THE CONCLUSIONS

* The surgical correction of either nasal or oropharyngeal OSA significantly reduces both the systolic and diastolic blood pressure.

* The surgical correction of either nasal or oropharyngeal OSA significantly improves the left ventricular systolic and diastolic functions, left atrial dimension and pulmonary artery systolic pressure.However the right ventricle diameter is reduced in both groups of OSA but the reduction is significant in oropharyngeal group only.

* The number of patients with sinus tachycardia, sinus bradycardia, ventricular extrasystole, supraventricular tachycardia, complete heart block and/or ischemic ECG changes is significantly reduced by the surgical correction of OSA regardless of the etiology whether nasal or oropharyngeal.

* The arterial blood oxygen saturation and carbon dioxide pressure are significantly improved by the surgical correction in nasal and oropharyngeal OSA patients.

* The surgical correction of OSA patients with nasal or oropharyngeal causes shows significant improvement in respiratory function test (FVC, FEV_1 and FEF). However, the FEV% shows significant improvement only in patients with oropharyngeal disorders.

* The symptoms of OSA as snoring, excessive daytime sleepiness, apnea, as well as headache and apnea/hypopnea index assisted by polysomnography are significantly improved in both nasal and oropharyngeal OSA patients by the surgical correction.

* Recommendation

The surgical correction in patients with nasal or oropharyngeal causes of OSA is advised since it improves significantly the cardiopulmonary functions to the normal levels.

THE SUMMARY

Obstructive sleep apnea syndrome is a multisystem disorder and characterized by cessation of normal Oronasal airflow for 10 seconds or longer and repetitive closure of the upper airway during sleep resulting in sleep fragmentation and daytime hypersomnolence. OSA is associated with a range of cardiovascular sequelae as systemic and pulmonary hypertension, cardiac arrhythmias, angina pectoris, myocardial infarction, and decreased arterial blood oxygen saturation.

Seventy (70) patients were selected from patients with OSAS and had history of cardiac manifestations, from ENT clinic of Benha university hospital and Shebien Al kom teaching- hospital during period from March 2001 to October 2004.

Patients were classified into two groups according to the site of obstruction.

*First group (**Nasal group**) : Thirty patients all had nasal obstruction secondary to a deviated septum, nasal polyps, hypertrophy of turbinates, and nasal valve obstruction. No patient had narrowing of the lateral dimension of the oropharynx to 2 cm or less, as measured between the midpoints of each anterior tonsil pillar.

The type of operation done in the first nasal group as follow:

Submucous resection with partial inferior turbinectomy in 6 patients (20%). Septoplasty with partial inferior turbinectomy in 12 patients (40%).Nasal polypectomy with middle meatal antrostomy by endoscope in 8 patients (26.7%). Nasal polypectomy with septoplasty and adenoidectomy in 4 patients (13.3%).

*Second group (**Oropharyngeal group**): Forty patients with oropharyngeal obstruction (A long soft palate, narrow inlet to the nasopharynx, hypertrophic tonsils and redundant lateral pharyngeal mucosa.

In the second Oropharyngeal group, half patients (20 patients 50%) had done radioablation of the redundant soft palate and uvula with tonsillectomy if marked enlargement ,however with mild to moderate enlargement of tonsils, Coblation-Channeling Technique was done**(subgroup- a- Coblation)** and another half (20 patients 50%) had traditional Uvulopalatopharyngoplasty **(subgroup- b-UPPP).**

*A control group: Other 10-nonapneic patients free of cardiopulmonary problems and with the same age and body mass index of our study.

The results of our study in nasal group of OSA, most of the thirty patients had a good subjective improvement in snoring, apnea, excessive daytime sleepiness, headache and personality changes as irritability and nervousness.
In addition, as regard of objective assessment of nasal OSA group determined by sleep study, good improvement occurred in seven patients from 20 patients (35**%).**

The results of our study in Oropharyngeal group of OSA, most of the forty patients had a very good improvement as regard of snoring, apnea, excessive daytime sleepiness, headache and personality changes as irritability and nervousness.

Also as regard of objective assessment of patients with OSA **(Oropharyngeal group)**, the results of objective assessment (Polysomnography) of oropharyngeal group of OSA **(subgroup a-Coblation)** 11 patients from 20 patients improved (55%) after Coblation of the palate and tonsils but in **(subgroup b-UPPP**) were 13 patients from 20 patients improved (65%) after Uvulopalatopharyngoplasty

The surgical correction of OSA was an excellent procedure for improvement of arterial blood gases.

In our study, as regard of assessment of arterial blood gases, first the O_2 saturation, **in nasal group,** the mean value before surgery was **90.2%** preoperative and there was a highly significant improvement in O_2 saturation that became **96.05%** after surgery. Also in **Oropharyngeal group,** before UPPP, O_2 saturation was **86.75%** and Post-operative there was a highly significant improvement in Sa O_2 that became **95.69 %.**

In addition, the carbon dioxide tension (pa Co_2) showed a highly significant improvement after surgery in both groups of OSA.

