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Absorbable Versus non Absorbable Suspintion Suture in Patient with Obstructive Sleep Apnea

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Abstract

Absorbable versus non absorbable suspintion suture in patient with obstructive sleep apnea up to the best of our knowledge, there is no evidence knowledge comparing absosbable suture and non absorbable suspintion suture.in patient with obstructive sleep apnea compare between absorbable versus non absorbable suspintion suture in patient with obstructive sleep apnea. A prospective randomized clinical study carried out in benha university hospital from november 2018 to august 2019. Included 36patients who underwent sleep surgeries; anteriore platoplasty .hyoid expantion patients were allocated into tow groups; a, b,). The groups(a) absorbable suspintion sutura compared non absorabable suspintion suturae in patient with osa, regardling the apne hypopnea index(ah) snoring score epworth scaling scale(epss) pain score and satistifacion of the patient.mean pain score was significantly lower in-group a and higher in-group b snoring score give more significant increase ingroup a more than group b .and lowest oxygen saturation incrase significant after absorbable suture groupa more than non absorbable suture groupb,in this study, postoperative pain scores significantly decreased after 1 week postoperative when compared with that reported in the 1st day and pain was controlled by oral analgesic only in first days. Regarding the epss values, they showed significant improvement after absorbable sutures and after non-absorbable sutures .both absorbable and non-absorbable suspension sutures are safe, fast, have low cost, easily applicable and effective procedures for treatment of osa.both absorbable and non absorbable sutures resulted in significant improvement of objective and subjective parameters in patients with osa.

Keywords: Absorbable versus non absorbable suspintion suture.

1. Introduction

Sleep disordered breathing (SDB) is associated with high risk complications e.g. major health problems, social and economic problems, thus its treatment is mandatory. Surgical therapy aims primarily at improving disease severity, decreasing mortality and cardiovascular risk**,** beside improvement in quality of life, reaction time and motor vehicle accident risk Obstructive sleep apnea (OSA) is characterized by repetitive collapse or narrowing of the upper airway during sleep resulting in sleep fragmentation, hypoxemia, hypercapnia, with increased sympathetic nervous system activation leading to excessive daytime sleepiness and cognitive impairment [1].

Expansion and stabilization of the collapsible pharyngeal tissues via tissue preservation, non-ablative techniques. The ideal procedure for the palatal component of OSA should be effective, without major complications, of anatomical base, non-destructive and should provide long term results [2]. OSA is a common and potentially life-threatening condition that significantly impairs good health and quality of life, but it is often unrecognized by primary care providers (PCPs). Mild OSA is estimated to affect one in five US adults, with one in 15 experiencing a moderate to severe form of the disorder [3].

2. Aim of the study

The aim of this study is to assess the results of absorbable versus non absorbable suspension sutures in treatment of palatal component of obstructive sleep apnea and snoring in adult patients.

3. Patients and methods

The present study is a prospective controlled study. It was conducted on the period extending from December 2018 to March 2020 after obtaining informed patients consent in otorhinolaryngology Head and Neck surgery department, Zagazig University Hospitals. The study was approved by Zagazig University Institutional Review Board (IRB).

3.1 Patients

The study included adult patients who had snoring and OSA symptoms with AHI> 5. All included subjects had retropalatal obstruction. The exclusion criteria included the presence of upper airway obstruction other than retropalatal obstruction, AHI ≤5, evidence of multilevel airway obstruction (other than retropalatal) and patients dropped from follow-up.

Patients were divided into two matched groups; group A; for whom, absorbable suspension suture was performed for and group B; for whom, non absorbable suspension sutures were used.

3.2 Methods

lowest oxygen saturation, snoring severity scale (SSS) which is a questionnaire completed by patients and their bed partners, (initially developed by Lim and Curry 1999 and modified and Degree of collapse by awake nasoendoscopy during Muller, The Muller Maneuver was performed with the patient in the sitting position. A flexible nasopharyngoscope was inserted through the nasal cavity to the lower oropharynx. Collapse of LPW and the base of tongue (BOT) were assessed during a maximal inspiratory effort against a closed mouth and sealed nose (reverse Valsalva) [4] The degree of collapse at each level was determined as follows: total collapse grade 4, a collapse < 75% grade 3, a collapse < 50% grade 2, a collapse < 25% as grade 1, no collapse grade 0[5].

