

## Quilting Sutures Technique without Intra Nasal Packing In Septoplasty Surgery

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**Abstract- Background:** Septoplasty is a common surgical procedure performed by otolaryngologists for the correction of deviated nasal septum. This surgery may be associated with numerous complications. To minimize these complications, otolaryngologists frequently pack both nasal cavities with different types of nasal packing. Despite all its advantages, nasal packing is also associated with some disadvantages. To avoid these issues, many surgeons use quilting suturing technique to obviate the need for packing after surgery. **Objective:** To determine the efficacy and safety of quilting suture technique in preventing complications and decreasing morbidity after septoplasty in comparison with nasal packing. **Patients and methods:** Prospective comparative study. This study was conducted in the department of Otolaryngology - Head and Neck Surgery, El Hussein University Hospital in Cairo and Damietta University Hospital, Al-Azhar university, From the 1st of March 2017 to the 30th of November 2017. A total of 50 patients aged 16-50 years, undergoing septoplasty, were included in the study. Before surgery, patients were randomly divided into two equal groups. Group (A) with quilting suture technique was compared with group (B) in which nasal packing with Merocel was done. Postoperative morbidity in terms of pain, bleeding, postnasal drip, sleep disturbance, dysphagia, headache and epiphora along with postoperative complications including septal hematoma, septal perforation, crustation and synechiae formation were assessed over a follow up period of four weeks. **Results:** Out of 50 patients, 30 patients were males (60%) and 20 patients were females (40%). Patients with nasal packing had significantly more postoperative pain ( $P<0.05$ ) and a significantly higher incidence of postnasal drip, sleep disturbance, dysphagia, headache and epiphora on the night of surgery ( $P<0.05$ ). There was no significant difference between the two groups with respect to nasal bleeding, septal hematoma, septal perforation, crustation and synechiae formation. **Conclusion:** Septoplasty can be safely performed using quilting suturing technique without nasal packing.

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**Key words:** Septoplasty, nasal packing, quilting suturing technique.

### I. Introduction:

The nasal septum is the central support structure of the nose. When significantly deformed, it may cause dysfunction and cosmetic deformity. It has many functions in the nasal cavity (**Fettman et al., 2009**). A deviated nasal septum requiring septoplasty to improve the nasal airway may result from traumatic injury, iatrogenic injury or congenital deformity. In many cases, patients have no obvious cause for their septal deviation (**Ketcham and Han, 2010**). Surgery on the nasal septum was first introduced in the middle of the nineteenth century. Excision of the whole nasal septum was first performed in 1904, Killian's method of partial septal resection was introduced and this was the most common method even in the nineteen-sixties. About that time, the modern ways of operating on the nasal septum were introduced, by Cottle (1960) and by Masing (1970) (**Nicklasson and Sundén, 1982**). Septoplasty is a commonly performed surgical procedure to relieve nasal obstruction, often in

conjunction with other nasal and sinus procedures, such as cosmetic rhinoplasty and endoscopic sinus surgery (**Stewart et al., 2004**). Surgery on a deviated nasal septum has seen several modifications since its inception, starting from radical septal resection to mucosal preservation and subsequent preservation of the possible septal framework (**Maran, 1974**). The emphasis has been on conservation of the septal framework rather than resection, as the former gives rise to lesser complications and allows concomitant rhinoplasty or a revision surgery later. Moreover, conservative surgery can be safely performed in children, without fear of possible poor development of the midface (**Nayak et al., 1998**). Conventional septoplasty is a conservative surgery in which only the deviated part is removed leaving behind as much cartilage and bone as possible (**Maran and Lund, 1990**). Conventional septoplasty has increased morbidity due to poor visualization, relative inaccessibility, poor illumination, difficulty in

