ADARPEF, 2015

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Hôpital Armand Trousseau, Paris, France

ANALGÉSIE APRÈS AMYGDALECTOMIE, SANS LA CODÉINE…



Recommandations de la SFORL

Comment substituer la codéine après amygdalectomie chez l'enfant de moins de 12 ans ? Recommandation de la Société française d'oto-rhino-laryngologie et de chirurgie de la face et du cou☆

I. Constant[c,*], S. Ayari Khalfalla[a], A. Brunaud[b], V. Deramoudt[d], P. Fayoux[e], A. Giovanni[f], C. Mareau[g], R. Marianowski[h], J. Michel[f], M. Mondain[i], A. Paganelli[f], S. Pondaven[j], P. Schultz[k], J.-M. Treluyer[l], C. Wood[m], R. Nicolas[f], Groupe de travail de la SFORL

Amygdalectomie et douleur postopératoire

- Une des interventions les plus fréquentes chez l'enfant
- Douleur postopératoire de modérée à intense de l'ordre de 7 jours
- Prise en charge de la douleur (évaluation et traitement) par les parents, à domicile.
- Avant 2012…
- En GB, 85% des MAR prescrivaient du paracetamol et 80% des AINS, 16% prescrivaient de la codéine (rescue)
- En Australie, et aux Etats Unis, codéine majoritaire
- En France aussi …

Analgésie postopératoire

Conférence d'experts SFAR 2005 (Annales Françaises d'Anesthésie et Réanimation, 27;2008)
Recommandations Pratique Clinique SFORL 2009 (Eur Ann Otorhinolaryngol Head Neck Dis. 129; 2012)

1 Analgésie postopératoire immédiate : morphine

- La posologie de la morphine doit être réduite en cas de SAOS grave (nadir Sp O2<85%)

Anesthesiology 2004; 100:806–10
© 2004 American Society of Anesthesiologists, Inc. Lippincott Williams & Wilkins, Inc.

Recurrent Hypoxemia in Young Children with Obstructive Sleep Apnea Is Associated with Reduced Opioid Requirement for Analgesia

Karen A. Brown, M.D., André Laferrière, B.A.,† Immanuela Ravé Moss, M.D., Ph.D.‡*

Anesthesiology 2006; 105:665–9
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Recurrent Hypoxemia in Children Is Associated with Increased Analgesic Sensitivity to Opiates

Karen A. Brown, M.D., André Laferrière, B.A.,† Indrani Lakheeram, M.D.,‡ Immanuela Ravé Moss, M.D., Ph.D.§*

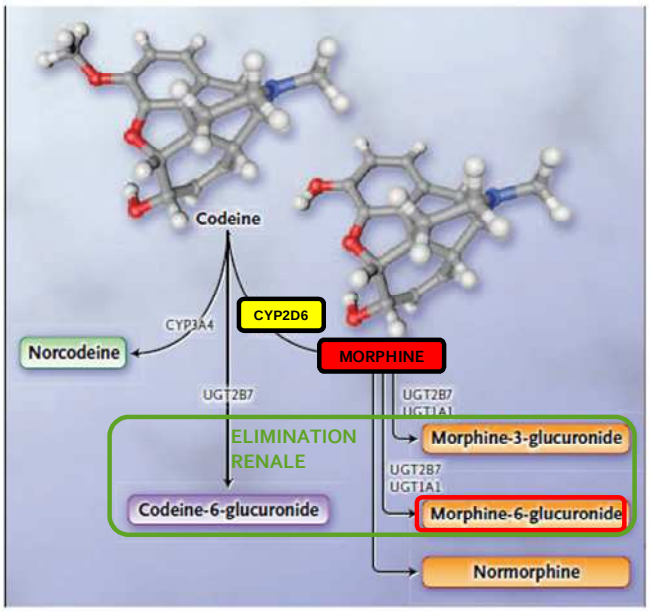
2 Analgésie postopératoire relai : codéine + paracétamol …



Mais ça, c'était avant …

New Evidence about an Old Drug — Risk with Codeine after Adenotonsillectomy

Judith A. Racoosin, M.D., M.P.H., David W. Roberson, M.D., Michael A. Pacanowski, Pharm.D., M.P.H., and David R. Nielsen, M.D.



