

HEALING EFFECT ANALYSIS AND APPLICATION OF FIBRIN GLUE COMBINED WITH MEDICAL TELA IODOFORMUM FOR PATIENTS WITH JAW CYST AFTER CURETTAGE

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ABSTRACT

Objective: The purpose of the study was to evaluate the clinical value of fibrin glue combined with tela iodoformum in jaw cyst surgery.

Methods: 30 patients with jaw cyst who were treated in our hospital from May 2019 to May 2020 were selected as the study subjects and divided into control group (n=13) and observation group (n=17). All patients underwent surgical excision and filling of cystic masses. Among them, patients in the control group received the filling with tela iodoformum, while on this basis, patients in the observation group received the combined filling with fibrin glue. Subsequently, VAS score, SAS score, wound swelling, number of white blood cell, wound healing time, hyperostosis thickness and bone mineral density (BMD) of new bone were all compared between the two groups, so as to evaluate the clinical effect of fibrin glue-assisted filling.

Results: The VAS score, SAS score and leucocyte level in the observation group were significantly lower than those in the control group ($P<0.05$), while the hyperostosis thickness and BMD of new bone in the observation group were significantly higher than those in the control group ($P<0.05$). In addition, the wound swelling, infection rate and wound healing time in the observation group were significantly lower than those in the control group ($P<0.05$).

Conclusion: Filling with fibrin glue combined with medical tela iodoformum can significantly improve the effect of the jaw cyst surgery, which has great values in clinical application.

Keywords: Jaw, tela iodoformum, curettage, fibrin glue, cyst.

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Introduction

Cystic lesion is a benign mass with liquid content with complex pathogenesis, which mostly occurs in the patient's upper and lower jaws⁽¹⁻³⁾. At present, the pathogenesis of the jaw cyst is still not very clear. Some studies believed that it was a congenital cystic vesicle formed by abnormal proliferation of residual neuroectodermal cells in the jaw during the embryonic period^(4,5). In addition, some other studies have suggested that jaw cysts are acquired diseases caused by inflammation and some psychiatric diseases⁽⁶⁻⁹⁾. Although cysts have slow

progress, they are prone to excessive development without intervention, thereby destroying surrounding blood vessels and nervous tissues, even leading to patients' facial bone fractures, and ultimately resulting in deformity^(10, 11). Currently, there have been many treatments for jaw cyst, including mass decompression, marsupialization, extirpation and bone dissection to improve patients' conditions, while the prevention of wound infection and complications should also be taken into consideration^(12, 13). Curettage is one of the clinically main surgical methods to treat cysts, and after cyst removal, tela iodoformum is usually used to fill patients' wounds,

which can inhibit bacterial infection at the wound site, adsorb exudate to prevent wound swelling and promote new tissue formation^(14, 15).

However, in the process of backfilling, patients' wounds need to be tightly filled with tela iodoformum, and because of its poor rebound resilience, tight backfilling will hinder the formation of new bones at the wound site, thus affecting patients' prognosis. In order to solve this problem, in this study, patients' wounds were filled with fibrin glue combined with medical tela iodoformum, and the effect of fibrin glue on wound healing and patients' subjective feelings was evaluated, with the aim of providing a reference for the jaw cyst surgery.

Materials and methods

General information

30 patients with cystic tumors of the jaw who were treated in our hospital from May 2019 to May 2020 were selected and randomly divided into control group (n=13) and observation group (n=17). Among them, the proportion of male and female in the control group was 7:6, with aging from 42 to 53 years old and the average age of (46.6±3.3) years old, while that in the observation group was 9:8, with aging from 43 to 52 years old and the average age of (46.4±3.4) years old. There were no significant differences in gender and age distribution in the two groups, with comparability (P>0.05).

Inclusion criteria:

- Patients were diagnosed with jaw cyst;
- Patients had complete clinical data;
- Patients underwent imaging examination;
- Patients were informed of the details of the study and have signed the informed consent;
- Patients passed the review by the Medical Ethics Committee.

Exclusion criteria:

- Patients had incomplete case data;
- Patients did not cooperate with prognostic follow-up;
- Patients had the history of severe infection.

Methods

Methods:

- Surgical incision was determined by the location of the lesion;
- Mucoperiosteum was turned up to fully expose the cyst;
- Bone window was opened to remove the cyst;

- Wound area was cleaned;
- Tight filling and suture were carried out;
- Fillers were extracted in turn every week starting from one week after surgery.

Filling methods

The control group received tight filling with tela iodoformum and suture, while the observation group received filling with fibrin glue (Hangzhou Puji Medical Technology Development Co., Ltd., 09000261767) combined with tela iodoformum and let the wounds close spontaneously.

