

THE ROLE OF ENDOSCOPIC MEDIAL MAXILLECTOMY IN THE TREATMENT OF MAXILLARY SINUS TUMORS: OUTCOME AND BENEFITS

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Received : 15/12/2022
Received in revised form : 10/01/2023
Accepted : 24/01/2023

Keywords:

Maxillary sinus, Inverted papilloma, Endoscopic sinus surgery, Endoscopic medial maxillectomy.

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DOI: 10.47009/jamp.2023.5.1.183

Source of Support: Nil,

Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (1); 884-888



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Abstract

Background: With the aid of superior magnification, lighting, and angled viewing offered by the Hd Hopkins rod endoscope, which is frequently used in nasal and paranasal sinus surgery, the surgeon can precisely characterize the extent of the disease and isolate the tumor's base. In addition, an advanced Endoscopic Sinus Surgery called Endoscopic Medial Maxillectomy (EMM) is useful in treating benign and malignant Sino nasal neoplasms. To evaluate the role of endoscopic medial maxillectomy for benign and malignant maxillary sinus tumours and its benefits over conventional methods. **Materials and Methods:** Twenty-four patients underwent endoscopic medial maxillectomy over two years. Preoperative symptoms, computed tomography findings, operative findings, tumor stage, and outcomes were recorded. **Result:** Twenty-four patients diagnosed with tumours involving the maxillary sinus are included in the study. Among them, thirteen patients are benign, and eleven are malignant. All the patients had involvement in the maxillary sinus, and three had involvement anterior ethmoid sinus. One patient had an extension of the mass to the septum. All the patients were managed by endoscopic medial maxillectomy. In one patient with involvement of the septum and medial maxillectomy, partial septal resection was done. Histopathological examination revealed thirteen patients with inverted papilloma, six with adenoid cystic carcinoma, three with squamous cell carcinoma, two with adenocarcinoma, and two with adenoid cystic carcinoma and squamous cell carcinoma were subjected to post-op radiotherapy. In addition, three patients with adenocarcinoma were subjected to chemoradiation post-operatively. **Conclusion:** EMM is superior to conventional procedures because it doesn't require an external incision, results in less blood loss and morbidity, and requires shorter hospital stays.

INTRODUCTION

The incidence of Sinonasal malignancies is 0.5-1% per year, which accounts for 0.2-0.8% of all malignancies.^[1] Medial maxillectomy is a procedure commonly used to remove benign and low-grade malignant tumors of the medial aspect of the maxilla, the lateral nasal wall, the ethmoid sinuses, and the lacrimal sac.^[2] Indications for endoscopic medial maxillectomy include sinonasal neoplasms, inverted papilloma, and intractable inflammatory maxillary disease.

An open medial maxillectomy causes secondary malformation and increases morbidity.^[3] This technique can result in disfiguring facial scar and may lead to prolonged crusting due to persistent changes in normal sinonasal physiology.^[4] The

endoscopic approach allows superior illumination and magnification and the ability to treat diseases beyond the limits of the traditional external medial maxillectomy.^[5] Additionally, it has demonstrated the potential benefits of a shorter hospital stay and fewer open surgery difficulties. Cure rates are on par with open medial maxillectomy.

MATERIALS AND METHODS

A total of twenty-four patients underwent endoscopic medial maxillectomy over two years. There were eleven males and thirteen females. The most common presenting feature was nasal obstruction and swelling in the nasal cavity. The other co-morbid conditions include diabetes and hypertension in two patients. The most common

clinical finding was mass in the middle meatus. All the patients had extensive clinical examinations followed by diagnostic nasal endoscopy. CT scan of the paranasal was performed in all the cases. MRI of paranasal sinuses was done wherever necessary. All the patients had involvement in the maxillary sinus, and three had involvement anterior ethmoid sinus. One patient had an extension of the mass to the septum. All the patients were managed by endoscopic medial maxillectomy. In one patient with involvement of the septum and medial maxillectomy, partial septal resection was done. Histopathological examination revealed thirteen patients with inverted papilloma, six with adenoid cystic carcinoma, three with squamous cell carcinoma, two with adenocarcinoma, and two with adenoid cystic carcinoma and squamous cell

carcinoma were subjected to post-op radiotherapy.^[6] Three patients with adenocarcinoma were subjected to chemoradiation post-operatively.^[6] All the patients are under follow-up, and one patient with adenoid cystic carcinoma had a recurrence and was subjected to total maxillectomy.

