



EUSTACHIAN TUBE DYSFUNCTION FOLLOWING ANTERIOR NASAL PACKING

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ABSTRACT

Background: Eustachian tube maintains middle ear pressure equal to that of atmosphere and helps in ventilation of middle ear. Its function may be deranged due to adenoids, cleft palate, nasogastric tubes, allergy and by nasal packing. **Objectives:** To evaluate the effect of anterior nasal packing on Eustachian tube function. **Methods:** A cross-sectional study including 50 patients with deviated nasal septum with or without external nasal deformity and nasal polyposis. Tympanometry was performed prior to surgery, second post-operative day before pack removal and on seventh post-operative day five days after pack removal. **Results:** Out of 50 patients (100 ears) who had anterior nasal packing after nasal surgeries, 40 ears had abnormal middle ear pressure after 48 hours of anterior nasal packing just before the pack removal. Middle ear pressure 5 days after the pack removal was found abnormal in 4 ears. **Conclusion:** This study shows that anterior nasal packing result in Eustachian tube dysfunction and negative middle ear pressure which is reversible in nature.

KEYWORDS

tympanometry, anterior nasal packing, Eustachian tube function, negative middle ear pressure

INTRODUCTION:

The Eustachian tube has two main function: to maintain the middle ear pressure at atmospheric pressure and to allow the normal secretion of the respiratory mucosa to pass on into the nasopharynx.¹ The normal middle ear has an inherent tendency to lose gas by diffusion into the surrounding tissue and circulation. The loss is compensated by Eustachian tube, which admits just enough gas to maintain the middle ear pressure. When this system fails to function properly, a negative gas pressure develops in the middle ear.² Anterior nasal packing after nasal surgery is a frequent cause of short term Eustachian tube dysfunction.³ The lymphatics of middle ear and Eustachian tube course along the postero-inferior aspect of the Eustachian tube, getting afferent from nasal cavity, paranasal sinuses, nasopharynx and adenoids. Efferent from plexus terminate in retropharyngeal lymph nodes. Inflammation and oedema in these areas cause obstruction to flow, resulting in retrograde obstruction of tympanic and tubal lymphatics producing tubal dysfunction and middle ear effusion.⁴ In case of nasal obstruction Eustachian dysfunction occurs secondary to lymphatic stasis in the peritubal plexus of lymphatic channels and vein. Nasal packing causes complete nasal obstruction, which results in oedema of nose, nasopharynx and paranasal sinuses.⁵ Thus nasal packing causes lymphatic stasis in nasopharynx and the opening of Eustachian tube, which ultimately results in middle ear dysfunction. Thomson and Crowther observed short term Eustachian tube dysfunction after anterior nasal packing following septal surgery.⁶ Reversible Eustachian tube dysfunction and negative middle ear pressure after anterior nasal packing was observed by Mohan et al.⁷ As anterior nasal packing is frequently required after nasal surgery, the present study was undertaken to evaluate the effect of anterior nasal packing on middle ear pressure and Eustachian tube function.

METHODS:

It was a Cross-sectional study done at Government Medical College Anantnag Kashmir and 50 Patients were included having deviated nasal septum, nasal deformity or polyposis undergoing nasal surgery followed by anterior nasal packing for 48 hours within the age range of 10 to 50 years. The study was done in accordance with the principles of Helsinki Declaration 1975.

Data collection method:

Data has been collected by personal interview with data sheet, clinical examination of Ear, Nose and Throat and impedance audiometry.

All patients were subjected to tympanometry prior to surgery and result recorded. Interacoustics impedance audiometer AT22t was used for tympanometric study and display on Interacoustic control panel. The middle ear pressure below -100 daPa was considered abnormal.

Middle ear pressure were measured 48 hours after application of anterior nasal packing just before removal of pack that is in 2nd post-operative day. The case were again tested 5 days after pack removal (7th post-operative day), to ascertain about reversibility of the phenomenon.

Anterior nasal packing consists of a one quarter inch gauze impregnated with 1% Framycetin skin cream. Bilateral anterior nasal packing was done in all patients for 48 hours.

RESULTS:

Table-1 Age distribution (n=50)

Age group	Number of Patients	Percentage
10-19	15	30
20-29	25	50
30-39	6	12
40-50	4	8

Table-2 Sex of the patients (n=50)

Sex	Number of patients	Percentage
Male	35	70
Female	15	30

Table-3 Symptoms of the patients (n=50).