Codeine Metabolism Pathway.
Data are from Crews et al.[1]

- La codéine est une prodrogue
- 80% de la codéine est métabolisée en métabolites inactifs
- L'effet analgésique résulte de la transformation en morphine (CYP2D6) et morphine 6G
- Le CYP2D6 a une activité très variable due à son polymorphisme génétique et à la fréquence de ses duplications
- Le métabolisme de la codéine (et donc son activité clinique) est très variable selon les individus

Les différents types de métaboliseurs de la codéine

- Activité métabolique normale (deux allèles normaux) = Extensive metabolizers = EM

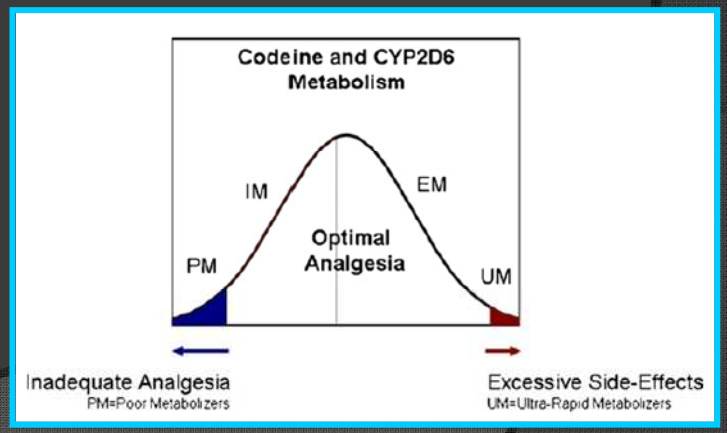
- Activité métabolique réduite (un ou deux allèles) = Intermediate metabolizers (IM) or Poor metabolizers (PM) = Codéine inefficace

- Activité métabolique augmentée

par duplication du gène CYP2D6

= Ultrarapid metabolizers = UM

= danger surdosage



Les accidents contexte médical pédiatrique

Wilkes et al, Lancet 1981						
3 mois, 3 kg	URI		<24h	RECUP		
Magnani and Evens, Pediatrics 1999						
29 jours, 3 kg	URI	2 mg x 4	<24h	DECES	0.04 ng/ml	
Tong et al, Pediatr Int 2001						
17 jours,	URI			RECUP		
Dresen et al, Int J Legal Med 2009						
3 ans, 14 kg	URI	#20 mg x 1®	6 j	RECUP	26 ng/ml	EM
3 ans, 14 kg	URI	#20 mg x 1®	6 j	DECES	139 ng/ml	EM
Koren et al, Lancet 2006						
13 jours,	allait mater 60 mg x 2		11 jrs	DECES	70 ng/ml	mère UM

Intervalle thérapeutique = 4.5±2.1 ng/ml
Dépression respiratoire = 20 ng/ml
Lynn et al, AA 1993

Les accidents contexte postopératoire (amygdalectomie)

Voronov et al, Pediatr Anesth 2007						
2 ans, 14 kg	AVG, SAOS	12-24 mg x 4	24h	RECUP	UM or EM	
Ciszkowski et al, NEJM 2009						
2 ans, 13 kg	AVG, SAOS	13 mg x 4-6	36h	DECES	UMd	30 ng/ml
Kelly et al, Pediatrics 2012						
4 ans, 28 kg	AVG, SAOS	8 mg x 5	24h	DECES	UMd	18 ng/ml
3 ans, 14 kg	AVG, SAOS	15 mg x4-6	30h	RECUP	EMd	17 ng/ml
5 ans, 29 kg	AVG, ronfl	12 mg x 4-6	24h	DECES	UMp	30 ng/ml

Intervalle thérapeutique = 4.5±2.1 ng/ml
Dépression respiratoire = 20 ng/ml
Lynn et al, AA 1993

ALERTE FDA, EMA, ANM …

- **CODEINE INTERDITE CHEZ L'ENFANT DE MOINS DE 12 ANS**

- **COMMENT LA REMPLACER ?**
  - **TRAMADOL**
  - **AINS**
  - **CORTICOIDES**
  - **MORPHINE PER OS**

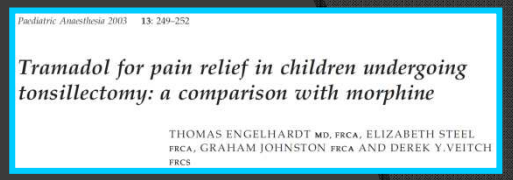
Le Tramadol

- **Analgésique central : Deux mécanismes d'action synergiques** :
  - une activité morphinique faible
  - une activité d’inhibiteur de la recapture de la noradrénaline et de la sérotonine