Observation indexes

- Wound swelling: the number of patients with wound swelling after surgery was recorded and they were accordingly divided into subtle swelling (swelling <2mm), mild swelling (swelling of 2-6mm), and severe swelling (swelling >6mm).
- Wound inflammatory respons: patients received blood routine tests 3 days after operation to observe the number of white blood cell.
- Pain and anxiety assessment: the VAS score and SAS score were performed on patients, and the scores were positively correlated with patients' pain and anxiety degree.
- Infection rate: the number of patients with wound infection three days after operation was recorded, and the infection rate was calculated.
- Healing time evaluation: the wound healing time of patients was recorded during clinical follow-up.
- Thickness of bone regeneration: the increasing thickness of wound bone was compared by CT after surgery.
- BMD of new bone: the BMD of the new bone was detected.

Data analysis

SPSS19 software was adopted in this study to process the data. Measurement data were expressed by ($\bar{x}\pm s$) and tested by t-test. Enumeration data were expressed as [n(%)] and tested by X² test. The differences had statistical significance when P<0.05.

Results

Swelling at wound site

The percentage of patients with wound swelling is shown in Figure 1. In the observation group, the percentage of patients with subtle swelling of 82.53% was significantly higher than 38.46% in the control

group, while the percentage of patients with mild or severe swelling in the observation group was significantly lower than that in the control group.

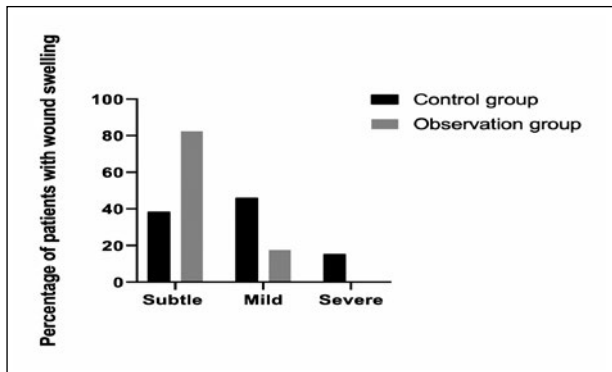


Figure 1: Percentage of patients with wound swelling. Note 1 X: Groups, Y: Percentage of patients with wound swelling. The percentage of patients with mild, mild and severe swelling in the control group were 38.46%, 46.15% and 15.38%, respectively, while in observation group were 82.35%, 17.65% and 0%.

Postoperative inflammation assessment

The leucocyte level of patients in the blood routine is shown in Figure 2. The results showed that compared with the filling with single tela iodoformum, the filling combined with fibrin glue on this basis could significantly reduce the inflammation caused by surgery in patients ($P < 0.05$).

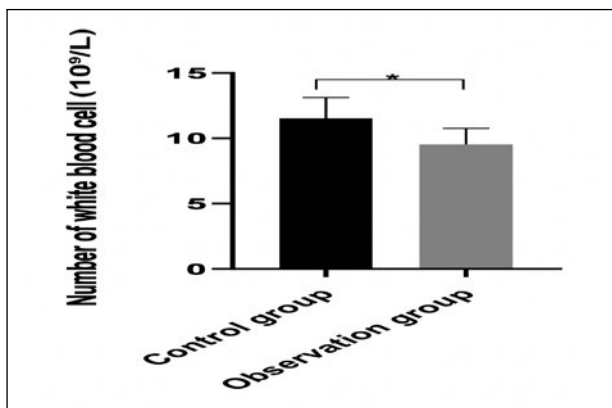


Figure 2: Number of white blood of patients in the two groups. Note 2 X: Groups, Y: Number of white blood cell. The white blood cells of patients in the control and observation groups were $11.53 \times 10^9/L$ and $9.52 \times 10^9/L$. *means significant differences in the results of the two groups ($t = 3.91$, $P < 0.05$).

VAS and SAS scores

The VAS and SAS scores of patients' subjective feelings is shown in Figure 3. The results showed that compared with the filling with single tela iodoformum, the filling combined with fibrin glue could effectively alleviate the pain and anxiety caused by surgery ($P < 0.05$).

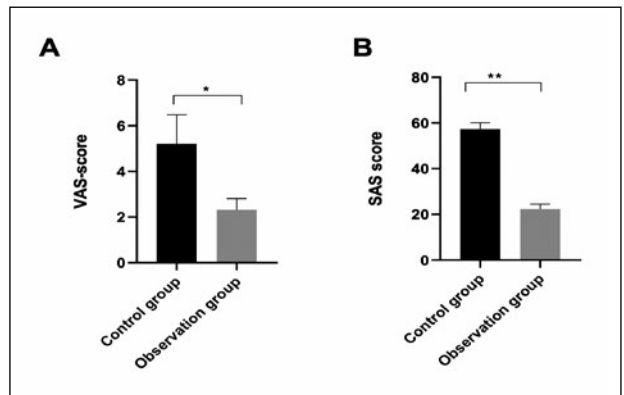


Figure 3: PVAS and SAS scores of patients in the two groups. Note 3 X: Groups, Y: Score value. (A) The VAS score of patients in control and observation groups were 5.21 and 2.32, respectively. *means significant differences between the results of two groups ($t = 8.62$, $P < 0.05$). (B) The SAS score of patients in control and observation groups were 57.27 and 22.29, respectively. ** means significant differences between the results of two groups ($t = 14.90$, $P < 0.01$).

