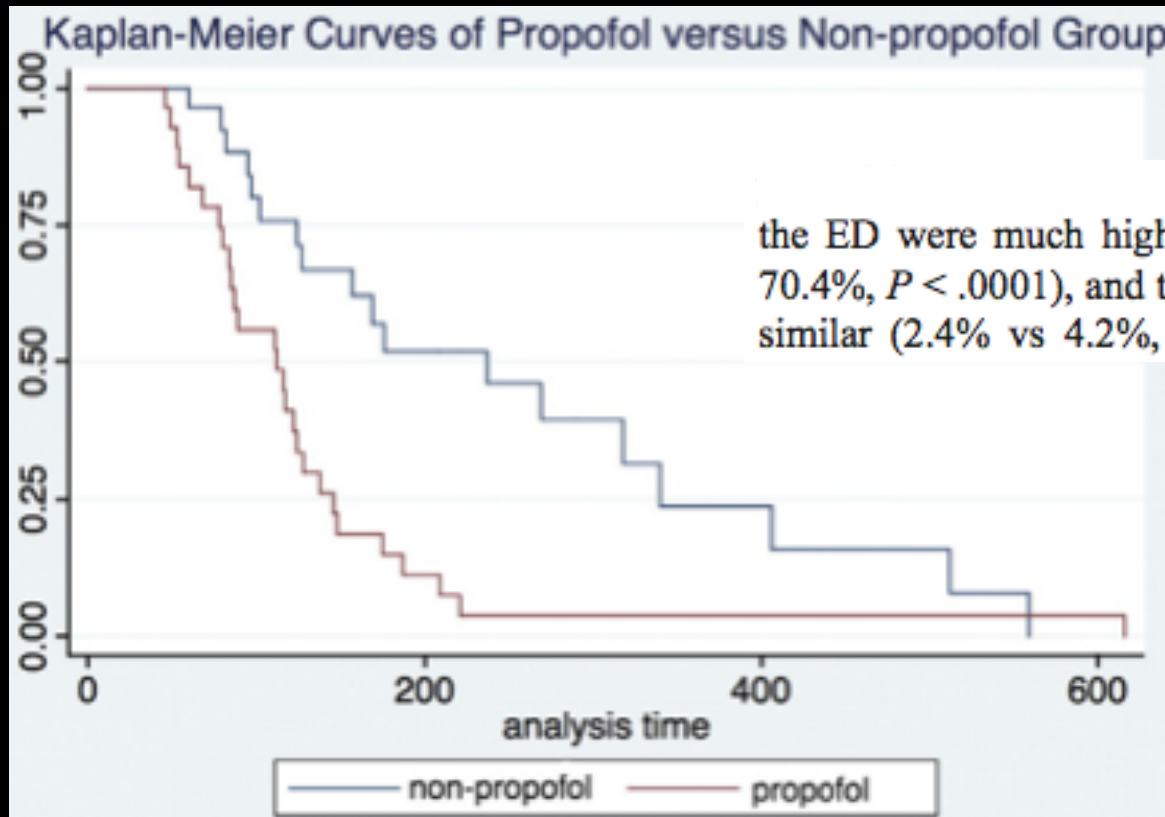
effects of propofol are typically dose dependent.^{50,51} The onset of clinical sedation is usually within 30 seconds from injection. The half-life for propofol blood-brain equilibration is approximately 1 to 3 minutes, and clinical effects typically resolve within 6 minutes. The total sedation duration depends

LE PROPOFOL

Am J Emerg Med. 2012 Oct;30(8):1352-6. doi: 10.1016/j.ajem.2011.09.024. Epub 2011 Dec 12.

Propofol for sedation can shorten the duration of ED stay in joint reductions.

Lee YK, Chen CC, Lin HY, Hsu CY, Su YC.



The successful reduction rates in the ED were much higher in the propofol group (90% vs 70.4%, $P < .0001$), and the all causes of complications were similar (2.4% vs 4.2%, $P = .43$).

LE PROPOFOL

Ann Emerg Med. 2007 Aug;50(2):182-7, 187.e1. Epub 2007 Feb 23.

Clinical practice advisory: Emergency department procedural sedation with propofol.

Miner JR, Burton JH.

Department of Emergency Medicine, Hennepin County Medical Center, Minneapolis, MN, USA.

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The use of bag-valve-mask-assisted ventilations has been described to occur in 3.0% to 9.4% of patients.

Administering combinations of propofol concurrently with analgesics may increase the likelihood of adverse outcomes,^{57,58}

ATTENTION À L'ASSOCIATION PROPOFOL + OPIACÉS

Acad Emerg Med. 2008 Oct;15(10):877-86. doi: 10.1111/j.1553-2712.2008.00219.x. Epub 2008 Aug 27.

Subdissociative-dose ketamine versus fentanyl for analgesia during propofol procedural sedation: a randomized clinical trial.

Messenger DW, Murray HE, Dungey PE, van Vlymen J, Sivilotti ML.

Methods: This double-blind, randomized trial enrolled American Society of Anesthesiology (ASA) Class I or II ED patients, aged 14–65 years, requiring PSA for orthopedic reduction or abscess drainage. Subjects received 0.3 mg/kg ketamine or 1.5 µg/kg fentanyl intravenously (IV), followed by IV propofol titrated to deep sedation. Supplemental oxygen was not routinely administered. The primary outcomes

Results: Sixty-three patients were enrolled. Of patients who received fentanyl, 26/31 (83.9%) had an intrasedation event versus 15/32 (46.9%) of those who received ketamine. Events prospectively rated as moderate or severe were seen in 16/31 (51.6%) of fentanyl subjects versus 7/32 (21.9%) of ketamine subjects. Patients receiving fentanyl had 5.1 (95% confidence interval [CI] = 1.9 to 13.6; $p < 0.001$) times the odds of having a more serious intrasedation event rating than patients receiving ketamine. There were no significant differences in secondary outcomes, apart from higher propofol doses in the ketamine arm.

PROPOFOL vs ÉTOMIDATE

[Ann Emerg Med](#). 2007 Jan;49(1):15-22. Epub 2006 Sep 25.

Randomized clinical trial of etomidate versus propofol for procedural sedation in the emergency department.

[Miner JR](#), [Danahy M](#), [Moch A](#), [Biros M](#).

Department of Emergency Medicine, Hennepin County Medical Center, Minneapolis, MN 55415, USA. jimminer@hotmail.com

Selon randomisation :

soit Eto 0,1 mg/kg +/- 0,05 mg/kg / 3 min ; soit Propofol 1 mg/kg +/- 0,5 mg/kg / 3 min

ÉTOMIDATE SIMILAIRE AU PROPOFOL POUR :

profondeur de la sédation ;

% de dépression respi infraclinique : 40% ;

% de désaturation (<92%) : 10% des cas ; % de prise au BAVU : 5% ;

ÉTOMIDATE DIFFÉRENT DU PROPOFOL POUR :

succès de la procédure : 89% (E) vs 97% (P) ;

% de myoclonies : 20% (E) vs 1% (P) (raison des échecs plus fréquents avec E ?) ;

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Randomized clinical trial of etomidate versus propofol for procedural sedation in the emergency department.

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Department of Emergency Medicine, Hennepin County Medical Center, Minneapolis, MN 55415, USA. jimminer@hotmail.com

[Research advances in procedural sedation and analgesia.](#)

Green SM.