  2 énantiomères et un métabolite actif M1 (CYP2D6)
- **Effets secondaires**
  - Nausées vomissements
  - Sédation
  - Pas (peu) de dépression respiratoire aux doses cliniques
  - Convulsions possibles si overdose

Tramadol et amygdalectomie

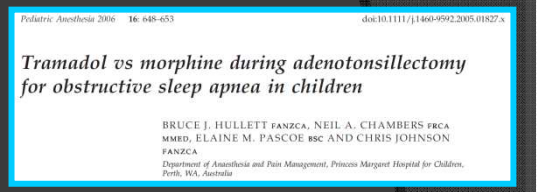
- En IV, 1, 2 mg/kg ou PCA, comparé à la morphine IV (0,1 mg/kg) ou en PCA
  - analgésie comparable ou moindre si PCA
  - moins de NVPO
  - moins de désaturations (SAOS préop)
- Biodisponibilité orale bonne
  - 1,5 mg/kg en gtes, pic à 30 min, durée 6h
  - Comparé au paracétamol, meilleur analgésie J0-J3 (2,5 mg/kg per os, toutes les 8h)
  - Profil comparable à la codéine



Paediatric Anaesthesia 2003 **13**: 249–252

Tramadol for pain relief in children undergoing tonsillectomy: a comparison with morphine

THOMAS ENGELHARDT MD, FRCA, ELIZABETH STEEL FRCA, GRAHAM JOHNSTON FRCA AND DEREK Y.VEITCH FRCS

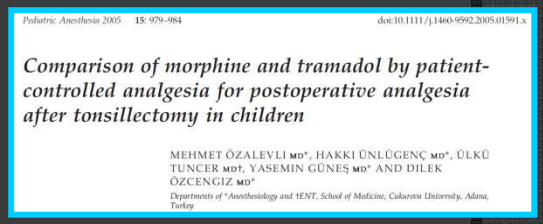


Pediatric Anesthesia 2006 **16**: 648–653 doi:10.1111/j.1460-9592.2005.01827.x

Tramadol vs morphine during adenotonsillectomy for obstructive sleep apnea in children

BRUCE J. HULLETT FANZCA, NEIL A. CHAMBERS FRCA MMED, ELAINE M. PASCOE BSC AND CHRIS JOHNSON FANZCA

Department of Anaesthesia and Pain Management, Princess Margaret Hospital for Children, Perth, WA, Australia



Pediatric Anesthesia 2005 **15**: 979–984 doi:10.1111/j.1460-9592.2005.01591.x

Comparison of morphine and tramadol by patient-controlled analgesia for postoperative analgesia after tonsillectomy in children

MEHMET ÖZALEVLI MD*, HAKKI ÜNLÜGENÇ MD*, ÜLKÜ TUNCER MD†, YASEMIN GÜNEŞ MD* AND DILEK ÖZCENGIZ MD*

*Departments of *Anesthesiology and †ENT, School of Medicine, Cukurova University, Adana, Turkey*

Eur J Anaesthesiol. 2000 Sep;17(9):576-82.
Double-blind randomized study of tramadol vs. paracetamol in analgesia after day-case tonsillectomy in children.
Pendeville PE1, Von Montigny S, Dort JP, Veyckemans F.

A Comparison of Postoperative Tramadol versus Acetaminophen with Codeine in Children Undergoing Tonsillectomy

Stefan J. Friedrichsdorf, Andrea P. Nugent, Laurie P. Foster, Yi Lu and James D. Sidman

Otolaryngology -- Head and Neck Surgery 2013 149: P115

DOI: 10.1177/0194599813495815a244

Tramadol, codéine mêmes questions ??

- Métabolite actif M1 (CYP2D6)
- Variation … aibles qu'avec l…
- Dépressi… e, obésité, i…
- Pas d'étude sur la pharmacodynamie chez les UM
- Comme pour la codéine, dépression respiratoire réversée par la naloxone.

A Case of Respiratory Depression in a Child With Ultrarapid CYP2D6 Metabolism After Tramadol

Gilles Orliaguet, MD, PhD[a], Jamil Hamza, MD, PhD[a], Vincent Couloigner, MD, PhD[b], Françoise Denoyelle, MD, PhD[b], Marie-Anne Loriot, MD, PhD[c,d], Franck Broly, MD, PhD[e], Erea Noel Garabedian, MD[b]

PEDIATRICS Volume 135, number 3, March 2015

Am J Emerg Med. 2013 Feb;31(2):410-1

Oral pure tramadol exposure like other opioids can cause apnea- why not be careful?

Hassanian-Moghaddam H.

