
**CLINICAL EVALUATION OF PAIN AFTER TONSILLECTOMY IN CHILDREN**

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### ABSTRACT

**Introduction:** Pain is a feeling of discomfort associated with the entanglement of several phenomena. The objective of this study was to assess post-tonsillectomy pain and comfort in children. **Patients and method:** this is a prospective observational descriptive study on children under 15 years of age hospitalized in the Oto-Rhino-Laryngology department at the Soavinandriana Hospital Center (CENHOSOA) Antananarivo Madagascar for tonsillectomy from 1<sup>st</sup> February 2016 to 31 July 2016. **Results:** The level of pain was higher in children aged 7 to 14 years. There was no difference in the perception of pain based on gender. During hospitalization, mild pain prevailed in children over 7 years of age (64.27%) and moderate in children aged 7 to 14 years (62.14%). The onset of postoperative nausea and vomiting was objectified in 4% of children during the first 6 hours' post-operative. Association with adenoidectomy (40%) increased pain in children 7 years of age. Half of the children had maximum comfort at the end of the hospitalization. **Conclusion:** Thus, for a better post-operative management of tonsillectomy, the evaluation of pain and post-operative comfort should be systematic and rigorous in order to adapt the analgesic treatment according to the level of pain and the quality of post-operative comfort.

**KEYWORDS:** Analgesics, Children, Pain, Tonsillectomy.

### INTRODUCTION

Pain is a finding of discomfort linked to the entanglement of several phenomena: physical, chemical or psychological.<sup>[1]</sup> Pain may be of interest to all anatomical sites in the Oto-Rhino-Laryngology part, especially palatine tonsils that require surgical treatment such as tonsillectomy.<sup>[2]</sup> The tonsillectomy is considered a minor intervention.<sup>[3]</sup> It is, in order of frequency, the second most common pediatric surgery.<sup>[4]</sup> The main problem is post-operative pain, a source of significant post-operative morbidity.<sup>[5]</sup> Although post-tonsillectomy pain and its management have been the subject of an inexhaustible origin of medical publishing in anaesthesia, paediatric and O.R.L surgery in Europe, this is not yet the case in Africa. In Madagascar, however, no studies have evaluated the pain and comfort of the child on his return home after a short-term hospitalization tonsillectomy. Also, the objective of our study was to determine the epidemic-clinical aspect of post-operative tonsillectomy in children.

### PATIENTS AND METHOD

It was a descriptive prospective observational study supported by survey on hospitalized children, spread over a 6-month period from 1<sup>st</sup> February 2016 to 31 July

2016 inclusive. The study was conducted in the Oto-Rhino-Laryngology department of the Soavinandriana Hospital Center (CENHOSOA) in Antananarivo Madagascar. The patients concerned are children aged 4 to 14 years hospitalized in the department for tonsillectomy under general anesthesia. We have studied the age, gender, intensity of pain in relation to age. Pain and comfort were assessed after 1 hour, 6 hours, 12 hours, 24 hours, 48 hours and 72 hours' post-operative. For children aged 4 to 7 years, we used the Face Legs Activity Cry Consolability (FLACC) scale and the Analog Visual Scale (EVA) for children aged 7 to 14 years.

