

Postoperative Pain After Tonsillectomy; Comparison Between CO₂ Laser Versus Conventional Dissection Tonsillectomy

Fahd Ali Alharbi¹, Mohamed Rifaat Ahmed^{1,2}

¹Department of Otolaryngology- Head and Neck Surgery, Faculty of Medicine, Jazan University, Jazan, Saudi Arabia

²Department of Otolaryngology-Head and Neck Surgery, Faculty of Medicine, Suez Canal University, Ismailia, Egypt

Email address:

fahdalhab3@gmail.com (F. A. Alharbi), m_rifaat@hotmail.com (M. R. Ahmed)

To cite this article:

Fahd Ali Alharbi, Mohamed Rifaat Ahmed. Postoperative Pain After Tonsillectomy; Comparison Between CO₂ Laser Versus Conventional Dissection Tonsillectomy. *Journal of Surgery*. Special Issue: Postoperative Pain Syndrome. Vol. 3, No. 2-1, 2015, pp. 27-30.

doi: 10.11648/j.js.s.2015030201.16

Abstract: *Background:* Postoperative pain after tonsillectomy is a great problem that the ideal tonsillectomy operation should have little or no morbidity or mortality with excellent outcome. *Aim of the study:* To compare the outcome of postoperative pain with two different methods of tonsillectomy, conventional dissection Tonsillectomy versus CO₂ laser assisted tonsillectomy procedure. *Method:* Randomized clinical trial was done on 126 adult patients with chronic recurrent tonsillitis that underwent tonsillectomies operation divided into two groups. Group A (n=63) subjected to Conventional dissection tonsillectomy. Group B (n=63) subjected to CO₂ Laser assisted tonsillectomy. *Results:* There was no statistically significant difference between patients in both groups with regard to mean VAS for pain starting from day 0 to day 10 after initiation of treatment. Mean VAS for post to nsillectomy pain in both groups revealed that at the end of day 10, pain was completely absent in both groups. *Conclusion:* Conventional dissection Tonsillectomy is almost similar to CO₂ Laser assisted tonsillectomy operation in post operative pain and patient's quality of life but Laser-assisted tonsillectomy has shown to have shortened in the operative time with reduces the blood loss.

Keywords: Tonsillectomy, Conventional, Laser, Pain, Randomized Controlled Trial

1. Introduction

Tonsils are part of the Waldeyer's ring with aggregates of lymphoid tissue located in oropharynx at the entrance of the upper aerodigestive tract and play a great role in immunology and defense mechanism especially immunoglobulin A (IgA) production.⁽¹⁾

The main indications for tonsillectomy are sleep disorder breathing due to enlarged tonsils and sore throat due to recurrent throat infections.⁽²⁾

An ideal tonsillectomy operation should have little or no morbidity and mortality, easily available and cost effective with out surgical complications if possible. Painless surgery remains a great aim and should allow a more early back return to normal diet and daily activity with excellent outcome.⁽³⁾ Post tonsillectomy pain is a problem that the magnitude of pain in the postoperative period varies as it may be more intense in early morning and reduces during the rest of the day with analgesic medication and keeping throat moist

by cold fluid but sometimes pain worsens again in the evening, especially during the first three days with swallowing.⁽⁴⁾

Referred otalgia with swallowing usually occurred due to common 9th sensory nerve innervation for both ear and throat that is relieved with regular doses of pain control given every 4 to 6 hours especially in the first 2 to 3 days.⁽⁵⁾

Conventional dissection technique for tonsillectomy operation had the advantage that it is a safe procedure with fewer incidence for post operative complications as bleeding with the possibility for the tonsil can be removed in toto without any remnants and remained the standard procedure for tonsillectomy for many years till now.⁽⁶⁾

CO₂ Laser tonsillectomy is done with wavelength of 10.6 μ m is at the peak of absorption of water. This is important to concentrate the energy with little heat to dissipate to adjacent tissues and minimal damage to surrounding structures with minimal edema that focused to create a precise cut and defocused to produce coagulation of small blood vessels so it

gives clear bloodless field during surgery.⁽⁶⁻⁷⁾

Aim for our study is to compare the outcome of postoperative pain with two different methods of tonsillectomy, conventional dissection tonsillectomy versus CO₂ laser assisted tonsillectomy procedure.

2. Materials and Methods

2.1. Design, Setting and Participants

We conducted this randomized clinical trial in the otolaryngology outpatient clinic of Jazan General Hospital, Jazan, Saudi Arabia from May 2011 to August 2014. The study protocol was approved by the local ethics committee and written informed consent was obtained from each patient.

