EFFECTIVENESS AND SAFETY OF LX1 CREAM IN THE CLINICAL TREATMENT OF FACIAL CONTUSIONS

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This research was conducted to evaluate the effectiveness and safety of LX1 cream in the clinical treatment of facial contusions. The study was conducted on 66 patients diagnosed with facial contusions, divided into 2 groups: Control group with patients treated according to the anti-inflammatory, analgesic and anti-edema protocol currently used in the department. Study group with patients treated according to the anti-inflammatory, analgesic and anti-edema protocol currently used in the department combined with the application of LX1 cream. The results showed that the study group had better improvement in pain levels according to the VAS scale with p < 0.05. The scores to assess the level of bruising after treatment of the study group that had a better tendency than the control group. We haven't found any side effects of LX1 cream in the treatment of facial contusions.

Keywords: Contusions, facial region, LX1 cream.

I. INTRODUCTION

Soft tissue injuries are among the most common traumas in the clinical setting of the facial region, presenting in various forms and degrees of severity such as lacerations, abrasions, burns, contusions, and bites. The incidence of soft tissue injuries in the facial region accounts for nearly 70% of patients at the Department of Cranio-Maxillofacial and Oral Surgery of the Medical University of Innsbruck, Austria in 15 years (1991 - 2005).[1]including intracranial, spinal, and upper- and lower-body injuries. It is a major cause of expensive treatment and rehabilitation requirements, temporary or lifelong morbidity, and loss of human productivity. The aim of this study was to evaluate patterns of CMF trauma in a large patient sample within a 15-year time frame. Between 1991 and 2005, CMF trauma data were collected from 14,654 patients with 35,129 injuries at the Department of Cranio-Maxillofacial and Oral Surgery in Innsbruck, assessing a plethora of parameters such as injury type and mechanism as well as age and gender distribution over time. Three main groups of CMF trauma were evaluated: facial bone fractures, dentoalveolar trauma, and soft tissue injuries. Statistical comparisons were carried out using a chi-square test. This was followed by a logistic regression analysis to determine the impact of the five main causes for CMF injury. Older people were more prone to soft tissue lesions with a rising risk of 2.1% per year older, showing no significant difference between male and female patients. Younger patients were at higher risk of suffering from dentoalveolar trauma with an increase of 4.4% per year younger. This number was even higher (by 19.6% Annually in the United States,

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approximately 150,000 patients suffer from soft tissue injuries in the facial region, with the most common cause being motorcycle accidents.[2] Other causes may vary depending on age, gender, and geographical distribution, such as falls, sports injuries, insect bites, etc. Although rarely life-threatening, facial soft tissue injuries are difficult to conceal and significantly affect not only various important functions of the patients but also aesthetics.[3,4]

Soft tissue injuries can be categorized into three types: abrasions, lacerations, and contusions. Contusions (bruises) are the most common injuries resulting from strong impact forces. Small contusions require treatment with ice packs and rest. Severe contusions may cause the injury of soft tissue, hard tissue (teeth and orthodontic appliances) and vascular nerve structures requiring surgical intervention.[5] The wound healing process consists of four overlapping stages: hemostasis and coagulation, inflammation, proliferation and remodelling. The role of Chymotrypsin has been recognized through numerous studies worldwide in treating contusions due to its high bioavailability without losing biological activities such as anti-inflammatory, anti-oxidant, anti-edematous, fibrinolytic and anti-infective effects. Therefore, Chymotrypsin contributes to improving inflammatory symptoms caused by tissue damage, reducing pain, and promoting wound healing.[6]

