Results

Our study included 40 patients presenting to the ENT outpatient clinic in Benha university hospital complaining of nasal obstruction due to inferior turbinate hypertrophy. The nasal obstruction was usually associated with other symptoms e.g. headache, snoring, post-nasal discharge, hyposmia or sneezing.

These 40 patients were randomly divided into 2 groups (A and B) as regard the line of management.

- Patients of **group A** undergone radiofrequency for reduction of inferior turbinate hypertrophy
- Patients of **group B** undergone traditional methods for reduction of inferior turbinate hypertrophy. (Partial inferior turbinectomy and submucous diathermy of inferior turbinate).

Each of these patients was subjected to full evaluation including history taking, clinical ENT examination, diagnostic nasal endoscopy and acoustic rhinometry both pre and post operatively.

Results are summarized as follow:

a) Pre-operative assessment:

As regard age and sex distribution our results showed that:

Group A : included 20 patients: 9 males (45%) and 11 females (55%) their ages ranged from 15 to 48 years with a mean age 31.5 years with standard deviation ±9.43 years.

Group B : included 20 patients: 10 males (50%) and 10 females (50%) their ages ranged from 16 to 45 years with a mean age 30.5 years with standard deviation±8.56 years. ***(Table2, 3).***

1) <u>Subjective assessment</u> :

- **<u>Nasal obstruction :</u>**

Mean duration of nasal obstruction of **group A** was 28.36 ± 25.45 months and the mean duration of nasal obstruction of **group B** was 26.47 ± 22.56 months ***(Table 4).***

As regard side of nasal obstruction there were 1 patient of **group A** who was complaining of unilateral nasal obstruction and 19 patients were bilaterally obstructed.

In **group B** there were 2 patients complaining of unilateral nasal obstruction and 18 patients were bilaterally obstructed. ***(Table 5).***

As regard severity of nasal obstruction:

In **group A** 13 patients were severely obstructed and 7 patients were moderately obstructed.

In **group B** 11 patients were severely obstructed and 9 patients were moderately obstructed***. (Table 6).***

In addition to nasal obstruction there were associated symptoms:

- **<u>Snoring</u>** :

In **group A**: 12 patients were complaining of snoring .

In **group B**: 13 patients were complaining of snoring.

- **<u>Headache</u>** :

In **group A**: 8 patients were complaining of headache

In **group B**: 7 patients were complaining of headache.

- **Bleeding per nose:**

No patient was complaining of bleeding per nose

- **Post-nasal discharge :**

In **group A**: 6 patients were complaining of post nasal discharge.

In **group B**: 8 patients were complaining of post nasal discharge

- **Hyposmia :**

In **group A**: 5 patients were complaining of hyposmia.

In **group B**: 6 patients were complaining of hyposmia.

- **Sneezing :**

In **group A**: 7 patients were complaining of sneezing.

In **group B**: 6 patients were complaining of sneezing. ***(Table 7).***

2) Objective assessment :

- **Endoscopic examination:**

In **group A**: 15 patients were severely hypertrophied of inferior turbinate and 5 patients were moderately hypertrophied.

In **group B**: 13 patients were severely hypertrophied of inferior turbinate and 7 patients were moderately hypertrophied. ***(Table 8).***

- **Acoustic rhinometry :**

Total nasal resistance:

Mean total pre-operative nasal resistance was measured in both groups. It was 2.86± 1.28 in **group A** and 2.75±1.42 in **group B. (table 9)**

Total nasal volume:

Mean total pre-operative nasal volume was measured in both groups; it was 20.79±7.80 in **group A** and 18.9±4.89 in **group B. (table 10)**

Total nasal minimal cross sectional area:

Mean total pre-operative minimal cross sectional area was measured in both groups; it was 0.49±0.15 in **group A** and 0.50±0.14 in **group B. (table 11)**

b) Operative data :

The duration of the operation was in **group A** from 9 minutes to 11 minutes with mean duration 10 minute and standard deviation± 4.32 minutes and in group (B) the duration of the operation was from 18 minutes to 25 minutes with mean duration 21.5 minutes and standard deviation ±4.68 .**(Table 12).** .

c) Post-operative care:

Patients of group (B) were hospitalized for 2 days.