2.2. Patient Eligibility and Enrolment

A total of 126 adult patients with chronic recurrent tonsillitis subjected tonsillectomy operations were enrolled in the study. They were aged 16 to 45 years and met American Academy of Otolaryngology guidelines for tonsillectomy⁽⁸⁾ Inclusion criteria were recurrent tonsillitis and obstructive tonsillar hypertrophy with sleep apnoea. Exclusion criteria were general contraindications for tonsillectomy such as bleeding tendency or associated adenoidectomy operation. Eligible patients attending study sites when a research assistant was present were invited to participate by their physician. The research assistant discussed participation requirements and completed the eligibility assessment and the consent process.

2.3. Randomization

This was performed using a blocked randomization scheme. Computer generated random numbers were used to evaluate post tonsillectomy pain were allocated to the consecutively numbered study operative packages.

Patients were divided into two groups. Group A ($n=63$) subjected to Conventional Dissection tonsillectomy. Group B ($n=63$) subjected to CO₂ Laser assisted tonsillectomy.

2.4. Operative Techniques

All the cases were done under general anesthesia using the same anesthetics drugs and technique; no preoperative or postoperative local anesthesia was used for any of the patients.

In conventional blunt dissection series Boyle Davis mouth gag was applied, tonsil was retracted medially then incision was made by using Waugh's dissection forceps and tonsillectomy was performed by blunt dissection and tonsil was removed with control of bleeding if present using ligatures and /or electrocautery.⁽⁹⁾

CO₂ laser assisted tonsillectomy was done after necessary precautions Boyle Davis mouth gag was applied and tonsil retracted medially. Laser was used in continuous mode with 7-10 Watts and 0.2 mm -0.3 mm spot size. The CO₂ laser is a non contact laser and was used with a microscope and micro manipulators. The tonsil was dissected through the loose

fibrous tissue of the capsule and vessels were photocoagulated.⁽¹⁰⁾

All the patients were given the same preoperative and postoperative antibiotics (amoxicillin and clavulanate, 1g/12 h) and for pain are combined analgesics no nsteroidal anti-inflammatory drugs (diclofenac, 1 mg/kg) with paracetamol (15 mg/kg) given every 8 hours.⁽¹¹⁾

2.5. Objective and Outcome Measurement Assessment

The objective was to evaluate clinically the post tonsillectomy pain as a major effect on quality of life.

All patients were required to answer a questionnaire assessing their pain symptom at day zero and daily following the operation and pain scores were charted from day one to 2 weeks using a visual analogue scale (VAS) to assess subjective symptoms, with 0 indicating no pain symptom and 10 indicating severe and/or constant pain symptoms.

Complete ENT examination with oral examination was performed. Pre operative full blood investigation was done for all patients were discharge 1 or 2 days after the operation.

All of the patients were followed up daily according to previous VAS for pain symptom also record any complication could be happened.

2.6. Data Collection, Allocation Concealment and Blinding

Before tonsillectomy operation each participant underwent a brief interview with the physician to complete a questionnaire, and provided demographic and disease-related information. Demographic information, including race and ethnicity, were provided by selecting from options included in the baseline questionnaire. The physicians then completed documenting the pain symptom daily following tonsillectomy operation with visual analogue scale (VAS) to assess subjective symptom, with 0 indicating no symptoms and 10 indicating severe and/or constant symptom and patients were reviewed in the clinic after two week to one month of surgery. Patients who were failed to come for follow-up were contacted by and interviewed through telephone.

2.7. Statistical Analysis

Data collected processed using SPSS version 15 [SPSS Inc., Chicago, IL, USA]. Quantitative data expressed as means \pm SD while qualitative data expressed as numbers and percentages [%]. Student *t* test used to test significance of difference for quantitative variables that follow normal distribution

2.8. Ethical Considerations

Written informed consent was obtained from all patients. The local ethics committee approved the study.

3. Results

Concerning the demographic data, there was no statistical significant difference between the two groups regarding age, sex, special habits and body mass index. There was neither

operative nor 30 days postoperative mortality.

In conventional dissection technique the operative time was 25-40 minutes (mean 34.52 ± 5.95 minutes) while in CO₂ laser assisted tonsillectomy it was 20-30 minutes (mean 24.55 ± 3.03 minutes) and this difference is considered to be extremely statistically significant [$P \leq 0.0001$].

About the intra operative blood loss in conventional dissection was

50 to 80 ml (mean 65 ± 9.09 ml) while less blood loss was observed in laser assisted tonsillectomy from 10 to 20 ml (mean 15.32 ± 3.03 ml) and this difference is considered to be extremely statistically significant [$P \leq 0.0001$].

Two patients showed reactionary hemorrhage in conventional dissection tonsillectomy patients required second general anesthesia for haemostasis by ligating of tonsillar pillars while no reactionary hemorrhage occurred in laser assisted tonsillectomy with no secondary hemorrhage occurred.