evaluation of the exact pathology, need for nasal packing, unnecessary manipulation, resection and overexposure of the septal framework reducing the scope for a revision surgery (**Chouhan et al., 2011**). Endoscopic septoplasty is an attractive alternative to traditional “headlight” approaches to septoplasty (**Hwang et al., 1999**). The application of endoscopic techniques to the correction of septal deformities was initially described in 1991 by **Lanza et al.** Also in 1993, Lanza et al., described a detailed endoscopic approach for treatment of isolated septal spurs. The nasal endoscope allows precise preoperative identification of the septal pathology and associated lateral nasal wall abnormalities and helps in better planning of endoscopic-aided septal surgery (**Jain et al., 2011**). Until 3 or 4 decades ago, septoplasty was usually performed with a submucous resection (SMR) of the nasal septum (**Berrylin, 2008**). Scar formation and subsequent contraction of the fibrous tissues in the resected part of the septal cartilage were a frequent cause of saddling and retraction of the columella. Septal perforations were a common complication, in part due to drying of the opposing mucoperichondrium adjacent to the incision. Another drawback of this technique was that correction of pathology in the dorsal, caudal, inferior and posterior parts of the septum was not possible (**Adriaan, 2008**). These criticisms lead to the emergence of the septoplasty operation (**Low and Willat, 1992**). The use of postoperative packing has been proposed to minimize postoperative complications such as haemorrhage, mucosal adhesions, and septal haematoma. Additionally, postoperative packing is believed to stabilize the remaining cartilaginous septum and minimize the persistence or recurrence of septal deviation. Numerous packing materials are available including ribbon gauze, fingerstall packs, polyvinyl acetate sponge (Merocel), cellulose sponges, and carboxymethyl-cellulose (**Weber et al., 2000**). Merocel is the most commonly used commercial nasal pack available throughout the world (**Hesham and Ghali, 2011**). Despite these theoretical advantages, evidence to support the use of postoperative packing is lacking. Moreover, nasal packing is not an innocuous procedure. The most common morbidity associated with packing is postoperative pain (**Samad et al., 1992**). Other complications attributed to post-septoplasty nasal packing are headache, sinusitis, and even bleeding (**Naghibzadeh et al., 2011**). Systemic complications induced by nasal packing include decreased sleep quality, respiratory problems and decreased oxygen saturation (**Walikar et al., 2011**). Toxic shock syndrome is the most serious complication which is also attributed to it. Besides, removal of nasal pack is often uncomfortable and painful for the patients and is often associated with

bleeding (**Iqbal and Nabil, 2003**). To overcome these issues, many surgeons use suturing techniques to obviate the need for packing after surgery (**Sessions et al., 1984**). Several suturing techniques have been described to approximate the mucosal flaps after septal procedures to reduce the complication rate (**Lee et al., 1988**). In 1984, Sessions et al reported continuous quilting suture using 4.0 plain catgut on a small cutting needle to approximate the mucosal flaps. A similar technique using a curved needle was described by Lee et al. These techniques also help to close mucosal tears and support the remaining cartilage (**Hari et al., 2008**).

## 2. Patients and Methods:

### Study design:

This is a prospective comparative study conducted on 50 adult patients, 30 males and 20 females, In the department of Otorhinolaryngology - Head and Neck Surgery, El Hussein University Hospital in Cairo and Damietta University Hospital, Al-Azhar university, From the 1st of March 2017 to the 30th of November 2017.

### Inclusion criteria:

Patients are ranged between the age groups of 16–50 years, symptomatic deviated nasal septum is the only cause for nasal obstruction, CT scan evidence of deviated nasal septum, Nasal endoscopic examination showing deviated nasal septum.

### Exclusion criteria:

Patients younger than 16 years and older than 50 years old, Patients suffering from medical problems (e.g. Diabetes, Heart problems, Hypertension, Immunodeficiency, Tuberculosis and bleeding disorders), Patients with history of nasal polyposis and drug abuse, Patients with a history of previous septal and nasal turbinate surgery.

