

MIDDLE MEATAL ANTROSTOMY WITHOUT ENDOSCOPE; INTRODUCTION OF A HYBRID TECHNIQUE

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ABSTRACT

Background: Functional endoscopic sinus surgery (FESS) is the standard treatment for inflammatory nasal polypi and sinusitis as it targets the common drainage pathway or the osteomeatal complex in the middle meatus. New techniques tailored according to regional patient needs and available on ground situations are constantly being mentioned in research articles.

Objective: To present our experience in practicing a hybrid technique of performing middle meatal antrostomies without endoscope.

Methods: This is an observational clinical study. This study was performed on 50 patients who underwent middle meatal antrostomies without endoscope from April 2017 till Aril 2019 in the department of ENT at Islam Medical College Pasrur Road Sialkot.

Results: In our study all the 50 patients were found to be having patent middle meatal antrostomies at 6 weeks times after surgery, assessed by flexible fiber optic nasal endoscopy.

Conclusion: middle meatal antrostomy without endoscope is a safe and effective method in treating maxillary sinus disease and should be practiced instead of the traditional inferior meatal antrostomies, at centers where an environment conducive to FESS is not available. Studies with larger sample size will further establish the efficacy, cost effectiveness and time conservation with this technique.

Key words: middle meatal antrostomy, FESS, nasal polyps.

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INTRODUCTION

The first successful attempt to introduce a modified Cystoscope into the human nose for sinonasal examination was made by Hirschman¹ in 1901. Before the later incorporation of its modified Hopkins² rod version in the field of sinonasal surgery and coining of the term FESS for endoscopic sinus surgery by Kennedy³, surgeons and scientists have been struggling and switching their routes of access to the maxillary sinus from the middle meatus, to the inferior meatus and to the sublabial with their own available scientific justifications.

In our country too, before the advent of FESS by pioneer endoscopic surgeons who were trained at centers abroad, the maxillary sinus was traditionally approached by one of the two routes; the inferior meatus in the form of an antrostomy, or a sublabial caldwell luc's approach anteriorly, through the canine fossa.

Both approaches had to violate the surgical principle of 'always attempting to revert back as close as possible towards a normal physiology and anatomy.' As the cilia lining the mucosa inside the antrum are programmed to beat towards its natural ostium, located under the cover of the middle turbinate between the sickle shaped uncinat process and the ball shaped bulla ethmoidalis called the hiatus semilunaris, an inferior meatal antrostomy only provides a gravity dependant drainage to the sinus, and the cilia keep on beating in the direction in which they are programmed to beat, dragging the mucous along, which keeps on recirculating inside the antrum. This allows the disease

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to linger on inside the antrum, with occasional gravity depended drainage through the inferior meatal antrostomy hole, if it doesn't manage to close itself during this time.

Endoscopic sinus surgery needs, in addition to a thorough working knowledge of the sinonasal anatomy and cadaver dissection workshops as well as hands-on closely supervised actual procedures, a very specific surgical environment conducive to the specialized procedure.

This surgical environment includes a dedicated operating table, a dedicated surgical team including an anesthetist willing to keep the patient under hypotensive anesthesia for as long as the surgeon requires, which is around two hours for a detailed bilateral all sinuses included FESS.

It is probably manageable in the large tertiary care hospitals in major cities of the country with dedicated operation rooms for each surgical specialty along with adequate human resource in all departments including anesthesiology, operation theatre technicians and nursing staff to provide this environment conducive to endoscopic sinus surgery, small sized hospitals in smaller cities of the country, with limitations in all areas; with limited operating rooms shared by all surgical specialties, limited human resource in anesthesia, operation theatre and nursing staff, and the load of patients, it is very difficult to dedicate a two hours, highly controlled operating time for a patient that the ENT surgeon has decided to operate by endoscopic sinus surgery on an already overburdened operating list.