American Journal of Emergency Medicine (2013) **31**, 26–31

ELSEVIER

The American Journal of Emergency Medicine

www.elsevier.com/locate/ajem

Original Contribution

Tramadol-induced apnea

Hossein Hassanian-Moghaddam MD[a,*], Hoorvash Farajidana MD[b], Saeedeh Sarjami MD[c], Hamid Owliaey MD[a]

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[b]*Department of Forensic Medicine, Tehran University of Medical Sciences, Tehran 14176, Iran*
[c]*Private Clinic, Child & Adolescent Psychiatry, Tehran 15879, Iran*

SIGNA VITAE 2012; 7(2): 56 - 59

CASE REPORT

Probable association of neonatal death with the use of tramadol to treat labour pain

ŠTEFAN GROSEK • MARTINA SOBAN • ALENKA KUŠTRIN-SAMBA
JANEZ PRIMOŽIČ • IZTOK GRABNAR

LES AINS …

Le doute persiste …
Mais le risque est très faible…

A 2013 updated systematic review & meta-analysis of 36 randomized controlled trials; no apparent effects of non steroidal anti-inflammatory agents on the risk of bleeding after tonsillectomy

Riggin, L.,[1] Ramakrishna, J.,[2] Sommer, D.D[2] & Koren, G.[1]

[1]*Ivey Chair in Molecular Toxicology & Hospital for Sick Children, Western University Schulich School of Medicine & Dentistry & Hospital for Sick Children, London & Toronto, and* [2]*Division of Otolaryngology – Head & Neck Surgery, Department of Surgery, McMaster University, Hamilton, ON, Canada*

Accepted for publication 20 February 2013
Clin. Otolaryngol. 2013, **38**, 115–129

Conclusions: *These results suggest that NSAIDs can be considered as a safe method of analgesia among children undergoing tonsillectomy.*

Table 3. Summary of all outcomes in children (n = number of studies; N = total number of patients)

	Odds ratio (95% confidence interval)	P-value	Hetero-geneity
Most severe bleeding, all NSAIDs (n = 18) (N = 1609)	1.06 (0.65–1.74)	0.81	0.801
Bleeding requiring reoperation, all NSAIDs (n = 9) (N = 564)	1.80 (0.54–5.99)	0.34	0.652
Bleeding requiring readmission, all NSAIDs (n = 4) (N = 385)	1.11 (0.31–3.98)	0.87	0.204
Bleeding managed conservatively, all NSAIDs (n = 14) (N = 1369)	1.35 (0.70–2.60)	0.36	0.096
Diclofenac only (n = 5) (N = 411)	0.92 (0.43–1.98)	0.84	0.472
Ibuprofen only (n = 4) (N = 535)	1.06 (0.49–2.30)	0.89	0.400
Ketoprofen only (n = 2) (N = 154)	0.66 (0.07–5.85)	0.71	0.603
Ketorolac only (n = 6) (N = 459)	3.40 (0.69–16.81)	0.13	0.833

Nonsteroidal anti-inflammatory drugs and perioperative bleeding in paediatric tonsillectomy (Review)

Lewis SR, Nicholson A, Cardwell ME, Siviter G, Smith AF

THE COCHRANE COLLABORATION®

Nonsteroidal anti-inflammatory drugs and perioperative bleeding in paediatric tonsillectomy (Review) Copyright © 2013 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

We included 15 studies that involved 1101 children in this updated review. One study was added as a result of our 2012 search, another previously included study was removed due to lack of randomization. Fourteen included studies compared NSAIDs with other analgesics or placebo and reported on bleeding requiring surgical intervention. The use of NSAIDs was associated with a non-significant increase in the risk of bleeding requiring surgical intervention: Peto odds ratio (OR) 1.69 (95% confidence interval (CI) 0.71 to 4.01). Ten studies involving 365 children reported perioperative bleeding requiring non-surgical intervention. NSAIDs did not significantly alter the number of perioperative bleeding events requiring non-surgical intervention: Peto OR 0.99 (95% CI 0.41 to 2.40) but the confidence intervals did not exclude an increased risk. Thirteen studies involving 1021 children reported postoperative vomiting. There was less vomiting when NSAIDs were used as part of the analgesic regime than when NSAIDs were not used: Mantel Haenszel (M-H) risk ratio (RR) 0.72 (95% CI 0.61 to 0.85).

Authors' conclusions

There is insufficient evidence to exclude an increased risk of bleeding when NSAIDs are used in paediatric tonsillectomy. They do however confer the benefit of a reduction in vomiting.