[Ann Emerg Med.](#) 2007 Jan;49(1):31-6. Epub 2006 Nov 1. No abstract available.

PMID: 17083997 [PubMed - indexed for MEDLINE]

[Related citations](#)

If You Can Administer Either Propofol or Etomidate, Choose Propofol

both agents were safe, propofol appeared more effective and lacked the complicating myoclonus seen in 20% of those receiving etomidate.

uncommon with both, vomiting appears to occur more frequently with etomidate^{30,32-34} than with propofol,

etomidate is known to cause temporary adrenal suppression, although this may not be of clinical consequence in the setting of procedural sedation and analgesia.⁴⁵

etomidate might be preferable in situations of preexisting hypotension or in which temporarily decreased perfusion could be problematic (eg, cardioversion).

PROPOFOL vs ÉTOMIDATE

NCBI Resources ▾ How To ▾

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PubMed etomidate [ti] AND procedural sedation AND emergency [ad]

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Results: 13

- ☐ [Etomidate for procedural sedation in the elderly: a retrospective comparison between age groups.](#)
1. Cicero M, Graneto J.
Am J Emerg Med. 2011 Nov;29(9):1111-6. Epub 2010 Oct 27.
PMID: 21030192 [PubMed - indexed for MEDLINE]
[Related citations](#)
- ☐ [Patient satisfaction and return to daily activities using etomidate procedural sedation for orthopedic injuries.](#)
2. Bordo D, Chan SB, Shin P.
West J Emerg Med. 2008 May;9(2):86-90.
PMID: 19561713 [PubMed] **Free PMC Article**
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- ☐ [Can etomidate have antiarrhythmic properties?](#)
3. Rivera-Bou WL, Torres-Galarza F, Deynes S.
Bol Asoc Med P R. 2007 Oct-Dec;99(4):310-3.
PMID: 18756645 [PubMed - indexed for MEDLINE]
[Related citations](#)
- ☐ [Randomized clinical trial of etomidate versus propofol for procedural sedation in the emergency department.](#)
4. Miner JR, Danahy M, Moch A, Biros M.
Ann Emerg Med. 2007 Jan;49(1):15-22. Epub 2006 Sep 25.
PMID: 16997421 [PubMed - indexed for MEDLINE]
[Related citations](#)

Depuis 2007, quasiment plus de papiers sur l'étomidate à visée de SAP...

NB.: dans la R.F.E SFAR-SFMU de 2010, aucune allusion à l'étomidate

PROPOFOL vs ÉTOMIDATE

Am J Emerg Med. 2010 Oct;28(8):880-3. doi: 10.1016/j.ajem.2009.04.035. Epub 2010 Feb 25.

Impact of addition of propofol to ED formulary.

Senula G, Sacchetti A, Moore S, Cortese T.

Evolution des pratiques avant / après mise en place d'un protocole de sédation procédurale sous propofol, aux urgences (573 patients au total)

Les 3 derniers mois de l'étude, jusqu'à 69% de SAP faites sous propofol

Table 3 ED procedural sedation characteristics before and after the introduction of propofol

	Before	After	P
Medication use			
Etomidate (%)	42.8	12.4	.001
Fentanyl (%)	37.2	27.3	.02
Midazolam (%)	53.3	33.2	.001
Ketamine (%)	14.9	14.3	.85
Propofol (%)	0	40.1	.001
No. of agents used	1.6	1.3	.001
Complications			
Minor (%)	5.8	1.7	.002
Major (%)	3.6	1.0	.002
None (%)	90.6	97.3	.002
Sedation failure (%)	5.1	4.1	.02

Table 1 Classification of complications into major and minor categories

Major complication	
Apnea: requiring BVM	
Hypoxia: definition, pulse oxygen <93%, >60 s	
Hypoxia: requiring reversal agent	
Hypoxia: requiring assisted BVM ventilation	
Minor complication	
Agitation	
Airway obstruction: responds to repositioning	
Hypotension: resolves spontaneously	
Hypotension: responds to saline bolus	
Hypoxia: resolves spontaneously	
Hypoxia: responsive to oxygen	

PROPOFOL vs KÉTAMINE

Acad Emerg Med. 2010 Jun;17(6):604-11.

Randomized clinical trial of propofol versus ketamine for procedural sedation in the emergency department.

Miner JR, Gray RO, Bahr J, Patel R, McGill JW.

Department of Emergency Medicine, Hennepin County Medical Center, Minneapolis, MN, USA. jimminer@hotmail.com

Patients were then randomized to receive either propofol 1 mg/kg bolus followed by 0.5 mg/kg every 3 minutes as needed for sedation or ketamine 1.0 mg/kg IV followed by 0.5 mg/kg every 3 minutes as needed for sedation.

The rate of subclinical respiratory depression was 63.8% in the ketamine group and 40.0% in the propofol group (difference = 23.8%, 95% CI = 4.5% to 43.1%, $p = 0.02$).

Neither patients nor physicians were blinded to the agent being administered. The use of supplemental oxygen during procedural sedation was at the discretion of the treating physician.

Clinical interventions related to respiratory depression were present in 26 of 50 propofol patients and 19 of 47 ketamine patients ($p = 0.253$).

	Ketamine (<i>n</i> = 47)	Propofol (<i>n</i> = 50)	Comparison <i>p</i> value	%
Increased supplemental oxygen, <i>n</i> (%)	17 (36.2)	18 (36.0)	0.99	0.2
Airway adjunct used, <i>n</i> (%)	5 (10.9)	9 (18.0)	0.32	-7.1
Airway repositioning, <i>n</i> (%)	9 (19.1)	9 (19.0)	0.88	1.1
Stimulation to induce breathing, <i>n</i> (%)	6 (12.8)	13 (26.0)	0.10	-13.2
Received supplemental oxygen before the procedure, % (<i>n</i> / <i>N</i>) 95% CI	53.2 (25/47) 38.1-67.9	86.0 (43/50) 73.3-94.2		

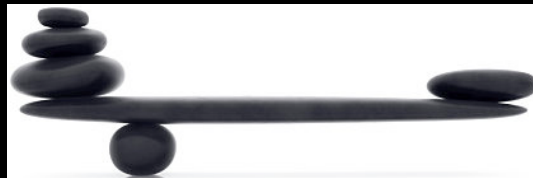
POURQUOI VOULOIR COMPARER L'INCOMPARABLE ??

KÉTAMINE + PROPOFOL : INTÉRESSANT ?

1^{ER} INTÉRÊT = combiner les effets sédatifs des 2 molécules, donc diminuer les doses de chacune, donc diminuer leurs effets indésirables respectifs

2^{ÈME} INTÉRÊT =
combiner les effets **positifs** de l'une pour équilibrer les effets **négatifs** de l'autre :

myorelaxation du propofol – rigidité musculaire de la kétamine (rare)
effet antiémétique du propofol – vomissements dus à la kéta (rares chez l'adulte)
stabilité cardiorespi de la kéta – dépression respi et hypotension dus au propofol
analgésie de la kétamine – absence d'effet analgésiant du propofol
excellente sédation du propofol – réveil parfois « sportif » dû à la kétamine



SÉDUISANT SUR LE PAPIER... ET EN PRATIQUE ?

KÉTAMINE + PROPOFOL : INTÉRESSANT ?

Biblio : 43 papiers sur le mélange K+P au cours des 2 dernières années

4 case-series concluant toutes à son efficacité et à son bon profil de sécurité :

A prospective evaluation of "ketofol" (ketamine/propofol combination) for procedural sedation and analgesia in the emergency department.