Some post operative problems like halitosis and blood-stained saliva were treated conservatively with hydrogen peroxide mouth washes.

Mean VAS for post tonsillectomy pain in both groups is shown in Figure (1). At the end of day 10, pain was completely absent in both groups. There was no statistically significant difference between patients in both groups with regard to mean VAS for pain starting from day 0 to day 10 after initiation of treatment, as seen in table (1).

Table (1). Mean VAS pain after tonsillectomy operation

Pain	Group A (n=63)		Group B (n=63)		t-test	P value
	Mean	SD	Mean	SD		
Day 0	8.31	1.12	8.96	1.49	0.71	0.67
1 st day	6.26	1.06	6.72	1.83	0.82	0.53
2 nd day	5.06	1.16	5.61	1.07	0.68	0.25
3 rd day	4.76	1.93	4.31	1.51	0.52	0.41
4 th day	3.91	0.98	3.21	0.79	0.68	0.09
5 th day	2.16	1.21	2.28	0.98	0.76	0.08
6 th day	1.03	0.25	1.16	0.04	0.73	0.31
7 th day	3.98	0.95	3.43	0.76	0.28	0.09
8 th day	2.59	0.86	2.13	0.73	0.59	0.14
9 th day	0.92	0.05	0.54	0.09	0.91	0.28
10 th day	0	0	0	0	0	0

Insignificant P value > 0.05

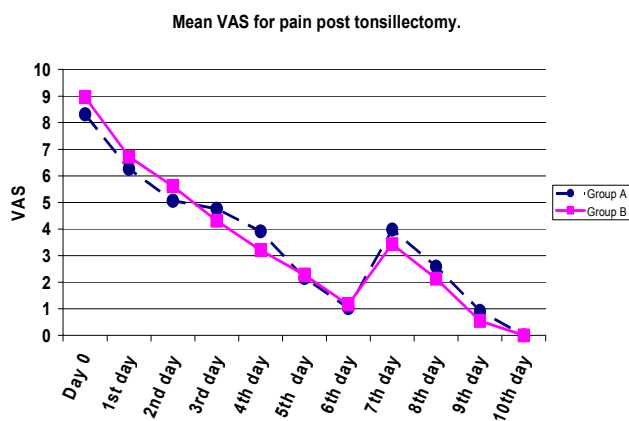


Figure (1). Mean degree of pain in both groups after tonsillectomy.

4. Discussion

Tonsillectomy operation is still the most commonly operation performed especially in pediatric population and the conventional dissection tonsillectomy operation still considered the standard method of tonsillectomy.⁽¹²⁾ Many literatures focused on the conventional dissection tonsillectomy operation that the healing is more rapid and postoperative pain is less than other studied techniques.⁽¹³⁾ Tonsillectomy remains a painful operation often disruptive of family and patients life for more than a week during convalescence whatever the technique.⁽¹⁴⁾

But the most frequent asked patient's questions are what about the postoperative hemorrhage and pain following tonsillectomy? As postoperative pain is the most significant subjective symptoms as far as patients usually alert about it.⁽¹⁵⁾ Many literatures mentioned that postoperative pain should be minimized not only for the patients comfort but also the pain usually impair swallowing with a great risk of dehydration, infection and secondary hemorrhage.⁽¹⁶⁾

Generally in the present study, we found that postoperative pain score in the laser group was slightly greater in CO₂ laser tonsillectomy group with no statistical significant difference and this observation came in agreement to data of Auf et al 1997 who reported that laser tonsillectomy caused more postoperative pain than conventional blunt dissection.⁽¹⁷⁾ Also, according to the Malaysian study by Ishlah et al., the total post operative pain was not significantly different between the two groups.⁽¹⁸⁾

In our study we found that the average blood loss was generally reduced with operative time in the CO₂ laser group compared with the conventional dissection tonsillectomy as the entire Otolaryngologist needs a nearly bloodless operation field during the tonsillectomy procedure rendering a good view to the surgeon aiming reducing the complication with improve the morbidity. The reduced intra operative bleeding by CO₂ Laser assisted tonsillectomy technique is achieved by cutting and simultaneous haemostasis by sealing the blood vessel lumen by virtue of tissue heating.⁽¹⁹⁾

In addition, the mean operative time was generally reduced with the CO₂ laser group that the reduced operative time is an important for increasing performed operations numbers and reduces the unnecessary hospitalization stay and increase patients turn over.

Affordability, technicality and maintenance costs are a big issue for research yet to be concluded as in the developing country because the information on the demographic data for tonsillectomy methods and the economic burdens of various methods on the country cannot be assessed.