Infection rate

The infection rates of the two groups at 3 days after surgery is shown in Table 1. The results showed that the infection rate was 23.1% in patients who received filling with fibrin glue on the basis of tela iodoformum, and 5.9% in patients who received filling with single tela iodoformum.

Groups	Case	Number of infections	Infection rates
Control group	13	4	30.77%
Observation group	17	1	5.9%
χ^2			3.2851
P-value			<0.05

Table 1: Infection rates of the two groups.

Healing time

Postoperative healing time of patients in both groups is shown in Figure 4. The results showed that compared with the filling with single tela iodoformum, the filling combined with fibrin glue on this basis could accelerate the wound healing ($P < 0.05$).

Hyperostosis thickness

Hyperostosis thickness at the wound site in both groups is shown in Figure 5. The results showed that compared with the filling with single tela iodoformum, the filling with combined fibrin glue on this basis could promote bone regeneration at the wound site ($P < 0.05$).

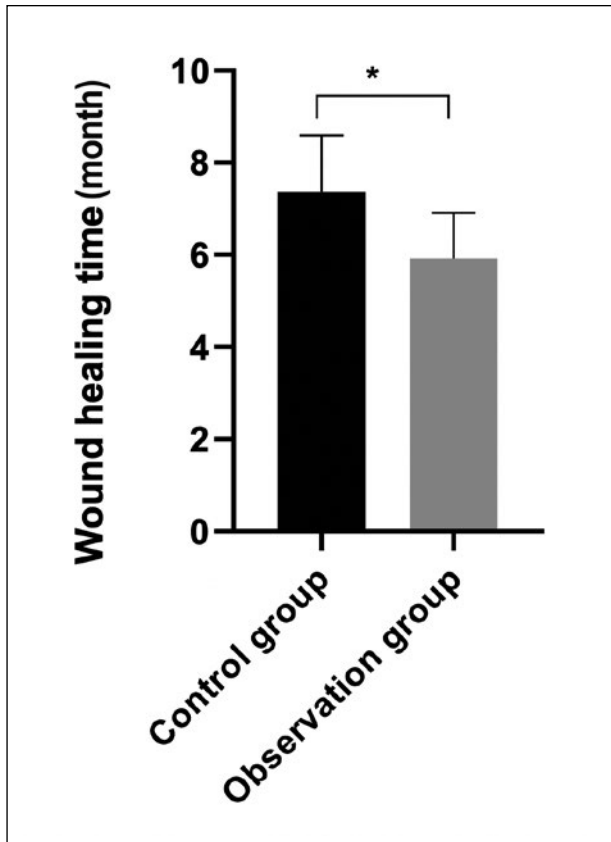


Figure 4: Wound healing time of patients in the two groups.

Note 4 X: Groups, Y: Wound healing time. The wound healing time of patients in the control group and observation group were 7.36 and 5.92 months, respectively. *means significant differences in the results of the two groups ($t=2.56$, $P<0.05$).

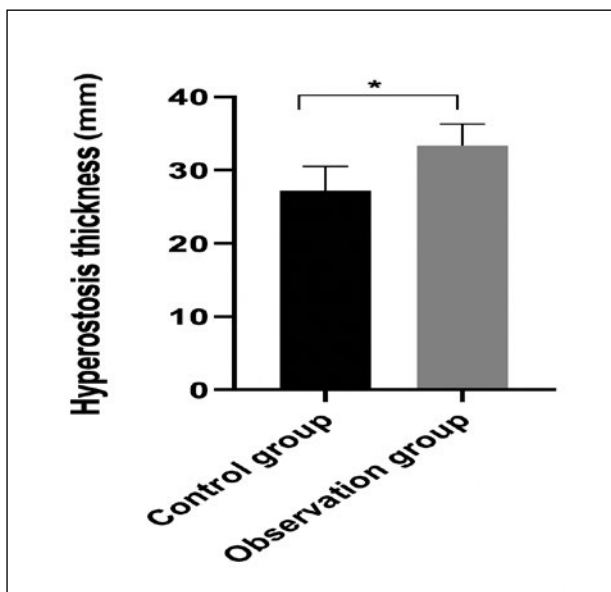


Figure 5: Hyperostosis thickness of patients in the two groups.

