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Original Research Article

A comparative study on quadrupedal and non-quadrupedal head position on recovery from chronic maxillary sinusitis in a tertiary hospital of Rohtas district, Bihar, India

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ABSTRACT

Background: Chronic rhino-sinusitis (CRS) is diagnosed in cases when symptoms are present for more than 12 weeks. Rhino-sinusitis manifests itself with a sudden onset of two or more symptoms, one of which is either nasal blockage or nasal discharge (anterior or posterior nasal drip). Position of maxillary ostia is high on their supero-medial walls, which may be suboptimal for natural drainage. Human maxillary sinuses exhibit better passive drainage through their ostia when tilted anteriorly to mimic a quadrupedal head position. Objective of this study is to evaluate the result and advantage of both quadrupedal and non-quadrupedal head position on recovery on CRS.
Methods: This study consists of 100 patients which consists of group 1 (quadrupedal) and group 2 (non-quadrupedal head position), of CMS in whom assess the result based on the overall Quality of Life and CT scan findings after 6 weeks treatment with medical treatment.
Results: The significant difference between the two groups was the group 1, had more males as compared with group 2.The scoring form used for CT scans reflected the Lund-Mackay staging system. Each maxillary sinus was scored separately and total scores were determined for right and left sides. No statistically significant differences in the scores were noted between the 2 groups at baseline and there were significant differences after 6 weeks of treatment.
Conclusions: CRS significantly impacts patients quality of life. From an analysis of quality of life and CT score, this study confirmed that quadrupedal head position significantly improved recovery from CMS. This study thus indicated that quadrupedal head position can be valuable adjuvant therapy for patients with CMS.

Keywords: Chronic rhino– sino sinusitis, Quality of life, Quadrupedal, CT scan

INTRODUCTION

Chronic rhino-sinusitis (CRS) is diagnosed in cases when symptoms are present for more than 12 weeks.[1] Rhino-sinusitis manifests itself with a sudden onset of two or more symptoms, one of which is either nasal blockage or nasal discharge.[2] It also has many other associated symptoms like facial pain or pressure, headache, impairment or loss of smell and cough with resultant sleep disturbance.[3]

The etiology of CRS is multifactorial and any pathological factors that damages the sinus mucosa leads to inflammation, edema, bacterial proliferation, outflow obstruction and muco-ciliary dysfunction. Allergic conditions, specifically rhinitis, are certain factor for cause of CRS as well as viral and bacterial infections.[4]

Chronic maxillary sinusitis (CMS) is the high incidence of CRS. The reason is that the position of maxillary Ostia is high on their supero-medial walls, which may be

suboptimal for natural drainage.[5] Human maxillary sinuses exhibit better passive drainage through their ostia when tilted anteriorly to mimic a quadrupedal head position.[6] The objective of this study was to compare the result and advantage of both quadrupedal and non-quadrupedal head position on recovery on CRS.

METHODS

Place of study

The study was carried out in ENT (Otorhinolaryngology) Department of Narayan Medical College and Hospital, Jamuhar, Sasaram Bihar.

Duration of study

Study was conducted over a period of 1 year from February 2017 to February 2018.

Study subjects

The subjects included patients coming in ENT OPD. Study subjects were obtained according to the following criteria:

Inclusion criteria

Inclusion criteria were healthy person age 18-40 years; history of CMS; all non-pregnant females; patient who consented for follow-up after 6 weeks.

Exclusion criteria

Exclusion criteria were age <18 and >40 years; history of acute (less than 3 week) and sub-acute (more than 3 week to upto12 week) maxillary sinusitis; all pregnant females; patients not ready for follow up.

Sample size

100 cases were studied and divided into two groups each group consisting of 50 cases.