RESULTS

A total of twenty-four patients comprising thirteen benign tumour patients and eleven malignancy patients were selected for the study. The minimum age group for benign tumour cases was eighteen, and the maximum was seventy-five; for malignancy, it was forty and seventy-five.

Table 1: Age distribution of inverted papilloma cases

Age	Inverted Papilloma	%
10-20	1	7
21-30	2	14
31-40	1	7
41-50	3	21
51-60	3	21
61-70	1	7
71-80	2	14

Table 2: Age distribution of malignancy patients

S. No:	Age	Squamous Carcinoma	Cell	Adenoid Carcinoma	Cystic	Adenocarcinoma	Total	%
1	10-20							
2	21-30							
3	31-40			1			1	9
4	41-50			2		1	3	27
5	51-60	1		2		1	4	36
6	61-70	2		1			3	27
7	71-80							
8	Total						11 Cases	

Table 3: Clinical features

CL/F	IN. P	%	SQ C CA	Adenoid Cystic	Adenoma	Total	Percent % (24 patients)
Nasal obstruction	11	84	3	6	2	11	100
Epistaxis	6	46	3	3		6	54
Nasal discharge	3	23	2	2		4	36
Headache	2	15	1	1		2	18
Mass per nose	4	30					
Anosmia	4	30					
Watering of eyes	11	84					
Neck node			1			1	9

Table 4: Subsite involvement

S.NO	Subsite	IN. P	%	SQ C CA	Adenoid cystic	Adenoma	Total	Percent % (24 patients)
1	Nasal cavity	11	84	1			1	9
2	Medial wall	13	100	2	6	2	4	36
	Inferior wall	10	76		3		3	27
	Lateral wall	3	23					
	Posterior wall	4	30					
3	Ethmoid	11	84		2		2	18
4	Frontal sinus	4	30					
5	Total number of patients						11	

In addition to the other clinical features, nine patients presented with anaemia and weight loss. Six patients had maxillary tenderness. One patient had maxillary swelling, and there was neither loosening

nor falling of teeth or palatal anaesthesia in any of the selected cases. The patient with external swelling had infra-orbital anaesthesia.