Willman EV, Andolfatto G.

Ann Emerg Med. 2007 Jan;49(1):23-30. Epub 2006 Oct 23.

PMID: 17059854 [PubMed - indexed for MEDLINE]

Ketamine-propofol combination sedation for fracture reduction in the pediatric emergency department.

Sharieff GQ, Trocinski DR, Kanegaye JT, Fisher B, Harley JR.

Pediatr Emerg Care. 2007 Dec;23(12):881-4.

PMID: 18091596 [PubMed - indexed for MEDLINE]

A prospective case series of pediatric procedural sedation and analgesia in the emergency department using single-syringe ketamine-propofol combination (ketofol).

Andolfatto G, Willman E.

Acad Emerg Med. 2010 Feb;17(2):194-201.

PMID: 20370749 [PubMed - indexed for MEDLINE]

A prospective case series of single-syringe ketamine-propofol (Ketofol) for emergency department procedural sedation and analgesia in adults.

Andolfatto G, Willman E.

Acad Emerg Med. 2011 Mar;18(3):237-45. doi: 10.1111/j.1553-2712.2011.01010.x.

PMID: 21401785 [PubMed - indexed for MEDLINE]

KÉTAMINE + PROPOFOL : INTÉRESSANT ?

Trois études récentes, randomisées, en double aveugle, aux urgences :

Ann Emerg Med. 2011 May;57(5):425-33.e2. Epub 2010 Oct 13.

A blinded, randomized controlled trial to evaluate ketamine/propofol versus ketamine alone for procedural sedation in children.

Shah A, Mosdossy G, McLeod S, Lehnhardt K, Peddle M, Rieder M.

ketamine and propofol produced slightly faster recoveries while also demonstrating less vomiting, higher satisfaction scores, and similar efficacy and airway complications.

Ann Emerg Med. 2011 May;57(5):435-41. Epub 2011 Jan 21.

A randomized controlled trial of ketamine/propofol versus propofol alone for emergency department procedural sedation.

David H, Shipp J.

did not reduce the incidence of respiratory depression but resulted in greater provider satisfaction, less propofol administration, and perhaps better sedation quality.

Ann Emerg Med. 2012 Jun;59(6):504-12.e1-2. Epub 2012 Mar 7.

Ketamine-propofol combination (ketofol) versus propofol alone for emergency department procedural sedation and analgesia: a randomized double-blind trial.

Andolfatto G, Abu-Laban RB, Zed PJ, Staniforth SM, Stackhouse S, Moadebi S, Willman E.

CONCLUSION: Ketofol for ED procedural sedation does not result in a reduced incidence of adverse respiratory events compared with propofol alone. Induction time, efficacy, and sedation time were similar; however, sedation depth appeared to be more consistent with ketofol.

KÉTAMINE + PROPOFOL : INTÉRESSANT ?

ETUDE MULTICENTRIQUE FRANÇAISE EN COURS (en préhosp) :

Nice (en cours) — Marseille (bientôt) — Nîmes (bientôt) — Avignon (bientôt) — Toulon (bientôt)

ClinicalTrials.gov
A service of the U.S. National Institutes of Health

Ketamine-propofol Versus Ketamine Alone for Procedural Sedation in Adults

This study is currently recruiting participants. <i>Verified April 2012 by Centre Hospitalier Universitaire de Nice</i> Sponsor: Centre Hospitalier Universitaire de Nice	ClinicalTrials.gov Identifier: NCT01544725 First received: February 6, 2012 Last updated: April 30, 2012
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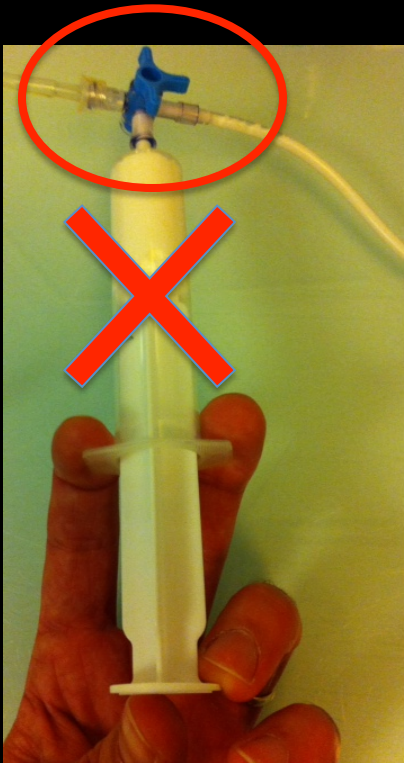
Critère de jugement principal : fréquence de « réveils de mauvaise qualité »

Critères de jugement secondaires : succès de procédure, effets indésirables, satisfactions...

PRÉCAUTIONS ? VITESSE D'INJECTION ?

MHC, aspiration, Guédel, BAVU et matériel d' IOT : à proximité
Scope, SpO₂ (avec la tonalité), PNI / 3 minutes, ETCO₂

Injection des produits sédatifs : toujours en IVL (sur 30 à 60 s)



OXYGÉNOTHÉRAPIE ?

Ann Emerg Med. 2011 May;57(5):449-61. Epub 2011 Jan 21.

Clinical practice guideline for emergency department ketamine dissociative sedation: 2011 update.

Green SM, Roback MG, Kennedy RM, Krauss B.

Department of Emergency Medicine, Loma Linda University Medical Center and Children's Hospital, Loma Linda, CA 92354, USA.

Supplemental Oxygen

The literature strongly supports the safety of ketamine in patients breathing room air.^{4,19,72}

Ann Emerg Med. 2011 Oct;58(4):365-70. Epub 2011 Jul 29.

Procedural sedation and analgesia in the emergency department: recommendations for physician credentialing, privileging, and practice.

O'Connor RE, Sama A, Burton JH, Callahan ML, House HR, Jaquis WP, Tibbles PM, Bromley M, Green SM; American College of Emergency Physicians.

Supplemental oxygen: ED sedation is widely practiced both with and without supplemental oxygen, and such use is left to emergency physician discretion.^{21,34}

OXYGÉNOTHÉRAPIE ?