Bleeding per nose:

Group A: 1 patient (5%) had bleeding per nose post-operatively that was controlled by insertion of ephedrine packs for few minutes and 19 patients (45%) hadn't bleeding per nose post operatively.

Group B: 5 patients (25%) had bleeding per nose upon removal of the packs 48 hours post-operatively that was controlled by insertion of ephedrine packs for few minutes. And 15 patients (75%) hadn't bleeding per nose upon removal of the packs 48 hours post operatively***.***

Pain and discomfort:

In group (A): no patients had pain and discomfort post operatively

In group (B) 15 patients were complaining of pain and discomfort after removal of the packs 48 hours post operatively which were controlled by analgesics and there were 5 patients free.

Smell of bad odour:

In group (A): there was no patient complaining of smell of bad odour post operatively in group (B): there were 3 patients complaining of smell of bad odour due to infection and crustation and 17 patients were free (on pack removal).

Synachae (Adhesions)

In group (A) there was no patient complaining of synachae (Adhesions) post operatively.

In group (B) there were 4 patients complaining of synachae (Adhesions) and 16 were free. ***(Table 13)***

d) <u>Post-operative evaluation:</u>

All patients were evaluated once weekly for the 1st month then every 2 weeks for 3 months then once every month till the end of follow up period after 6 months.

This was done in the ENT outpatient clinic of Benha university hospital for 6 months. Post-operative evaluation was done after 6 months.

1) **Subjective assessment:**

The subjective assessment scores pre- and post-operative for individual symptoms were compared and classified into benefited (resolved, improved,) and not benefited (same and worsened) ***(Table 14).***

Nasal obstruction :

In **group A**: 90% of patients were benefited.

In **group B**: 85% of patients were benefited.

Headache:

In **group A:** 95% of patients were benefited.

In **group B**: 75% of patients were benefited.

- **Snoring** :

In **group A**: 90% of patients were benefited.

In **group B**: 80% of patients were benefited.

- **Post-nasal discharge :**

In **group A**: 95% of patients were benefited.

In **group B**: 80% of patients were benefited.

- **Hyposmia :**

In **groupA:** 85% of patients were benefited.

In **grou B** : 65% of patients were benefited.

- **Sneezing :**

In **group A:** 85% of patients were benefited.

In **group B** : 70% of patients were benefited.

2) Objective assessment:

- **Endoscopic examination:**

Nasal endoscopic examination was done monthly for follow up for each patient. The nasal endoscopic findings on last available follow up (after 6 months) were:

In **group A**:

No Hypertrophy of inferior turbinate was neither detected nor nasal crustation nor peristant contact of turbinates with the septum nor nasal synechiae

In **group B**:

There was 1 patient (5%) had posterior hypertrophy of inferior turbinate nasal crustations were present in 5 patients (25%) persistant contact of the turbinates with the septum were present in 1 patient (5%) and nasal synchiae were detected in 4 patients (20%) ***(Table 15).***

Acoustic rhinometry :

Total nasal resistance:

Mean total nasal resistance post-operatively was measured in both groups. It was 1.64 ± 0.82 in **group A** and 1.92 ± 0.95 in **group B** with high significant difference between postoperative values between 2 groups and high significant difference between pre and postoperatively in each group separately ***(Table 9).***

Total nasal volume:

Mean total nasal volume post-operatively (at inspiration) was measured in both groups. It was 27.42±11.95 in group A and 26.89±6.67 in group B with high significant difference between post-operative values between 2 groups and high significant difference between pre and post-operatively in each group separately. **(Table 10)**

Total nasal minimal cross sectional area:

Mean total minimal cross sectional area post-operatively (at inspiration) was measured in both groups. It was 0.62±0.17 in group A and 0.60±0.15 in group B with high significant difference between post-operative values between 2 groups and high significant difference between pre and post-operatively in each group separately. **(Table 11)**

Patient satisfaction :

The patient satisfaction were used to evaluate the status of nasal breathing

In group (A): The patient satisfactions were 90%.