Such on-ground limitations in providing a supportive environment at small centers have pushed the authors to practice a hybrid technique of performing middle meatal antrostomies in patients with a variety of sinonasal diseases, this technique is given the name of "**BALGARI'S technique**"

In this technique, the surgeons incorporate a thorough knowledge of sinonasal anatomy particularly of the osteomeatal complex learned from their FESS training during post graduation, and use of specialized forceps used in endoscopic sinus surgery like the straight and 90 degree bent Weil Blakesley forceps, without using the Hopkins rod endoscopes.

METHODS

This observational clinical study was performed on 50 patients who underwent middle meatal antrostomies without endoscope from April 2017 till April 2019 in the department of ENT at Islam Medical College Pasrur Road Sialkot.

Inclusion Criteria

1. Patients with fungal ball or Allergic fungal rhinosinusitis limited to the maxillary sinuses.
2. Patients with antrochoanal polyp.
3. Patients with bilateral ethmoidal polyps.

Exclusion Criteria

1. Patients unfit for General Anesthesia.
2. Patients not giving consent for surgery.
3. Patients with disease involving the frontal sinus.
4. Patients with diagnosed malignant sinus disease.
5. Patients with disease causing telecanthus / proptosis.
6. Patients with CT evidence of disease extension across the lamina papyracea, or extension beyond the nose/paranasal sinuses into other neighboring areas.

Data Collection

1. After approval from the ethical committee, all patients were informed about the nature of study and their consents taken for using the data for research purposes.
2. A CT scan axial and coronal cuts with thin slices, FESS protocol, was done for all patients included in the study.
3. A four week course of systemic oral steroids in tapering dose preoperatively in patients with AFRS and bilateral ethmoidal polyps.
4. Flexible fiberoptic examination of the middle meatal antrostomy hole at 6 weeks of follow up postoperatively, and declare the procedure as successful if the antrostomy was patent and working.

Procedure

After general anesthesia, the nose is packed with xylometazoline soaked gauze in the middle meatus, after injecting a solution of 2% xylocain with 1 in 200,000 units of adrenaline at three sites; one at the anterior face of the middle turbinate and two sites vertically in the plane of the middle turbinate just above, where the inferior turbinate is attached to the lateral wall. This site corresponds to the area of the uncinat process.

After the pack is removed, the inferior turbinate is out fractured and pushed laterally into the inferior meatus. Then the middle turbinate is pushed medially towards the nasal septum. These two maneuvers open up the middle meatus to the surgeon and make the introduction of a medium sized Killian's long bladed nasal speculum into the middle meatus area easily

possible, with its lateral prong pressed firmly at the attachment of the fractured inferior turbinate on the lateral wall.

A weil blakesley forceps with a 90 degree bend is introduced into the wide open middle meatus area with prongs closed and its direction laterally and inferiorly touching the lateral wall firmly, but not causing injury to the mucosa, just above the lateral attachment of the inferior turbinate and moved gently deep posteriorly. Upon reaching the uncinate process along the lateral wall, as the firmly held bent forceps crosses the free border of the uncinate, it dips down into the hiatus semilunaris and further deep into the natural maxillary sinus ostium. At this stage, the surgeon can easily visualize the tip of the bent forceps going into the maxillary sinus ostium. The forcep's working prongs are pushed further deep into the sinus keeping the angle inferolaterally.

The prongs are then opened wide, and keeping a firm force anteriorly, the opened forceps is gradually taken out of the sinus ostium. This act causes out fracturing of the uncinate process along with its attached mucosa with minimal bleeding. The pieces of broken uncinate are then removed.



Fig .1: 90 degree bent Blakesley forceps.

RESULTS

Table 1: Type of procedure

Procedure	Frequency	Percentage
Right MMA	17	34
Left MMA	11	22
Right MMA plus R ethmoidectomy	5	10
Left MMA plus L ethmoidectomy	2	4
Bilateral MMA plus BL ethmoidectomy	7	14
Total	50	100

Upon re-examination of the middle meatus area, the maxillary sinus ostium can be visualized clearly, and further suction clearance of its contents can be done with a 90 degree curved maxillary sinus suction tip.

