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Original Article

Effect evaluation of repeated debridement after endoscopic sinus surgery

Lin Shi*,Ya Feng*, Wanming Cui, Kaisheng Yan, Mei Lv, Zhijun Hong, Mingyu Wang, Lijie Zhai, Haolin Wang

Department of Otorhinolaryngology, The First Affiliated Hospital, Dalian Medical University, Dalian 116013, China.
**Equal contributors.*

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Abstract: Objective: To investigate the effect of early phase debridement by the different intervention frequencies on postoperative symptoms recovery and turnover of mucosa after functional endoscopic sinus surgery (FESS). Methods: 67 patients undergone FESS were divided into intervention group and control group. Intranasal corticosteroids, macrolides antibiotics and postoperative saline douching were used in both groups. Debridement was performed on the 1st, 4th, 8th postoperative week on patients of invention group, while once per week on patients of control group. The primary outcome measure was visual analogue scale (VAS) and Lund-Kennedy Endoscopic Score (LKES) Results: On the 4th week, the control group presented more release on nasal block, the VAS of the two groups is 3.45 ± 1.16 and 4.83 ± 1.47 in the control group and intervention group respectively which was significantly different. The LKES on crust decreased more in the control group (1.12 ± 0.64 in the control group and 1.90 ± 0.47 in the intervention group). However, the control group complained more sever facial pain and uncomfortable; the VAS of two groups is 5.92 ± 0.91 and 2.74 ± 1.41 respectively. On the 8th week, there were no significant difference between the two groups on all domains of VAS and LKES except lower scar was shown in the control group. Conclusions: Benefit of frequent debridement during the early postoperative was not in positive correlation with patients recovering from ESS. Excessive debridement may induce more surgical trauma and cause more facial pain to patients. Therefore, in terms of subjective recovery and health care costs, appropriate extending postoperative management time and decreasing intervention frequencies will not affect the therapeutic effect of endoscopic surgery for chronic sinusitis.

Keywords: Endoscopic sinus surgery, postoperative debridement, frequency

Introduction

Currently, endoscopic sinus surgery is seen as the standard treatment in clinically challenging chronic rhinosinusitis (CRS) and in nasosinusal polyposis. Postoperative debridement, i.e. removal of crusts, clots and secretions, is considered essential after FESS, and it has been shown to decrease postoperative crusting and the development of adhesions. On the other hand, repeated early debridement associated with increased postoperative pain may bring unpleasant to patients [1] which may interfere with the effective execution of postoperative care.

It has not been definited whether it's necessary to receive debridement in the early stage. In this prospective study, we have evaluated the effect of repeated postoperative debridement on the 4th, 8th, 12th postoperative week of two parallel groups. We hypothesized, that repeated postoperative debridement may alleviate the symptom of nasal discharge.

Materials and methods

Materials

Patients: A total of 67 patients (age 18-61 years), who underwent FESS in our hospital were included in this study. The patients were suffered from chronic rhinosinusitis (CRS) with polyps on both sides, which was diagnosed by history, physical examination, endoscopic, and CT scan. The diagnosis standard was based on the CRS clinical classification standard of EPOS 2007 [2, 3]. The study was approved by the

Table 1. Lund-MacKay Endoscopic Appearance Score. Both sides are evaluated separately

	0 point	1 point	2 points
PPolyps	P Absent	Only in the middle meatus	Beyond the middle meatus
Edema	Absent	Mild	Severe
Discharge	Absent	Clear, thin discharge	Thick, purulent discharge
Scaring	Absent	Mild	Severe
Crusting	Absent	Mild	Severe

committee for Medical Research Ethics of the Dalian Medical University. The inclusion of patients started in January 2012 and the last patient was included in December 2012.

Group: We randomly divided the patients into two parallel groups, the intervention group and control group. The mean age of the intervention group was 36.4 ± 5.3 years, and 18 of 35 patients were males. The mean age of the control group was 37.0 ± 6.2 years, and 17 of 32 patients were males. The course of all the patients was 16.4 ± 8.3 years.

