Original Article

Endoscopic Subtotal Inferior Turbinectomy is a Safe Procedure

Saddam Sahib Atshan[1], Firas Baqir Al-Hameed[1], Aymen Ahmed Mohsin[2], Mustafa Haseeb Alali[3], Firas T. Obeid[2] and Ahmed Al Abbasi[4]

ABSTRACT

Objective: To evaluate the effectiveness of endoscopic subtotal inferior turbinectomy (ESIT) on nasal obstruction and the consequences of this approach.
Study Design: Prospective interventional cohort study.
Place and Duration of Study: This study was conducted within Basra between October 2023 to October 2025.
Methods: The total number of patients who were undertaken endoscopic subtotal inferior turbinectomy and followed up for one year was 425 patients. Post-operative evaluation was conducted using clinical assessment, including endoscopic examination and a structured questionnaire completed by patients during follow-up visits.
Results: All patients reported improvement in nasal obstruction postoperatively. Headache and nasal discharge were improved in approximately 83% and 76% respectively. Thirty-three patients (out of 425) developed haemorrhage after removal of the packs and only five patients required surgical interference to stop bleeding. No statistically significant difference was observed in the onset of haemorrhage postoperatively between day 1(after removal of nasal pack) and day 3-10 (p=1.000). Crusting was demonstrated in 40% of patients during the first three months and it disappeared in the following period. Mucosal adhesion was noticed in patients who were required septoplasty as well as inferior turbinectomy. Re-enlargement of turbinates were been noticed in 2.1% of patients postoperatively during follow up period.
Conclusion: Endoscopic subtotal inferior turbinectomy is safe procedure and effective in treating nasal obstruction.
Key Words: Endoscopic subtotal inferior turbinectomy, nasal obstruction, inferior turbinate hypertrophy

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INTRODUCTION

Inferior turbinate enlargement is a common cause of nasal obstruction, presented in more than 70% of patients who were evaluated for nasal airway obstruction.[1] The enlargement is either due to soft tissue swelling or due to increase bone thickness. There are different factors can be involved in inferior turbinate hypertrophy, such as allergic and non-allergic (vasomotor) rhinitis, septal deviation with compensatory changes, hormonal effect, rhinitis medicamentosa and inferior turbinate pneumatization.[2-5] When conservative and medical treatment of turbinate enlargement fails, surgical intervention is often required.[6] One of these procedures is inferior turbinectomy which improves nasal airflow and nasal obstruction. However, this procedure remains debated because of post operative complications and physiological consequences, for example post-operative haemorrhage and crusting are reported complications for this procedure. Excessive resection of inferior turbinate may alter normal nasal airflow and heat/ water exchange function and consequently empty nose syndrome may develop. This condition is characterized by paradoxical nasal obstruction, dryness, and abnormal perception of air flow despite a patent nasal cavity.[7] On the other hand, a computational fluid dynamics study showed a minimal impairment under certain environmental conditions (temperature = 12–40 ◦C; relative humidity = 13–80%).[8] The aim of this study is to evaluate the safety of endoscopic subtotal inferior turbinectomy in southern Iraq where the climate is hot and humid in Summer and mild in Winter.

[1.] Department of Faculty of Medicine, College of Medicine, University of Thi-Qar, Thi-Qar, Iraq.
[2.] Department of ENT, Basrah Teaching Hospital, Basrah, Iraq
[3.] Department of Basra Skull Base Center, Kuwaiti-Iraqi Surgical Hospital, Basrah, Iraq
[4.] Department of ENT, College of medicine, University of Basrah, Iraq

Correspondence: Firas Baqir Al-Hameed, Department of ENT, Basrah Teaching Hospital, Basrah, Iraq
Contact No: 00447518208402
Email: alhameed@utq.edu.iq

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METHODS

This was a prospective interventional cohort study with a follow up for one year duration. It was undertaken in

Basra, southern Iraq, at Basra Teaching Hospital between October 2023 to October 2025. During this period, 577 patients underwent endoscopic subtotal inferior turbinectomy with or without septoplasty. The total number of patients who were followed up for one year duration was 425 patients. Exclusion criteria included patients who had nasal polyposis, nasal masses, tumour, unilateral turbinate enlargement or chronic rhinosinusitis.

Preoperatively, all patients were assessed using endoscopic examination and CT scan of the nose and sinuses to exclude other co-existing nasal conditions.