2003
Anesthesiology, Marret et al

Nonsteroidal Antiinflammatory Drugs and the Risk of Operative Site Bleeding After Tonsillectomy: A Quantitative Systematic Review

Steen Møiniche, MD*, Janne Rømsing, MS, Pharm, PhD†, Jørgen B. Dahl, MD, DMSc*, and Martin R. Tramèr, MD, DPhil‡

*Department of Anesthesiology and Intensive Care Medicine, Herlev University Hospital; †Department of Pharmaceutics, The Royal Danish School of Pharmacy, Copenhagen, Denmark; and ‡Division of Anesthesiology, Geneva University Hospitals, Switzerland

The use of nonsteroidal antiinflammatory drugs (NSAIDs) for analgesia after tonsillectomy is controversial because NSAIDS, through platelet inhibition, may increase the risk of perioperative bleeding. We systematically searched for randomized, controlled trials that reported on the incidence of perioperative bleeding attributable to the use of NSAIDs in patients undergoing tonsillectomy. As secondary outcome measures, we analyzed the quality of pain relief and the incidence of postoperative nausea and vomiting. Twenty-five studies with data from 970 patients receiving a NSAID and 883 receiving a non-NSAID treatment or a placebo were analyzed. Data were combined using a fixed-effect model. Of four bleeding end points (intraoperative blood loss, postoperative bleeding, hospital admission, and reoperation because of bleeding), only reoperation happened significantly more often with NSAIDs: Peto-odds ratio, 2.33 (95% confidence interval [CI], 1.12–4.83) and number-needed-to-treat, 60 (95% CI, 34–277). Compared with opioids, NSAIDs were equianalgesic, and the risk of emesis was significantly decreased (relative risk, 0.73; 95% CI, 0.63–0.85; numbers-needed-to-treat, 9; 95% CI, 5–19).

(Anesth Analg 2003;96:68–77)

LES AINS …

- IBUPROFENE 3 mois
- Ketoprofene 6 mois
- Diclofenac 6 ans
- Acide niflumique 6 mois

- Pouvoir antalgique supérieur au paracétamol et à la codéine
- Diminution des NVPO
- Synergie avec la morphine (30-50% épargne) et le néfopam
- Effet additif avec le paracetamol

- Effet secondaires (hémorragiques et infectieux)
  - Respect des contre indications, prescription limitée sur 5 jours.

Corticoïdes IV…

Le doute s'installe …

JAMA. 2008 Czarnetzki et al. Randomized prospective study (n=215)
Conclusion: In this study of children undergoing tonsillectomy, dexamethasone decreased the risk of PONV dose dependently but was associated with an increased risk of postoperative bleeding.

Head and Neck surgery. 2011 Geva et al , Meta-analysis, 14 studies, 1500 patients
The results of this meta-analysis indicate that perioperative dexamethasone does not confer an increased risk of postoperative bleeding in patients undergoing tonsillectomy.

JAMA 2012 Gallagher et al : multicenter study, Randomized prospective study (n=314)
Conclusion: Perioperative dexamethasone administered during pediatric tonsillectomy was not associated with excessive, clinically significant level II or III bleeding events based on not having crossed the noninferior threshold of 5%. Increased subjective (level I) bleeding events caused by dexamethasone could not be excluded because the noninferiority threshold was crossed.

Laryngoscope 2012 Shargorodsky et al. Meta-analysis, 12 studies, 1180 patients
Conclusion: There was no overall association between dexamethasone administration and postoperative bleeding in children undergoing tonsillectomy or adenotonsillectomy. However, this study cannot exclude the possibility of an association between specific dexamethasone doses and increased odds of bleeding. The results underscore the need for more dedicated prospective studies of this very common intervention.

BMJ 2012, Plante et al. Meta-analysis, 29 studies, 2674 patients
Conclusions: Although systemic steroids do not appear to increase bleeding events after tonsillectomy, their use is associated with a raised incidence of operative reinterventions for bleeding episodes, which may be related to increased severity of bleeding events. Systemic steroids should be used with caution, and the risks and benefits weighed, for the prevention of postoperative nausea and vomiting after tonsillectomy before further research is performed to clarify their condition of use.

J Otorhinolaryngol Relat Spec. 2013; Keller et al, Editorial
The steroid controversy: where are we?
Ultimately, the body of evidence that currently exists appears to support the concept that a single dose of perioperative dexamethasone is not associated with undue risk. A decision to withdraw dexamethasone from use in pediatric tonsillectomy needs to be weighed against the potential of causing increased postoperative nausea, vomiting, pain, and resultant hospital readmission. At this point, surgeons and anesthesiologists should feel comfortable giving perioperative dexamethasone but must remain vigilant for bleeding complications.