**Informed consent** was obtained from all the patients who were enrolled in the study prior to their enrollment. In the outpatient department, history was taken and a routine clinical assessment by anterior rhinoscopy and endoscopy was done. Patients were investigated by: Haemoglobin, blood group and Rh, bleeding time, clotting time and blood sugar. Patients above 35 years were assessed for: Blood urea, serum creatinine, chest x-ray and ECG. Patients were randomly divided into two groups before undergoing septoplasty, each group included 25 patients: Group A (16 males, 9 females): Endoscopic guided quilting suturing technique was done without nasal packing. Group B (14 males, 11 females): Nasal packing (Merocel) only. All septoplasties were performed under general anesthesia with endotracheal intubation. Patients were placed supine on a head ring in the reverse Trendelenberg position with head flexion from 15-30 degree. Endoscopic septoplasty was performed

in all patients. In group A, a trans-septal (quilting) sutures technique was used to closely appose the mucoperichondrial flaps following septoplasty. No nasal packing or splints were used in this group. Quilting sutures were applied with 4/0 dyed Vicryl on a 30 mm curved atraumatic needle. A needle holder, slightly angled at the shaft, was used for accurate visualization during placement of sutures. The needle was initially passed through the upper posterior part of the septum, through the ipsilateral septal flap and septal cartilage (if present) to emerge from the septal flap on the opposite side. This manoeuvre was then repeated in the opposite direction, so that the needle now emerges in the ipsilateral nasal cavity. This step was continued several times over the entire extent of septal flaps in the area of the septal cavity so as to fully approximate them, thereby resembling a sutured quilt. A surgical knot was placed finally between the two suture ends, thus fully copating the flaps. Care was taken to keep a distance of at least 1 cm between the entry and exit points of septal sutures to avoid the risk of an iatrogenic septal perforation. A small area of the septal cavity towards the floor and the adjacent Freer incision was not included in sutures so as to create a drainage part to prevent any recollection of blood. In group B, a Merocel pack (PMSSteripack, EUROCELL NAZAL TAMPON) impregnated with an antibiotic eye ointment (Tetracycline) was inserted into each of the nasal cavities following septoplasty and let to expand and swollen by instillation of normal saline. It was removed on the morning of the 1<sup>st</sup> postoperative day. All patients were monitored in the recovery room for about half an hour, then transferred to the ward where advised for elevation of the head of the patient about 30 degree. Patients of both groups stayed in the ward for one night and discharged from the hospital in the morning of the 1<sup>st</sup> postoperative day. For the nasal packing group, packs were removed on the 1<sup>st</sup> postoperative day and discharged. Antibiotics were prescribed for both groups; analgesics were prescribed for the patients after their discharge from the hospital 24 hours after surgery. All the patients were advised to use sea water spray. Postoperatively, the subjective symptoms were evaluated, including postoperative nasal pain, nasal bleeding, postnasal drip, sleep disturbance, food intake and dysphagia, headache and epiphora. Each of these evaluations, except for epiphora, was performed using a visual analogue scale (VAS; a scale between 0 and 100; 0 nil, 100 very sever). Patients were interviewed regarding their symptoms on the 1<sup>st</sup> and 2<sup>nd</sup> postoperative days. One week postoperatively, patients were assessed for septal hematoma, nasal bleeding and nasal discharge. Complications such as crustations, synechiae and septal perforation were evaluated 4 weeks postoperatively.

### 3. Results:

The mean age of the sample is 24.64 years, ranging from 16-50 years. The mean age of quilting sutures group (A) is 22.52 and for packing group (B) is 26.76.

Out of 50 patients, 30 patients were males (60%) and 20 patients were females (40%) as show in table (1) The male to female ratio was estimated to be 1.5:1.

**Table (1): Distribution of cases according to their sex.**

Sex	Male		Female		Total	
	No	%	No	%	No	%
	30	60	20	40	50	100

There is a statistically non- significant association between different age groups and type of operation as show in table (2). Chi square test was used for analysis of data and P – value was 0.06.