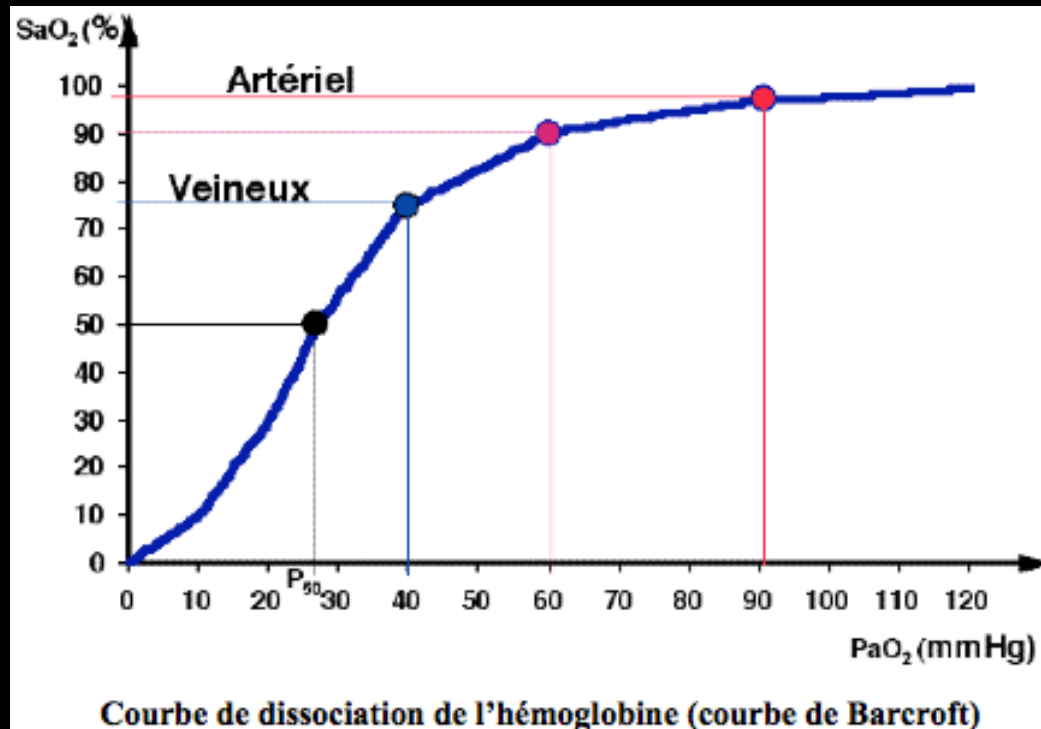
Table. If one is preoxygenated with 100% oxygen and ventilating effectively and then becomes apneic, how long will it take before oxygen saturation decreases to less than 90% ($\pm$ SD)?

Patient Type	Time (minutes)
Healthy adults	Mean 6.1 ± 0.4 min ⁸
Healthy adolescents	Mean 6.4 ± 1.3 min ⁹
Healthy children	Mean 2.7 ± 0.5 min (2-5 y old) ⁹
	Mean 3.0 ± 0.3 min (2-7 y old) ¹⁰
	Mean 4.1 ± 0.2 min (3-12 y old) ¹¹
Healthy infants	Mean 1.6 ± 0.2 min ⁹
	Mean 2.0 ± 0.1 min ¹¹

AVANTAGE :

plus longue période d'oxygénation normale si apnée ou dépression respiratoire,
donc recours au BAVU moins fréquent, donc risque d'insufflation gastrique moindre

OXYGÉNOTHÉRAPIE ?



INCONVÉNIENT EN TERME DE MONITORAGE :

la SpO_2 devient incapable de détecter précocement une dépression respiratoire

OXYGÉNOTHÉRAPIE ?

Ann Emerg Med. 2008 Jul;52(1):1-8. Epub 2008 Mar 4.

The utility of supplemental oxygen during emergency department procedural sedation with propofol: a randomized, controlled trial.

Deitch K, Chudnofsky CR, Dominici P.

G1 (n=56) : O₂ lunettes à 3 L/min ; G2 (n=54) : air comprimé aux lunettes à 3 L/min
Médecins : aveugles de la nature du gaz administré aux patients

RÉSULTATS :

diminution non significative du nombre d' hypoxie dans le G1 par rapport au G2 ;

CONCLUSION: Supplemental oxygen (3 L/minute) trended toward reducing hypoxia in adult study patients; however, the 10% difference observed was not statistically significant and was below our a priori 20% threshold. Blinded capnography frequently identified respiratory depression undetected by the treating physicians.

OXYGÉNOTHÉRAPIE ?

Ann Emerg Med. 2011 Oct;58(4):360-364.e3. Epub 2011 Jun 15.

The utility of high-flow oxygen during emergency department procedural sedation and analgesia with propofol: a randomized, controlled trial.

Deitch K, Chudnofsky CR, Dominici P, Latta D, Salamanca Y.

Albert Einstein Medical Center, Philadelphia, PA, USA. deitchk@einstein.edu

Table 2. Respiratory depression and hypoxia.

	No. (%)		Difference, % (95% CI)
	High-Flow Oxygen (n=59)	Compressed Air (n=58)	
Patients who developed hypoxia	11 (19)	24 (41)	23, $P=.007$ (6 to 38)
Respiratory depression	30 (51)	28 (48)	3 (-16 to 21)
Hypoxia	10 (17)	19 (33)	16 (1 to 31)
No hypoxia	20 (34)	9 (16)	18 (3 to 33)

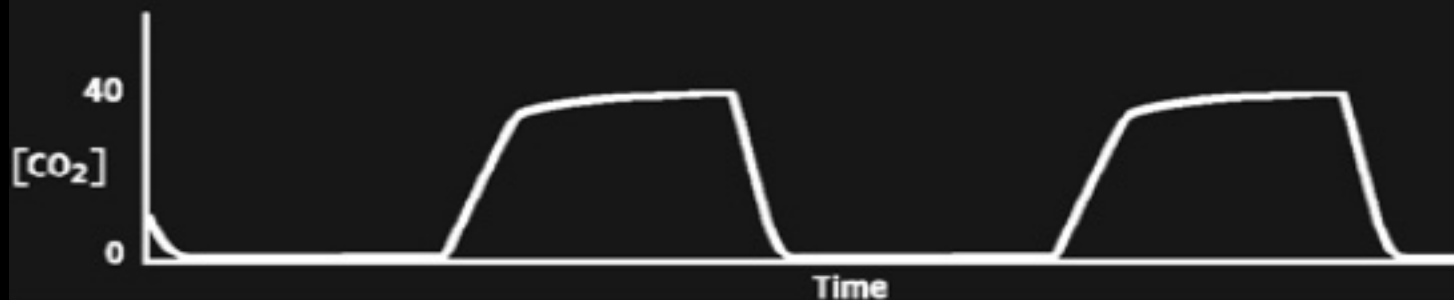
In summary, we found that high-flow supplemental oxygen significantly reduced the incidence of hypoxia during ED propofol sedation. We believe that such supplementation should be routinely administered, assuming the presence of capnography to monitoring ventilations.

CAPNOGRAPHIE : QUEL INTÉRÊT ?

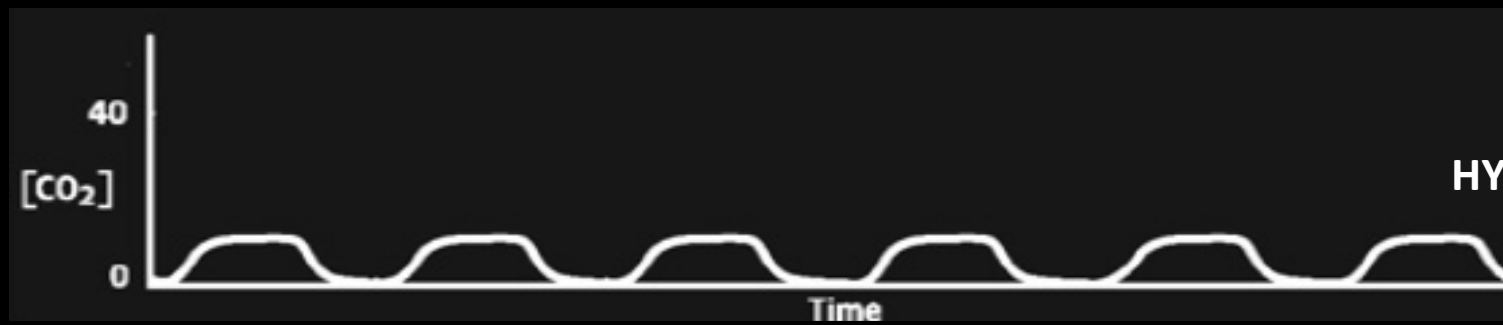
Ann Emerg Med. 2007 Aug;50(2):172-81. Epub 2007 Jan 12.