Contusions fall within the scope of department of injury in Traditional Medicine. A number of studies worldwide and in Vietnam have shown the effectiveness of pain-relieving, anti-inflammatory, anti-edema, and wound healing promotion of traditional medicine drugs and remedies in treating soft tissue injuries, such as crocodile oil, turmeric (Curcuma mangga Valeton & Van Zijp.), Caryocar coriaceum Wittm oil, remedies to clear and resolve the heat toxin, anti-inflammatory extracts, etc.[7-10] LX1 is a traditional remedy originating from the Dao ethnic group in Ba Vi District. In vivo studies, LX1 cream reduced the thickness and damaged area of rabbit ears compared to the excipient cream group. In an experimental bone fracture model in mice, LX1 effectively reduced swelling, rapidly decreased inflammatory cells after one week, and promoted bone formation. In clinical studies on experimental fracture models, LX1 cream lowered VAS scores during rest and swelling, improved signs of bone regeneration on radiographs, and enhanced mouse activity levels.[11] However, there is no study on the effects of LX1 cream on patients with soft tissue injuries in the facial region. Therefore, the authors conducted this study with the following objectives: *Evaluation of the effectiveness and safety of LX1 cream in the clinical treatment of facial contusions at the Department of Neurosurgery - Saint Paul General Hospital from April 2022 to December 2022*.

II. MATERIALS AND METHODS

1. Subjects

Patients were diagnosed with facial contusions due to trauma and treated at the Department of Neurosurgery - Saint Paul General Hospital.

Selection criteria according to Modern medicine:

- Conscious patients, Glasgow Coma Scale score of 15, age > 18.
- Patients diagnosed with facial contusions due to trauma: swelling, heat, redness, pain, bruising at the site of contusion.
- Patients volunteering to participate in the study.

Exclusion criteria

Skin lacerations, facial bone fractures,

patients with skin conditions such as allergic vasculitis, eczema and, allergic dermatitis. Pregnant patients. Patients not adhering to treatment.

2. Methods

Study design: Prospective, pre-post treatment comparison with control.

Study period: From April 2022 to December 2022.

Sample size

To calculate the research sample size, apply the following formula:

$$n_1 = n_2 = n = X^2_{(\alpha,\beta)} \frac{\sigma_1^2+\sigma_2^2}{(\overline{X_1}-\overline{X_2})^2}$$

In which:

σ_1, σ_2: The Standard Difference of 2 groups: Group 1 is the study group and Group 2 is the control group. In this case, it is assumed to be the same.

$\Delta = (X_1 - X_2)$: The difference in the average treatment response rate between Group 1 and Group 2 according to the researcher's wishes, $\Delta = 0.8$ (ie. 80% of results are expected).

$\Delta^2 = (0.8)^2 = 0.64$

α: The probability of making a type I error (reject H0 when it is true); α = 0.05 corresponds to 95% confidence interval.

β: The probability of making a type II error (accepting Ho when it is wrong); β = 0.1.

$Z^2_{(\alpha, \beta)}$: looking up according to the table, the value is 10.5.

The results calculated the sample size: $n_1 = n_2 = 10.5 \times 2 / 0.64 = 32.8 \sim 33$ patients

The study was conducted on 66 patients diagnosed with facial contusions treated at the Department of Neurosurgery - Saint Paul General Hospital, divided into 2 groups ensuring equivalence in age, gender, and level of pain:

Control group: patients treated according to the anti-inflammatory, analgesic, and anti- edema protocol currently used at the department.

Study group: patients treated according to the anti-inflammatory, analgesic, and anti- edema protocol currently used at the department combined with the application of LX1 herbal cream.

Study materials:

Composition of LX1 herbal cream:

Herbals Strobilanthes affinis.	100g
Folium Tinospora sinensis	100g
Cortex Salmalia malabarica	100g
Herbals Gendarussa vulgaris	100g
Folium Strobilanthes cusia	100g
Herbals Plantago major L.	100g
Rhizoma Zingiber officinale	30g
Folium Blumea balsamifera	3g
Rhizoma Costus speciosus	200g
Gallus gallus domesticus Brisson	01 chicken
Excipients and flavorings as needed.	
Liquid 2,5:1	Enough
Vaselin cream	18g
Cetyl stearyl alcohol	15g
Parafin oil	10g
Tween 80	5g
Paraben (Nifarin)	0.5%

Effects of LX1 herbal cream: Clear heat, anti-inflammatory, blood stasis, reducing swelling, alleviating pain, promoting bone healing.

Manufactured at: The herbal cream is produced in standard form and prepared at the Hanoi University of Pharmacy.