**Table (2): Different age group in relation to type of operation.**

Age group	Quilting group	Packing group
10-20 years	16	9
20-30 years	7	7
30-40 years	1	8
40-50 years	1	1
<b>Total</b>	<b>25</b>	<b>25</b>

**Chi square test (3) = 7.404. The P-Value is =0.06. The result is not significant at p > 0.05**

There is also a statistically non- significant association between types of Mladina classification and the type of operation as show in table (3).

**Table (3): Types of Mladina classification in relation to the type of operation:**

Mladina Type	Quilting group	Packing group	Percentage
Type 2	6	10	16 (32%)
Type 3	8	8	16 (32%)
Type 4	1	2	3 (6%)
Type 5	8	3	11(22%)
Type 6	1	1	2 (4%)
Type 7	1	1	2 (4%)
<b>Total</b>	<b>25</b>	<b>25</b>	<b>50 (100%)</b>

**Chi square test (5) = 3.606. P-Value is =0.60. The result is not significant at p > 0.05**

**(1) Postoperative nasal pain:** The findings from table (5,6,7) indicate that the level of postoperative nasal pain in both days was higher among packing group compared to suturing group. Chi square test and T – Test was done and there was strongly significant difference between the two groups in both 1<sup>st</sup> and 2<sup>nd</sup> postoperative days.

**Table (4): Some post operativesymptoms and their significance.**

Post operative symptoms	Group		Chi square (df)	P value
	(A) Quilting suturing group. N=25	(B)Packing group. N=25		
Nasal bleeding	3 (12%)	0	3.191(1)	0.074
Postnasal drip1st POD	7 (28%)	18 (72%)	9.680	0.0018*
Sleep disturbance1st POD	3 (12%)	18 (72%)	18.473(1)	0.000017*
Food intake and dysphagia1st POD	5 (20%)	25 (100%)	33.33(1)	0.000001*
Headache1st POD	4 (16%)	24 (96%)	32.468(1)	0.00001*
Epiphora	0	23 (92%)	42.593(1)	0.00001*
Septal hematoma	1 (4%)	0	1.02(1)	0.312
Nasal crustation	2 (8%)	5 (20%)	1.495(1)	0.221
Nasal synechia	1 (4%)	2 (8%)	0.355(1)	0.551

(\* ) This is a mark which stands for significant values in our study.

Table (5): Visual analog pain scale in the first post operative day.

Pain scale	Pain scale description	Suturing Group	Packing Group
Mild	10-30	20 (80%)	0
Moderate	40-60	5 (20%)	16 (64%)
Severe	70-100	0	9 (36%)

Chi square test (2) = 34.762. The P-Value is < 0.00001.\* The result is significant at p < 0.05.

Table (6): Visual analog pain scale in the secondpost operative day.

Pain scale	Pain scale description	Suturing Group	Packing Group
Mild	10-30	21 (84%)	8 (32%)
Moderate	40-60	4 (16%)	11 (44%)
Severe	70-100	0	6 (24%)

Chi square test (2) = 15.094. The P-Value is =0.00052.\* The result is significant at p < 0.05

Table (7): Postoperative nasal pain:

Type of operation		1 <sup>st</sup> POD	2 <sup>nd</sup> POD
Suturing	Mean	25.6	20.4
	SD	13.253	10.98
Packing	Mean	59.2	48.8
	SD	18.91	19.21
p – value		0.00001*	0.00052*
T – test		Significant	Significant

(2) Postoperative nasal bleeding: The results of table (8) show that there was no difference regarding postoperative nasal bleeding among suturing or packing groups after the operation. However, patients in packing group experienced mild bleeding at the time of removal of nasal packs.

Table (8): Postoperative nasal bleeding:

Type of operation	Nasal bleeding		Total
	No	Yes	
Suturing	22	3	25
Packing	25	0	25
Total	47	3	50

Chi square test (1) = 3.191. The P-Value is =0.074. The result is not significant at p > 0.05

(3) Postoperative postnasal drip of discharge:

The results from table (9) reveal that postoperative postnasal drip in both days was higher among packing group compared to suturing group. Chi square test and T – Test was done and there was strongly significant difference between the two groups. P–value was 0.0018.