ADISE was performed as a matter of routine on each patient in supine position in the surgical room just before the operation. Monitored by electrocardiography and pulse oximetry, sleep was induced by slow intravenous titration of small boluses of midazolam starting with 0.03 mg midazolam per kg body weight. After every 5–10 min, 1 mg midazolam was added until the patient fell asleep deeply enough to snore and to show obstructions. The final dose was set individually by a maximum dose of 0.2 mg per kg body weight. After nasal decongestion without topical anesthesia, the endoscope was inserted transnasally and positioned on different levels of the upper airway observing and documenting[1]location including soft palate and tonsils, tongue base, epiglottis), [2]mechanism(anterior–posterior, concentric[6].

PSG was performed for all patients preoperatively and postoperatively(3 months after surgery).

Standard techniques of monitoring were used including EEG, electroculographic derivations, electromyographic derivations, nasal pressure transducer, chest and abdominal effort monitors, body position monitor, leg EMG derivations, and ECG channels, as well as dedicated pulse oximetry. The patients' main complaints such as snoring, disturbed sleep, observed apnea, sleepiness and pain were evaluated by the patients themselves using visual analog scales (VAS)[7].

Postoperative

Patients received systemic oral antibiotics, pain medication if necessary.

Follow up visits

We scheduled evaluation of the patients in form of pain score (Ps) .apnea hyponea index(AHI).epworth scaling scale(Epss) snoring score..and patient satstifaction

Also bleeding during operative and post operative with how it is controlled (No bleeding, bleeding controlled spontaneously, bleeding controlled by ephedrine pack or bleeding controlled by anterior Vaseline pack).

In addition, hematoma, postoperative infection, adhesions and evaluated.

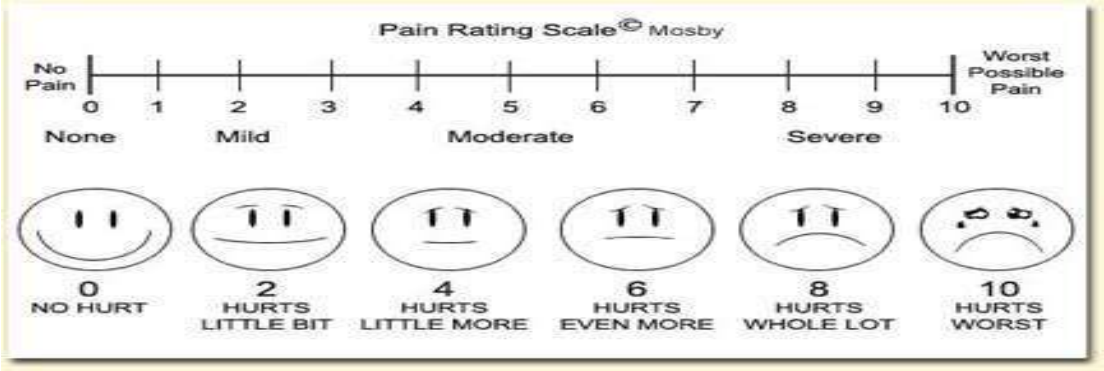

Fig. (1) Visual linear analog scale (VAS) (0-10 Numeric pain distress scale) (Zirak et al., 2014) [5].

Data management and statistical analysis done by using SPSS version 20.

Descriptive statistics calculated in the form of mean & standard deviation (±SD) for quantitative data and frequency & distribution for qualitative data.

In the statistical comparison between the different groups, the significance of difference tested by using ANOVA test (P value) to compare mean of more than two groups of quantitative data or fisher exact test (FET) for inter-group comparison of categorical data.

4. Results

One hundred and fifty patients were included in this study with a mean follow-up period of 3 months (Range: 2-6 months).

Results of the present study are shown in the following tables: There was 20 patients are introduced to the study, divided into two Groups; 10 patients 6 males (60%) and 4 females (40%), were included in non absorbable suspension suture, their age ranged from 25-58 years (mean; 43.06±6.8), their BMI ranged from 24-38 (mean; 34.2±4) and their N.C. ranged from 37-42 (mean; 38.6±1). The second group, 16 patients 12 males (75%) and 5 females (25%), were included in double suspension sutures, their age ranged from 36-61 years (mean; 44.3±8), their BMI ranged from 30-40 (mean; 36.6±2) and their N.C. ranged from38-44 (mean; 39.3±1.8) Table (2).

Table(1) Demographic characteristics of the studied patients.

