Bangladesh J Otorhinolaryngol 2010; 16(1): 9-14

*Original Article*

# Turbinoplasty by laser

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**Abstract:**

*This is a study of 61 cases of turbinoplasty done in 3 hospitals of Bangladesh from August' 2007 to July' 2009 (2 years). This study compares turbinoplasty by laser with that of non-laser techniques. 60.65 % of patients were operated by laser and 39.34 % of patients were operated by non-laser techniques. Majority of the patients were from 21- 40 years of age, (62.16% in laser group and 54.16% in non-laser group). Male & Female patients ratio was 3:1 in both groups. 100 % of the patients were presented with nasal obstruction. 98.36% with nasal discharge, 95.08% with headache and 75.40 % with frequent sneezing (p<0.01). Most patients were operated under local anesthesia in both groups (78.38 % and 58.33 % respectably). Follow up was satisfactory up to 3 months (Laser group 81.08 % and non-laser group 70.83 %). Most of the patient were all symptoms free (86.48 % in laser group and 79.16 % in non-laser group). Only 8 patients (21.62 %) present with crusting in laser group in respect to 22 patients (91.66%) in non-laser group with no incidence of severe post–operative nasal bleeding in laser group. 34 patients (91.89 %) of Laser group and 13 patients (35.13 %) of non-laser group were treated as day care surgery.*

*Most of the cases (70.27 %) were operated by diode laser. Recurrences of symptoms were negligible in laser group (2.70%).*

***Key Words:*** *Laser, Turbinoplasty.*

**Introduction:**

The inferior turbinates play an integral role in respiration and nasal physiology. They contribute to inspiratory resistance, the nasal defense system, and mucociliary transport, and they aid in humidification, warming, and cleansing. Pathologic enlargement (hyperplastic inferior turbinates) may lead to a variety of symptoms, including nasal congestion and rhinitis. It may also contribute to increased allergy intensity and exacerbation of sinus disease. Mucosal inflammation of the inferior turbinates is a common physical finding in patients with allergic rhinitis and vasomotor rhinitis. The medical treatment of these conditions include the use of nasal steroid sprays, antihistamines, decongestants, ipratropium, saline washes and, in appropriately selected patients with atopic allergy, immunotherapy.

However, medical therapy alone is often unsuccessful in alleviating symptoms; in such cases, surgery may be indicated. There are multiple surgical procedures that address hyperplastic inferior turbinates, ranging from minimally invasive procedures (e.g., laser turbinoplasty, electrocautery, radiofrequency ablation, and cryotherapy) to more involved

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techniques that require general anesthesia (e.g., submucosal resection with a microdebrider, outfracture, and partial or total turbinate resection).

**Objectives:**

1. To describe the current practice of Laser turbinoplasty
2. To observe the consequence of use of Laser in turbinoplasty in present situation

**Materials and Methods:**

Study was carried out at Apollo Hospitals Dhaka, Bangladesh ENT hospital, Dhanmondi R/A, Dhaka and Laser medical centre, Dhaka, Bangladesh.

Duration of study was August' 2007 to July' 2009 (2 years).

In this study 61 patients were studied in two groups. Group-1 included the patients operated by laser and group – 2 included patients operated by conventional techniques – ECT, SMD, Partial Turbinectomy.

In this work we describe the management of hypertrophied inferior turbinates using $CO_2$ laser in the Unipulse mode and diode laser delivered by fibres. The $CO_2$ laser beam is delivered through the nasal probe delivery system, and the procedure is performed using the 0 degree endoscope. The Unipulse mode allowed fine-tuned, char-free tissue ablation, and the nasal probes allowed delivery of laser energy to the posterior parts of the inferior turbinates. The diode laser was used by contact with the target tissue.

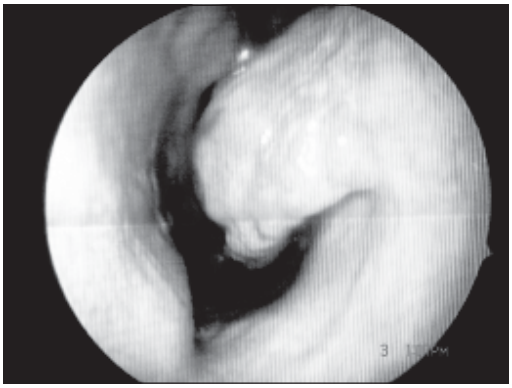
Inclusion criteria of the study was nasal obstruction due to hypertrophied Inferior turbinate and allergic rhinitis, frequent sneezing, headache and nasal discharge.