Usage: Moisten a sterile cotton ball or gauze with boiled water to clean the damaged skin area. Then, leave the skin surface dry (for about 2 minutes). Apply LX1 herbal cream to the damaged area. Apply 3 - 6 times a day.

Treatment protocol currently used at the Department of Neurosurgery - Saint Paul General Hospital:

Pain relief: Paracetamol 1g x 2 intravenous

injections in the first 2 days after trauma, then oral intake 500mg x 2 tablets/day for the next 5 days.

Anti-edema: Alphachymotrypsin 5000 IU x 1 intramuscular injection in the first 2 days, then oral intake Alphachymotrypsin 25mg x 4 tablets/day divided into 2 doses for 5 days.

Research Instruments

- Sterile cotton, sterile gauze, 0.9% physiological saline, forceps, clean trays.
- VAS pain scale
- mm^2 wound area measurement chart. Blank paper, pen for drawing on blank paper.

Study Content:

Monitoring indicators (before treatment on Day 0 and after treatment on Day 7)

Pain symptoms: according to the VAS pain scale

0 points: no pain

1 - <3 points: mild pain

3 - <6 points: moderate pain

6 - 10 points: severe pain.

Bruising symptoms: measure the area of the wound at 3 levels:

Small: with a size < $2cm^2$.

Medium: with a size ≥ $2cm^2$ and ≤ $4cm^2$.

Large: with a size > $4cm^2$.

Adverse reactions: redness, itching, swelling, blisters.

Outcome Evaluation Criteria

- To evaluate the treatment effectiveness, the authors assessed the bruising area after treatment compared to before treatment using the formula:

$$TE = \frac{(\text{Before treatment - After treatment})}{\text{Before treatment}} x100$$

TE: Treatment effectiveness, unit (%).

Before treatment: Bruising area before treatment.

After treatment: Bruising area after treatment.

- Evaluation criteria are as follows:
- Good effectiveness: TE ≥ 75%.
- Fair effectiveness: 50% ≤ TE < 75%.
- Poor effectiveness: TE < 50%.

Data processing: SPSS 16.0

3. Research ethics

The study protocol was submitted to and approved by the scientific council of General Saint Paul Hospital (No.NCKHCS-2022-05 dated November 16th, 2022). Patients voluntarily participated in the study and could withdraw or switch to another treatment protocol.

III. RESULTS

1. General Characteristics of Study Patients

The average age of the 66 patients was 35.8 ± 14.91 years old. The male - to - female ratio was approximately 3:1. The male proportion was at 78.8%. the under 40 years old age group accounted for the highest proportion at 62.1%. In the study, 83.33% of patients had trauma caused by traffic accidents, and 66.67% of patients underwent treatment intervention within the first 24 hours.

2. Treatment Effectiveness

At time point D_0, the level of pain according to the VAS scale in both groups showed no statistically significant difference with $p > 0.05$. After 7 days of treatment (D_7), the average pain score in both groups decreased significantly with $p < 0.05$. The research group reduced the VAS score from 2.91± 1.42 to 0.85± 0.83, showing better improvement than the control group, which reduced the VAS score from 3± 1.46 to 1.67± 1.28. The difference between the two groups was statistically significant with $p < 0.05$.