Study design

The Study was prospective, randomized, double–blinded study that included 100 patients. All patients were randomized into 2 treatment groups, quadrupedal head position group (Group1) and non-quadrupedal head position group (Group2) for 6 weeks of treatment. Each group contain approximately 50 patients. Both were treated with amoxicillin+clavulinic acid, fluticasone and xylometazoline nasal spray, fexofenadine+montelukast tablets. The group 1was taken quadrupedal head position for 20 minutes in every morning and afternoon respectively as shown in Figure 1. Positive screening was based on a positive clinical history as well as positive CT scan findings. Treatment outcomes were measured using

a) Lund – Mackay scoring system[7] (The scoring form were used for CT scan findings,each maxillary sinus was scored separately and total scores were determined for the right and the left sides:

- 0 represents no opacification in the sinus.
- 1 represents partial opacification irrespective of number of millimeters or degree of mucosal thickening reported by the radiologist.
- 2 represents complete opacification without any aeration.

osteo-meatal complex (OMC) on each side was scored as well of pre and post-treatment CT scan findings; and

b) Sinonasal quality-of-life (QoL) survey was completed at baseline and 6 weeks of therapy.

Figure 1: Quadrupedal head position.

Statistical analysis

T-tests were used for QoL. For the top nine domains, 0 equals the score for answer of “none of the time” and 10 equals the score for answer of “all of the time”. For overall quality of life, 0 represent the score for “worse possible quality of life” and 10 represent the “best possible quality of life ”.The higher the score the worse the symptoms.

RESULTS

The present study was based on observation of 100 patients distributed in two groups, 50 in each group. Table 1 shows that in group1, mean age was 27.53 (±6.19) years and in group 2 mean age group 25.98 (±5.78) years. (Table 1) Group 1 had more males as compared with group 2. Quality of life at baseline in group1 was 4.29±2.4 and 8.47±3.2 after 6 week of therapy, and in group2 was 4.12±1.9 and 6.78±2.89 after 6 week of therapy. It means in group 1 quality of life was

better than group 2 quality of life And also overall p value at baseline was 0.254 and after 6 weeks of therapy p value was 0.06 (Table 2). Total CT scan scoring for right and left maxillary sinuses was 2.13±0.34 and 2.02±0.13 at baseline and after 6 weeks of therapy was 1.01±0.28 and 0.98±0.33 for group 1 (Table 3).

Table 1: Baseline characteristics.

	Group 1 (n= 50)	Group 2 (n=50)	Total
Age(years)	27.53±6.19	25.98±5.78	
Gender			
Male	41 (65.1%)	22 (34.9%)	63
Female	9 (24.3%)	28 (75.7%)	37

Table 2: Summary statistics for quality of life at baseline and 6 weeks.

Domains	Baseline			6 weeks		
	Group 1	Group 2	P value	Group 1	Group2	P value
Nasal obstruction	6.23±2.3	6.59±3.1	0.251	1.12±1.0	2.58±1.25	0.012
Nasal discharge	7.56±3.3	7.89±2.9	0.364	2.11±1.2	3.25±2.18	0.002
Post-nasal drip	5.27±3.2	5.34±2.7	0.147	2.43±1.9	3.21±2.01	0.004
Cough(dry)	4.08±1.1	4.22±1.6	0.653	2.33±1.1	2.99±1.42	0.021
Decreased olfaction	4.78±2.4	4.69±2.6	0.151	1.89±1.0	2.25±1.83	0.032
Earache/fullness	2.67±0.9	2.74±1.0	0.352	.58±0.32	0.93±0.21	0.011
Facial pain	3.11±1.0	3.23±0.9	0.159	0.99±0.1	1.34±0.23	0.039
Headache	4.03±2.0	4.11±1.9	0.357	0.83±0.2	1.28±0.34	0.018
Fatigue	5.26±2.4	5.49±2.6	0.156	2.41±1.2	3.01±1.41	0.004
Overall QoL	4.29±2.4	4.12±1.9	0.254	8.47±3.2	6.78±2.89	0.006

Table 3: CT scoring (Lund-Mackay) at baseline and 6 weeks.