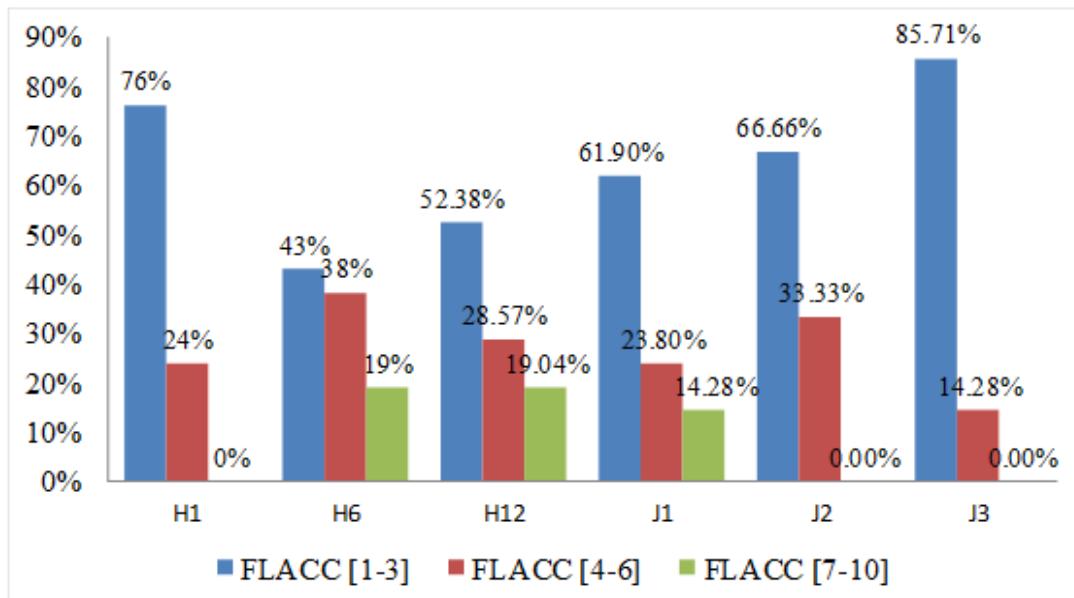
### RESULTS

We collected 53 children operated for tonsillectomy and 50 were included in our study. Children aged 4 to 7 and 7 to 14 years of age made up 42% and 58% of our study population, respectively. The average age was 7.94 years. As for pain, we obtained an average score of 3.11 (mild pain) in children aged 4 to 7 years. A score of 4.13 (moderate pain) in children aged 7 to 14 years.

We noted a slight female predominance (60%) with a sex ratio of 0.66. For children aged 4 to 7 years, the average FLACC score was 3.08 (mild pain) in girls and 3.16

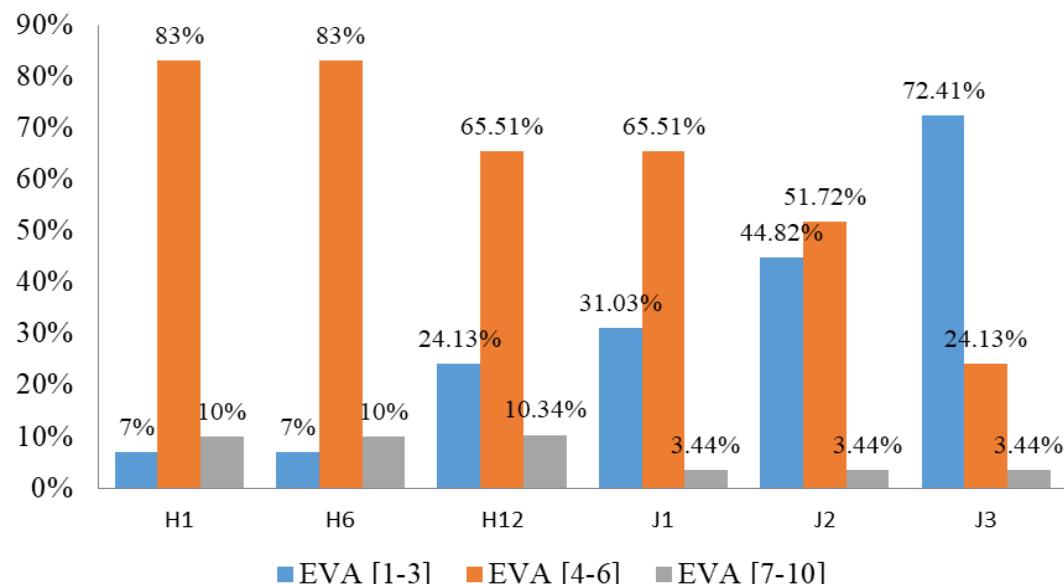
(mild pain) in boys. For children aged 7 to 14 years, the average EVA score was 3.87 (moderate pain) for girls and 3.70 (moderate pain) for boys. For children aged 4 to

7, we found that mild pain (FLACC score between 1 and 3) prevailed during the hospital stay. This mild pain was also very marked from the 3<sup>rd</sup> day onwards.



