

EVALUATION OF TREATMENT OUTCOMES OF CHRONIC TONSILLITIS USING CO₂ LASER TONSILLECTOMY AT XUYEN A VINH LONG HOSPITAL

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Summary

Introduction: Tonsillectomy is necessary when recurrent tonsillitis occurs frequently, aiming to prevent complications. It is an effective and cost-efficient treatment. CO₂ laser tonsillectomy has been proven to provide good bleeding control, as the CO₂ laser functions both as a surgical scalpel and a hemostatic tool.

Objective: To evaluate the effectiveness of CO₂ laser tonsillectomy in patients with chronic tonsillitis indicated for surgery.

Subjects and Methods: A prospective cross-sectional descriptive study with intervention. Patients diagnosed with chronic tonsillitis who underwent laser tonsillectomy at Xuyen A Vinh Long Hospital from 2023 to 2024 were included.

Results: A total of 74 patients underwent laser tonsillectomy, of which 35.1% were male and 64.9% female. The patients' ages ranged from 5 to 59 years, with a mean age of 34.28 ± 12.73 . All patients showed good postoperative outcomes. Most patients experienced blood loss of less than 5 ml, accounting for 58.1%. The average length of hospital stay was 2.88 ± 1.40 days. On average, normal eating resumed after 8.77 ± 2.04 days, and normal activities after 6.08 ± 2.37 days.

Conclusion: CO₂ laser tonsillectomy for chronic tonsillitis provides good treatment outcomes, regardless of hypertrophy grading. It helps reduce blood loss and shortens postoperative recovery time.

Keywords: chronic tonsillitis, CO₂ laser, tonsils, blood loss, pain.

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INTRODUCTION

Tonsillitis is a common disease but remains a relevant issue in the field of Otolaryngology. It is not merely a local inflammation but can lead to nearby complications such as cellulitis, peritonsillar abscess, tonsillar abscess, otitis media, and rhinosinusitis, as well as distant complications affecting the heart, kidneys, and joints [1 – 3]. Treatment for tonsillitis ranges from medical to surgical approaches. Tonsillectomy is performed when tonsillitis recurs frequently. Surgical removal of the tonsils is still considered an effective and cost-efficient method.

With the advancement of science, various new technologies have been introduced for tonsillectomy, including monopolar and bipolar electrocautery, ultrasonic scalpels, Microdebriders, Coblation, Plasma, and Laser [1], [4 -6]. CO2 laser was introduced in medicine in 1960 and has been proven to offer superior bleeding control. It was first applied in tonsillectomy in 1973. Thanks to the ability to control the intensity and frequency of the laser beam, it serves both as a surgical scalpel and a hemostatic tool during surgery. In Vietnam, many institutions have adopted CO2 laser tonsillectomy and highlighted the advantages of this method [2]. At Xuyen A Vinh Long Hospital, alongside the use of bipolar electrocautery for removing inflamed tonsils, CO2 laser tonsillectomy has also been implemented in recent years. Therefore, to better understand the advantages and limitations of CO2 laser in tonsillectomy, we conducted this study with the following two main objectives:

1. Describing the clinical and paraclinical characteristics of

patients with chronic tonsillitis.

2. Evaluating the treatment outcomes of CO2 laser tonsillectomy for chronic tonsillitis.

RESEARCH SUBJECTS AND METHODS

Research subjects

All patients diagnosed with chronic tonsillitis and treated with CO2 laser tonsillectomy at Xuyen A Vinh Long Hospital from 2023 to 2024.

Inclusion criteria: Patients diagnosed with chronic tonsillitis who meet the surgical indications according to the American Academy of Otolaryngology – Head and Neck Surgery (AAO-HNS) guidelines, fulfilling at least one of the following:

Absolute Indications:

Tonsillar hypertrophy causing upper airway obstruction, severe painful swallowing, sleep disturbances, or associated cardiovascular complications.

Peritonsillar abscess unresponsive to medical treatment and surgical drainage.

Relative Indications:

Recurrent tonsillitis: at least 7 episodes per year, 5 episodes per year for 2 consecutive years, or 3 episodes per year for 3 consecutive years.

Chronic tonsillitis causing persistent halitosis and altered taste that does not respond to medical treatment.

Unilateral tonsillar hypertrophy suspected of malignancy.

Tonsillar hypertrophy causing functional issues.

Exclusion Criteria: Patients with contraindications for surgery. Patients requiring simultaneous adenoidectomy with tonsillectomy. Patients who did not consent to surgery.