The procedure was undertaken by the same team for all patients. Septoplasty was performed first, if required, turbinectomy scissor were used to excise the turbinates endoscopically and any bleeding point was electrocauterized. For patients who underwent septoplasty, bilateral nasal splints were applied. After that, merocele nasal packs were inserted bilaterally. On day one, the packs were removed and patients were discharged home on nasal saline irrigation for three months. One week later, splints were removed and nasal cleansing were performed. At weekly intervals, patients were seen three times. To evaluate the success of the operation and to determine types of complications that could occur, patients were followed up after three months, six months and after a year. During the last two visit, patients were given a questionnaire that asked about the following aspects: whether they have developed improvement or worsening in nasal breathing, headache, nasal discharge, olfactory dysfunction or noted nasal dryness. Endoscopic examination was performed to assess if there was any crusting, mucosal adhesion or re-enlargement of turbinates.

Statistical analysis was performed using SPSS version 25. Categorical variables were compared using McNemar test or Fisher's exact test when appropriate. A p-value < 0.05 was considered statistically significant.

RESULTS

The total number of patients who had subtotal turbinectomy during the period of our study was 577. However, only 425 patients were followed up for one year and included in this cohort. Sixty four percent of patients were males and the median age of all patients was 35 years (IQR:12; range:15-68 years. Age distribution is shown in the table 1.

All patients who had bilateral nasal obstruction stated that this complaint relieved significantly after the operation. Headache and nasal discharge improved in 82% and 76% of patients postoperatively, respectively (McNemar test, P< 0.01).

There were no patient complaints of worsening in any symptom; however, a subset of patients noticed no improvement or progression of symptoms; particularly smell dysfunction, see table 2.

Table No. 1: Age distribution in the present study

Age	Number (n)	Percentage (%)
Under 20 years	10	2.4
20-29	90	21.2
30-39	196	46.1
40-49	97	22.8
50-59	26	6.1
60 and above	6	1.4
Total	425	100%

Table No. 2: Postoperative improvement of symptoms

Symptoms	Preoperative	Postoperative improvement	
		Yes	No
Nasal obstruction	425 (100%)	425 (100%)	0
Headache	180 (42.35%)	149 (82.77%)	31
Nasal discharge	74 (17.4%)	56 (75.67%)	18
Olfactory dysfunction	40 (9.4%)	18 (45%)	22

McNemar test, P< 0.01:

On the other hand, ESIT was associated with variable complications. Nasal crusting for example was observed in 170 patients (40%) during the first three months after the surgery. However, after this period this feature disappeared completely. Nasal bleeding occurred in 7.8% of patients (33 patients), of which just above half of cases (18 patients) started after day 3 postoperatively. Two patients required nasal packing to stop bleeding. However, immediate post-operative bleeding on day one was seen in 15 patients only. Two patients underwent nasal packing to control bleeding and only one patient required re-admission to the theatre to manage bleeding through endoscopic electrocauterization of bleeding points at the posterior end of inferior turbinate, see figure 1 and table 3.

Small percent of patients who had septoplasty at the same time of ESIT developed nasal mucosal adhesion at 6.8% (n=29). Nevertheless, no adhesion was seen among patients who had sole subtotal turbinectomy.

Re enlargement of inferior turbinate developed in a few numbers of cases at only 2% (n=9). This enlargement was mild and not obstructing nasal cavity as it was assessed endoscopically. Nasal dryness was an uncommon feature, found only in 0.9% of patients.

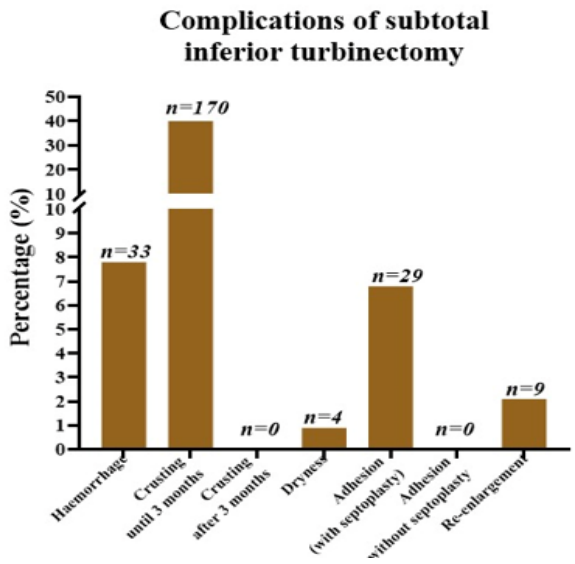

Figure No. 1: Complications of subtotal inferior turbinectomy

Table No. 3: Post turbinectomy haemorrhage

Haemorrhage time	(n)	(%)	Required intervention
Day 1(immediately after pack removal)	15	45.5%	3
Day 3-10	18	54.5%	2
Total	33	100%	5

P-value = 1.000

DISCUSSION

This cohort study showed that nasal obstruction improved in all patients who underwent ESIT. This significant improvement confirming that this procedure is highly effective in managing nasal obstruction due to inferior turbinate hypertrophy. Non-obstructive symptoms improved variably, more than three-quarters of patients with headache and nasal discharged experienced improvement. Olfactory symptoms showed improvement in 45% of individuals. This relatively modest response is understandable because olfactory impairment is not always directly related to inferior turbinate enlargement and it could be influenced by additional factors such as mucosal inflammation, airflow distribution to the olfactory cleft and other underlying sinonasal pathologies.