**Figure 1:** Post-operative pain intensity as a function of time in children aged 4 to 7 years.

For children aged 7 to 14, we found that moderate pain prevailed in 83% of cases in the first hour and sixth hour. From the twelfth hour this percentage began to decrease gradually. On day three, 72.41% of children had mild pain.



**Figure 2:** Post-tonsillectomy pain intensity in children 7-14 years of age on the Analog Visual Scale (EVA) as a function of time.

Post-operative discomfort was marked by nausea and vomiting. This discomfort was found only in the first hour after the operation in a child aged 4 to 7 years. In addition, for the 7 to 14 age group, 6 children had nausea and vomiting in the first hour and 7 children in the sixth hour.

The first indication of tonsillectomy in our study was obstructive tonsillar hypertrophy (52%) followed by repetitive angina (30%).

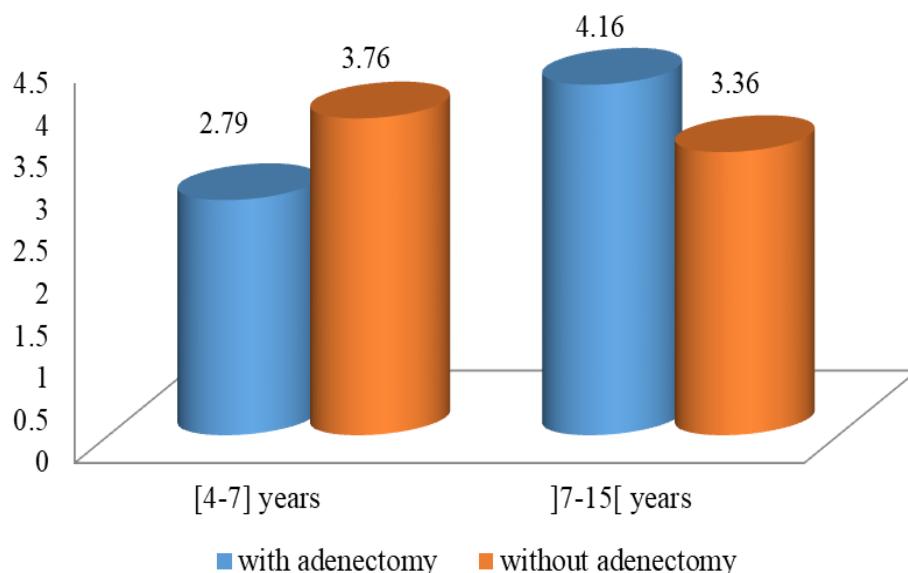
As for pain, the average score was equal to:

- ✓ 3.80 for repeat angina
- ✓ 3.44 for obstructive tonsillar hypertrophy
- ✓ 4.26 for recurrent angina associated with obstructive hypertrophy.

Recurrent angina associated with tonsillar hypertrophy were the most painful after surgery, followed by recurrent angina. Obstructive tonsillar hypertrophy was the operative indication that generates less post-operative pain.

