

Clinical application research on the use of the Photon Therapeutic Apparatus combined with Hops extract compound ointment in treatment for breast cancer patients

Yunzhu Chen, Liying Qun and Guang Sun^a

Breast Surgery Department of China-Japan Union Hospital of Jilin University, No.169,Xiantai Street Changchun Jilin Province,130021, China

Abstract. Objective: To research Carnation-87C photon therapeutic apparatus combine with compound hops extract ointment in the clinical effect of breast cancer patients after operation with unhealed incision of skin flap necrosis. Method: The experimental group is treated by the conventional therapy and Carnation-87C photon therapeutic apparatus combine with compound hops extract ointment, while the control group is treated by the conventional therapy only, such as regular dressing change. The other treatments for two groups of patients are the same. Through 4 weeks' treatment, the growth of fresh granulation tissue and healing time were observed between two groups. Results: There were statistically significant differences ($P<0.05$) in the growth of fresh granulation tissue and healing time between two groups of patients with non-healing skin flap necrosis after the operation. Conclusion: The treatment with the Carnation-87C photon therapeutic apparatus combine with compound hops extract ointment for breast cancer patients after operation with unhealed incision of skin flap necrosis is easy to operate with good curative effect, and it is worth popularizing in clinical application.

1 Introduction

Since May 2011, Carnation-87C photon therapeutic apparatus (Shenzhen Pumen science and Technology Co., Ltd. production) combine with compound hops extract ointment (Jilin Haifa pharmaceutical Limited by Share Ltd Jilin Aodong group) were used in 31 cases of breast cancer postsurgical patients with skin flap necrosis in our department and their wound healing finally acquired definitive curative effect.

2 Method

2.1 Inclusion criteria

^a Corresponding author: guangsun2013@163.com

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Patients from China-Japan Union Hospital of Jilin University during May, 2011 and May, 2016, female, accepted the breast cancer modified radical mastectomy or radical mastectomy, diagnosed with breast cancer by pathology and immunohistochemistry examination, had long-term non-healing (>2 weeks) skin flap necrosis after radical mastectomy or modified radical mastectomy.

2.2 Exclusion criteria

Patients had serious infection, autoimmune disease or basic diseases of other organs, such as liver, kidney, heart, cerebrovascular, etc. Patients had other serious complications, such as severe pneumonia, pulmonary embolism, myocardial infarction, etc. Patients were allergic to compound hops extract ointment.

2.3 General information

We selected the patients from China-Japan Union Hospital of Jilin University during May, 2011 and May, 2016. Those patients with skin flap necrosis after breast cancer surgery required a long recovery cycle (more than 2 weeks). Following the strict inclusion and exclusion criteria, all the patients we chose were female who had been taken the breast cancer modified radical mastectomy or radical mastectomy. Using the method of random number table, the 61 cases of breast cancer patients in the group of number were divided into two groups: 31 cases in experimental group while 30 cases in control group.

The experimental group, aged between 36-73 (51.48±9.06) years old, median age is 51 years old, is treated by the conventional therapy and Carnation-87C photon therapeutic apparatus combine with compound hops extract ointment. Their necrotic skin flap healing period is between 15 and 45(23.10±7.92) days. The average wound area is 20.48±19.45 cm² and 13 tumours are on the left breast while 18 tumours are on the right breast.

The control group, aged between 31-69 (52.87±7.71) years old, median age is 54 years old, is treated by the conventional therapy only, such as regular dressing change. Their necrotic skin flap healing period is between 28and 60(39.73±8.20) days. The average wound area is 19.97±18.34cm² and 19 tumours are on the left breast while 11 tumours are on the right breast.

The two groups of cases showed no statistical difference in age and the average wound area (P > 0.05), but showed significance difference in treatment days (P <0.05). General clinical information is shown in Figure 1 below treatment days.