In group (B): The patient satisfactions were 80%.

Table (2): Sex distribution of the studied cases

Sex	Radiofrequency	Percentage	Traditional	Percentage
Male	9	45%	10	50%
Female	11	55%	10	50%
Total	20		20	

Chi square test shows no significant difference in sex distribution in both groups (p = 0.454).

Table (3): distribution of the studied cases according to the age (in years)

Age	Radiofrequency		Traditional	
	No	percentage	no	Percentage
< 20	**7**	**35%**	**6**	**30%**
20-30	**6**	**30%**	**8**	**40%**
30-40	**4**	**20%**	**4**	**20%**
40-50	**3**	**15%**	**2**	**10%**
Total	**20**	**100%**	**20**	**100%**
Range	**15-48**		**16-45**	
Mean	**31.5**		**30.5**	
Standard deviation	**9.43**		**8.56**	

Chi square test shows no significant difference between the mean age in both groups (p=0.732)

Table (4): Mean duration and standard deviations of duration of nasal obstruction in the studied cases.

Duration (months)	Radiofrequency	Traditional
Mean	28.35	26.47
Standard deviation	25.45	22.56

T test shows no significant difference between the mean duration of nasal obstruction of both groups (p = 0.642).

Table (5): Side of nasal obstruction in both groups at presentation

Side of nasal obstruction	Radiofrequency	Percentage	Traditional	Percentage
Unilateral	1	5%	2	10%
Bilateral	19	95%	18	90%
Total	20		20	

Chi square test shows no significant difference in both groups as regard side of nasal obstruction (p = 0.439).

Table (6): Severity of nasal obstruction in the studied cases at presentation

Severity	Radiofrequency	Percentage	Traditional	Percentage
Severe	13	65%	11	55%
Moderate	7	35%	9	45%
Total	20		20	

Chi square test shows no significant difference in both groups as regard severity of nasal obstruction (p =0.269).

Table (7): Number of patients having associated symptoms at presentation

Complaint	Radiofrequency	Percentage	Traditional	Percentage	P
Snoring	12	60%	13	65%	0.586
Headache	8	40%	7	35%	0.674
PND	6	30%	8	40%	0.524
Bleeding per nose	0	0%	0	0	
Hyposmia	5	25%	6	30%	0.693
Sneezing	7	35%	6	30%	0.541

Chi square test shows no significant difference in both groups as regard Snoring, headache, post-nasal discharge (PND), Bleeding per nose and sneezing.

Table (8): degree of inferior turbinate hypertrophy in the studied cases at presentation

Degree of inferior turbinate hypertrophy	radiofrequency	Percentage	Traditional	Percentage
Severly hypertrophied	15	75%	13	65%
Moderately hypertrophied	5	25%	7	35%
Total	20		20	

Chi square test shows no significant difference in the degree of inferior turbinate hypertrophy in both groups (p = 0.361).

Table (9): Pre- and post-operative means of total nasal resistance in the studied cases

	radiofrequency	Traditional	P value	Significance
Pre-operative	**2.86**	**2.75**	**0.6877**	**N.S.**
Post-operative	**1.64**	**1.92**	**0.0034**	**H.S.**
P value	**0.0073**	**0.0085**		
Significance	**H.S.**	**H.S.**		

T test shows no significant difference between pre-operative means of total nasal resistance in both groups but it shows highly significant difference between pre- and post-operative values in each group separately. Also, there is highly significant difference between post-operative results in both groups.