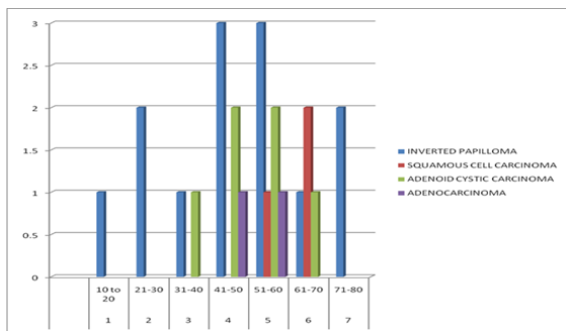


Figure 1: Age distribution of benign and malignant patients

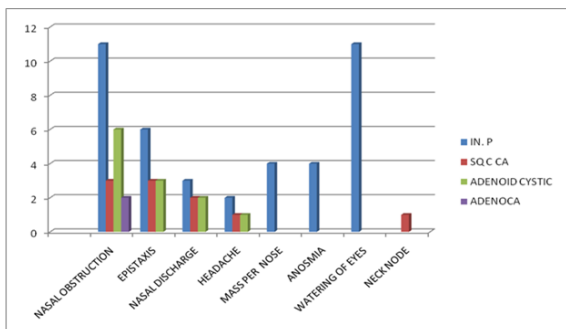


Figure 2: Clinical features

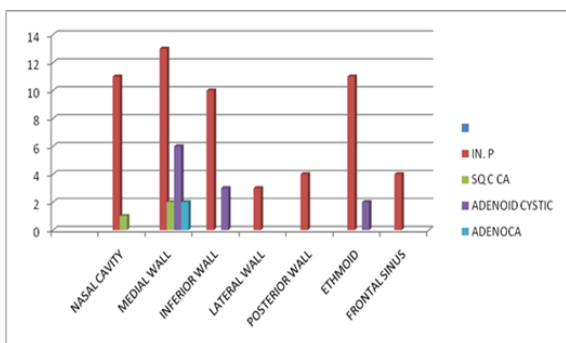


Figure 3: Subsite involvement

All the patients had a medial wall of the maxillary sinus involvement, in addition, 27% of the patient with malignancy had inferior wall involvement, and 18 % of the patients had anterior ethmoid involvement. The subsite involvement was preoperatively assessed with diagnostic nasal endoscopy, which revealed the involvement of ethmoid and other adjacent sinuses. With CT scans and MRI in patients with adenoid cystic carcinoma, the opacification in the maxillary sinus was precisely differentiated into tissue or fluid, also the origin and the extension of the tumour. Also, a CT scan analysis of the neck node involvement was done, and one patient with squamous cell carcinoma had neck node metastasis. This also helped in the radiotherapy planning. None of the cases had retropharyngeal or other nodes.

We did endoscopic medial maxillectomy for all these twenty-four patients. The average time for EMM for inverted papilloma was 2 hours and fifteen minutes, and three hours for malignancy is comparable with the study by Nader Sadeki et al.

The average blood loss was 150 ml for benign and 300 ml for malignant tumours. None of the patients had more than one unit of blood transfusion.^[7-9]

Post-operative hospital stays for all the inverted papilloma patients ranged from 4 to 16 days on an average of 9 days. For malignancy, the period of stay ranged from 10 to 16 days, with an average of 11 days. Malignancy patients were discharged after confirming the negative margins in the histopathological report.

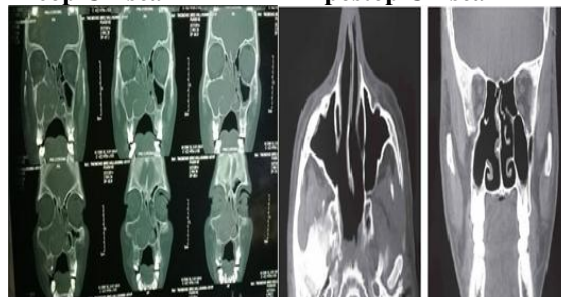
All the patients are followed from the day after surgery, and the follow-up period averaged 9 months (range – 1 month to 15 months) for inverted papilloma and 1 year for malignancy (range of 7 months to 2 years). After one year of follow-up, one of the patients with adenoid cystic carcinoma developed recurrence at the same site.

The recurrence rate of one patient out of eleven malignancy patients is nine %. Though it may appear large, the study group is small to comment on accurately. But with the recent review by Osquthope et al,^[8] the recurrence rate is 9% for benign tumours and 15 % for malignancy. The results are comparable. Recurrence was confirmed, and total maxillectomy and palliative radiotherapy followed. The patient has been under surveillance since then.