Exclusive criteria were nasal obstruction due to deviated nasal septum, sinusitis, nasal polyps, etc.

Treatment was performed with the $CO_2$, or diode laser.

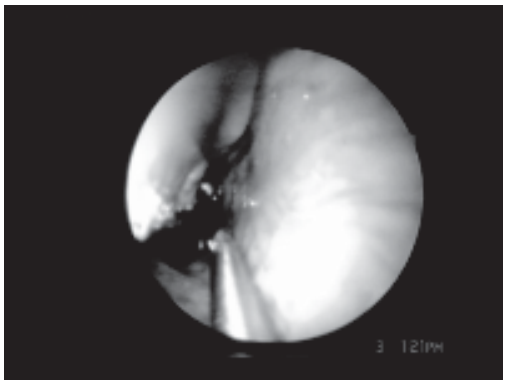
All patients completed pre-operative assessment and post-operative follow-up weekly for 1 month. A good number of patient completed longer-term follow-up for 12 months and above.

Generally, the authors of the trials used different laser parameters (power, energy) and application modalities (contact, non-contact, interstitial, superficial).

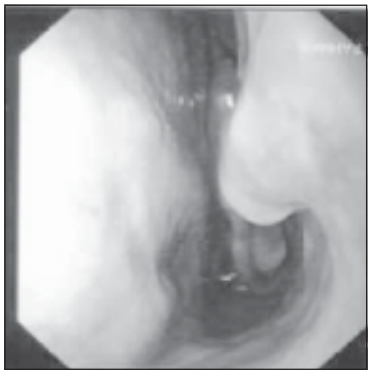


*Pre-operative – HIT*

*Laser probe introduced to nose*



*Turbinoplasty by $CO_2$ Laser*



*Post-operative follow up picture*

**Results:**

Data collected, plotted and set in a previously prescribed form and compared with other studies published.

Laser surgery of inferior turbinates were performed as an outpatient procedure under local anesthesia.

Most of the patients were from 21 – 40 years of age in both group. 23 (62.16%) patients in laser group and 13 (54.16%) patients in non-laser group.

**Table-I**

*Age incidence (n – 61)*

| Age (years) | Laser ( n – 37) | Non – Laser (n - 24) |
|---|---|---|
| 0 - 20 | 8 (21.62%) | 7 (29.16%) |
| 21 - 40 | 23 (62.16%) | 13 (54.16%) |
| 41 - above | 6 (16.21%) | 4 (16.66 %) |

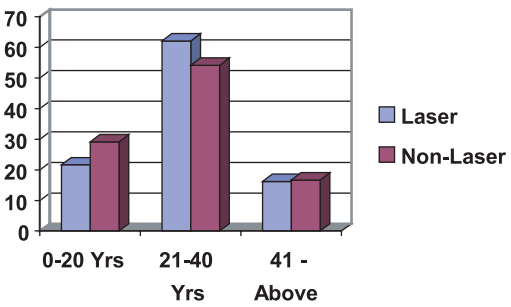



**Table-II**

*Sex incidence (n – 61)*

| Sex | Laser (n - 37) | Non – Laser (n- 24) |
|---|---|---|
| Male | 29 (78.37%) | 18 (75.00%) |
| Female | 8 (21.63%) | 6 (25.00%) |

Most of the patients were male with M : F = 3 : 1

**Table-III**

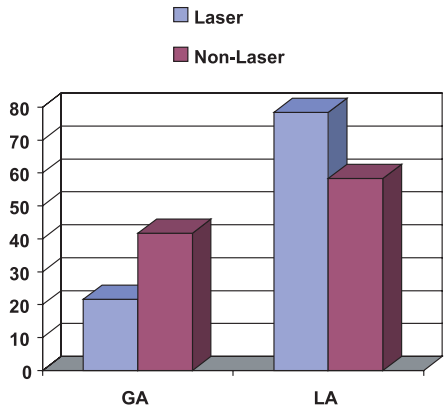
*Presenting symptoms (n – 61)*

| Symptoms | Number of patient | Percentage |
|---|---|---|
| Nasal obstruction | 61 | 100.00 |
| Nasal discharge | 60 | 98..36 |
| Headache | 58 | 95.08 |
| Frequent sneezing | 46 | 75.40 |

Nasal obstruction was the commonest symptom in 61 patients (100%) followed by nasal discharge in 60 patients (98.36 %).

