Partial Resection of the Middle Turbinate at Functional Endoscopic Sinus Surgery

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SUMMARY: The middle turbinate is often carefully preserved at Functional Endoscopic Sinus Surgery (FESS). However there is no clear understanding of its importance and its presence may prevent good access to the middle meatus to the detriment of the surgical result. In addition its bulk may cause symptoms of nasal obstruction and prevent paranasal sinus drainage. Adhesions and stenosis have been reported at the middle meatus following its preservation. We undertook a prospective study of 50 consecutive patients all of whom underwent resection of the anterior half of the middle turbinate at the time of Functional Endoscopic Sinus Surgery. The patients were asked to complete a symptom score sheet before and ten weeks after surgery. The parameters considered were nasal obstruction, nasal congestion, discharge, facial pain and headache. Non parametric analysis of the results indicated a significant improvement in all patient symptom scores and no postoperative complications were noted. We conclude that partial resection of the middle turbinate is a useful modification of accepted endoscopic sinus surgery techniques.

Introduction

Preservation of the middle turbinate during endoscopic sinus surgery has become accepted practise in order to supposedly, preserve normal nasal physiology and maintain a useful anatomical landmark. However, inflammatory pathology may involve the middle turbinate, its bulk may make surgery difficult or result in obstructive symptoms, and frequently by the end of the procedure it is so unstable as to demand removal. There is therefore some logic to its removal at the start of the procedure. This should in addition allow easier access to the lateral nasal wall and reduce complications associated with its preservation. There is already some retrospective evidence from the United States of the efficacy of this manoeuvre (1-3). Our aim in this study was to prospectively assess the subjective outcome of routinely and electively removing the anterior half of the middle turbinate.

Methods

Fifty consecutive patients presenting with recurrent acute sinusitis or chronic rhinosinusitis were asked to complete a

Appendix 1 FESS AUDIT ASSESSMENT SHEET

Please rate your symptoms by circling the appropriate number on the following scale

SYMPTOMS SCALE (0 = Absent, 3 = Worst it can be)

Nasal Obstruction (blockage)	0	1	2	3
Nasal Congestion (feeling of need to blow or sniff)	0	1	2	3
Discharge (blown or sniffed)	0	1	2	3
Facial Pain (around eyes, cheeks or forehead)	0	1	2	3
Headache	0	1	2	3

Any other comments:

Post Operatively:

Overall assessment of surgery: Good/Bad/Don't know

Are you glad you had it done? Yes/No

Diagram 1: Lateral wall of the nose demonstrating that part of the middle turbinate which is resected (shaded)

symptom score sheet (Appendix 1) before and after undergoing modified endoscopic sinus surgery. The first questionnaire was administered immediately prior to the surgery. Under general anaesthesia with the patient head down and the neck extended the nose was prepared with a topical solution containing 2 mls of 10% cocaine, 2 mls of 1/1000 adrenaline and 16 mls of normal saline. Resection of the anterior half of the middle turbinate was performed at the start of the procedure using curved and straight scissors (Diagram 1). A remnant of the middle turbinate attachment was maintained. This was followed in all cases by uncinectomy, middle meatal antrostomy and anterior ethmoidectomy using the Messerklinger technique. Posterior ethmoidectomy and sphenoidectomy were performed where indicated. Nasal packing was not routinely employed but in the event of excessive bleeding Telfa packs were left *in situ* for two hours. The methods were similar for all cases and were all performed by the senior author, thus removing operator variability. Discharge from hospital was normally the day following surgery and patients were asked to use a regular saline douche (three times daily) until their first follow up at two weeks.

At this point patients were normally started on topical nasal steroids with other treatment (such as antibiotics or a short course of oral steroids) when clinically indicated. Second follow up was after a further two months and the patients were asked to fill in their second score sheet at this point.

Patient outcome was assessed using a four point linear symptom score (0 - 3) (Appendix 1). In all cases patients were blind to their first response sheet when completing their second. The parameters assessed were nasal obstruction, nasal congestion, discharge, facial pain and headache. In addition the patients were asked to comment on their overall assessment of surgery and whether they were glad they had undergone it. The examination findings including rigid nasendoscopy were recorded before and after surgery. The results of the linear analogue score sheet were collated and analysed. Statistical analysis was using non-parametric methods.