An antral wash out at this stage with the classical tilley litwitz trocar canula introduced through the inferior meatus will further clear the maxillary sinus of debris or discharge. 56% patients underwent middle meatal antrostomy only, 14% underwent MMA with one sided ethmoidectomy while 14% patients underwent bilateral MMA with bilateral ethmoidectomy.

Table 2: Type of disease

Disease	Frequency	Percentage
Right Antrochoanal polyp	5	10
Left Antrochoanal polyp	4	8
Right fungal disease	18	36
Left fungal disease	8	16
Bilateral fungal disease	13	26
Bilateral ethmoidal polyp	2	4
Total	50	100

Table 3: preoperative steroid administration for four weeks

Preop steroids	Frequency	Percentage
Given for 4 weeks	39	78
Not given	11	22
Total	50	100

Table 4: duration of procedure

Duration	Frequency	Percentage
Less than 20 mins	32	64
20 to 30 mins	18	36
Total	50	100

DISCUSSION

Although the creation of a surgical opening to the maxillary sinus via the middle meatus isn't new and Johann von Mikulicz-Radecki (1850 – 1905) had suggested to reach the antrum through the middle meatus in 1866.⁴

Historically, since then, surgeons and scientists have been struggling and switching their routes of access to the maxillary sinus from the middle meatus, to the inferior meatus and to the sublabial with their own available scientific justifications.^{5,6}

It was Walter Messerklinger's revolutionary work on the cadaveric mucociliary drainage functions of the nose and paranasal sinuses describing the details of

nasal mucous drainage physiology that once and for all, settled the issue in favor of middle meatal antrostomy. As the cilia inside the antrum were proven to have been programmed to always beat towards the natural maxillary ostium located in the middle meatus.⁷ Messerklinger and Stamberger described a step by step intervention of the lateral wall of nose as well on the basis of this discovery.

“After understanding more of pathophysiology, the first surgical attempts were carried out in the lateral nasal wall... Step by step surgical procedures were developed, starting with resection of the medial infundibular wall, the lateral lamella of a concha bullosa and resection of an oversized and stenotizing ethmoidal bulla. Later we dared to approach the frontal recess and, finally, all accessible paranasal sinuses”⁸.

Kennedy et al also incorporated this revolutionary knowledge of sinonasal mucocilliary drainage physiology to describe systematically the steps of endoscopic sinus surgery and coined the term FESS for it.⁹

FESS is a demanding and challenging group of surgical procedures, which need availability of costly equipment and expert skills to operate that equipment. Structured training by expert supervisors is being provided in tertiary care hospitals in major cities of the country to trainees and junior surgeons; however such costly equipment and the “supportive environment” required for such relatively lengthy surgical procedures are a hurdle in performing these procedures at smaller healthcare centers where the trainee surgeons eventually land to begin their careers.

In the literature relatively simpler procedures that consume less time as compared to standard FESS has been described in the form of balloon catheter sinuplasties (BCS), and their affectivity compared to FESS. However the balloon is costly and its availability is a challenge in smaller centers in our country^{10,11}.

In our study we performed middle meatal antrostomies (MMA) without endoscope in a group of 50 selected patients utilizing our FESS training skills with some modifications described as “BALGARI’S technique” in the methods section.

All antrostomy holes were patent at 6 weeks follow up, visualized on fiberoptic flexible endoscopy. Average time duration for unilateral MMA was 15 to 20 minutes in our study.

CONCLUSION

On the basis of this study we present our conclusion that middle meatal antrostomy without endoscope is a safe and effective method in treating maxillary sinus disease

and should be practiced instead of the traditional inferior meatal antrostomies, at centers where an environment conducive to FESS is not available.

Studies with larger sample size will further establish the efficacy, cost effectiveness and time conservation with this technique.

ETHICAL APPROVAL

The study was approved from Ethical Review Committee of Islam Medical & Dental College, Sialkot, Pakistan.

AUTHORS’ CONTRIBUTION:

KW: Principal author editing

MI: Literature research

TM: Proof Reading, data collection

NA: Surgical assistance & follow up data

MI: Data analysis

MAA: Reference search & proof reading

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