**Table-IV**
*Anesthesia used (n – 61)*

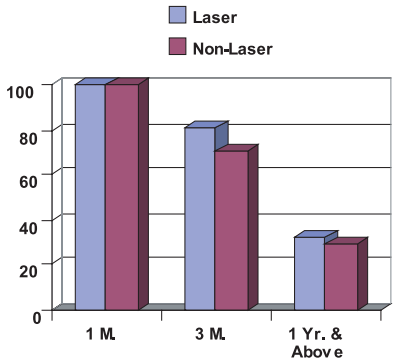
| Anesthesia used | Laser (n - 37) | Non – Laser (n- 24) |
|---|---|---|
| General anesthesia | 8( 21.62% ) | 1041.67%) |
| Local anesthesia | 29(78.38%) | 14 (58.33%) |




Most patients were operated under local anesthesia in both groups (78.38 % and 58.33 % respectably). In laser group ratio of LA and GA was 29: 8. In Non-laser group ratio of LA and GA was 7: 5.

**Table-V**
*Post-operative follow – up duration (n – 61)*

| Duration after surgery | Laser (n -37) | Non-Laser (n - 24) |
|---|---|---|
| 1 month | 37(100%) | 24(100%) |
| 3 month | 30(81.08 %) | 17( 70.83% ) |
| 1 year and above | 12 (32.43) | 7( 29.16) |




Follow up was satisfactory up to 3 months (Laser group 81.08 % and non-laser group 70.83 %).

**Table-VI**
*Post-operative follow – up result (n – 61)*

| Free from symptoms | Laser (n - 37) | Non-Laser (n - 24) |
|---|---|---|
| All symptoms | 32 (86.48%) | 19(79.16%) |
| Nasal discharge | 30 (81.08%) | 18(75%) |
| Headache | 28(75.6 %) | 16(66.66%) |
| Sneezing | 26(70.27%) | 12(50%) |

Most of the patients were all symptoms free (86.48 % in laser group and 79.16 % in non-laser group). Nasal discharge, headache and sneezing also relieved markedly in laser group (81.08 %, 75.67 %, and 70.27 % respectably).

**Table-VII**
*Post-operative complications result (n – 61)*

| Complications | Laser (n - 37) | Non-Laser (n - 24) |
|---|---|---|
| Nasal crusting | 8( 21.62 % ) | 22( 91. 66%) |
| Blood stained discharge | 2( 5.40 % ) | 12(50%) |
| Severe nasal bleeding | Nil(0%) | 3(12.5%) |
| Sense of obstruction | Nil (0%) | 5(20.83%) |

Only 8 patients (21.62 %) present with crusting in laser group in respect to 22 patients (91.66 %) in non-laser group with no incidence of severe post–operative nasal bleeding in laser group. 3 patients (12.5 %) in non-laser group presented with severe nasal bleeding.

**Table-VIII**
*Hospital stay (n – 61)*

| Duration | Laser (n-37) | Non-Laser (n-24) |
|---|---|---|
| Day care | 34( 91.89%) | 13(35.13%) |
| 1 night | 3(8.10%) | 10( 27.02%) |
| 2 nights | Nil(0%) | 1( 2.70%) |

34 patients (91.89 %) of Laser group and 13 patients (35.13 %) of non-laser group were treated as day care surgery.

**Table-IX**
*Laser used (n – 37)*

| Laser used | Number of patients | Percentage |
|---|---|---|
| Diode Laser | 26 | 70.27 % |
| $CO_2$ Laser | 11 | 29.73 % |

Most of the cases (70.27 %) were operated by Diode Laser.