Symptoms	Number of patients	Percentage
Nasal obstruction	50	100
Headache	16	32
Nasal discharge	13	26
Disorder of olfaction	14	28
Epistaxis	10	20

Table-4 Diagnosis of the patients (n=50).

Diagnosis	Number of patients	Percentage
DNS	14	28
DNS with HIT	18	36
Ethmoidal polyp	8	16
Antrochoanal polyp	7	14
DNS with nasal deformity	3	6

DNS= Deviated Nasal Septum

HIT= Hypertrophy of Inferior Turbinate

Table-5 Surgical treatment (n=50).

Operation	Number	percentage
Septoplasty	14	28
Septoplasty with SMD	18	36

FESS	15	30
Septorhinoplasty	3	6

FESS= Functional Endoscopic Sinus Surgery
SMD= Submucosal diathermy

Table-6 Number of ears showing pre-pack middle ear pressure (n=100)

Middle ear pressure(daPa)	Number of ears	Percentage
-300 to -250	0	0
-250 to -200	0	0
-200 to -150	2	2
-150 to -100	6	6
-100 to -50	3	3
-50 to 0	52	52
0 to +50	30	30
+50 to +100	7	7
+100 to +150	0	0

Table-7 Middle ear pressure after 48 hours of anterior nasal packing: (n=100)

Middle ear pressure(daPa)	Number of ears	Percentage
-300 to -250	8	8
-250 to -200	7	7
-200 to -150	15	15
-150 to -100	10	10
-100 to -50	9	9
-50 to 0	40	40
0 to +50	7	7
+50 to +100	4	4
+100 to +150	0	0

Table-8 Middle ear pressure 5 days after pack removal (n=100)

Middle ear pressure (daPa)	Number of ears	Percentage
-300 to -250	0	0
-250 to -200	0	0
-200 to -150	1	1
-150 to -100	3	3
-100 to -50	4	4
-50 to 0	50	50
0 to +50	34	34
+50 to +100	6	6
+100 to +150	2	2

DISCUSSION:

The patients of this series were of different age group. The minimum age was 15 years and maximum was 47 years and 50 percent of the patient were in third decade (Table-1). Majority of the patients were male (Table-2) and the commonest symptom was nasal obstruction (Table-3).

Among 50 patients, 14 patients diagnosed as deviated nasal septum, 18 patients deviated nasal septum with hypertrophied inferior turbinate, 8 patients ethmoidal polyps, 7 patients antrochoanal polyps & 3 patients as deviated nasal septum with nasal deformity (Table-4). In this study 14 patients underwent septoplasty, 18 patients had septoplasty with SMD, 15 patients had FESS & septorhinoplasty in 3 patients (Table-5).

Middle ear pressure -100 daPa has been considered to be normal middle ear pressure. The prepack middle ear pressure range between -50 daPa to 0 daPa were maximum (52%) (Table-6). The mean prepack middle ear was -8 daPa. Out of 100 ears only 8 ears showed abnormal middle ear pressure that means below -100 daPa. The middle ear pressure ranges between -150 daPa to -100 daPa in 6 ears in patients having unilateral nasal obstruction more than 1 year.

After 48 hours of anterior nasal packing (2nd post-operative day) just before pack removal abnormal middle ear pressure was seen in 40 ears (40%) (Table-7). Middle ear pressure 5 days after pack removal (7th post-operative day) was found abnormal in 4 ears (Table-8). This result is consistent with the findings of Bonding & Tos and Thomson & Crowther^{6,8}. Bonding & Tos examined 15 patients with anterior nasal

packing and found that seven (46%) developed significant negative middle ear pressure which resolved on removal of packs. Thomson & Crowther showed 126 ears of 63 patients, 55 of 126 ears tested (46%) developed a reduction of middle ear pressure of at least < -100 daPa. Finding of present study is similar to the result of Mohan, Saxena & Chauhan⁷. They found 40 ears out of 80 had below -100 daPa middle ear pressure 48 hours after anterior nasal packing which was reversible in nature. Chronic nasal obstruction appears to have detrimental effect on middle ear ventilation⁹.

CONCLUSION:

Anterior nasal packing causes reversible Eustachian tube dysfunction and negative middle ear pressure which return to normal 5 days after pack removal. It appears from this study that there might be some permanent change in peritubal nasopharyngeal mucosa due to chronic nasal obstruction. Lymphatic stasis around peritubal plexus of lymphatic channels and veins appears to be the cause of lymphatic oedema following nasal packing.

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