Inverted papilloma

Preop CT scan

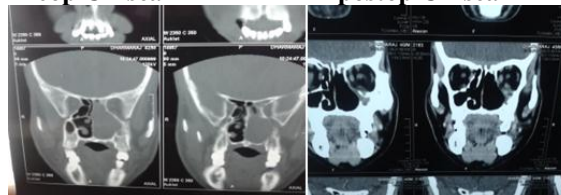
postop CT scan



Adenoid cystic carcinoma

Preop CT scan

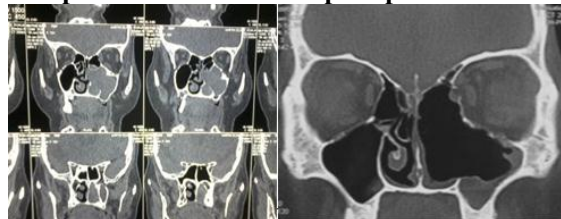
postop CT scan



Squamous cell carcinoma

Preop CT scan

postop CT scan



Adenocarcinoma

Preop CT scan



Postop CT scan



Patients with inverted papilloma had better healing,^[7] with the return of normal mucosa at an average of 3 months' time interval assessed by serial diagnostic endoscopy during follow-up. Patients with malignancy underwent radiotherapy after six weeks of surgery.^[10] They had completed six weeks of RT and came for a follow-up. The return of mucosa normally takes an average of seven months. There was no bleeding or any other complication during radiotherapy or adjuvant chemotherapy. During the follow-up, three patients with malignancy initially complained of epiphora. None of the patients had atrophic rhinitis or other severe complications during follow-up. Two of the patient post radiotherapy had complained of anosmia, which also improved during follow-up. The patients, especially those with malignancy, also had routine nutritional consultations and gained weight during follow-up.

DISCUSSION

There are three principal aims in the excision of the sinonasal tumour. First, to create an adequate exposure for complete excision. Secondly, to provide an unobstructed view of post-operative surveillance of the cavity, and thirdly to minimize cosmetic and functional disabilities. These objectives are completely fulfilled by endoscopic medial maxillectomy. Traditionally, maxillary sinus tumours have been treated with resection via lateral rhinotomy and medial maxillectomy. However, the procedure includes high morbidity in external scarring, blepharitis, diplopia, intermittent dacryocystitis, facial neuralgia and sometimes CSF leak, with a chance of recurrence requiring revision surgeries.

With endoscopic medial maxillectomy, we use powered instruments and a high-definition camera set-up, which gives unparalleled visualization and magnification of margins allowing resection of the tumour completely with adequate margins. Multiple biopsies of the adjacent apparent normal areas were taken and sent for Histopathology. Even unfavourable sites, including inferior lateral and posterior walls, can be visualized using angled endoscopes. Using microdebriders and diamond burrs combined with endoscopes helps remove the

micrometastasis in the underlying bone. In contrast to the external approaches, in endoscopic medial maxillectomy, the normal sinonasal mucosa is preserved, allowing normal physiological function and mucociliary clearance, thus, very little post-operative complication.

All the malignant cases selected were limited to the early stages of malignancy and were done without compromising the oncological principles. The procedure was discussed with the oncologist and submitted to ethical clearance, and with their concurrence, early malignancies have been included in the study. Saki et al,^[9] achieved a 5-year survival rate of 54% with a combination of radiotherapy, intra-arterial infusion of 5-fluorouracil, surgery, immunotherapy and curettage. The frequency of recurrences is higher in squamous cell carcinomas, with positive neck nodes being an important prognostic factor.^[11] Studies have concluded that recurrence rates using endoscopic medial maxillectomy are the same or lower when compared to traditional procedures.

CONCLUSION

Endoscopic medial maxillectomy is the best treatment for benign maxillary tumours of the medial wall, especially the inverted papilloma. In this study, the early stage of the maxillary sinus malignancies has been included with good results. Endoscopic medial maxillectomy is associated with minimum morbidity, follows oncological principles, and preserves the normal physiology of the nose and paranasal sinuses.

The endoscopic technique allows for direct visualization of the surgical site and hence precise localization of the pathological lesion and hence adequate excision, especially for the posterior aspect of the maxillary sinus adjoining ethmoid and frontal sinus with preservation of the normal structure, if possible, with a same average number or even lower recurrence as with external medial maxillectomy. Cosmetically it is an excellent treatment for benign tumours or malignancies. Endoscopic medial maxillectomy offers the best surgical approach regarding tumour clearance and minimal morbidity. The main advantage is avoiding scar and cosmetically better results without compromising the oncologic principles.

The apparent reduction of hospital stay is a major point to be considered in favour of endoscopic medial maxillectomy for both patients and surgeons in the management of tumours of the maxillary sinus. Easy post-operative follow-up with diagnostic endoscopy as an office procedure also assists the surgeon in picking up early recurrence and treating more radically when needed. However, good results depend on appropriate patient selection motivated to comply with regular post-operative follow-ups.

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