Note 5 X: Groups, Y: Hyperostosis thickness. The hyperostosis thickness of patients in the control group and observation group were 27.19 mm and 33.39 mm, respectively. *means significant differences in the results of the two groups ($t=5.43$, $P<0.05$).

Postoperative BMD of new bone

The BMD of new bone at the wound site in both groups is shown in Figure 6. The results showed that the quality of new bone formed at the wound site of patients could be significantly improved by adopting filling with fibrin glue on this basis, compared with filling with single tela iodoformum ($P<0.05$).

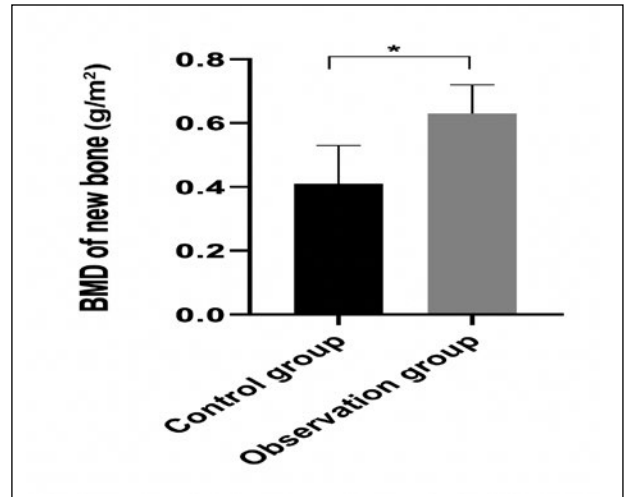


Figure 6: BMD of new bone of patients in the two groups ($P<0.05$).

Note 6 X: Groups, Y: BMD of new bone. The BMD of new bone of patients in the control group and observation group were 0.41 g/m² mm and 0.63 g/m², respectively. *means significant differences in the results of the two groups ($t=5.75$, $P<0.05$).

Discussion

Jaw cyst can be classified into odontogenic and non-odontogenic cysts according to different conditions, and the continuous development will lead to great distress to patients' physiology and psychology^(16,17).

In this study, curettage was adopted to remove cysts in patients' jaw, and routine filling with tela iodoformum was applied as the control. The VAS score, SAS score, the detection of number of white blood cell, the thickness and BMD of new bone, wound healing speed and wound infection rate were all adopted to evaluate the clinical effect of the fibrin glue-assisted filling. The VAS and SAS scores are systems that can effectively evaluate patients' pain, which is commonly used to evaluate the impact of clinical intervention on patients^(18,19). The VAS and SAS scores of patients in this study showed that fibrin glue-assisted filling can effectively reduce postoperative pain and anxiety, which may be related to its better resilience. Fibrin glue has been proved to be a good filler in clinical diagnosis and treatment, which can alleviate patients' pain to some

extent⁽²⁰⁾. Alamdari et al. used fibrin glue to fill the surgical wounds of patients with pilocarpal cyst, and confirmed in the follow-up that fibrin glue can significantly alleviate the pain caused by surgery, and can promote wound healing⁽²⁰⁾. Some studies also demonstrated that the application of fibrin glue could accelerate wound healing by observing the healing time of patients after surgery. The number of white blood cell in patients can reflect the inflammation levels in patients after surgery to some extent^(21, 22). Compared with the patients who received the single filling with tela iodoformum, the patients who received fibrin glue-assisted filling had significantly lower leukocyte levels, suggesting that fibrin glue can significantly slow down the inflammatory stress response in patients with jaw cysts after surgery and has certain anti-inflammatory effects. Chow et al.⁽²³⁾ found that the application of fibrin glue to fill the wounds formed during neural prosthetics could significantly reduce the inflammatory stress of patients. This study also demonstrated that the application of fibrin glue could effectively improve the wound swelling after surgery and effectively reduce the wound infection rate. Some other studies have shown that fibrin glue can promote the proliferation of osteocyte. Ao et al.⁽²⁴⁾ revealed that protein glue could induce MC3T3-E1 proliferation, which in turn promoted rat cranial regeneration. This study showed that the recovery of jaw after fibrin glue-assisted filling was significantly better than that after the single filling with tela iodoformum, indicating that fibrin glue can promote osteoblast regeneration in the jaw wound area of patients. In addition, in oral diseases, studies have also confirmed that fibrin glue can be used as a filler in the treatment of alveolitis, can significantly reduce patients' pain, and can accelerate the recovery of patients' wounds⁽²⁵⁾.

In conclusion, filling the curettage site of jaw cyst with fibrin glue combined with medical tela iodoformum can reduce the postoperative patients' pain, reduce the inflammatory reaction caused by surgery, and significantly improve the wound recovery speed and quality, which has great values in the clinical treatment of jaw cyst.

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