Capnography for procedural sedation and analgesia in the emergency department.

Krauss B. Hess DR.



FRÉQUENCE
RESPIRATOIRE
NORMALE



HYPERVENTILATION

1^{er} INTÉRÊT DU CAPNO = FRÉQUENCE RESPIRATOIRE FIABLE ET CONTINUE

CAPNOGRAPHIE : QUEL INTÉRÊT ?



ET LA CLINIQUE ?!?

Anesth Analg. 2004 Aug;99(2):379-82, table of contents.

Capnography accurately detects apnea during monitored anesthesia care.

Soto RG, Fu ES, Vila H Jr, Miguel RV.

Department of Anesthesiology, College of Medicine, University of South Florida, 12901 Bruce B. Downs Blvd., MDC 59, Tampa, FL 33612, USA. rsoto@hsc.usf.edu

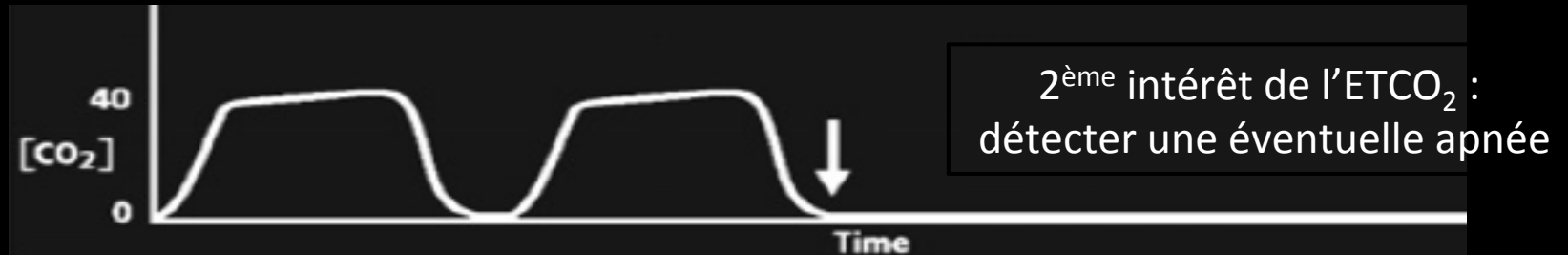
39 patients recevant une sédation procédurale. Médecins aveugles de la capno.

10 patients sur 39 (26%) ont présenté une **apnée ≥ 20 s**

Aucune de ces apnées n'a été détectée par les médecins

Toutes les apnées ont été détectées immédiatement grâce à la courbe de capno

CAPNOGRAPHIE : QUEL INTÉRÊT ?



MOUVEMENTS THORACIQUES RESPIRATOIRES (MTR) ?

ABSENCE de MTR =
apnée centrale

STIMULER LE PATIENT

Si $\nearrow$ SpO_2 : ventilation BAVU douce
Si $\nearrow$ SpO_2 malgré prise au BAVU : IOT...

PRÉSENCE de MTR =
apnée obstructive

LIBÉRER LES VAS : subluxer mâchoire +/- Guedel

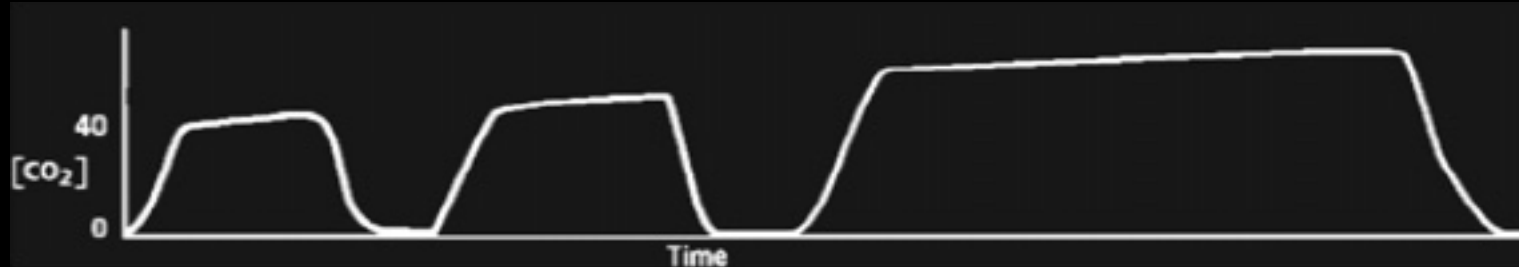
Réapparition
courbe EtCO_2

OBSTRUCTION SIMPLE DES VAS :
poursuite de procédure si SpO_2 OK

Pas de courbe
 EtCO_2

LARYNGOSPASME :
intubation si $\nearrow$ SpO_2

CAPNO : ET EN CAS DE DÉPRESSION RESPI SANS APNÉE ?



HYPOVENTILATION BRADYPNÉIQUE : ↘↘↘ FR + ↘ Vt
(plutôt les opiacés)

SpO₂ normale

Continuer la
procédure
+/- naloxone

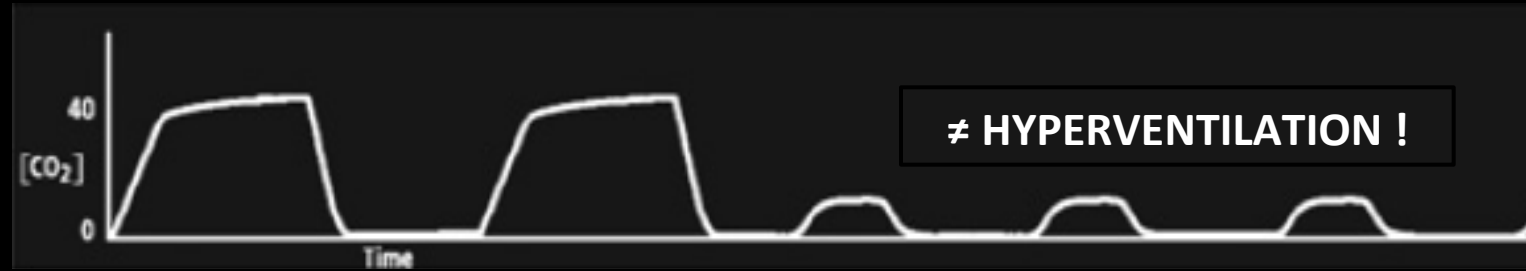
SpO₂ diminuée

Mettre sous MHC 15L
Rechercher une obstruction partielle des VAS
Stopper la procédure si pas d'amélioration
+/- naloxone ?

L' évolution de ce type de dépression respiratoire est assez **prévisible** :

l' ETCO₂ va progressivement augmenter jusqu' à un seuil (variable selon les personnes)
où le risque d' apnée centrale devient significatif (risque ++ à partir de 70 mmHg d' ETCO₂)

CAPNO : ET EN CAS DE DÉPRESSION RESPI SANS APNÉE ?