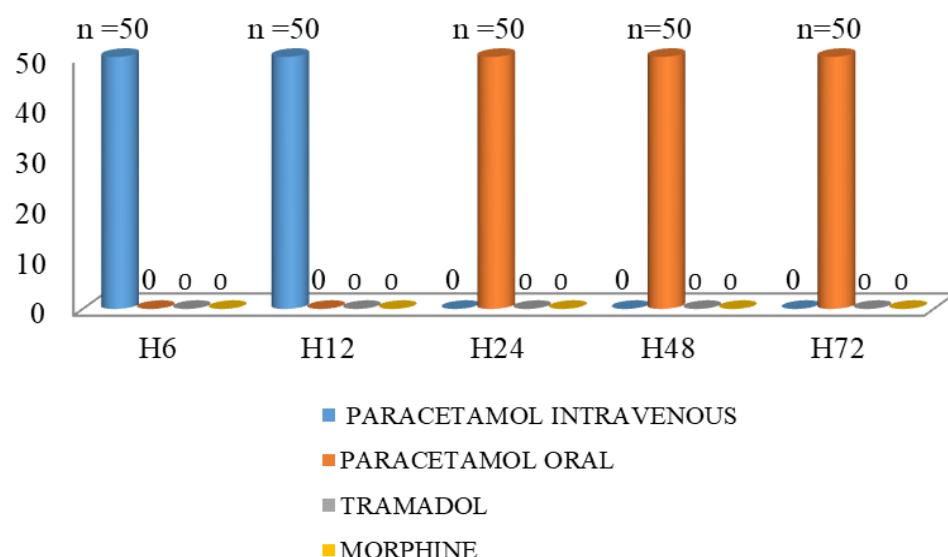
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rent angina. Obstructive tonsillar hypertrophy was the operative indication that generates less post-operative pain. Adenoidectomy was associated with tonsillectomy in 40% of children. The average score for these children was in favour of mild pain (2.79) for children under 7 years of age and moderate pain (4.16) for children over 7 years of age.



**Figure 3:** Mean pain score based on association with adenoidectomy.

Compared to analgesics, paracetamol was used at a dose of 15 mg/kg/6 hours orally relayed intravenously from the first post-operative day in all post-operative children with tonsillectomy.



**Figure 4:** Distribution of patients according to the analgesic used.

After the operation, the patients are monitored in the hospital for 24 hours. Half of the children who had a tonsillectomy had maximum comfort (score less than 2

points) at the end of the hospitalization, 46% of children had average comfort and only 4% of children had unsatisfactory comfort (score > 4).

## DISCUSSION

The average age in our series was 7.94 years. Razanakoto et al and Weil-Olivier found an average age of 8.65 and 9 years respectively.<sup>[6,7]</sup> In addition, a study conducted by Senez, noted that tonsillectomy is possible from 9 months; the average age of intervention is between 2 and 5 years.<sup>[8]</sup> The average age in our series was comparable to that of most authors in the literature, but delayed compared to the Senez study.<sup>[6-8]</sup> This is likely related to the reluctance of pediatricians and the difficult decision-making for parents for fear of post-operative pain and post-tonsillectomy bleeding.<sup>[6]</sup> According to the literature, the level of post-tonsillectomy pain increases with the age of intervention in fact, post-operative pain is low in young children.<sup>[9,10]</sup>

In our study, we noted a slight female predominance. The study by Fournier Charrière et al<sup>[11]</sup> found that the level of post-operative pain was higher among boys than girls. Hélène Sghaier et al<sup>[12]</sup> also showed pain above the therapeutic threshold in 66% of boys. According to the literature, there is no difference in the perception of pain by gender. Overall, the result of our study corroborates the literature evidence that there is no difference in the perception of pain by gender.<sup>[13]</sup>

Post-tonsillectomy pain is acute pain due to excess nociception, transient, paroxysmal at 48 hours, then decreases in three to five days.<sup>[13]</sup> Vons K et al found that post-tonsillectomy pain is intense during the first post-operative week.<sup>[14]</sup>

Tonsillectomy in small children is less painful than in older children, according to other authors.<sup>[15,16]</sup> A study carried out by Schommer concerning the children operated, showed that 48% of the children over 7 years operated had an EVA score higher than 7 on the return from the recovery room, 30% had a score between 4 and 6, and 22% had a score less than 3.<sup>[17]</sup> On the first post-operative day, more than 78% of the children included in their study had a score above the therapeutic threshold (EVA score > 4/10), of which 40% had severe pain with thresholds above 8/10. In the third post-operative, 33% of children had a score between 4 and 6, 30% had a score above 7, 37% had a score below the therapeutic threshold. The intense pain disappeared on the seventh day after surgery.

Another study on child pain after tonsillectomy conducted by Laigle C et al.<sup>[18]</sup> showed that post-operative pain is severe, maximum in the first two days and persists until the tenth day with a gradual decrease. Among the 38 children included in their study, the score was above 6 in 42% of children at H 24, 22% at H 48 and only 13% at H 72.