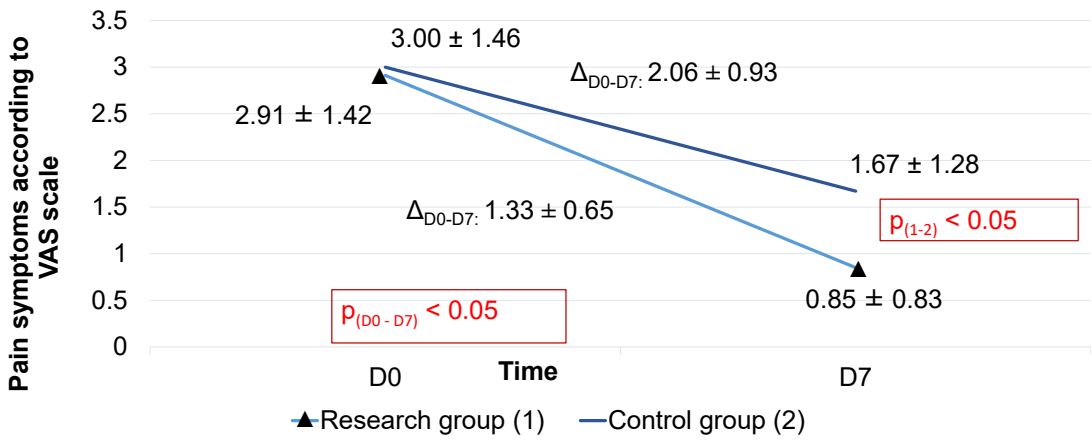

Chart 1. Changes in pain symptoms according to the VAS scale

Table 2. Changes in bruising area

Day \ Group	Study group (n = 33)	Control group (n = 33)	p_{1-2}
	$\bar{x} \pm SD$ (mm^2)	$\bar{x} \pm SD$ (mm^2)	
D_0	2065.06 ± 1793.3	2088.67 ± 1716.96	> 0.05
D_7	909.10 ± 937.77	1354.64 ± 1192.79	> 0.05
Δ_{D0-D7}	1155.97 ± 962.16	734.03 ± 552.51	< 0.05
$p_{(D0-D7)}$	< 0.05	< 0.05	

At time point D_0, the area of bruising in the facial region in both groups showed no statistically significant difference with p > 0.05.

After 7 days of treatment (D_7), the area of bruising in both groups decreased significantly with p < 0.05. The research group reduced the area of bruising from 2065.06 ± 1793.3 (mm^2) to 909.10 ± 937.77 (mm^2), showing a tendency towards better improvement than the control group, which reduced the area of bruising from 2088.67 ± 1716.96 (mm^2) to 1354.64 ± 1192.79 (mm2). However, the difference between the two groups was not statistically significant with p > 0.05.

Table 3. General Treatment Results

Group	Study group (1) (n = 33)		Control group (2) (n = 33)		Total		p_{1-2}
	n	%	n	%	n	%	
Effectiveness							
Good	12	36.34	07	21.21	19	28.79	< 0.05
Fair	10	30.33	08	24.24	18	27.27	
Poor	11	33.33	18	54.55	29	43.94	
Total	33	100	33	100	66	100	

After 7 days of treatment (D7), the research group had better treatment outcomes than the control group, with the proportion of patients achieving good results being 36.4%, fair results being 30.3%, and poor results being 33.3%. The difference between the two groups is statistically significant with $p < 0.05$.

3. Adverse Effects

During the clinical monitoring process, no symptom such as generalized itching, redness, hives, or blisters were detected in either group.