5. Conclusion

Conventional dissection tonsillectomy is almost similar to CO₂ Laser assisted tonsillectomy operation in post operative pain and patient's quality of life but Laser-assisted tonsillectomy has shown to have shortened in the operative time with reduces the blood loss.

References

- [1] Sharma K, Kumar D. Ligation versus bipolar diathermy for hemostasis in tonsillectomy: a comparative study. *Indian J Otolaryngol Head Neck Surg.* 2011 ;63(1):15-9.
- [2] Oomen KP, Modi VK, Stewart MG. Evidence-based practice: pediatric tonsillectomy. *Otolaryngol Clin North Am.* 2012; 45(5): 1071-81.
- [3] Curtin JM ; The history of tonsil and adenoid surgery. *Otol Clin North Am* 20: 1987 , 415-419.
- [4] Fayoux P, Wood C. Non-pharmacological treatment of post-tonsillectomy pain. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2014;4. pii: S1879-7296(14)00098-2
- [5] Tugrul S, Degirmenci N, Eren SB, Dogan R, Veyseller B, Ozturan O. Analgesic effect of magnesium in post-tonsillectomy patients: a prospective randomised clinical trial. *Eur Arch Otorhinolaryngol.* 2014 Aug 6.[Repeated as reference 16]
- [6] Sharma K, Kumar D. Ligation versus bipolar diathermy for hemostasis in tonsillectomy: a comparative study. *Indian J Otolaryngol Head Neck Surg.* 2011 Jan;63(1):15-9.
- [7] Gofman VR, Kniaz'kov VB. [The application of a CO(2)-laser for tonsillectomy in the patients presenting with chronic decompensated tonsillitis as an alternative to the traditional methods of surgical treatment]. [Article in Russian]
- [8] Setabutr D, Adil EA, Chaikhoutdinov I, Carr MM. Impact of the pediatric tonsillectomy and polysomnography clinical practice guidelines. *Int J Pediatr Otorhinolaryngol.* 2014 Mar;78(3):517-21.
- [9] Sargi Z, Younis RT. Tonsillectomy and adenoidectomy techniques: past, present and future. *ORL J Otorhinolaryngol Relat Spec.* 2007;69(6):331-5. Epub 2007 Nov 23.
- [10] Jiang Z, Wang J, Dong C, Liang C, Fu Q, Liu G, Yin J, Zhang Z. [Clinical study of carbon dioxide laser tonsillectomy]. [Article in Chinese] *Lin Chung Er Bi Yan Hou Tou Jing Wai Ke Za Zhi.* 2010 Feb;24(3):119-21.
- [11] SFORL work group, Paganelli A, Ayari Khalfallah S, Brunaud A, Constant I, Deramoudt V, Fayoux P, et al; Guidelines (short version) of the French Oto-Rhino-Laryngology - Head and Neck Surgery Society (SFORL) for the management of post-tonsillectomy pain in adults. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2014 Aug 5. pii: S1879-7296(14)00095-7.
- [12] Rakesh S, Anand TS, Payal G, Pranjal K. A Prospective, Randomized, Double-Blind Study of Coblation versus Dissection Tonsillectomy in Adult Patients. *Indian J Otolaryngol Head Neck Surg.* 2012 Sep;64(3):290-4.
- [13] Pinder DK, Wilson H, Hilton MP. Dissection versus diathermy for tonsillectomy. *Cochrane Database Syst Rev.* 2011 Mar 16;(3):CD002211.
- [14] Warnock FF, Lander J ; Pain Progression, intensity and outcomes following tonsillectomy. *Pain.*; 1998 ,10, 75: 37-45.
- [15] Sezen OS, Kaytanci H, Kubilay U, Coskuner T, Unver S. Comparison between tonsillectomy with thermal welding and the conventional 'cold' tonsillectomy technique. *ANZ J Surg.* 2008 Nov;78(11):1014-8.
- [16] Tugrul S, Degirmenci N, Eren SB, Dogan R, Veyseller B, Ozturan O. Analgesic effect of magnesium in post-tonsillectomy patients: a prospective randomised clinical trial. *Eur Arch Otorhinolaryngol.* 2014 Aug 6.
- [17] Auf I, Osborne JE, Sparkes C, Khall H. Is the KTP laser effective in tonsillectomy? *Clin Otolaryngol* 1997; 22: 145-46.
- [18] Ishlah LW, Fahmi AM, Srinovianti N ; Laser versus dissection technique of tonsillectomy. *Med J Malaysia*; 2005, 60: 76-80.
- [19] Unkel C, Lehnerdt G, Schmitz KJ, Jahnke K. Laser-tonsillotomy for treatment of obstructive tonsillar hyperplasia in early childhood: a retrospective review. *Int J Pediatr Otorhinolaryngol.* 2005 Dec;69(12):1615-20. Epub 2005 Sep 26.