Research Methods

Research design: The study was conducted using a prospective cross-sectional descriptive study with intervention.

Sample size:

The sample size was calculated using the formula for estimating a population proportion:

$$n = \frac{Z^2_{1-\frac{\alpha}{2}} p(1-p)}{d^2}$$

Where: **p:** Estimated proportion of the population with the characteristic of interest. In our study, p represents the success rate of tonsillectomy using CO2 laser. According to the research by Jake Ahmed, this success rate is reported to be 86% ($p = 0.86$). Therefore, we selected $p = 0.86$ for our calculations.

This formula ensures the study includes enough participants to draw valid conclusions about the outcomes of CO2 laser tonsillectomy. Adjustments may be made to account for potential dropouts or missing data.

Calculating this gives a required sample size of at least 72 cases to ensure valid statistical results for the evaluation of CO2 laser tonsillectomy outcomes.

Sampling method: Convenience sampling

Data collection

- 1. General Characteristics of Study Subjects:** Gender, age

- 2. Clinical and Paraclinical Characteristics:** reasons for hospital admission, symptoms and hypertrophy grading of tonsil

- 3. Treatment Outcomes:** blood loss, postoperative pain level, recovery time (length of hospital stay, time to resume eating, time to return to normal activities)

Overall Surgical Outcomes: Postoperative outcomes were considered good if all the following criteria were met: Rapid healing of the tonsillar fossa with minimal or no injured in tonsillar, no significant damage or minimal damage to surrounding tissues, low postoperative pain, no bleeding or only mild bleeding, no readmission due to complications

Data Processing and Analysis Methods

SPSS software version 25.0 was used for data entry and analysis. Qualitative variables were described using frequency and percentage. Quantitative variables were presented as maximum and minimum values, mean, and standard deviation. The relationship between postoperative pain levels on Day 14 and various factors was determined using the Chi-square test and Fisher's exact test, with a statistical significance level set at $p < 0.05$.

Ethics in Research: The study was approved by the Board of Directors and the Scientific and Technical Council of Xuyen A Vinh Long Hospital. Data collection was conducted after obtaining approval from the Ethics Committee in Biomedical Research of Can Tho University of Medicine and Pharmacy, approval number 23.204.HV/PCT-HĐĐĐ.

RESEARCH RESULTS

Demographics

There were 74 patients (26 males and 48 females). 55.4% of the patients were over 40 years old, with a mean age of 34.28 ± 12.73 years.

Clinical and Paraclinical Characteristics of the Study Population

Systemic Symptoms: Recurrent fever was the most common systemic symptom, accounting for 37.8% (28/74) of cases. **Functional Symptoms:** Sore throat was reported by all patients (100%). Difficulty

swallowing was observed in 71 patients, accounting for 95.9%.

Physical Symptoms: 97.3% of patients showed lymphoid hyperplasia at the base of the tongue and the posterior pharyngeal wall. 87.8% had tonsillar crypts containing pus. Two less frequent physical symptoms were enlarged tonsils (35/74; 47.3%) and tonsillar congestion (30/74; 40.5%).

Tonsil Hypertrophy Grading:

50% of the patients had grade II tonsil hypertrophy.

48.6% had grade III tonsil hypertrophy.

Treatment Outcomes

Blood Loss During Surgery and Postoperative Recovery Time of Patients

Table 1: Indication for tonsillectomy, blood loss and recovery time

Treatment outcomes			Number	Percentage (%)
<i>Indications for Tonsillectomy</i>	Hypertrophy	Sleep Disturbances	6	8,1
		Difficulty Swallowing	27	36,5
		Upper Airway Obstruction	3	4,1
	Recurrent tonsillitis	≥ 7 times/ year	18	24,3
		≥ 5 times/year for 2 years	46	62,2
		≥ 3 times/year for 3 years	10	13,5
<i>Blood loss</i>	< 5 ml		43	58,1
	5 – 10 ml		29	39,2
	> 10 ml		2	2,7
<i>Postoperative recovery time</i>	Postoperative Hospitalization		$2,88 \pm 1,40$ days (Min - Max: 1-10)	
	Normal Eating and Drinking		$8,77 \pm 2,04$ days (Min - Max: 1-12)	
	Normal living		$6,08 \pm 2,37$ days (Min - Max: 1-10)	

Comments: The indications for tonsillectomy were primarily due to recurrent tonsillitis. The majority of patients experienced blood loss during surgery of less than 5 ml, with 43 cases representing

58.1%. The shortest recovery time was 1 day, while the longest was 12 days.