Regarding the intensity of pain, the result of our study corroborates the data from the literature. On the other hand, concerning the duration of the painful episode, our result differs the findings of some authors. In our series,

the pain started to decrease from the third post-operative day. This is probably related to the behaviour of older children who tend to choose the minimum score for doctors to allow discharge from hospital, to the systematic administration of analgesics, a cold diet that accelerates healing and has an analgesic property during tonsillectomy.<sup>[19]</sup>

Chacra Z et al observed a decrease in pain in children chewing gum in the immediate post-operative period and in the days following tonsillectomy. Post-operative use of hydrogen peroxide mouthwash does not show significant improvement in post-operative pain score.<sup>[20]</sup> Extracapsular dissection tonsillectomy using cold instruments and intracapsular reduction techniques generate less post-operative pain.<sup>[21]</sup>

The pain mitigation factors in our study are: the use of spatula extracapsular dissection technique, routine administration of analgesics every six hours, and cold feeding.<sup>[19,22,23]</sup>

Tonsillectomy is a very emetizing surgery.<sup>[24]</sup> Vomiting is a common complication of tonsillectomy, its incidence varies among authors (between 30 and 60%).<sup>[13]</sup> Mechanically, they cause increased pain and post-operative discomfort, and increase the risk of bleeding.<sup>[10]</sup> In our study, post-operative vomiting is prevented by injecting dexamethasone at the 0.15mg/kg induction dose.<sup>[25]</sup> Dexamethasone is a corticosteroid with intravenous administration that reduces vomiting and post-operative pain.<sup>[26]</sup>

In our study we noted a case of reflex otalgia post-operative (2%). The Kona YH team reported 17% of otalgia cases after tonsillotomy.<sup>[9]</sup> Laigle C et al found an otalgia in 31% of cases.<sup>[18]</sup>

The first indication of tonsillectomy in our study was obstructive tonsillar hypertrophy, followed by repeated angina. According to Weil-Olivier et al,<sup>[7]</sup> the major indication of tonsillectomy is tonsillar hypertrophy which is formal in the presence of sleep apnea. A study by Madadaki showed that tonsillectomy indicated for recurrent angina causes intense pain.<sup>[10]</sup> Our results were comparable to the literature that indicated that the indication of tonsillectomy was obstructive rather than infectious, and that post-operative pain was more pronounced for recurrent angina. On the other hand, Cohen-Salmon states that the intensity of post-tonsillectomy pain is independent of the operative indications.<sup>[27]</sup>

In our study, we performed tonsillectomy with adenoidectomy in some children. According to the study by Cohen-Salmon,<sup>[27]</sup> the cure of adenoid vegetations increases post-tonsillectomy pain. Lescane E in their 2009 article on clinical practice guidelines for paediatric tonsillectomy found that the level of pain was high in children who received tonsillectomy with adenoidectomy.<sup>[28]</sup>

Compared to the analgesics used, AFFSAPS recommends the use of morphine intravenously in immediate post-operative.<sup>[29]</sup> In our case, paracetamol was used at a dose of 15 mg/kg/day in all children in the study. This support modality differs from the literature data. This inequality is probably related to the reluctance of resuscitators and surgeons to use morphines that increase the occurrence of respiratory distress and post-operative vomiting.

According to the surgical technique, we found that extra-capsular tonsillectomy using cold instruments generates good comfort only if it is performed with coagulation systems only. Several authors report the same finding.<sup>[30,31,32]</sup> A study carried out by Vayisoglu Y et al found that the use of voice exercises to mobilize the muscles of the veil, 10 times a day, in post-surgery would allow to obtain a good comfort after tonsillectomy.<sup>[33,34]</sup>

## CONCLUSION

The intensity of post-tonsillectomy pain increases with age of intervention. There is no difference in the perception of pain based on gender. This is mild to moderate pain during the hospital stay. Postoperative vomiting occurs only during the first six hours post-operative. As for the surgical indication, obstructive tonsillar hypertrophy generates less post-operative pain unlike repetitive angina. Association with adenoidectomy causes significantly more pain in children over 7 years of age. For the treatment of pain, we used World Health Organization Tier 1 analgesics in all children regardless of the intensity of the pain. The evaluation of post-operative pain and comfort should be systematic and rigorous in order to adapt the analgesic treatment according to the level of pain and the quality of post-operative comfort.