Preoperative evaluation: All the patients were evaluated by an 11-point numeric scale (0 = symptom not present, 10 = greatest severity of symptoms) according to VAS which included facial pain or pressure, headache, nasal blockage or congestion, nasal discharge, olfactory disturbances, overall discomfort. Endoscopic staging was performed according to LKES (**Table 1**) [4]. There were no statistically significant differences between the two study groups in the ratings at baseline .

Methods

Peri-Operative medical care: 67 patients underwent the same perioperative medical care as follows. Flixanase (GlaxoSmithKline), which was used from one week before to 3 months after operation, was taken once a day, two sprays for each nostril. After then reduce the dosage to one spray for each nostril. The tip should be avoided to spray directly onto the septum.

Small dosage of clarithromycin tablets (Jiangsu Hengrui medicine co. LTD) which was used P.O during the perioperative period [5], was taken 0.5 Bid for 3 days before the operation and 0.25 once a day from the 3rd days post-operation to 3rd months. During the two first postoperative days, the patients with negative penicillin skin tests were injected venous amoxicillin Sulbactam Sodium. Or, use azithromycin instead.

Sinopret (BIONORICA, Germany) which was taken by oral during the perioperative period, was taken 100 drops tid for 3 days before the operation, and a reduced half dosage for 3 months after the operation.

Corticosteroid which was used for patients without contraindications was taken 0.5 mg/kg, from the last week before the operation and the first three days after the operation, P.O at morning [6].

Surgery: The operation was performed with Storzz endoscopic. Two deflection angles of 0 and 30 degrees were used. We followed standard Messerklinger method [7]. First, to identify and cut off the uncinate process, then expose maxillary ostium. Open the anterior, posterior ethmoid ostium, frontal ostium and sphenoid ostium if they suffered, cut off polyps and edema mucosa. The septoplasty was done if the nasal septum defection existed. Nasal packing was used to stop bleeding after the operation.

Post-operative treatment: All patients were taught to use nasal saline douches twice a day when nasal packing was pulled out on the 2nd postoperative day, and continued if necessary. On the 7th postoperative day, the debridement was performed under local anesthesia with 1% epinephrine and 2% lidocaine. The nasal cavity was debrided, i.e. cleaned from blood, clots, crusts, and secretions in nasoendoscope with suction. The middle turbinate should be gently medialized and a spacer placed if lateralizing.

In the intervention group, loose clots and crusts which made blockage to the nasal cavity and sinus were removed, the granulation and fixed cysts were left or just punctured with appropriate tissue-presenting instruments.

In the control group, we performed debridement to clean off all the blood, clots, crusts and granulation.