Table (9): Postoperative postnasal drip of discharge:

Type of operation		1 <sup>st</sup> POD	2 <sup>nd</sup> POD
Suturing	Mean	18.57	12.85
	SD	6.9	4.87
Packing	Mean	33.33	19.44
	SD	13.71	9.98
p – value		0.0018*	0.0018*
T – test		Significant	Significant

(4) Postoperative sleep disturbance:

Table (10): Postoperative sleep disturbance:

Type of operation		1 <sup>st</sup> POD	2 <sup>nd</sup> POD
Suturing	Mean	30.00	45.00
	SD	10.00	12.00
Packing	Mean	20.00	30.00
	SD	10.00	15.80
p – value		0.000017*	0.44
T – test		Significant	Non-Significant

As shown in table (10) there was a significant variation in postoperative sleep disturbance regarding both groups on the 1<sup>st</sup> day; those with packing experienced much sleep disturbance in comparison to suturing group patients. P – value was 0.000017. This difference disappeared on the 2<sup>nd</sup> post operative day and P – value was 0.44.

(5) Postoperative food intake and dysphagia:

The findings in table (11) indicate that the level of post operative dysphagia in the 1<sup>st</sup> day was higher among packing group compared to suturing group. There was a significant difference between them and P

– value was <0.00001. In contrary, there was no difference among suturing or packing groups on the 2<sup>nd</sup> day after operation. P – value was 0.507.

**Table (11): Postoperative food intake and dysphagia:**

Type of operation		1 <sup>st</sup> POD	2 <sup>nd</sup> POD
Suturing	Mean	52.00	46.00
	SD	19.23	15.16
Packing	Mean	49.20	45.70
	SD	18.00	17.18
p – value		0.000001*	0.507
T – test		Significant	Non-Significant

**(6) Postoperative headache:** There was a significant variation in postoperative headache regarding both groups on the 1<sup>st</sup> day; those with packing experienced much headache in comparison to patients in suturing group, as shown in table (12) P – value was <0.00001. This difference disappeared on the 2<sup>nd</sup> day and P value was 0.47.

**Table (12): Postoperative headache:**

Type of operation		1 <sup>st</sup> POD	2 <sup>nd</sup> POD
Suturing	Mean	21.00	13.75
	SD	6.29	4.78
Packing	Mean	40.83	25.00
	SD	15.01	10.48
p – value		0.00001*	0.47
T – test		Significant	Non-Significant

**(7) Postoperative epiphora:**

**Table (13): Association of epiphora with type of operation:**

Type of operation	Epiphora		Total
	No	Yes	
Suturing	25	0	25
Packing	2	23	25
Total	27	23	50

Chi square test (1) = 42.593. P-Value is < 0.00001.\* The result is significant at p < 0.05

There was a statistically significant association between Epiphora and type of operation, as shown in table (13). All patients in suturing group (100%) did not develop epiphora while in contrast Majority of packing group developed it (92%). Analysis done by chi square test and P – value was <0.00001.

**Evaluation at 1<sup>st</sup> postoperative week:**

**Nasal discharge:** There was no statistical significant difference between the two groups regarding nasal discharge on the 1<sup>st</sup> week after operation. Patients from both groups reported mild

nasal discharge. P – value was 0.55, as shown in table (14).

**Table (14): Postoperative nasal discharge:**

Type of operation	No	Mean	SD
Suturing	15	12.00	4.14
Packing	17	14.11	6.18

Chi square test (1) = 0.347. P-Value is =0.55. The result is not significant at p > 0.05.

**Nasal bleeding:** Nasal bleeding was not reported from any patient in both groups one week postoperatively.

**Septal hematoma:** Only one patient from suturing group developed septal hematoma which required incision and drainage under general anesthesia, as shown in table (15).