Postoperative Pain Level on Day 14: More than half (63.5%) of the patients reported no pain. Those with mild pain

accounted for 35.5%. Only one patient experienced moderate pain.

Overall Postoperative Outcome: All 74 patients achieved good outcomes.

DISCUSSION

General Characteristics of the Study Population

In this study, 64.9% of the patients were female. This result aligns with the findings of Nguyen Thi Ngoc Anh's 2022 study at Thai Nguyen Central Hospital. That prospective interventional study on 65 patients undergoing CO₂ laser tonsillectomy reported that 52.3% of the patients were female [8].

The mean age of patients in our study was 34.28 ± 12.73 years, higher than reported in previous studies. Nguyen Thi Ngoc Anh (2022) found a mean patient age of 22.7 years. Similarly, Ta Chi Kien's 2022 analysis reported a mean age of 25.6 ± 9.1 years [9]. In Luu Van Duy's 2013 study, the mean age was 28.9 years [2].

Clinical and Paraclinical Characteristics

Among the 74 patients in our study, the majority (87.8% to 100%) experienced four key symptoms: sore throat, difficulty swallowing, throat itching, and cough during the preoperative observation period. Overall, our findings align with previous studies, where sore throat was identified as the most common functional symptom in patients. Difficulty swallowing was the second most common symptom, consistent with the results of studies by Nguyen Thi

Ngoc Anh and Ta Chi Kien [9].

Hypertrophy Grading:

Half (50%) of the patients in our study had grade II tonsil hypertrophy, representing the highest proportion. This finding is consistent with Huynh Thi Kim Cuong's study, which reported a rate of 48.9% [1], [2]. However, unlike our results, the highest proportion of patients with grade III hypertrophy was found in other studies, including those by Doan Xuan Thanh (46.7%), Nguyen Thi Ngoc Anh (52.3%), Nguyen Van Tiem (53.66%), and Ta Chi Kien (42.1%) [8], [9].

Outcomes:

Indications for Tonsillectomy: All patients in this study experienced recurrent tonsillitis. The majority (62.2%) had a frequency of 5 episodes per year for two consecutive years, representing the highest proportion in the sample. In comparison, Huynh Thi Kim Cuong's study reported that 80.7% of patients underwent tonsillectomy due to recurrent infections, with the most common frequency being 7 episodes per year, accounting for 64.8% [1].

Blood Loss:

In this study, 58.1% of patients had blood loss of less than 5 ml, a higher rate compared to the studies by Nguyen Thi Ngoc Anh (21.5%) and Luu Van Duy (23.3%) using the CO₂ laser technique [2], [8]. Our findings align with those of Tsikopoulos, who also concluded that CO₂ laser tonsillectomy significantly reduces

blood loss compared to traditional dissection techniques in both pediatric and adult patients.

Recovery Time:

The average duration of hospitalization and return to normal activities in this study were 2.88 days and 6.08 days, respectively, both lower than reported in previous studies. In Nguyen Thi Ngoc Anh's study, the average hospitalization and return-to-work times were 4.12 days and 6.7 days, respectively.

For the time to resume normal eating, patients in this study averaged 8.77 days, which is longer than the findings in previous studies by Nguyen Thi Ngoc Anh (8.1 days), Nguyen Van Tiem (7.24 days), and Luu Van Duy (7.3 days) [2], [8], [10]. However, this duration was shorter than that reported by Huynh Thi Kim Cuong, which was 10.21 days [1]. These results highlight the advantages of CO2 laser tonsillectomy compared to other methods.

Postoperative Pain Level on Day 14:

In this study, 98.6% of patients reported mild or no pain, which is higher than the 93.3% reported by Doan Xuan Thanh [13]. However, this rate is lower than the 100% reported by both Huynh Thi Kim Cuong and Luu Van Duy [1].

Overall Postoperative Outcome: All patients achieved good outcomes. We share the same view as Costa (2022), who concluded that CO2 laser tonsillectomy is a safe and effective procedure that can be

incorporated into daily clinical practice [13].

CONCLUSION

Patients with tonsillitis who are indicated for surgery are mostly of working age. CO2 laser tonsillectomy offers a short recovery time and helps reduce blood loss. CO2 laser is a method with several advantages over other techniques.

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