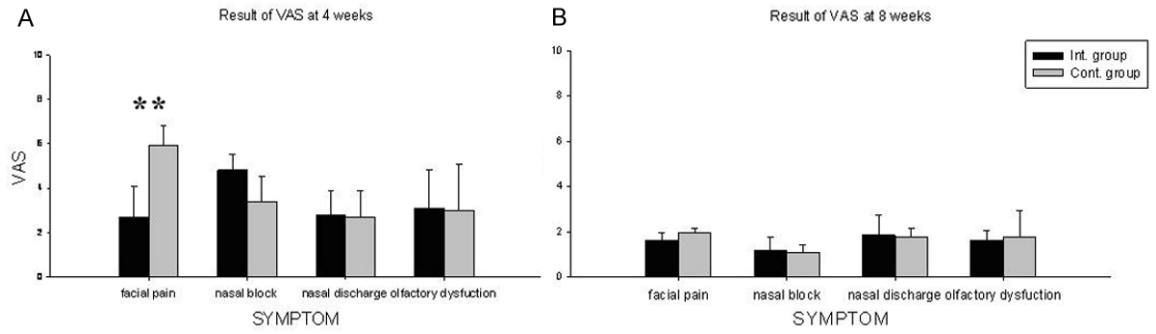

Figure 1. VAS of the two groups at 4 weeks and 8 weeks. A showed the VAS result of the two groups at 4 weeks. The complaints of facial pain on an 11-point VAS were significantly less severe in the intervention group (2.74 ± 1.41) compared with the control group (5.92 ± 0.91, mean diff 2.5, 95% CI of the diff 0.3 to 3.1, P = 0.009, the Mann-Whitney U-test). There was significantly lower sever nasal blockage in the nose of the patients from the control group (3.45 ± 1.16) compared with the intervention group (4.83 ± 1.47, mean diff 1.21, 95% CI of the diff 0.3 to 2.5, P = 0.25, the Mann-Whitney U-test). There was a consistent pattern in favor of frequent postoperative debridement in discharge and olfactory dysfunction, but the differences between groups did not reach statistical difference. B showed the VAS result of the two groups at 8 weeks. There was no significant difference between the groups on all domains of VAS.

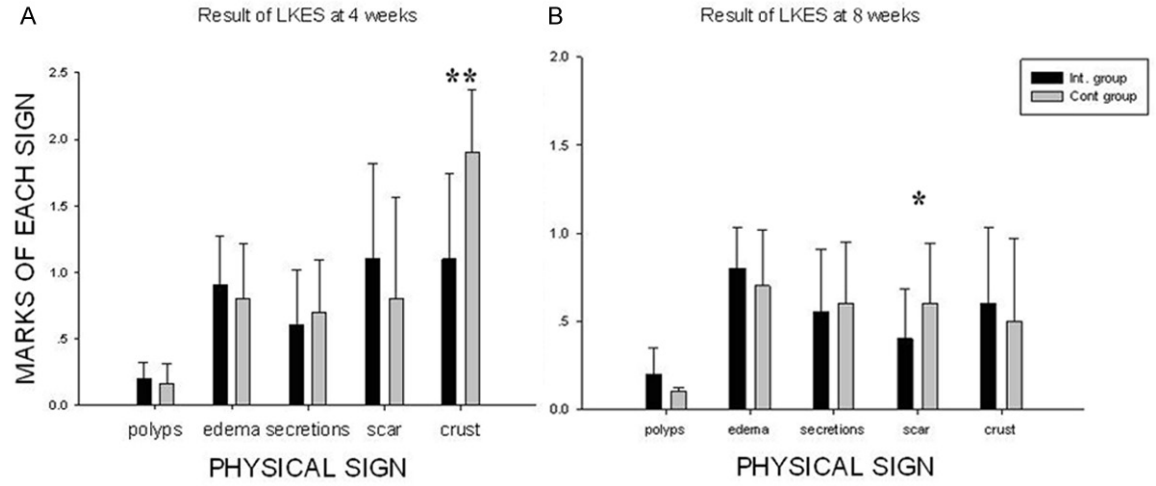

Figure 2. Results of LKES of the two groups. A showed significantly lower sever crusts in the nose of the patients from the control group (1.12 = 0.64) than the intervention group (1.90 = 0.47 mean diff 0.56, 95% CI of the diff 0.72 to 1.67, P = 0.003, the Mann-Whitney U-test), but less scar in the patients from the intervention group (1.11 = 0.72 in the intervention group, 0.83 = 0.78 in the control group, P < 0.01) at 4 weeks. B showed at 8 weeks, there was no significant difference between the groups on all domains of LKES except lower scar was shown in the control group (A, B). The endoscopic appearance score of scar in the intervention group was 0.47 = 0.28, and in the control group it was 0.67 = 0.34 in the control group, which was significantly different (P < 0.01).

Patients in the intervention group were scheduled for a postoperative debridement on the 4th, 8th postoperative week.

Patients in the control group were scheduled for a postoperative debridement once per week.

Effect evaluation: During the follow-up visits at 4th and 8th week, we evaluated symptoms as nasal congestion, nasal pain, and headache reported by the patients on VAS. Nasoendoscopy was performed to assess the presence of polyps, edema, discharge, scarring and crusting in the middle meatus (LKES).

Statistic methods

Data analysis was performed using SPSS 19.0 for windows (SPSS Inc, Chicago, USA).