**Table-X**
*Recurrences of symptoms within one year (n – 61)*

| Symptoms | Laser (n-37) | Non-Laser (n-24) |
|---|---|---|
| Nasal obstruction | 1 (2.70%) | 3(12.5%) |
| Nasal discharge | 1(2.70 %) | 2( 8.3%) |
| Frequent sneezing | 1(2.70 %) | 2( 8.3%) |

**Discussion:**

This is a study of 61 cases of turbinoplasty done in 3 hospitals of Bangladesh. Duration of study was from August 2007 to July 2009 (2 years). This study compares turbinoplasty by laser with that of non-laser techniques. This is the first such study in Bangladesh. The study was done in two groups (Laser and Non-Laser) of patients and result was compared with other published studies.

Table-I shows the age incidents of the patients. Most of the patients were 21 – 40 years in both groups (Laser 62.16 % & Non laser 54.16 %). This is because of the fact that young patients are more conscious about their problems and they see the doctors whenever they feel problem which disturbs their day to day activity. Elderly patients are reluctant about their nasal problem.

Table-II shows number of male patients are more and male & female patient's ratio was 3:1 in both groups. This is because of the fact that male patients attend the hospital more frequently. Because they are the privileged part of the community and female patients are neglected to an extent due to social customs.

Table-III shows the presenting symptoms were like that discussed in the synopsis of otolaryngology[4] and Scott – brown's otolaryngology[5] ,most of the patients presented with nasal obstruction for sometimes in both groups (100%), followed by nasal discharge (98.36 %), headache (95.08 %) and frequent sneezing (75.40%). Nasal obstruction, nasal discharge and sneezing may be associated with allergy[4,5].

Table-IV shows most of the patients were operated under LA in laser group than in non-laser group. These suggest that the patients are more comfortable with laser when the operation was done under LA.

Table-V shows the duration of follow-up in patients of both groups. Up to 3 months follow-up patients were 81.08% in laser group and non-laser group were 70.83 %. Up to 1 year 1/3 patient came for follow-up. These indicate that the patient who did not come are mostly free of symptoms.

Table-VI shows the post–operative follow up results. Most patient were free from nasal obstruction, nasal discharge and sneezing when operated by laser (86.48%) ($p<0.01$).

Some patients did not come after 3 months, may because of the fact that they were happy with the result the operation. Our result is in constant with others[1,2,3]. Similar results were found by Elwany[3] .

Table – VII shows the post operative complications. In the laser group the post operative crusting were least and blood stained discharge were also less. There was no incidence of post operative severe epistaxis and no atrophic change in laser group. This may be because of the fact that laser acts precisely and was under full control.

Table – VIII shows the duration of hospital stay. Hospital stay was less in both groups but least in laser group. Immediately post operative patient may feel nasal passage clearance because the target tissue is vaporized although sometimes after it may come due to inflammatory reaction.

Table – IX shows the types of laser used. We have used both $CO_2$ and Diode laser. Many workers have been using these laser systems for many years[1,2,3].

Elwany[3] used the $CO_2$ laser in unipulse mode, though we have used $CO_2$ laser in both continuous and pulse mode and diode laser delivered by fibres. The laser beam is delivered through the nasal probe delivery system, and the procedure is performed using the 0 degree endoscope. The Unipulse mode allowed fine-tuned, char-free tissue ablation, and the nasal probes allowed delivery of laser energy to the posterior parts of the inferior turbinates[3].

Table-X shows the number of recurrence of the disease is very less in laser group in comparison to non-laser group.

The main drawback in the laser surgery is that it is costlier than non-laser procedures. However if the cost and benefits are calculated, definitely the laser turbinoplasty is much more effective and beneficial.

**Conclusions:**

Laser treatment of hyperplastic inferior nasal turbinates can be considered as a useful, cost-effective, and time-saving procedure for the reduction of hyperplastic inferior nasal turbinates. Short operation time, good results, and minor side effects compared to other surgical methods provide an excellent clinical response of the patients ($p< 0.01$). It needs special training on laser for surgeons, trained assistants and OT staffs as well as experienced anesthetist if done under GA. However arrangement for training and relevant workshops can definitely increase the standard of surgery. One must remember that laser is not a surgery for occasional surgeons. It requires arrangement and safely measure as well.

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