Results

Of the 50 patients, 27 were males and 23 were females. The mean age was 41 with a range of 25 to 60. The surgical results are shown in Table 1. Median scores for nasal obstruction improved from 2 to 1, nasal congestion from 3 to 1 and facial pain from 2 to 0. Nasal discharge values fell from a mean of 2 to 1 and headache from 2 to 0. All results were found to be significant on two sided Sign test ($P < 0.0001$). No patients developed postoperative nasal adhesions within the middle meatus within the three month follow up period. Overall 97% of patients were happy with the outcome of surgery.

Table 1

Symptom	Pre-operative Median Score (Range)	Post-operative Median Score (Range)
Nasal Obstruction	2 (3 - 1)	1 (2 - 0)
Nasal Congestion	3 (3 - 0)	1 (3 - 0)
Facial Pain	2 (3 - 0)	0 (3 - 0)
Nasal Discharge	2 (3 - 0)	1 (2 - 0)
Headache	2 (3 - 0)	0 (3 - 0)

Discussion

Since the introduction of functional endoscopic sinus surgery the preservation of normal nasal anatomy has been a widely accepted principle. This approach applies in particular to the middle turbinate despite the incomplete understanding of its function. The main concerns regarding its removal are loss of surgical landmarks during initial and at revision surgery, and the potential for atrophic rhinitis, as seen in the past following total inferior turbinate resection (4). Yet preservation of the middle turbinate restricts access to the surgical site both at the time of surgery and later during outpatient debridement. Adequate access is a long standing surgical principle and compromise must be to the detriment of the surgical result. Lateralisation of the preserved middle turbinate can result in adhesions or even stenosis at the middle meatus. Attempts to prevent lateralisation include stabilisation techniques (5) and stents (6).

Partial resection of the middle turbinate can improve the nasal airflow and help mucous drainage particularly when it is large, paradoxical or pneumatized. Resection can also be of benefit when facial pain results from mucosal contact points between the middle turbinate and the lateral nasal wall or the septum (1). Finally despite all attempts to spare it, the middle turbinate may still require removal at the end of the procedure owing to gross instability following manipulation.

These factors dictate that most surgeons will remove part or all

of the middle turbinate on isolated occasions during endoscopic sinus surgery but routine removal is not popular. However Lamear *et al* in 1992 published a retrospective series of 298 patients who underwent resection of half to two thirds of the middle turbinate and concluded that the procedure was safe with minimal effect on nasal physiology. They reported reduced synechiae formation and a 92.5% middle meatal anastomy patency rate. Biedlingmaier *et al* in 1993 performed a retrospective study of 80 patients who underwent partial middle turbinate resection at endoscopic sinus surgery and noted a 94.8% maxillary sinus anastomy patency rate. In terms of symptom relief the overall success rate was reported as 93.5% in respect of chronic headache and infection.

Our prospective study supports these findings with excellent symptom improvement and an absence of serious complications. Our study might be open to criticism for only using subjective measurements without objective criteria and for failing to provide a control group. However, as regards the first criticism there is a growing body of evidence that the correlation between subjective and objective nasal parameters is extremely poor (7). Furthermore in the clinical setting patients are usually managed according to their subjective symptom reporting. A satisfied patient postoperatively is almost certain to be discharged regardless of any objective measure of nasal patency even if one were routinely available. As regards the second criticism this study was not designed as a controlled trial but rather a prospective pilot to gain an impression of likely outcome and problems. However we have been so impressed by the results of this technique that although we plan to undertake a controlled study to examine this modification, we have serious concerns about the ethical position of undertaking such a study and will certainly be looking closely at our early results.

Conclusion

Partial resection of the middle turbinate is a quick and easy procedure. Removal improves surgical access for both experienced and trainee surgeons. Preservation of the middle turbinate stump allows anatomical orientation to be maintained. As the risk of local complications appears to be extremely low and the subjective outcome usually good, we conclude that partial resection of the middle turbinate is a useful modification of accepted FESS techniques.

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