**Table (15): Postoperative septal hematoma:**

Type of operation	Septal hematoma		Total
	No	Yes	
Suturing	24	1	25
Packing	25	0	25
Total	49	1	50

Chi square test (1) = 1.02. P-Value is =0.312. The result is not significant at p > 0.05

**Evaluation at 4<sup>th</sup> postoperative week:** No significant difference between the two groups was seen with respect to complications including nasal crustation, synechia formation and septal perforation.

**Septal perforation:** Septal perforation was not reported in any case postoperatively.

**Crust formation:**

**Table (16): Postoperative Nasal crustations:**

Type of operation		Nasal crustations		Total
		No	Yes	
Suturing	Count	23	2	25
	%	92%	8%	100.00%
Packing	Count	20	5	25
	%	80%	20%	100.00%
Total	Count	43	7	50
	%	86%	14%	100.00%

Chi square test (1) = 1.495. P-Value is =0.22. The result is not significant at p > 0.05

Crust formation was seen in two cases (8%) in suturing group and in 5 cases (20%) in packing group, P value was **0.221**, as shown in table (16).

**Nasal synechia:** The majority of patients did not develop nasalsynechia after four weeks of surgery. Only one patient (4%) in suturing group and 2 patients (8%) in packing group developed unilateral adhesions and P – value was 0.551 which was not significant, as shown in table (17).

**Table (17): Postoperative Nasalsynechia:**

Type of operation		Nasal synechia		Total
		No	Yes	
Suturing	Count	24	1	25
	%	96%	4%	100.00%
Packing	Count	23	2	25
	%	92%	8%	100.00%
Total	Count	47	3	50
	%	94%	6%	100.00%

Chi square test (1) = 0.355. P-Value is =0.55.  
The result is not significant at  $p > 0.05$

#### 4. Discussion:

##### A. Post operative pain:

The level of postoperative nasal pain in both days was higher among packing group compared to suturing group. Packs were removed on the 1<sup>st</sup> postoperative day but the pain score was still higher in the packing group on the 2<sup>nd</sup> postoperative day compared to the suturing group. This is because of the pressure applied by the Merocel pack on the nasal walls, resulting in more pain sensation. Pain in nose on the visual Analog scale in group A patients 80% of patients were having mild pain and remaining 20% moderate pain, while group B patients is from nagging uncomfortable to worst pain ie moderate pain in 64% to severe in 36%. This is in accordance with the results of **Walikar, (2011)** a comparative study of septoplasty with or without nasal packing, where (79.3%) of patients with nasal packing experienced postoperative pain compared to only (25.7%) of patients without nasal packing. A study done by **Awan et al., (2008)** on nasal packing after septoplasty a randomized comparison of packing versus no packing in 88 patients showed that the most common pain scores were 10 in the packing group and one in the non-packing group. In a retrospective analysis of 697 septoplasty surgery cases: packing versus trans-septal suturing method which was done by **Cukurova et al., (2012)** the reported pain levels were 2.3 for suturing and 4.8 for packing on a scale of 1 to 10, indicating that the suturing group felt less pain than the packing group (P value < 0.05). **Naghibzadeh et al., (2011)** conducted a study on 145 patients in which was "Does post septoplasty nasal packing reduce complications?" in which all patients in packing group (n=77) mentioned sever pain feeling while only 2 out of (68) patients without nasal packing felt such pain.

##### B. Postoperative nasal bleeding:

In our study there was no bleeding in packing group before pack removal but immediately after pack removal there was some post nasal dripping in all the patients which stopped on its own without any intervention in few minutes. In the quilting suturing group there was some bleeding in two patients ie post

nasal dripping, on 1<sup>st</sup> post operative day, which stopped on its own. But in one patient there was constant dripping so nasal packing was done post operatively. Reason could not be found as there was constant oozing from the incision line and the places where the suturing was done on the septum. **Ansari et al., (2013)** mentioned in their study "Trans-septal suturing technique without intra-nasal packing in nasal septal surgery" that postoperative bleeding was noticed in 11.43% (n=8) in packing group, and 7.14% (n=5) in suturing group and the difference was not significant. **Naghibzadeh et al., (2011)** reported only 3 cases that developed postoperative bleeding (2 from non-packing group and 1 from packing group) that needed nasal packing which was removed the day after. In **Cukurova et al., (2012)** study, 4 patients (1.1%) in suturing group and 6 patients (1.8%) in packing group suffered post-septoplasty bleeding but the difference was not statistically significant.