## CONFLICTS OF INTEREST

The authors do not declare any conflict of interest.

## Contributions from authors

All authors read and approved the final version of the manuscript.

## REFERENCES

- Twycross A, Moriarty A, Bettts T. Prise en charge de la douleur : une approche multidisciplinaire. Paris : Masson, 2002.
- Pascal J. Analgésie après amygdalectomie. Journées thématiques de la SFAR. Septembre, Elsevier SAS, 2004 ; 1.
- Omen KP, ModiVK, Stewart MG. Evidence based practice : pediatric tonsillectomy. North Am Clin Otolaryngol, 2012; 45: 1071-9.
- Aouad MT, Siddik SS, Rizk LB, Zaytoun GM, Baraka AS. Effet de la dexaméthasone sur l'incidence des vomissements post-opératoires après amygdalectomie. Anesth Analg, 2011; 92: 636-40.
- Gatbois E, Annequin D. Prise en charge de la douleur chez l'enfant de un mois à 15 ans. J Pediatr Puéric, 2008; 21: 20-36.
- Razanakoto GFA, Tsifiregna RL, Fare ATS, Andriamampionona GB, Rakotoarisoa RA, Rakotoarisoa AHN et al. Indications de l'amygdalectomie chez l'enfant au Centre Hospitalier de Soavinandriana. Rev-Méd Madag, 2016; 6(1): 694-7.
- Weil-Olivier C, Sterkers G, François M. L'amygdalectomie en 2005. Arch Pediatr, 2006; 13: 168-74.
- Senez B, Laugier L. Indications de l'adénoïdectomie et de l'amygdalectomie chez l'enfant. J Pediatr Puéric, 1998; 2: 104-23.
- Kone YH. Analgesie après amygdalectomie : intérêt du paracétamol et du chlorhydrate de tramadol (à propos de 120 cas) [thèse]. Pharmacie : Mali, 2007 ; 115.
- Madadaki C, Laffon M, Lesage V, Blond MH, Lescanne E, Mercier C. Evaluation du confort post-opératoire après amygdalectomie en ambulatoire chez l'enfant. Ann Fr Anesth Réanim, 2002; 21: 764-74.
- Fournier-Charrière, Tourniaire B, Cimerman P, Annequin D. Les publications sur les douleurs chez l'enfant. Arch Pediatr, 2006; 13(922): 130.
- Hélène DS. Validation d'EVENDOL, une échelle comportementale pour l'enfant moins de 8 ans en post-opératoire [thèse]. Pédiatrie : Rouen, 2012; 85.
- Prades JM. Analgésie post-opératoire en Orl. Ann Fr Otolaryngol Chir Cervicofac, 2014.
- Vons KMA, Biker JB, Verwys EW. Postoperative pain during the first week after adenoidectomy and tonsillectomy in children. Paeditr Anesth, 2014; 24(5): 476-82.
- Sutters KA, Miaskowski C, Holdridge-Zeuner D, Waite S, Paul SM, Savedra MC et al. A randomized clinical trial of the efficacy of scheduled dosing of acetaminophen and hydrocodone for the management of postoperative pain in children after tonsillectomy. Clin J Pain, 2010; 26: 95-9.
- Czarnetzki C, Elia N, Lysakowski C, Dumont L, Landis BN, Giger L et al. Dexamethasone and risk of nausea and bleeding after tonsillectomy in children: a randomized trial. Jama, 2008; 300(22): 2621-30.
- Schommer MC. Le parcours douleur de l'enfant amygdalectomisé : enquête auprès de 60 parents. 17e journée La douleur chez l'enfant : quelles réponses ? Pédiadol, 2010 ; 63-70.
- Laigle C, Varé B, Maschi C. Douleur et amygdalectomie: évaluation à la maison. Ann Fr Anesth Réanim, 2002; 21.
- Harii, Hirose M, Machizuki R, Yamamoto K, Kawamoto M, Kitchare T et al. Effects of cooling the pharyngeal mucosa after bipolar scissors tonsillectomy on postoperative pain. Acta Otolaryngol, 2011; 131: 764-8.
- Chakra ZA, Manoukian JJ, Al-Qahtani K, Al-Elsa M, Balsy R, Hagr A et al. Hydrogen peroxide

