Intra Turbinate Diathermy Cautery V/S High Frequency in Inferior Turbinate Hypertrophy

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Abstract

Objective To compare the efficacy of intraturbinate monopolar cautery, bipolar cautery, high frequency monopolar and high frequency bipolar cautery in inferior turbinate hypertrophy.

Study design Prospective randomized single blinded clinical study

Method The study comprised of 80 patients divided in 4 groups each of 20 patients who underwent monopolar cautery, Bipolar cautery, high frequency monopolar and bipolar intra-turbinate cautery. Patients were evaluated on the 7th post operative day and 1 year after the surgery & saccharine transit time test also performed and compared.

Results Remarkable improvement was recorded in nasal obstruction and quality of life. The Saccharine transit time test showed a comparable frequency and confirmed maintenance of mucociliary mechanism.

Key words Intraturbinate cautery · inferior turbinate hypertrophy · nasal obstruction

Introduction

Nasal cavities provide conduction, filtration, heating, humidification and chemosensation of air which is mainly performed through mucosa and contours of the turbinates, hence nasal obstruction by hypertrophy of inferior turbinate plays a significant role in the quality of human life. The inferior turbinate is 50–60 mm long, 3.8mm wide and 7.5mm in height and a dominant structure of the inferior nose. Nasal obstruction in chronic non allergic or hypertrophic rhinitis is usually caused by submucosal or mucosal hypertrophy and boggy tissue due to increased vascularity as anterior end of inferior turbinate is an erectile tissue. Various methods have been tried viz nasal decongestant or corticosteroid drops, oral antihistamines, sympathomimetics [1–2], [3], regular physical exercise (yoga), sutraneti, laser assisted turbinoplasty and argon plasma surgery (Jackson) [4], [5]. Epidemiological studies in European countries have shown incidence up to 20% of inferior turbinate hypertrophy [6].

Injection of methyl prednisolone has improved results in allergic cases only but repeated visits to hospital are required [7]. Various modes of diathermy cautery/high frequency/radio frequency have been performed and evaluated with varying morbidity and outcome. Hence this prospective study was designed to find out the best treatment protocol to suit the north Indian average patient with maximum outcome.

The tertiary care center with modern gadgets recommend either laser or radiofrequency ablation while district level ENT practitioner use monopolar diathermy cautery or simple electro cautery.

While using monopolar intraturbinate diathermy most of the mucosa remains normal but due to the high heat at the site of cautery, necrosis of periosteum and blood vessels is quite likely resulting in an unpredictable long lasting pain or even post operative necrosis of the mucosa as it adheres to the necrosed periosteum and results in poor blood flow. This leads to decreased sensitivity of the nasal mucosa. The present prospective randomized study was conducted with

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the aim to assess the morbidity and long term subjective or objective efficacy of monopolar diathermy cautery/ bipolar diathermy cautery and radiofrequency monopolar/ bipolar cautery.

Material and method

The present study comprised of 80 patients with 4 groups of 20 each, presenting with symptoms of nasal obstruction. The patient age ranged from 14 to 58 years. All patients were examined clinically for ENT as well as for systemic manifestations. Those who were hypertensive and/or diabetic were referred to a general physician for control and fitness deferring surgery for a later date. Nasal endoscopy was performed in all cases. Patient with Sino nasal tumours, hypertrophic bulla conchosa or nasal polyposis were excluded. The associated symptoms were nasal discharge, post nasal drip, deviated nasal symptom, headache, obesity, hypertension, diabetes, and snoring and gastro esophageal reflux disease.

The saccharin transit time test was performed in all cases preoperatively as well as 1 year post operatively.

Procedure

The saccharine test time was measured by placing 15 mg of sodium saccharine including 1% indigo tin just behind the anterior end of the inferior turbinate. Patient was instructed to swallow every 30 seconds and sit with his head inclined 100 forward and avoid breathing through the nose thereafter. (as soon as the patient testing the saccharin), throat was checked and blue color of indigo tin was searched on pharyngeal wall.

Diathermy procedure

In all patients an injection of diclofenac potassium (50mg),

and inj medazolam (4mg) was given intramuscularly half an hour before the procedure. Two drops of Xylocaine was instilled into the eye to rule out sensitivity to local anesthesia.