##### C. Postoperative postnasal drip of discharge:

Postoperative postnasal drip in both days was higher among packing group compared to suturing group and the difference was strongly significant between the two groups. This is most probably due to the presence of the pack which acts as a foreign body, so the reaction of the nasal mucosa will be by increased secretions which in turn results in increased postnasal drip. This result is similar to that of **MoJH et al., (2008)** who conducted a study about no packing versus packing after endoscopic sinus surgery and found that postnasal drip on the 1<sup>st</sup> postoperative day was lower in the non-packing group.

##### D. Postoperative sleep disturbance:

Patients in packing group experienced more sleep disturbance in the 1<sup>st</sup> POD compared to suturing group patients. This difference disappeared on the 2<sup>nd</sup> day, mostly due to removal of the pack as a cause of mechanical obstruction to the airway in the 1<sup>st</sup> postoperative day and also due to higher pain levels appreciated by packing group patients. This result is similar to that of other studies. For example, **Awan et al., (2008)** found that 81.1% of patients in the packing group had less than 6 hours of sleep on the night of surgery, compared with only 15.9% in the suturing group (P value <0.05), and **Jawaid et al., (2012)** found in their study "Intranasal pressure splints - a reliable alternative to nasal packing in septal surgery" that 80% in the packing group had less than 6 hours of sleep on the night of surgery, compared with only 16.2% in the non-packing group (P value <0.05).

##### E. Postoperative food intake and dysphagia:

Postoperative dysphagia in the 1<sup>st</sup> day was higher among packing group compared to suturing group. In contrary, there was no difference among suturing or packing groups on the 2<sup>nd</sup> day after operation which can be explained as a result of removal of the pack that

severely affected the swallowing mechanism. If a patient swallows when the nasal passages are blocked (Toynbee maneuver), air can't pass anteriorly and it is insufflated into the middle ear. This unpleasant feeling results in poor oral intake while the packing is in place. Our study is in agreement with the study of **Awan et al., (2008)** where 95.5% of patients said that they had difficulty in swallowing, whereas only 4.5% expressed this complaint in the suturing group.

#### **F. Postoperative headache:**

Patients with packing experienced much more headache in the 1<sup>st</sup> POD compared to patients in suturing group. This difference disappeared on the 2<sup>nd</sup> day due to pack removal because packing has more mass bulk which causes obstruction of sinus ostia and impaired ventilation with stasis of secretion, so patients become more liable for pain. This result is in accordance with the study of **Awan et al., (2008)** as they found that 90.9% of patients in packing group experienced postoperative headache compared with 20.5% in the non-packing group. **Korkut et al., (2009)** also found that 74% of packing group patients had headache compared with 29.7% in the suturing group. Another study done by **Walikar et al., (2011)** showed that the majority of packing group patients developed headache (61 out of 77) about 79.2% and only (19 patients out of 74) about 25.6% had such event in the non-packing group.

#### **G. Postoperative epiphora:**

There was a statistically significant difference between the two groups regarding this complaint as the whole of suturing group did not develop epiphora while in contrast majority of packing group developed it (92%). In the study of **Awan et al., (2008)**, all patients in the packing group (100%) complained of excessive lacrimation, compared with only 11.4% in the non-packing group. Also our study agreed with that of **Arafat Jawaid et al., (2012)** where they found that 80% of patients in the packing group complained of epiphora compared with 12.5% in the suturing group. The excessive pressure of the Merocel pack within the nasal cavity resulted in obstruction of the nasolacrimal duct and diversion of lacrimal flow outside the nasal cavity.