The surgical correction of OSA is an excellent procedure for the reversal of the cardiovascular lesions associated with OSA.

As regard to blood pressure, comparing of the mean value of the diastolic blood pressure during sleep pre operatively in nasal group was 86.5 mm Hg with the mean value of the diastolic blood pressure postoperatively became (82.1mmhg). Also in oropharyngeal group the mean pre operative diastolic blood pressure in cases of **(subgroup a – Coblation)** was 86.8 mm Hg with the mean value of the diastolic blood pressure postoperatively became (82.23 mmHg).

In addition, in cases of **(subgroup b-UPPP**), the mean value of the diastolic blood pressure pre UPPP was 92.8 mm Hg and post UPPP became 85 mm Hg. It showed a highly significant improvement in the diastolic blood pressure post-operatively in both nasal and oropharyngeal groups of OSA.

Also in systolic blood pressure, there was a highly significant improvement in the systolic blood pressure postoperatively as the mean systolic blood pressure pre-operatively in nasal group was (137 mm Hg) and post operatively became 125.6 mm Hg. Also in oropharyngeal group, in cases of **(subgroup a – Coblation**) the mean systolic blood pressure pre-operatively was 139.16 mm Hg and postoperatively became (128.56 mmHg).Also in cases of **(subgroup b-UPPP**) the mean systolic blood pressure pre-operatively was 138 mm Hg and post UPPP became 130.6 mm Hg.

In our study, in nasal group of OSA, we recorded the following important objective postoperative evaluation of the effectiveness of surgical correction of OSA with cardiac problems, which revealed that sinus bradycardia which was present in **9** patients prior to the surgery was completely abolished in 5 patients (**55.5% improvement**) post-surgery. Also **5** patients with sinus tachycardia, **4** patients completely improved after surgery **(80% improvement), 5** patients with ventricular extrasystole, 4 patients improved after surgery (**80%), 2** patients with supraventricular tachycardia, completely improved after surgery (**100%), 2** patients of heart block, one patient improved and another patient not improved **(50%)** , **6** patients depressed ST segment (Ischemia), **2** patients improved (**33.3%),** also **one** patient had peaked T wave (Ischemia) improved after surgery.

In oropharyngeal group: -

There was improvement in arrhythmia after **Coblation (subgroup –a)** showed a very highly significant response (p-value<0.001) as regard of sinus tachycardia, all patients (100%) improved, ventricular extrasystole, all 3 patients improved (100%), sinus bradycardia, 4 patients improved from 7 patients (57 %) , one patient had heart block with good improvement (100%) , Ischemia, 2 patients improved from 6 patients (33.4%). Also there was improvement in arrhythmia after **UPPP (subgroup –b)** showed a very highly significant response (p-value <0.001) , as regard of sinus tachycardia, all patients improved (100%), ventricular extrasystole, all patients improved (100%) ,sinus bradycardia, 6 patients (85.7%)improved from 7 patients, one patient had heart block

with good improvement (100%), Ischemia, 3 patients improved from 6 patients (50%), P-value<0.001.

We study the effects of OSA on cardiopulmonary function using: Doppler Echocardiography for assisting systolic and diastolic function of the left ventricle of the heart and pulmonary artery pressure.

In this study, we found a good improvement of both the systolic and diastolic ventricular function of the left ventricle but more significant in diastolic function in both groups of oropharyngeal group of OSA than nasal group , (The parameters of Echo were LVESD – LVEDD, EF%, FS%, RV and E/A Ratio) .

The Pulmonary artery pressure **(PAP)**: The Pulmonary artery pressure (PAP) in patients with OSA higher than control subjects with highly significantly importance (P –value <0.001**)**. In nasal group, there was pulmonary artery hypertension **(PAH)** in a about 70% compared with 68 % **(PAH)** in oropharyngeal group **(subgroup -a- Coblation)** and 73% **(PAH)** in oropharyngeal group **(Subgroup-b-UPPP)**. However, after surgical correction of OSA- there was significantly decease of pulmonary artery pressure in all groups of OSA (nasal, oropharyngeal group) P -value <0.001. Therefore, there was a significant correlation between the severity of OSAS and the presence of systolic and diastolic function of the heart.

Also pulmonary function of the patients of OSA assisted by spirometry that became better after surgery

In nasal and oropharyngeal groups of OSA, spirometry parameters (FVC, FEV1, FEF25, FEF50, and FEF75) were improved after surgical correction of OSA.

Therefore, the surgical correction of OSA is an excellent procedure for the reversal of the cardiovascular lesions associated with OSA.