HYPOVENTILATION HYPOPNEÏQUE : $\downarrow\downarrow\downarrow V_t$ + $\downarrow$ FR

SpO₂ normale

Continuer la procédure
mais rester vigilant

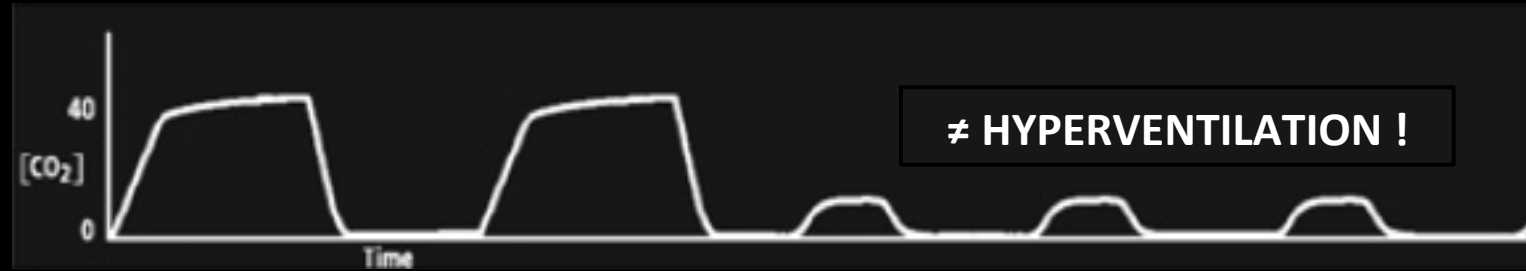
SpO₂ diminuée

Mettre sous MHC 15L
Rechercher une obstruction partielle des VAS
Stopper la procédure si pas d'amélioration

L'évolution de ce type de dépression respiratoire est plus **imprévisible** :

1. **stabilité** puis amélioration ;
2. **dégradation** avec pauses respiratoires (qui peuvent s'améliorer ou se dégrader en apnée centrale) ;
3. **apnée centrale d'emblée**

CAPNO : ET EN CAS DE DÉPRESSION RESPI SANS APNÉE ?



HYPOVENTILATION HYPOPNÉIQUE : $\downarrow \downarrow \downarrow V_t + \downarrow FR$
(plutôt les sédatifs : propofol, étomidate)

SpO₂ normale

Continuer la procédure
mais rester vigilant

SpO₂ diminuée

Mettre sous MHC 15L
Rechercher une obstruction partielle des VAS
Stopper la procédure si pas d'amélioration

L'évolution de ce type de dépression respiratoire est plus **imprévisible** :

1. **stabilité** puis amélioration ;
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3. **apnée centrale d'emblée**

CAPNOGRAPHIE : ET EN PRATIQUE ?

Ann Emerg Med. 2010 Mar;55(3):258-64. Epub 2009 Sep 24.

Does end tidal CO₂ monitoring during emergency department procedural sedation and analgesia with propofol decrease the incidence of hypoxic events? A randomized, controlled trial.

Deitch K, Miner J, Chudnofsky CR, Dominici P, Latta D.

Department of Emergency Medicine, Albert Einstein Medical Center, 5501 Old York Road, Philadelphia, PA 19141, USA. deitchk@einstein.edu

1^{er} groupe : capno « visible », 2^{ème} groupe : capno « invisible »

Hypoxie (SpO₂ < 93% pendant au moins 15s)

moins fréquente dans le groupe capno « visible » : **25% vs 42%** (p=0,035)

100% des hypoxiques ont présenté auparavant une dépression respi détectable au capno (courbe plate pendant au moins 15s, ETCO₂ ≥ 50, modif de l'ETCO₂ de +/- 10%) : **Sensi=100%**

Délai médian de détection : 60 s (5 à 240 s)

Mais bcp de FP (dépression respi au capno, mais pas d'hypoxie) : **Spé=64%**

Plus d'interventions pour améliorer l'état respi dans le groupe capno : **35% vs 22%**

CAPNOGRAPHIE : ET EN PRATIQUE ?

J Clin Anesth. 2011 May;23(3):189-96. doi: 10.1016/j.jclinane.2010.08.012. Epub 2011 Apr 14.

Capnography enhances surveillance of respiratory events during procedural sedation: a meta-analysis.

Waugh JB, Epps CA, Khodneva YA.

Main Results: During PSA, cases of respiratory depression were 17.6 times more likely to be detected if monitored by capnography than cases not monitored by capnography (95% CI, 2.5-122.1; $P < 0.004$).

Capnography is an important addition to pulse oximetry in detecting respiratory depression during procedural sedation.

NB : la R.F.E SFAR – SFMU de 2010 ne mentionne la capnographie que pour l'ISR

CAPNOGRAPHIE : OBLIGATOIRE ?

NON, pas (encore) obligatoire

Sous kétamine, la capnographie n'est pas indispensable si le patient est laissé en air ambiant car dans ce cas la SpO₂ suffit pour détecter une dépression respi

Par contre, la littérature Nord-américaine conseille fortement la capnographie lors des sédations profondes (sous propofol ou étomidate) car l'O₂ y est indispensable

Ann Emerg Med. 2011 Oct;58(4):365-70. Epub 2011 Jul 29.

Procedural sedation and analgesia in the emergency department: recommendations for physician credentialing, privileging, and practice.

O'Connor RE, Sama A, Burton JH, Callahan ML, House HR, Jaquis WP, Tibbles PM, Bromley M, Green SM; American College of Emergency Physicians.

Continuous pulse oximetry should be routine during moderate, dissociative, or deep sedation. Continuous capnography is not mandatory, but is increasingly being recommended for deep sedation. This technology provides the earliest possible warning of hypoventilation and can reduce hypoxia.^{22,33}

A JEUN ?

SEDATION EN URGENCE =



Anesthesiology. 1999 Mar;90(3):896-905.

Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: a report by the American Society of Anesthesiologist Task Force on Preoperative Fasting.

2h pour les liquides
6h pour les solides

Guidelines ASA = ne concernent pas la SAP en urgence mais l' AG programmée, avec intervention sur les VAS (d'où un risque d'inhalation bien supérieur)

Table 1 Categories of sedation

SÉDATION PROCÉDURALE

	Minimal sedation	Moderate sedation	Deep sedation	General anaesthesia
Responsiveness	Normal response to verbal stimulation	Purposeful* response to verbal or tactile stimulation	Purposeful* response following repeated or painful stimulus	Unrousable, even with painful stimulus
Airway reflexes	Unaffected	No intervention required	Intervention may be required	Intervention often required
Breathing	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular	Unaffected	Usually maintained	Usually maintained	May be impaired

*Reflex withdrawal from painful stimulus is NOT considered a purposeful response.

A JEUN ?

Prospective case series :

900 enfants

56% n' étaient pas à jeun

Ann Emerg Med. 2003 Nov;42(5):636-46.

Preprocedural fasting state and adverse events in children undergoing procedural sedation and analgesia in a pediatric emergency department.

Agrawal D, Manzi SF, Gupta R, Krauss B.

CONCLUSION: Fifty-six percent of children undergoing ED procedural sedation and analgesia were not fasted in accordance with established guidelines. There was **no association between preprocedural fasting state and adverse events.**

Emerg Med J. 2010 Apr;27(4):254-61.

Pre-procedural fasting in emergency sedation.

Thorpe RJ, Benger J.

one reported case of pulmonary aspiration during emergency procedural sedation, among 4657 adult cases and 17 672 paediatric cases reviewed.