Question persistante …

- Quid de l'association

  dexamethasone-AINS ????

En terme de majoration du risque de saignement

Plante et al, BMJ 2012

Table 4| **Sensitivity analysis of operative reintervention to treat post-tonsillectomy bleeding**

Subgroups	No of studies	No of participants	Odds ratio (95% CI)	I^2 (%)
Methodological quality				
Low risk of bias	3	299	0.91 (0.22 to 3.68)	0
High risk of bias	4	320	3.31 (0.51 to 21.61)	0
Blinding				
Double blinded	9	938	2.22 (0.95 to 5.18)	0
No blinding or unclear	3	240	2.64 (0.31 to 22.41)	0
Sample size				
<100 patients	7	394	3.85 (1.13 to 13.17)	0
≥100 patients	5	784	1.57 (0.56 to 4.38)	0
Follow-up				
≤24 h	3	260	3.06 (0.37 to 25.07)	0
>24 h	9	918	2.16 (0.92 to 5.06)	0
Age group				
Children only	8	679	3.43 (1.29 to 9.13)	0
Adults only	4	499	1.07 (0.29 to 4.03)	0
Surgical technique				
Cold or combined dissection	6	453	1.45 (0.50 to 4.20)	0
Hot dissection	4	450	3.84 (0.53 to 28.00)	0
Dosage regimen of steroid				
≤0.5 mg/kg	8	816	2.45 (1.04 to 5.76)	0
>0.5 mg/kg	4	362	1.52 (0.21 to 11.20)	0
Coadministration of NSAID				
NSAID	3	475	4.10 (0.99 to 16.97)	0
No NSAID	9	703	1.75 (0.68 to 4.50)	0

Cold=dissection with cold steel instruments, haemostasis with gauze compression, or ligatures; combined=cold dissection with use of electrocautery for haemostasis; hot=dissection and haemostasis with electric device; NSAID=non-steroidal anti-inflammatory drug.

British Journal of Anaesthesia **113** (1): 23–42 (2014)
doi:10.1093/bja/aeu152

BJA

Dexamethasone and haemorrhage risk in paediatric tonsillectomy: a systematic review and meta-analysis

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[5] Norwich Medical School, Faculty of Medicine and Health Sciences, University of East Anglia, Norwich NR4 7TJ, UK
[6] Centre for Reviews and Dissemination, University of York, York YO10 5DD, UK
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* Corresponding author. E-mail: jennifer.bellis@alderhey.nhs.uk

Editor's key points

- The authors performed a systematic review to examine the effect of dexamethasone and NSAIDs on post-tonsillectomy haemorrhage.
- They found no influence of these drugs on post-tonsillectomy haemorrhage, but noted that further prospective research is needed.

Summary. In children undergoing tonsillectomy, dexamethasone is recommended to reduce the risk of postoperative nausea and vomiting while non-steroidal anti-inflammatory drugs (NSAIDs) are used for pain relief. We aimed to determine whether children who receive dexamethasone or dexamethasone with NSAID are more likely to experience haemorrhage post-tonsillectomy. Randomized and non-randomized studies in which children undergoing tonsillectomy received dexamethasone or dexamethasone and NSAID were sought within bibliographic databases and selected tertiary sources. The risk of bias assessment and evaluation of haemorrhage rate data collection and reporting were assessed using the Cochrane Risk of Bias Tool and McHarm tool. Synthesis methods comprised pooled estimate of the effect of dexamethasone on the risk of haemorrhage rate using the Peto odds ratio (OR) method. The pooled estimate for haemorrhage rate in children who received dexamethasone was 6.2%, OR 1.41 (95% confidence interval 0.89–2.25, $P=0.15$). There was risk of bias and inconsistent data collection and reporting rates of haemorrhage in many of the included studies. Clinical heterogeneity was observed between studies. The pooled analysis did not demonstrate a statistically significant increase in the risk of post-tonsillectomy haemorrhage with dexamethasone with/without NSAID use in children. However, the majority of the included studies were not designed to investigate this endpoint, and thus large studies which are specifically designed to collect data on haemorrhage rate are needed.

Keywords: dexamethasone; paediatrics; tonsillectomy



Et les corticoïdes per os ???