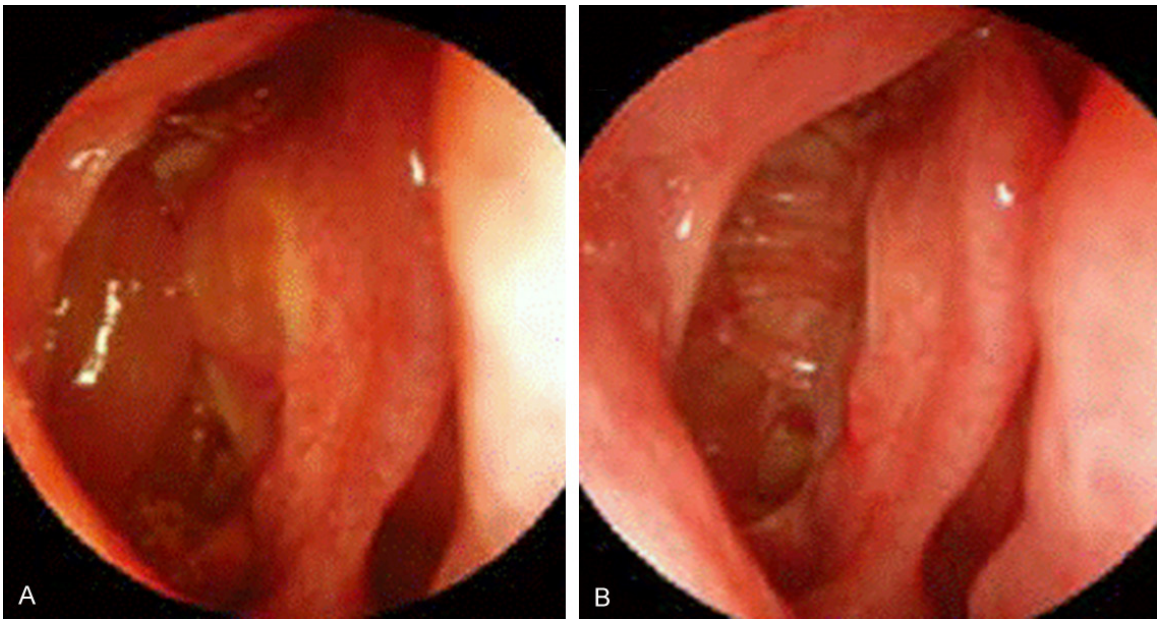

Figure 3. Crusts in middle meatus of patients in the intervention group at 4 weeks (A) disappeared at the 8 weeks without debridement (B).

Differences according to treatment assignment for categorical variables were assessed with the Pearson Chi-Square test and for the continuous and nominal variables with the Mann-Whitney Utest, as appropriate. Differences were regarded as statistically significant if the two-sided *p*-value was less than 0.05. Data were expressed as X ± S. For the main outcome measures, 95% confidence intervals (95% CI) were calculated. Statistical analysis was performed using T test. A p less than 0.05 was considered significantly.

Result

At baseline, there were no statistically significant differences between the two study groups in the ratings according to the VAS and LKES.

At 4 weeks, the complaints of facial pain on an 11-point VAS were significantly less severe in the intervention group (2.74 ± 1.41) compared with the control group (5.92 ± 0.91), P < 0.01. However, there were significantly lower sever nasal blockage in the nose of the patients from the control group (3.45 ± 1.16) compared with the intervention group (4.83 ± 1.47), P < 0.05 (**Figure 1A**). According to endoscopic appearance, there were no significant differences regarding the presence of polyps, edema and discharge between the groups. There were significantly lower sever crusts in the nose of the patients from the control group (1.12 ± 0.64) than the intervention group (1.90 ± 0.47) ,but less scar in the patients from the intervention group as shown in **Figures 1B**, **2A** (1.11 ± 0.72 in the intervention group, 0.83 ± 0.78 in the control group, P < 0.01).