		Total	Non Absorbable	Absorbable	P value
Age	Range	38 -65	38 - 65	50 - 52	0.8518
	Mean+ SD	48.3+7.48	47.63+ 8.31	51+ 1.4	(t = 0.1895)
Gender	Female	7 (35%)	4 (40%)	3(30%)	0.639
	Male	13 (65 %)	6 (60 %)	7 (70%)	(X= 0.22)

Table (2) Demographic characteristics of the studied patients (Pain Score).

(Mean + SD) (Pain Score)	1st day postoperative	After 1 week
Absorbable	3.5+0.7	3.25 + 1.75
Non Absorbable	0.7+ 1.67	1.5 +0.7
P value	<0.0001 (t = 4.8898)	0.0088 (t = 2.9361

Table (3) Demographic characteristics of the studied patients (BMI).

(Mean + SD) (BMI)	Preoperative (BMI)	T test	P valve
Non Absorbable	38.4 + 6.79	t = 0.4969	0.6253
Non Absorbable	39.68 + 4.5		

Table (4) Demographic characteristics of the studied patients (AHI).

Apnea (AHI) (Mean + SD)	Pre-operative	6 month Post-operative	T test	P value
Total	58.5+ 12.51	33.57 + 14.27	5.875	<0.0001
Non Absorbable	48.57+ 16.99	32.05+ 11.8	2.5255	0.0212
Absorbable	49.85+ 19.45	34.2 + 13.2	2.1054	0.0496

Table (5) Demographic characteristics of the studied patients (Lowest O_2 saturation)

Mean + SD	Preoperative (Lowest O2 saturation)	6 month Post-operative	T test	P value
Absorbable	80 + 7.07	90 + 4.24	3.8359	0.0012
Non Absorbable	73.5 + 8.96	86.5 + 6.04	3.8044	0.0013
P value	0.0885 (t = 1.8009)	0.151 (t= 1.4998)		

Table (6) Comparison between pre and postoperative oropharyngeal measurements after absorbable & non Absorbable sutures in the studied patients.

Mean + SD	Preoperative	
	Absorbable	Non Absorbable
Inter pillar space	1.45 + 0.35	1.55 + 0.4
Retro pharyngeal space	1.25 + 0.07	0.99 + 0.43

Table (7) Comparison between pre and postoperative oropharyngeal measurements after absorbable & non Absorbable sutures in the studied patients.

Mean + SD	postoperative	
	Absorbable	Non Absorbable
Inter pillar space	2.65 + 0.2	2.75 + 0.32
Retro pharyngeal space	2.3 + 0.28	2.13 +0.5

Table (8) Comparison between pre and postoperative improvement in snoring scores.

Mean + SD	preoperative	6 months postoperative	T test	P value
Absorbable	6.96 + 1.47	3.9 + 1.2	5.0994	<0.0001
Non Absorbable	7.03 + 0.99	2.1 + 1.4	9.0921	<0.0001
P value	0.902 (t= 0.1249)	0.0064 (t= 3.087)		

Non-significant

		No	%
Gender	Males	76	50.7
	Females	74	49.3
Age	Mean	26.73	
	±SD	±7.62	
	Rang	18-50	

5. Discussion

OSA is very frequent and is increasingly recognized as a major health problem . OSA may result in cardiovascular disease, performance deficits, and quality of life deficits from loss of alertness [8].

Degree of collapse by awake nasoendoscopy during Muller, The Muller Maneuver was performed with the patient in the sitting position. A flexible nasopharyngoscope was inserted through the nasal cavity to the lower oropharynx. Collapse of LPW and the base of tongue (BOT) were assessed during a maximal inspiratory effort against a closed mouth and sealed nose (reverse Valsalva) [4] The degree of collapse at each level was determined as follows: total collapse grade 4, a collapse < 75% grade 3, a collapse < 50% grade 2, a collapse < 25% as grade 1, no collapse grade 0[5].

A DISE was performed as a matter of routine on each patient in supine position in the surgical room just before the operation. Monitored by electrocardiography and pulse oximetry, sleep was induced by slow intravenous titration of small boluses of midazolam starting with 0.03 mg midazolam per kg body weight. After every 5–10 min, 1 mg midazolam was added until the patient fell asleep deeply enough to snore and to show obstructions. The final dose was set individually by a maximum dose of 0.2 mg per kg body weight. After nasal decongestion without topical anesthesia, the endoscope was inserted transnasally and positioned on different levels of the upper airway observing and documenting[1]location including soft palate and tonsils, tongue base, epiglottis), [2] mechanism(anterior–posterior, concentric[6].