- Prescription (très) fréquente par les chirurgiens ORL
- Effets anti-inflamatoire et antalgique… à prouver dans l'AVG
- Pas (ou peu) d'études
  - Efficacité antalgique
  - Interaction saignement
  - Interaction infection

The Laryngoscope
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Evaluating the Effects of Oral Prednisolone on Recovery After Tonsillectomy: A Prospective, Double-Blind, Randomized Trial

Carsten E. Palme, MB, BS; Predrag Tomasevic, MB, BS; David V. Pohl, FRACS

Original Research—Pediatric Otolaryngology

AMERICAN ACADEMY OF OTOLARYNGOLOGY–HEAD AND NECK SURGERY FOUNDATION

Otolaryngology–Head and Neck Surgery
147(3) 551–556
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DOI: 10.1177/0194599812447776
http://otojournal.org
SAGE

The Effect of a Postoperative Course of Oral Prednisone on Postoperative Morbidity following Childhood Tonsillectomy

Emily Macassey, MBChB, FRACS[1], Patrick Dawes, MBChB, FRCS[1], Barry Taylor, MBChB, FRACP[2], and Andrew Gray[3]

The Laryngoscope
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Effects of Oral Prednisolone on Recovery After Tonsillectomy

Soo K. Park, MD; Jisung Kim, MD; Jeong M. Kim, MD;
Je Y. Yeon, MD; Woo S. Shim, MD; Dong W. Lee, MD

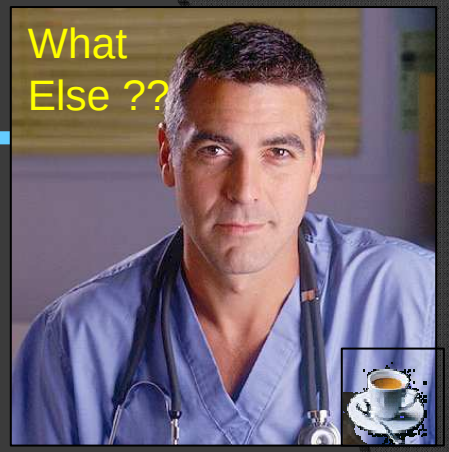
On day 7, in pediatric patients, differences in pain, diet, activity, mean area of re-epithelialization, fever, and sleep disturbance were observed.
On day 14, differences in the mean area of re-epithelialization remained in both pediatric and adult patients.

TABLE V.
Characteristics of Hypertrophy and Tonsillitis Patients on Day 7.

Factor	Control, n = 65	Prednisolone, n = 69	*P* Value
Hypertrophy			
Pain score, 0 to 10 ± SD	2.71 ± 2.65	1.42 ± 1.53	<.001*
Diet			
None	0	0	.003*
Fluid	10	1	
Soft	38	36	
Normal	17	32	
Activity			.005*
None	0	0	
Quiet	13	2	
Restricted	15	15	
Normal	37	52	
Re-epithelialization area, % ± SD	24.62 ± 3.82	47.90 ± 7.59	<.001*
Minor bleeding, %	15.0	16.0	.31
Nausea/vomiting, %	9.2	9.8	1.00
Fever, %	8.2	7.2	.09
Sleep disturbance, %	9.2	9.8	.34

Tonsillitis	Control, n = 34	Prednisolone, n = 30	
Pain score, 0 to 10 ± SD	3.56 ± 1.61	3.10 ± 2.20	.34
Diet			
None	0	0	.27
Fluid	3	2	
Soft	28	21	
Normal	3	7	
Activity			
None	1	0	.09
Quiet	5	2	
Restricted	22	15	
Normal	6	13	
Re-epithelialization area, % ± SD	23.94 ± 2.41	38.57 ± 3.13	<.001*
Minor bleeding, %	9.6	8.4	.17
Nausea/vomiting, %	7.0	3.3	.01*
Fever, %	3.2	2.8	.02*
Sleep disturbance, %	9.6	8.4	.26

Et la Morphine per os …



- Antalgique de référence …
- Education des parents…
- Risque d'erreur d'administration

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ORIGINAL PAPER

Drug dosing error with drops—severe clinical course of codeine intoxication in twins

Maren Hermanns-Clausen · Wolfgang Weinmann · Volker Auwärter · Nerea Ferreirós · Rainer Trittler · Christoph Müller · Andreas Pahl · Andrea Superti-Furga · Roland Hentschel

Table 2 Weight of 10 drops of the retarded codeine formulation (expected weight is 500 mg). The drop bottle was held vertical (0°), at 30° or 60° angles, experiments were done 12 times each. Dropping was slow especially when bottle was held at a 60° angle and tapping the bottle produced big drops. Lowest weight of 10 drops was 493.6 mg, highest 940.2 mg (**bold**). Thus lowest codeine dose was 12.3 mg, highest dose was 23.5 mg