At 8 weeks, there were no significant difference between the groups on all domains of VAS and LKES except lower scar was shown in the control group (**Figures 1B**, **2B**). The endoscopic appearance score of scar in the intervention group was 0.47 ± 0.28, and in the control group it was 0.67 ± 0.34 in the control group, which was significantly different (P < 0.01). We observed patients with sever crusts in the intervention group. It showed coalescence with out debridement (**Figure 3**).

Discussion

Postoperative debridement is considered as an important means of facilitating the healing of nasal mucosa, it has been shown to prevent the development of crusting and adhesions in the middle meatus [8]. On the other hand, patients may experience postoperative unpleasant. In fact, frequently debridement has been associated with more postoperative pain. So the necessity has not been identified.

During the healing process of mucosa after FESS, large crusting and clot may trap mucosa, which will reinfect the sinuses [9]. The old blood itself may be a good culture medium for bacteria. The crusts may act as bridges across which scar formation may occur, leading to an obstructed postoperative cavity. And retained bone fragments that are denuded of mucosa maybe the cause for reinforce.

Many surgeons document weekly debridement may reduce crusts in the nose, nasal congestion, and postoperative infections [10]. It is known that crusts act as bridges over which adhesion can grow. Sever crusting may also cause nasal blockage. **Figure 1A** supports this by showing that nasal blockage decreased more rapidly in the control group, comparing with the intervention group. According to a randomized, partly blinded, controlled clinical trial, Burgten V discovered crusts in the middle meatus after sinus surgery is associated with postoperative adhesions [8]. Debridement of the nasal cavity reduces crusts and postoperative adhesions significantly compared with saline irrigation only.

However, it maybe argued that more surgery results in more surgical trauma and more postoperative crust. There is no question that doing less surgery and preserving mucosa leads to better, faster healing and less need for postoperative care. Some surgeons consider debridement unnecessary because a packing in the middle meatus also prevent adhesions effectively [8]. The best evidence is in the realm of pediatric rhinology [11, 12]. Children are not able to tolerant the postoperative debridement. Where able, children use a nasal douche or spray 3 times a day for the first 2 to 3 weeks [13]. Mair's further describes that extensive removal may promote synechia formation. Not one study profound no follow-up with endoscopy, and all results has proved a synechia occurring at a rate of 5%~10%. It was also speculated that the increased nasal pain in the debridement patients reported acute rhinosinusitis postoperatively. Extensive debridement which cause blood, pain, and time consuming may counterproduction as Dr Thaler noted [14]. The downsides of multiple debridements are time, equipment, and reimbursement issues. Burgten V's trial demonstrated the procedure induces more postoperative nasal pain which interfere the outcome [8]. And our study has shown that the patients experience some pain as a result of the local anesthesia and debridement procedure.

In the present study, the patients undergoing repeated debridement during the 4 postoperative weeks reported fewer crusts when compared with the intervention group. This is in agreement with a previous study. There were no other statistically significant differences between the groups in other domains of the VAS and the LKSS. However, the intervention group seemed to feel slightly better with regard to nasal congestion, facial pain, headache and overall discomfort.

One of the main limitations of the present study was that there were few remarkable infection cases after the operation. To be worth, by observing these patients in the both groups, we found multiple debridements played an important role in their healing.

Conclusion

According to the present study, compared with a single debridement every four weeks, repeated debridement provided only slightly benefit. As insist on peri-operative optimal medical care, such as Intranasal corticosteroids, PO Corticosteroids, PO macrolides antinflammatory and postoperative saline douching for at least 8 weeks, there's hardly need to perform surgical debridement once a week, except those with sever infection. When weighting the health care costs, the time and resources spent in the execution of debridement against the minor favorable effects on symptoms, the repeated debridement may not be justified after FESS.

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Address correspondence to: Lijie Zhai or Haolin Wang, Department of Otorhinolaryngology, The First Affiliated Hospital, Dalian Medical University, Dalian 116013, China. E-mail: lijie-zhai@hotmail.com (LJZ); mouse0405@hotmail.com (HLW)

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