Sinus	Baseline			6 weeks		
	Group1	Group 2	P value	Group1	Group2	P value
Left maxillary	1.24±0.49	1.32±0.54	0.368	0.51±0.24	0.71 ±0.31	0.027
Right maxillary	1.31±0.38	1.41±0.26	0.296	0.59±0.32	0.80 ±0.42	0.039
Left OMC	0.92±0.23	0.86±0.14	0.695	0.38±0.12	0.61±0.22	0.021
Right OMC	0.88±0.18	0.94±0.21	0.521	0.41±0.19	0.68±0.14	0.018
Total score left	2.02±0.31	2.11±0.29	0.231	0.98±0.33	1.21±0.26	0.031
Total score right	2.13±0.34	2.07±0.13	0.173	1.01±0.28	1.33±0.45	0.016

Score 0= no opacification, 1= partial opacification, 2= complete opacification, OMC= ostiomeatal complex.

Table 4: Patients required FESS in 2 groups after 6 weeks treatment.

	Group 1	Group 2	P value
Required FESS	1	9	0.008

X^2 test was used. FESS= Functional endoscopic sinus surgery.

The scoring form used for CT scans reflected the Lund-Mackay staging system. Each maxillary sinus was scored separately and total scores were determined for right and left sides. The significant differences in the scores were noted between the two groups at baseline and there were significant differences after 6 weeks of treatment. In group 1, after therapy lesser number of patients need functional endoscopic sinus surgery in comparison to group 2 (Table 4). From an analysis of quality of life and CT score, this study confirmed that quadrupedal head position significantly improved recovery from CMS.

DISCUSSION

In our study overall quality of life at baseline in group1 was 4.29±2.4 and 8.47±3.2 after 6 week of therapy, and in group2 was 4.12±1.9 and 6.78±2.89 after 6 week of therapy. It means in group 1 quality of life was better than group 2 quality of life. And also overall P value at baseline was 0.254 and after 6 weeks of therapy P value was 0.06. Total CT scan scoring for right and left maxillary sinuses was 2.13±0.34 and 2.02±0.13 at baseline and after 6 weeks of therapy was 1.01+ 0.28 and

0.98±0.33 for group 1. While total CT scan scoring for right and left maxillary sinuses was 2.07±0.13 and 2.11±0.29 at baseline and after 6 weeks of therapy 1.33±0.45 and 1.21±0.26 for group 2. It means less the CT scan score,more better result in group 1 in comparison to group 2. So in group 1, after therapy lesser number of patients need Functional Endoscopic Sinus surgery in comparison to group 2.

Xiong et al studies showed that there were statistically significant differences in sinonasal quality of life (QoL) and computer tomography (CT) scores between quadrupedal head position group and non-quadrupedal head position group.[6] This study also showed that there were less patients that required ESS in quadrupedal head position group than non-quadrupedal Head position group.

The value of CT scanning may be enhanced when taken together with clinical examination for the purposes of staging of rhino -sinusitis**.** The staging of the extent of rhino sinusitis must rely heavily upon the assessment of the CT scan but contribution from symptom scores, can be added**.** CT scanning is the optimal imaging technique for diagnostic, prognostic and staging of diseases of para-nasal sinuses.[7]

Ford et al had done cadaveric studies on human and goat maxillary sinus and comparing drainage in upright and quadrupedal position.[8] The result showed that drainage was significantly better in. the quadrupedal head position than upright in both species ($p<0.01$). Those patient who were used nasal decongestant drop, poorly distributed to the majority of nasal mucosa andthis is particularly true in the blocked nose where the best distribution is obtained from a pipette.[9]

The head downward position would appear to be the most effective way of decongesting the ostia of the sinuses the head down and backwards position has been advocated by Mygind, but radiological studies clinical evidence supports the head down and forward position is most effective.[9]

CONCLUSION

CRS significantly impacts patients quality of life. From an analysis of quality of life and CT score, this study confirmed that quadrupedal head position significantly improved recovery from CMS. This study thus indicated that quadrupedal head position can be valuable adjuvant therapy for patients with CMS.

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