IV. DISCUSSION

Contusions cause blood to spill into the tissues due to the rupture of small blood vessels at the site of impact. The classification of the injury includes intradermal, subcutaneous, and deep layers without disrupting the surface layer of the skin. Red blood cells in the ruptured wound and hemoglobin molecules are broken down into hemosiderin, hematoidin, and bilirubin by the action of enzymes. The color of the injury changes over time: red at the time of injury, blue within a few hours to 3 days, and bluish - black to brown due to the deposition of hemosiderin from the extravasted red blood cells on the fourth day. After 5 - 6 days, the injury turns green due to the breakdown of hemoglobin into hemosiderin. From days 7 to 12, the injury turns yellow due to the presence of bilirubin, the final breakdown product of the pigment. Normal skin injuries within 2 weeks. Factors influencing the colour of the injury include the depth of bleeding, the amount of blood extravasation, and overlying skin color.[3] More than 90% of sports-related injuries are due to contusions when muscles are suddenly compressed by a strong force. In clinical practice, first aid based on the RICE principle (R = Rest, I = Ice, C = Compression, E = Elevation) is used to prevent bleeding into tissues and minimise the degree of the injury. The destruction phase immediately after injury is characterised by muscle cell damage, blood clot formation, and cellular inflammation. Non-steroidal anti-inflammatory drugs (NSAIDs) or glucocorticoid short-term use during this phase reduces inflammatory cell reactions.[12] Trypsin (chymotrypsin) is a protein-degrading enzyme used since the 1960s as a solution to improve inflammatory symptoms and promote acute injury recovery.[6] According to Traditional Medicine, “When injured, blood circulation and the qi immediately becomes stagnant, leading to swelling. To treat pain, first blood statis and swelling must be relieved. Therefore, in Traditional medicine, it is necessary to promote blood stasis, nourish and quicken the blood. The LX1 remedy thoroughly applies the above principle when using many Traditional medicinal herbs that have the effect of activating blood and eliminating emphysema such as: Phloem of Bombax (containing 3.01% tannin) with the effect of tightening the skin, astringent the mucous membrane, and reducing swelling; Justicia gendarussa to eliminate rheumatism, dispel stasis, reduce swelling and relieve pain; Cheilocostus speciosus has the effect of water-draining and swelling-dispersing; Tinospora sinensis Merr cord has the effect of treating rheumatism and is used to cover swollen and painful areas; Zingiber officinale helps clear meridians, relieve pain, and circulate blood. The above medicinal herbs overlap with statistics in research on the ingredients of medicinal herbs according to the Dao people’s experience in treating injuries: Justicia gendarussa 86.67%, Ginger 83.33%, Rice bark 76.67%, Plantago major 66.67%.[13] The LX1 medication, with its clear heat and reduced inflammation, has the effect of promoting the inflammatory process, rapidly increasing the number of granular tissues, reducing swelling,

hematomas and pain with 6 out of 10 medicinal ingredients such as Phloem of Bombax, Blumea balsamifera, Justicia gendarussa, Plantago major, Strobilanthes cuisine, Cheilocostus speciosus, and Tinospora sinensis Merr. The use of medicinal ingredients that both clear heat and promote and trans- form blood such as Phloem of Bombax, Strobilanthes cuisine, and Justicia gendarussa helps achieve a high treatment effectiveness while reducing the number of medicinal ingredients. In addition, Blumea balsamifera and Zingiber officinale maximize the effects of the medication. Blumea balsamifera has the effect of dilating peripheral blood vessels, and Ginger recuperating depleted Yang and invigorating pulse beat, making it easier for the medication to be absorbed through the skin. Blumea balsamifera has an antibacterial effect, inhibiting bacteria, and is promising for use in subsequent studies on patients with scratches or open wounds.[14] The LX1 medication is formulated as a topical cream, with active ingredients extracted according to standardized processes and dosages, supplemented with suitable excipients to ensure correct dosage usage, high safety, softness, moisture, reduced toxicity, and long-term preservation. Additionally, using cream is convenient for patients, contributing to the modernization of traditional medicine. This is an advantage over the usage of fresh herbs in the community as in the past, which was difficult to control in dosage, involved manual harvesting and processing, consumed labor and resources, and had a risk of burns and skin discoloration upon use.

V. CONCLUSION

The effectiveness of LX1 cream in assisting the treatment of contusions in the facial region: Based on a study involving 66 patients with facial contusions, the authors have drawn several conclusions:

Pain reduction effect based on VAS score: After 7 days of treatment, the average VAS score decreased from 2.91 ± 1.42 (points) to 0.85 ± 0.83 (points). The average improvement in VAS score compared to before treatment was -2.06 ± 0.93 (points), statistically significant with $p < 0.05$. The treatment effect was better than the control group ($p < 0.05$).

Reduction of bruising based on changes in bruise area: After 7 days of treatment, the average bruise area decreased from 2065.06 ± 1793.3 (mm^2) to 909.10 ± 937.77 (mm^2). The average improvement in bruise area compared to before treatment was 1155.97 ± 962.16 (mm^2), statistically significant with $p < 0.05$.

Treatment effectiveness: After 7 days of treatment, 66.7% of patients had good or satisfactory treatment outcomes. The treatment effect was better than the control group ($p < 0.05$).

The safety of LX1: LX1 medication combined with the basic protocol of Modern Medicine during the study period did not exhibit any adverse effects on certain clinical indicators such as increased pain, skin swelling, increased edema, itching, redness, or blistering.

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