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The recent evolution focused on the concept of obtaining expansion and stabilization of the collapsible pharyngeal tissues via tissue preservation, non-ablative techniques (Askar and El-Anwar, 2018)[7]. At 2016, El-ahl and El-Anwar introduced the suspension sutures to perform expansion pharyngoplasty by advancing the palate to the ptergoid humulus antero-laterally by pulling and plicating the palatopharyngeus and palatoglossus muscles, leading to elevation and anterior displacement, and to resume tension of the intact uvula and free edge of the palate gaining a very good success rate.

On 2018, Askar and El-Anwar [7], perform the similar expansion pharyngoplasty and add another suture to advance the pataltoglossus fold laterally to the ptergomandibular raphe with similar results and better reduction of snoring. The second sutures strengthen the effect of primary sutures. Additionally, this second suture pulls the palate in a second dimension (axis) by a non-ablative procedure with minimal velopharyngeal insufficiency risk. This widens the retropalatal space and decreases airway resistance. [7]

Both techniques were achieved by simple suspension sutures without pharyngeal tissue removal, or dissection. The utilized procedures are fast, low cost, and easily applicable, and do not require implants. Furthermore, it produces excellent results, negligible pain, and rapid recovery without significant complication

In both studies; the absorbable sutures were used. Even when the Barbed sutures was used by its longer absorbsion course, it is still absorbable suture. Thus, the permanent effect of the surgery is an important issue and question; still not answered.

Therefore, the current study was designed to assess the results of absorbable versus non absorbable suspension sutures in a trial to meet the above goals via a comparative study in treatment of OSA in adult patients.

To achieve this target, the study included 32 patients with OSA due to a retropalatal obstruction (Fujita1). Patients was divided into two matched groups, in which absorbable suspension suture was done for the first group and non absorbable suspension sutures for the second group.

In the present study, comparison between preoperative and postoperative snoring scores in the studied patients had showed significant improvement after absorbable sutures and after non absorbable sutures ($p< 0.0001$). non absorbable suspension sutures gave significantly more improvement of snoring scores than absorbable suture (p).

Regarding the PSG results, significant improvement in AHI was reported after absorbable sutures and after non absorbable sutures, also the lowest oxygen saturation increased significantly after absorbable sutures & after non absorbable sutures post-operatively without significant differences between both groups.

In this study, postoperative pain scores significantly decreased after 1 week postoperative when compared with that reported in the 1st day and pain was controlled by oral analgesic only in first days.

Regarding the EpSS values, they showed significant improvement after absorbable sutures and after non-absorbable sutures

The second group, 16 patients who undergone non absorbable suspension sutures, the SSS, ESS values, AHI values and oxygen saturation had showed more improvement without consuming long time minutes or cost, using the same technique without tissue removal, or dissection and easy applicable so, OSA patients who suffer mainly from snoring and daytime sleepiness.

In the present study, we hadn't had to dissect any muscle in surgery, we passed submucosally to target end without tissue destruction.

In the present study, the expansion and stabilization of the collapsible pharyngeal tissues was done by anchoring them to a fixed identified bone (pterygoid hamulus) without depending on fleshy soft tissue or muscle that might tear, cut off, or weakened and re-prolapse with time, increasing possibility of recurrence.

In the present study, we used round needle with prolin - 2/0 that would apply to group of non absorbable suture and round needle with vicryl 2/0 to group of absorbable suture of palate regardless its thickness so SS could be done in thin palate unlike applied to Barbed sutures technique that performed within thick palate only, beside Barbed unavailability and high cost. [9]

In the present study, velopharyngeal insufficiency was not recorded as a possible complication, none of patients needed admission to intensive care unit, one patient had felt with foreign body sensation in throat, otherwise no other complications was reported**.** [10]

5. Conclusions and Recommendations

Both absorbable and non absorbable suspension sutures are safe, fast, have low cost, easily applicable and effective procedures for treatment of OSA.

Both absorbable and non absorbable sutures resulted in significant improvement of objective and subjective parameters in patients with OSA

non absorbable suspension sutures improve significantly snoring & ESS scores, more than absorbable sutures, so the technique could improve partner impression, satisfaction, as well as patient quality of life.

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