- mouth rinse: an analgesic post-tonsillectomy. *J Otolaryngol*, 2005; 34:178-82.
- 21. Pinder DK, Wilson H, Hilton MP. Dissection versus diathermy for tonsillectomy. Cochrane ENT Group, 2011. <http://onlinelibrary.wiley.com/dol>.
  - 22. Marinière S, Roux A, Bakhos D, Pondaven S, Lescanne E . Radiofrequency tonsillectomy versus bipolar scissors tonsillectomy for the treatment of OSAS in children; A prospective study. *Ann Eur Otorhinolaryngol Head and Neck Dis*. April, 2013; 130(2): 60.
  - 23. Kemal O. Harmonic scalpel versus bipolar tonsillectomy: a double-blind clinical trial. *Eur Arch Otorhinolaryngol*, 2012; 269: 1533-6.
  - 24. Gacia S, Bourdaud N, Bientz J. Facteurs de risque de vomissements postopératoires chez l'enfant. Résumé des communications libres-R529. Congrès SFAR, 2010.
  - 25. Wang JJ, Ho ST, Lee SC, Yo CM. The use of dexamethasone for preventing postoperative nausea and vomiting in females undergoing tonsillectomy: a dose-ranging study. *Anesth Analg*, 2000; 91: 1404-7.
  - 26. Herman V, De Poter F, De Groote F et al. Effect of dexamethasone on nausea, vomiting and pain in paediatric tonsillectomy. *Br J Anaesth*, 2012; 109: 427-31.
  - 27. Cohen-Salmon D. En travers la gorge. L'enfant, les amygdales, les végétations adénoïdes et la douleur. Paris : Inter- Editions, 1994.
  - 28. Lescanne E, Chiron B, Constant I. Amygdalectomie de l'enfant : recommandation pour la pratique clinique. *Ann Fr Otolaryngol Chir Cervicofac*, 2012; 129: 327-35.
  - 29. AFFSAPS 2011 : Agence Française de Sécurité Sanitaire des Produits de Santé. Prise en charge médicamenteuse de la douleur aiguë et chronique chez l'enfant. Recommandations de bonne pratique, 2009.
  - 30. Walton J, Ebner Y, Stewart MG, April MM. Systematic review of randomized controlled trials comparing intracapsular tonsillectomy with total tonsillectomy in a pediatric in a pediatric population. *Arch Otolaryngol Neck Surg*, 2012; 138(3): 243.
  - 31. Maschi C, Ambolet D, Palleri TC. Tramadol et douleur de l'enfant à la maison après amygdalectomie. 20e réunion du club de l'anesthésie réanimation en ORL. Nice, 2006.
  - 32. Ashbach MN, Ostraver ST, Parikh SR. Tonsillectomy techniques and pain: a review of randomized controlled trials and call for standardization. *Arch Otolaryngol Neck Surg*, 2007; 69(6): 364-70.
  - 33. Walton J, Ebner Y, Stewart MC, April MM. Systematic review of randomized controlled trials comparing intracapsular tonsillectomy with total tonsillectomy in children population. *Arch Otolaryngol Neck Surg*, 2012; 138(3): 243.
  - 34. Vayisoglu Y, Görür K , Ozcan C. Is speech therapy useful as a complementary treatment for post-tonsillectomy pain? *Int J Pediatr Otorhinolaryngol*, 2010; 74: 765-7.