Weight of 10 drops in mg	Vertical (=0°)	30°	60°
	903.4	696.8	528.2
	779.7	700.8	519.1
	858.0	687.7	**940.2**
	839.0	646.0	**493.6**
	867.0	660.8	504.1
	834.8	643.2	658.9
	904.3	620.0	499.3
	819.1	757.7	618.7
	798.6	745.0	632.2
	784.9	595.7	567.0
	769.9	655.1	586.9
	794.3	734.3	603.3
Mean	829.4	678.6	596.0
Standard deviation	46.4	50.6	122.1
Relative standard deviation (%)	5.6	7.5	20.5
Mean codeine dose in mg	20.7	17.0	14.9

Morphine or Ibuprofen for Post-Tonsillectomy Analgesia: A Randomized Trial

Lauren E. Kelly, PhD[a,b], Doron D. Sommer, MD[c], Jayant Ramakrishna, MD[c], Stephanie Hoffbauer, BHSc[c], Sadaf Arbab-tafti, BHSc[c], Diane Reid, MD[c], Jonathan Maclean, MD[c], Gideon Koren, MD[a,b,d]

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WHAT'S KNOWN ON THIS SUBJECT: Sleep apnea is a common condition in childhood, mainly managed by tonsillectomy. Codeine was recently contraindicated for pain management after surgery. Controversy exists regarding the safety and effectiveness of alternative medications, morphine, and ibuprofen.

WHAT THIS STUDY ADDS: Our findings suggest that ibuprofen does not increase tonsillar bleeding and in combination with acetaminophen is effective for pain management after tonsillectomy. Furthermore, standard morphine doses increased postoperative respiratory events and were not safe in all children.

91 children (1-10 yrs) with sleep disorder breathing, randomized into 2 groups

- Acetaminophen (10–15 mg/kg per dose every 4 hours) and morphine (0.2–0.5 mg/kg per dose every 4 hours)
- Acetaminophen (10–15 mg/kg per dose every 4 hours) and ibuprofen (10 mg/kg per dose every 6 hours)
- Oxygen saturation and apnea events the night before and the night after surgery
- Effectiveness on postoperative pain, day 1 and day 5

TABLE 3 Primary Outcome Variables in the Morphine and Ibuprofen Groups

	Ibuprofen (N = 26)	Morphine (N = 30)	P Value
Lowest O_2 saturation (% nadir)			
Preoperative	85.39 (6.93)	83.97 (7.86)	
Postoperative	81.27 (15.81)	81.63 (12.75)	
Δ Lowest O_2 saturation	3.96 (12.65)	2.38 (12.30)	.64
Mean O_2 saturation (% nadir)			
Preoperative	97.41 (1.02)	97.20 (1.22)	
Postoperative	96.55 (2.07)	95.00 (2.18)	
Δ Mean O_2 saturation	0.79 (2.33)	2.13 (1.42)	.33
Total number of desaturation events/h			
Preoperative	4.52 (7.87)	3.64 (3.71)	
Postoperative	3.04 (3.27)	14.26 (11.85)	
Δ Total desaturation events/h	−1.79 (7.57)	+ 11.17 (15.02)	<.01
Number of children improved	65% (17/26)	13% (4/30)	<.01

Data are presented as mean (SD) unless otherwise noted. The number of children improved is defined as a child having fewer desaturation events per hour after surgery when compared with their preoperative values.

CONCLUSION: Plusieurs schémas thérapeutiques à la disposition du prescripteur, à choisir en fonction du risque…


Recommandations de la SFORL

Comment substituer la codéine après amygdalectomie chez l'enfant de moins de 12 ans ? Recommandation de la Société française d'oto-rhino-laryngologie et de chirurgie de la face et du cou☆

I. Constant[c,*], S. Ayari Khalfalla[a], A. Brunaud[b], V. Deramoudt[d], P. Fayoux[e], A. Giovanni[f], C. Mareau[g], R. Marianowski[h], J. Michel[g], M. Mondain[i], A. Paganelli[f], S. Pondaven[j], P. Schultz[k], J.-M. Treluyer[l], C. Wood[m], R. Nicolas[f], Groupe de travail de la SFORL

Risque respiratoire

Risque hémorragique

A valider

Une variante…

A L'HOPITAL

A LA MAISON

Si persistance des douleurs, consultation médicale pour rescue