Part preparation

The patient lying in supine position with the head end inclined at 15 degrees, both nostrils were packed with cottonoid soaked in 4% xylocaine & with 26 gauze 3.75 cm long.

Needle 2% local anesthesia was infiltrated on each side, 1.5 ml in anterior part and 1.0 ml in posterior part of inferior turbinate.

Table 1 Sign & Symptoms

Sign & Symptom	No.	%
Nasal obstruction	80	100 %
Nasal discharge		
Profuse	6	7.5 %
Scanty	11	13.75 %
Post nasal drip	5	6.25 %
Deviated nasal septum	23	28.75 %
Headache	14	17.5 %
Obesity	26	32.5 %
Hypertension	9	11.25 %
Diabetes controlled	2	2.5 %
Snoring mild	17	21.25 %
Moderate	12	15 %
Severe	8	10 %
Gastro esophageal reflux disease	13	16.25 %

Table 2 Age & Sex distribution

No.	Monopolar		Bipolar		High frequency monopolar		Bipolar High frequency		Total	
	M	F	M	F	M	F	M	F	M	F
Age										
10-25	4	-	3	1	2	1	1	1	10	3
26-40	11	2	10	2	12	1	15	-	48	5
40-58	3	-	4	-	2	2	3	-	12	2
Total	18	2	17	3	16	4	19	1	70	10

Monopolar submucosal diathermy

Inert electrode was placed under the right side of the shoulder and back, 7.5 cm 18 gauze spinal needle was used as monopolar electrode and inserted longitudinally into the lower anterior end of inferior turbinate. The cautery was switched on by foot switch control till the lower anterior end of inferior turbinate was coagulated but no charring, same way the second attempt was made in upper anterior part and coagulation done.

Third attempt was made in posterior aspect with taking precaution not to burn the septal mucosa or alar skin. An additional coagulation may be required in the superior aspect of the inferior turbinate 1.0 cm posterior to the tip which may enhance the airflow to upper part of the nasal cavity.

Bipolar submucosal diathermy

Since bipolar is used, no inert electrode is required and specially designed bipolar forceps is used. Needle is inserted deep to touch the periosteum and withdrawn slightly, four to six passes are made on each side, taking all precaution to prevent charring and produce only coagulation, diathermy cautery is stopped at the minimal coagulation (whitening) of nasal mucosa.

High frequency monopolar/bipolar diathermy cautery

These were similar to monopolar and bipolar cautery in all respect in procedure.

In the post operative period, sign and symptoms, viz pain in nose radiating to incisor teeth, nasal discharge, nasal obstruction, sneezing, itching, crusting and blood or blood mixed discharge, heaviness in head were evaluated on Day 1, Day 7 and 1year postoperatively.

All patients were prohibited from using topical or oral steroids, antihistamines and decongestants from postoperative Day 4.

Since ours is a private hospital, to complete the study each patient was allowed complimentary consultation and follow up for one year. Also, an additional complimentary consultation coupon for any accompanying new patient was provided to encourage their visits.

Results

All the patients were analysed for associated signs and symptoms as shown in Table 1. All the patients were given an analgesic and antibiotic along with anti-inflammatory serratiopeptidase for three days. Result of all four groups

are shown in Table 3 & 4. In our series 37 patient had mild (17) Moderate (12) and severe (8) snoring from which 24 patients remarkably recovered and only 13 patients had persistent snoring, majority of which were cases of deviated septum.

The fastest regression of edema and nasal discharge was observed in high frequency bipolar intra turbinate cautery with a residual obstruction of 55% and nasal discharge of 15% vs obstruction of 85% and nasal discharge of 70% in mono polar cautery on postoperative Day 7.

There was improvement in overall quality of life and nasal symptoms.

Saccharine Test time

The saccharine test time remained almost same varying from 7.5 min. to 15.2 min. and indigo tin could be seen well in all cases. Details are shown in Table 4.

Discussion

Sub mucous or intraturbinate monopolar and bipolar diathermy has given variable results Hol and Hiuzing evaluated 13 surgical techniques that have been used for inferior turbinate hypertrophy over the past 130 years and inferior turbinate reduction to be method of choice [8].