#### **H. Evaluation at 1<sup>st</sup> and 4<sup>th</sup> weeks postoperatively:**

**Nasal discharge and local infection:** Regarding postoperative nasal discharge and local infection, this study showed no statistical significant difference between the two groups as patients from both groups reported mild nasal discharge. **Awan et al., (2008)**, **Ardehali et al., (2009)**, **Kula et al., (2010)** and **Günaydin et al., (2011)** showed similar results.

**Septal hematoma:** Regarding septal hematoma, only one patient from suturing group developed such complication. **Cukurova et al., (2012)** reported no case with septal hematoma in their study.

In the study of **Ansari et al., (2013)**, there was only one reported case of septal hematoma in the suturing group (1.43%) and no one in the packing group. **Günaydin et al., (2011)** also mentioned two cases of septal hematoma in the suturing group and no one in the packing group. All these results are in agreement with our results.

No significant difference between the two groups was seen with respect to complications including nasal crustation, synechia formation and septal perforation.

**Septal perforation:** Septal perforation was not reported in any case postoperatively. **Kula et al., (2009)**, **Naghizadeh et al., (2011)** and **Günaydin et al., (2011)** showed nearly similar results in their studies. **Cukurova et al., (2012)** reported 8 cases (2.2%) of septal perforation in the suturing group and 11 cases (3.2%) in the packing group among a total of 697 patients included in the study and the difference between the two groups was statistically not significant.

**Nasal Crustation:** Nasal Crustation was seen in two cases (8%) in suturing group and in 5 cases (20%) in packing group. Postoperatively, all patients were instructed to perform frequent nasal irrigation with seawater spray and this is most probably the reason of such low incidence of nasal crustation. A study done by **Thapa et al., (2011)** "postoperative complications of septal quilting and BIPP packing following septoplasty" showed different results; 3 from 44 patients in suturing group developed crustation compared with 9 from 41 patients in BIPP group (P value =0.0043). A possible explanation might be that BIPP packs were removed after 48 hours of operation instead of 24 hours and BIPP packs causes more traumas to the mucosa than Merocel that resulted in more mucosal injury which affected the mucociliary clearance.

**Intranasal adhesions:** Unilateral intranasal adhesions were seen in one patient in suturing group and in 2 patients in packing group 4 weeks postoperatively. **Nunez and Martin, (1991)**, **Kula et al., (2010)** and **Naghizadeh et al., (2011)** mentioned data regarding the postoperative adhesions of the nasal mucosa for the suturing and conventional packing groups. Their data showed a statistically non-significant risk reduction in the postoperative adhesions for the study. In the study of **Awan et al., (2008)**, the rate of adhesion formation was higher in the packing group than in the suturing group (18.2% vs. 0%). It has been found that packing makes the nasal mucosa raw and actually more susceptible to synechia formation. Adhesions can be prevented without packing by careful handling of the septal mucosa, by avoiding manipulation of the turbinates, and by meticulous placement of instruments in the surgical site.

**Conclusions:**

Septoplasty can be safely performed using quilting suturing technique without nasal packing, with better patient compliance and fewer chances of postoperative pain and discomfort, postnasal drip, sleep disturbance, dysphagia, headache and epiphora.

Quilting suturing technique has no obvious advantage over nasal packing in minimizing postoperative bleeding. Suturing technique and nasal packing showed similar risks for postoperative local infection, septal hematoma, septal perforation, crust formation and mucosal adhesions.

**Recommendations:**

We recommend the use of quilting suturing technique after septoplasty as a safe alternative to nasal packing as it showed less postoperative morbidity in comparison with nasal packing. This study had been carried out over a limited period of time comprising a limited number of cases. The facts mentioned here may considerably vary from a larger series. So, further studies with greater number of patients are necessary to find out the most appropriate method for controlling the postoperative sequel of septoplasty.

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