Table 2 Case report

Reference	Subjects	Study design	Findings	Comments
Cheung ¹ 2007	Single patient, fasted for 5 h undergoing manipulation of a fractured ankle	Case report	Pulmonary aspiration occurred	Alcohol consumed. Sedated on two occasions. Sedation administered by orthopaedic team

ACEP :

Recent food intake is not a contraindication for administering procedural sedation and analgesia, but should be considered in choosing the timing and target level of sedation."²

A JEUN ?

Ann Emerg Med. 2007 Apr;49(4):454-61. Epub 2006 Nov 1.

Fasting and emergency department procedural sedation and analgesia: a consensus-based clinical practice advisory.

Green SM, Roback MG, Miner JR, Burton JH, Krauss B.

← Increasing potential aspiration risk ←	Minimal sedation only
	Dissociative sedation; brief or intermediate-length moderate sedation
	Extended moderate sedation
	Brief deep sedation
	Intermediate or extended-length deep sedation

Brief: <10 minutes
Intermediate: 10-20 minutes
Extended: >20 minutes

Standard-risk patient ^a		Procedural Urgency ^b			
Oral intake in the prior 3 hours		<i>Emergent Procedure</i>	<i>Urgent Procedure</i>	<i>Semi-Urgent</i>	<i>Non-Urgent</i>
<i>Nothing</i>		All levels of sedation	All levels of sedation	All levels of sedation	All levels of sedation
<i>Clear liquids only</i>		All levels of sedation	All levels of sedation	Up to and including brief deep sedation	Up to and including extended moderate sedation
<i>Light snack</i>		All levels of sedation	Up to and including brief deep sedation	Up to and including dissociative sedation; non-extended moderate sedation	Minimal sedation only
<i>Heavier snack or meal</i>		All levels of sedation	Up to and including extended moderate sedation	Minimal sedation only	Minimal sedation only

A JEUN ?

Ann Emerg Med. 2007 Apr;49(4):454-61. Epub 2006 Nov 1.

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<i>Heavier snack or meal</i>	All levels of sedation	Up to and including extended moderate sedation	Minimal sedation only

CEE pour TdR menaçant, fracture très déplacée ou luxation +/- fracture avec souffrance cutanée, neurologique ou vasculaire ; douleur insupportable/résistante

Réduction d'une fracture déplacée ou d'une luxation de hanche

Réduction d'une luxation d'épaule non compliquée

A JEUN ?

Ann Emerg Med. 2007 Apr;49(4):454-61. Epub 2006 Nov 1.

Fasting and emergency department procedural sedation and analgesia: a consensus-based clinical practice advisory.

Green SM, Roback MG, Miner JR, Burton JH, Krauss B.

Higher-risk patient^a

Oral intake in the prior 3 hours	Procedural Urgency ^b		
	<i>Emergent Procedure</i>	<i>Urgent Procedure</i>	<i>Semi-Urgent</i>
<i>Nothing</i>	All levels of sedation	All levels of sedation	All levels of sedation
<i>Clear liquids only</i>	All levels of sedation	Up to and including brief deep sedation	Up to and including extended moderate sedation
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Hernie hiatale,
RGO, iléus,
occlusion, PIC
élevée

Cou court,
macroglossie,
rétrognatisme,
SAS, barbe,
édentation...

Patients à
« haut
risque » =

- Conditions predisposing to esophageal reflux
- Potential for difficult or prolonged assisted ventilation should an airway complication occur
- Extremes of age (eg, >70 years or <6 months)
- Severe systemic disease with definite functional limitation (ie, ASA physical status 3 or greater)
- Other clinical findings leading the EP to judge the patient to be at higher than standard risk (eg,

OÙ EST LA LIMITE ?

Ann Fr Anesth Reanim. 2012 Apr;31(4):281-2. Epub 2012 Mar 20.

[Sedation and analgesia in emergency structure. How far is too far?].

[Article in French]

Vivien B, de La Coussaye JE.

La question que doit se poser l'urgentiste est donc en quelque sorte « jusqu'où ne pas aller trop loin ? »

surtout aux urgences...

OÙ EST LA LIMITE ?

Ann Fr Anesth Reanim. 2012 Apr;31(4):343-6. Epub 2012 Mar 21.

[Sedation and analgesia in emergency structure. Which sedation and/or analgesia for emergency external electrical cardioversion?].

[Article in French]

de La Coussaye JE, Adnet F; groupe d'experts Sfar-SFMU.

il est sage de recommander qu'en milieu hospitalier la sédation du CEE soit réalisée par un MAR.

Il faut néanmoins tempérer cette position par le fait que le CEE se fait en raison d'états extrêmement précaires donc urgents, et que la disponibilité immédiate d'un MAR 24 h/24 est aléatoire. En effet, il est illusoire de pouvoir dédier exclusivement un MAR pour une situation peu fréquente. En cas d'indisponibilité immédiate dûment constatée, il conviendra de se référer à la situation extrahospitalière.

Le CEE étant très bref, une sédation « éclair » n'est-elle pas moins délétère que la durée de la procédure de l'ISR en termes de non-contrôle des voies aériennes ?

Comme la douleur provoquée par la CEE ne dure qu'une seconde, cette brièveté extrême doit amener à proposer une technique la plus courte possible, et dans cette optique, le propofol est incontestablement le meilleur produit, s'il est utilisé à faible dose. En effet, on peut avec une dose de l'ordre de $0,8 \text{ mg} \cdot \text{kg}^{-1}$ ($0,5 \text{ mg} \cdot \text{kg}^{-1}$ chez les personnes âgées)

OÙ EST LA LIMITE ?

Recommandations formalisées d'experts 2010 : sédation et analgésie en structure d'urgence (réactualisation de la conférence d'experts de la SFAR de 1999)

Ce qui caractérise l'utilisation de ces techniques d'anesthésie par l'urgentiste est que ce dernier les pratique pour des actes indiqués et effectués en urgence par lui-même et non par un autre praticien.

Les seules circonstances où l'urgentiste pourrait être amené à réaliser une anesthésie pour un praticien tiers sont des circonstances exceptionnelles (incarcération, isolement, catastrophe) dans lesquelles un anesthésiste-réanimateur n'est pas disponible et où la pratique de l'anesthésie est par ailleurs immédiatement et impérativement nécessaire.

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Ann Emerg Med. 2011 Oct;58(4):365-70. Epub 2011 Jul 29.

Procedural sedation and analgesia in the emergency department: recommendations for physician credentialing, privileging, and practice.

O'Connor RE, Sama A, Burton JH, Callahan ML, House HR, Jaquis WP, Tibbles PM, Bromley M, Green SM; American College of Emergency Physicians.

Deep sedation may be accomplished with the emergency physician monitoring the patient and a separate practitioner performing the procedure, or by the same emergency physician both administering sedation and performing the procedure.

LES URGENTISTES EN SONT-ILS CAPABLES ?

J Anesth. 2013 Jan 13. [Epub ahead of print]

Is procedural sedation safe by non-anesthesiologists?

Singh B.

Pediatrics. 2011 May;127(5):e1154-60. doi: 10.1542/peds.2010-2960. Epub 2011 Apr 25.

Impact of provider specialty on pediatric procedural sedation complication rates.

Couloures KG, Beach M, Cravero JP, Monroe KK, Hertzog JH.