Though we used gelcosponge nasal packing in all cases but the incidence of adhesion was comparatively much less in bipolar radiofrequency. In monopolar electrocautery when used over the mucosa of turbinate it leads to histological changes involving transformation of columnar epithelium into cuboidal or squamous epithelium due to burn injury. A Giovanni Salzano et al has reported more than 75% incidence of mucosal metaplasia in their series.

Intraturbinate cautery prevents mucosal damage which is minimal in bipolar diathermy cautery. The advantage of bipolar high frequency diathermy cautery is intensity of electric current required is extremely low hence surgical trauma and post operative pain is much less and theoretically nasal packing is not required. We performed almost all the surgeries under local anesthesia.

In our series we always made it a point to cauterize the posterior end of inferior turbinate which perhaps may be the reason of achieving 72.5 % success rate only 9% cases required use of decongestant nasal drops after one year as also Francesco-Antonio Salzano et al [9]. The response to nasal drops which was quite less due to fibrotic contracture of sub mucous tissue of inferior turbinate, similar observation has been observed by Elwany S. et al [10].

In our series of postoperative results of bipolar surgical diathermy and radiofrequency diathermy was comparable but amount of pain, discomfort and post operative oedema was more in Monopolar Diathermy. Higher is the frequency lesser is the intensity required, more precise is the coagulation and lesser is the surrounding tissue damage but no technique is perfect and has got short term as well as long term complication specifically atrophic rhinitis crusting and bleeding [11]. Author has observed more incidence of atrophic rhinitis in cases of surface electro cautery or surgical partial or total turbinectomy as compared to intraturbinate bipolar diathermy or cautery.

The Saccharine transit time was comparable in preoperative or postoperative period, similar observation were noted by Zeynep Kizilkaya et al [12].

Conclusion

The long term postoperative results of bipolar radiofrequency and bipolar intraturbinate diathermy are comparable. Though the incidence of adhesion is much less but apart from anti-inflammatory analgesic and antibiotic, gelcosponge packing should be done in all cases. High frequency cautery makes it a safe convenient OPD procedure and provides success in majority of cases. Saccharine test confirms maintenance of mucocilliary mechanism.

Table 2 Sign symptoms preoperatively and 7th post operative day

Pos top	Monopolar cautery		Bi polar cautery		Monopolar high frequency		Bipolar high frequency	
	Pre op	7th day post op	Pre op	7th day post op	Pre op	7th day post op	Pre op	7th day post op
Nasal obstruction	20	17	20	13	20	14	20	11
Nasal discharge	3	14	5	7	4	5	5	3
Headache	4	8	3	2	4	3	3	1
Obesity	7	7	6	6	7	7	6	6
Hypertension	2	3	3	3	2	3	2	2
Snoring	10	12	12	9	8	6	7	4
Dryness of nose	Nil	3	-	2	-	3	-	4
Crusting	Nil	12	-	4	-	5	-	3
Blood /blood mixed discharge	Nil	14	-	3	-	2	-	-

Table 3 Post operative sign symptoms after one year: a comparison

Pos top	Monopolar		Bi polar		Monopolar		Bipolar	
	Diathermy cautery		Diathermy cautery		high frequency		high frequency	
	Pre op	1 yr aft	Pre op	post op	Pre op	post op	Pre op	post op
Nasal obstruction	20	7	20	4	20	6	20	5
Nasal discharge	3	3	5	2	4	2	5	4
Headache	4	2	3	2	4	4	3	1
Obesity	7	5	6	6	7	4	6	5
Hypertension	2	2	3	1	2	2	2	2
Snoring	10	5	12	3	8	3	7	2
Dryness of nose	-	2	-	1	-	1	-	-
Crusting	-	1	-	-	-	1	-	-
Crusting blood/blood mixed discharge	-	-	-	-	-	-	-	-

Table 4 Saccharine Transit time

Monopolar Intra turbinate cautery		Monopolar high frequency		Bipolar Diathermy		Bipolar High frequency	
Pre op	1yr post op	Pre op	1yr post op	Pre op	1yr post op	Pre op	1yr post op
7.0- 15 min (8.2)	7.3-14.2 (8.5)	7.0-14.5 (8.5)	7.6-13.0 (8.0)	8-13.0 (9.2)	7.4-16.0 (8.4)	8.4-15.2 (9.4)	7.2-13.0 (8.2)

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