Table (10): Pre- and post-operative means of total nasal volume in the studied cases

	radiofrequency	Traditional	P value	Significance
Pre-operative	**18.79**	**17.95**	**0.626**	**N.S.**
Post-operative	**27.42**	**22.89**	**0.0092**	**H.S.**
P value	**0.0076**	**0.0087**		
Significance	**H.S.**	**H.S.**		

T test shows no significant difference between pre-operative means of total nasal volume in both groups but it shows highly significant difference between pre- and post-operative values in each group separately. Also, there is highly significant difference between post-operative results in both groups.

Table (11): Pre- and post-operative means of total nasal minimal cross sectional area in the studied cases

	radiofrequency	Traditional	P value	Significance
Pre-operative	**0.49**	**0.50**	**0.563**	**N.S.**
Post-operative	**0.62**	**0.57**	**0.0039**	**H.S.**
P value	**0.0089**	**0.0074**		
Significance	**H.S.**	**H.S.**		

T test shows no significant difference between pre-operative means of total nasal minimal cross sectional area in both groups but it shows highly significant difference between pre- and post-operative values in each group separately. Also, there is highly significant difference between post-operative results in both groups.

Table (12): Time of the operation in the studied cases

time of the operation(in minutes)	Radiofrequency	Traditional
Range	9-11	18-25
Mean	10	21.5
Standard deviation	4.32	4.68

T test shows no significant difference between the mean time (in minutes) of the operation in both groups (p = 0.672).

Table (13): Early post-operative complications in the studied cases

Complications	Radiofrequency	Percentage	Traditional	Percentage	P	Sig
Bleeding per nose	1	5%	5	25%	0.0675	N.S
Pain & discomfort	0	0%	13	65%	0.0027	H.S
Smell of bad odour	0	0%	3	15%	0.0735	N.S
Synachiae (Adhesions)	0	0%	4	20%	0.0621	H.S

Chi square test shows no significant difference in early post-operative complication in both groups as regards epistaxis and smell of bad odour but shows highly significant difference in pain and discomfort and synachiae.

Table (14): Comparison of the subjective results between both groups (6 months post-operative) based on the pre- and post-operative visual analogue scores

Symptoms (No. of cases E/T)		Radiofrequency				Traditional				P	Significance
		Benefited		Not Benefited		Benefited		Not Benefited			
		R	I	S	W	R	I	S	W		
Obstruction (n=20/20)	No.	13	4	1	2	7	5	5	3	0.0487	Sig.
	%	65%	20%	5%	10%	35%	25%	25%	15%		
Snoring (n=12/13)	No.	5	5	1	1	5	4	2	2	0.423	N.S
	%	41.65%	41.65%	8.33%	8.33%	38.48%	30.76%	15.38%	15.38%		
Headache (n=8/7)	No.	5	2	1	0	4	2	1	0	0.267	N.S
	%	62.5%	25%	12.5%	0%	57.16%	28.56%	14.28%	0%		
PND (n=6/8)	No.	3	2	1	0	3	2	1	2	0.598	N.S
	%	50%	33.34%	16.66%	0%	37.5%	25%	12.5%	25%		
Hyposmia (n= 5/6)	No.	2	2	1	0	2	2	1	1	0.706	N.S
	%	40%	40%	20%	0%	33.34%	33.34%	16.66%	16.66%		
Sneezing (n=7/6)	No.	3	3	1	0	2	2	1	1	0.659	N.S
	%	42.85%	42.85%	14.28%	0%	33.34%	33.34%	16.66%	16.66%		
Patient satisfaction(n =20/20)	No.	18	2	0	0	13	3	3	1	0.0853	N.S
	%	90%	10%	0%	0%	65%	15%	15%	5%		

Chi square test shows significant difference in nasal obstruction between both groups, but there is no significant difference between both groups in snoring, headache, post-nasal discharge (PND), hyposmia or sneezing and patient satisfaction.**NB:** R=radiofrequency , T= traditional, R= resolved, I= improved, S= same and W= worsen