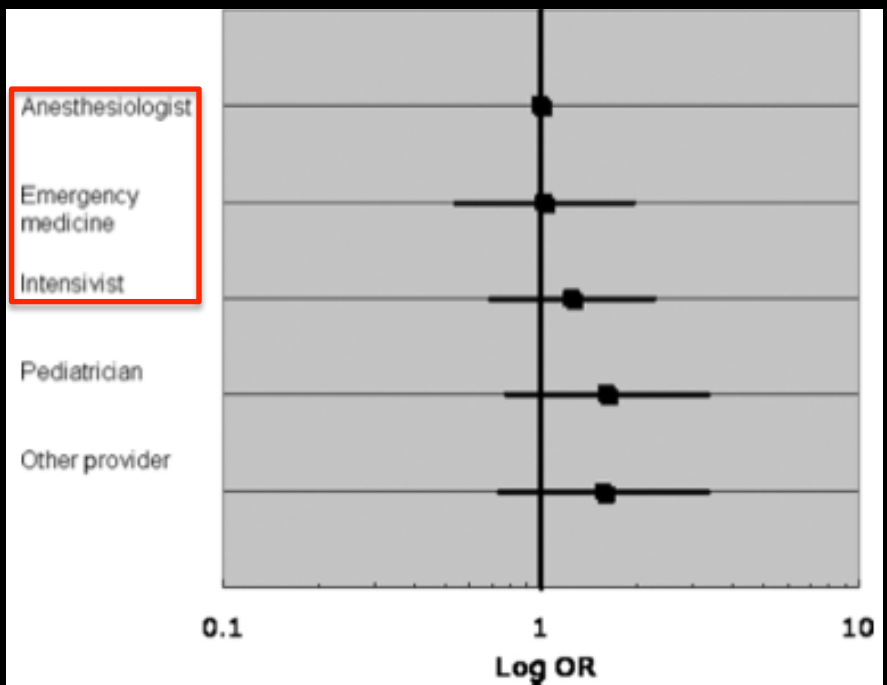
131 751 pediatric procedural sedation cases

Major complications

aspiration, death, cardiac arrest,
unplanned hospital admission or level-of-care increase,
or emergency anesthesia consultation.

Major complication rates per 10 000 sedations were as follows:

anesthesiologists, 7.6 (4.6-12.8);
emergency medicine, 7.8 (5.5-11.2);
intensivist, 9.6 (7.3-12.6);
pediatrician, 12.4 (6.9-20.4);
and other, 10.2 (5.1-18.3).



LES URGENTISTES EN SONT-ILS CAPABLES ?

Eur J Emerg Med. 2011 Jun;18(3):162-7. doi: 10.1097/MEJ.0b013e32834230fb.

Safety and efficacy of procedural sedation with propofol in a country with a young emergency medicine training program.

Kuypers MI, Menci F, Verhagen MF, Kok ME, Dijksman LM, Simons MP.

Indications reduction of dislocations (51%), electrocardioversion (32%), fracture reduction (8%), and abscess/wound treatment (6%).

The median propofol dose was 1.0 mg/kg (0.70-1.5) **Most had a Ramsay sedation score of 4 or 5.**

The procedural success rate was 99.5%. No serious adverse events were reported. Sedation events included; hypoventilation (11%), desaturation (5%), hypotension (3%), and bradycardia (1%), all of which resolved with simple supportive interventions. One patient vomited without aspirating.

Emerg Med J. 2006 Dec;23(12):922-3.

The safety of single-physician procedural sedation in the emergency department.

Hogan K, Sacchetti A, Aman L, Opiela D.

West J Emerg Med. 2013 Feb;14(1):47-54. doi: 10.5811/westjem.2012.4.12455.

Sedation-assisted Orthopedic Reduction in Emergency Medicine: The Safety and Success of a One Physician/One Nurse Model.

Vinson DR, Hoehn CL.

INTÉRÊT ++ DE LA FORMATION DES URGENTISTES

Ann Emerg Med. 2011 May;57(5):470-4. doi: 10.1016/j.annemergmed.2011.03.014. Epub 2011 Mar 27.

Who owns deep sedation?

Green SM, Krauss B.

Procedural sedation at all levels is and always has been multidisciplinary, and its leadership belongs not to a single specialty but rather to all with the demonstrated skills and commitment to administer it safely.

Ann Emerg Med. 2011 Oct;58(4):365-70. Epub 2011 Jul 29.

Procedural sedation and analgesia in the emergency department: recommendations for physician credentialing, privileging, and practice.

O'Connor RE, Sama A, Burton JH, Callahan ML, House HR, Jaquis WP, Tibbles PM, Bromley M, Green SM; American College of Emergency Physicians.

Each emergency medicine service should participate in a departmental and/or institution-wide multidisciplinary quality assurance program that monitors procedural sedation and analgesia practice, tracks adverse events, ensures satisfactory documentation and compliance with protocols, and identifies opportunities for improvement.

INTÉRÊT +++ DE PROTOCOLES DE S.A.P AUX URGENCES

Emergency Department Procedural Sedation and Analgesia Physician Checklist

[patient label]

Pre-Procedure Assessment

- ☐ Past medical history (note history of OSA) _____
- ☐ Prior problems with sedation/anesthesia _____
- ☐ Allergies to food or medications _____
- ☐ Procedure _____
- ☐ Cardiorespiratory reserve no or mild impairment / moderate impairment / significant impairment
- ☐ Difficult airway features none / mild concern / significant concern
- ☐ Last oral intake (see fasting grid on reverse) _____
- ☐ Weight (kg) _____

Difficult Airway Features

Difficult Laryngoscopy: Look externally, Evaluate 3-3-2 rule, Mallampati score, Obstruction, Neck Mobility
Difficult BVM Ventilation: Beard, Obese, No teeth, Elderly, Sleep Apnea / Snoring
Difficult LMA: Restricted mouth opening, Obstruction, Distorted airway, Stiff lungs or c-spine
Difficult Cricothyroidotomy: Surgery, Hematoma, Obesity, Radiation distortion or other deformity, Tumor*

Is this patient a good candidate for ED procedural sedation and analgesia?

The less cardiorespiratory reserve, the more difficult airway features, and the less urgent the procedure, the more likely the patient should not receive ED-based PSA. If not a candidate for ED PSA consider these alternatives:

- Regional or local anesthetic
- PSA or GA in the operating room
- Endotracheal intubation in ED

INTÉRÊT +++ DE PROTOCOLES DE S.A.P AUX URGENCES

Am J Emerg Med. 2010 Oct;28(8):880-3. doi: 10.1016/j.ajem.2009.04.035. Epub 2010 Feb 25.

Impact of addition of propofol to ED formulary.

Senula G, Sacchetti A, Moore S, Cortese T.

Evolution des pratiques avant / après mise en place d'un protocole de sédation procédurale sous propofol, aux urgences (573 patients au total)

Les 3 derniers mois de l'étude, jusqu'à 69% de SAP faites sous propofol

Table 3 ED procedural sedation characteristics before and after the introduction of propofol

	Before	After	<i>P</i>
Medication use			
Etomidate (%)	42.8	12.4	.001
Fentanyl (%)	37.2	27.3	.02
Midazolam (%)	53.3	33.2	.001
Ketamine (%)	14.9	14.3	.85
Propofol (%)	0	40.1	.001
No. of agents used	1.6	1.3	.001
Complications			
Minor (%)	5.8	1.7	.002
Major (%)	3.6	1.0	.002
None (%)	90.6	97.3	.002
Sedation failure (%)	5.1	4.1	.02

FAISONS
DES
PROTOCOLES !!

JE VOUS REMERCIE DE VOTRE ATTENTION

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