Khan et al found that 94.81 % of patients who had were undertaken total inferior turbinectomy demonstrated improvement in nasal obstruction. Similarly, nasal discharge and headache improved significantly.[9] A Systematic Review and Meta-analysis of long-term effect of turbinate surgery on allergic rhinitis was performed by Park et al and they found significant improvement in nasal obstruction and rhinorrhoea, (WMD, 4.60, 95% CI, 3.43-5.76), (WMD, 3.12; 95% CI, 1.97-4.28) respectively.[10]

Regarding the complications associated with turbinectomy, this study showed that 40% of patients suffered from nasal crusting in the first few weeks. However, this reduced over the next period and crust formation stopped in all patients after three months. Early crusting is attributed to the bone exposure after turbinate resection and it persists until re-epithelization of mucosa occurred and bone covered.[11,12] Mucociliary clearance, in addition, can be disrupted in the early weeks after the surgery and this may increase crust formation during this period. We observed that persistent nasal dryness was reported by 0.9% of patients. Features of empty nose syndrome or atrophic rhinitis were not seen in our patients. This could be because of neutral climate where the study is undertaken. This opinion is supported by a study performed by Siu et al. who conducted virtual surgery and computational fluid dynamics analyses. They concluded that air-mucosal heat exchange and moisture carrying capacity reduced in cold temperature in individuals with inferior turbinate surgery, whereas the effect under hot and humid conditions was minimal.

In this study, post ESIT bleeding occurred in 7.8% of patients. The number of patients who developed bleeding immediately after packs removal was 15. One patient experienced severe bleeding that did not stop with re insertion of bilateral nasal meroceles and required endoscopic electrical cauterization in the operating room. Two other patients required re-packing for another 24 hours, whereas the bleeding from the other 10 patients ceased without intervention. Just over half of bleeding attacks were within day-3 to day-10 postoperatively. Only two patients required nasal packing to control bleeding while the remaining patients did not require any surgical intervention and the bleeding stopped spontaneously. Delayed post-turbinectomy bleeding could be linked to normal mucosal healing process, including eschar separation, reactive vasodilatation and increased mucosal vascularity.[13] It is obvious that most of post-operative bleeding was manageable and treated conservatively.

Similar to our finding, Levey et al concluded that bleeding occurred in 8.4% of patients underwent partial inferior turbinectomy.[14] Rao et al, in contrast, showed a relatively lower bleeding rate after total inferior turbinectomy, at 5%.[15]

Synechia developed in 6.8% of patients (n=29); all of these patients underwent septoplasty as well as ESIT. Adhesion did not develop among patients whom underwent only ESIT. The risk of adhesion increased with the combined approach because of opposing of large mucosal surface, therefore meticulous mucosal preservation and postoperative care is essential to reduce this complication. Similarly, Khan et al reported that adhesion was observed in 5.9% of 135 patients underwent total inferior turbinectomy.[9]

Re-enlargement of inferior turbinates after subtotal resection was seen in nine patients (2%). The increase in turbinate size was noticed six months after the operation. This secondary hypertrophy could be due to continuous allergic or inflammatory rhinitis and for this

reason a long-term intranasal steroid could be recommended..

CONCLUSION

Endoscopic subtotal inferior turbinectomy was not associated with serious post-operative haemorrhage or long-term complications. Bleeding occurred in 7.8% of patients and only five patients were managed surgically to stop bleeding. Regarding preoperative symptoms, all patients experienced improvement in nasal obstruction and a substantial proportion of patients reported relief of headache and nasal discharge postoperatively. Olfactory dysfunction also improved in 45% of patients. These findings suggest that endoscopic subtotal inferior turbinectomy is relatively safe and effective in managing obstructive and non-obstructive symptoms associated with inferior turbinate enlargement.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Firas Baqir AL-Hameed, Mustafa Haseeb Alali
Drafting or Revising Critically:	Saddam Sahib Atshan,Firas Baqir AL-Hameed ,Aymen Ahmed Mohsin, Mustafa Haseeb Alali, Ahmed Al Abbasi, Firas T. Obeid
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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