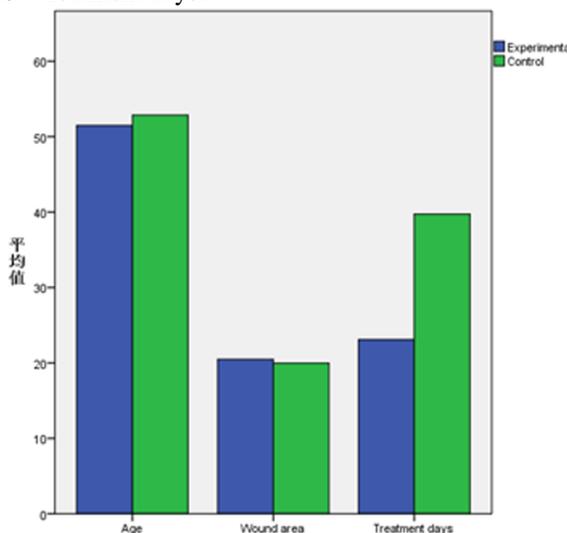


Figure 1. The General Information of the two groups which show no statistical different in age, the average wound area ((P > 0.05)), but show significance difference in treatment days (P <0.05).

3 Treatment

The experimental group is treated by the conventional therapy and Carnation-87C photon therapeutic apparatus combine with compound hops extract ointment. After using the iodine tampons to disinfect surrounding skin, washing the wound by physiological saline repeatedly and removing the necrotic tissue completely, we use the photon therapeutic apparatus to irradiate the wound for 15 minutes each time with 10- 12cm of distance. Then we apply compound hops extract ointment to the wound duly; keep appropriate negative pressure drainage unobstructed and use external pressure dressing to make the compound hops extract ointment integrated with the wound closely. The dressing change should be done once a day. The fresh granulation tissue growth and healing status of the wound can be observed stage by stage.

The control group is treated by the conventional therapy only, such as regular dressing change. After using the iodine tampons disinfect surrounding skin, washing the wound by physiological saline, use scissors to cut off the wound necrotic tissue. Then use physiological saline cotton ball to wipe the wound purulent secretion off. The last step is to wash the wound by physiological saline repeatedly, keep negative pressure drainage unobstructed and use external pressure dressing to make sterile gauze integrated with the wound closely. The dressing change should be done once a day. Observe the fresh granulation tissue growth and healing status of the wound. The other treatments for two groups of patients are the same.

3.1 Standard of curative effect and evaluation method

Healing: The wound should be covered by the newborn epithelial tissue. The healing area is more than 50% with no exudation and the local tissue should be repaired successfully.

Effective: Part of the wound should be covered by the newborn epithelial tissue. The healing area is more than 50% with no exudation and the new granulation tissue can be seen.

Invalid: There is no newborn epithelial tissue covering the wound. The healing area is less than 50% with exudation or bleeding and erosion appears at local wound.

If the wound is still unhealed after 4 weeks' treatment, we should continue the same treatment and statistics the time when the wound heals completely.

3.2 Statistical processing

SPSS23.0 statistical software is applied; t test analysis is used for measurement data while count data is used for chi-square test. $P < 0.05$ for differences is statistical significance.

4 Results

Through our comparative analysis of two groups' clinical curative effect after treatment. The results showed that in experimental group including 31 patients, 27 cases showed healed (87%), only 1 case showed invalid (3%), healing period was between 15 and 45(23.10 ± 7.92) days; and in control group including 30 patients, 20 cases showed healed (67%), 3 cases showed invalid (10%), healing period was between 28 and 60(39.73 ± 8.20) days. Two groups of patients were statistical significance ($p < 0.05$).

Table 1. Comparison the two groups of patients' clinical curative effect after treatment.

Group	Case number	Healed	Effective	Invalid	Recovery Rate	Healing time
Experimental	31	27	3	1	87	23.10 ± 7.92
Control	30	20	7	3	67	39.73 ± 8.20

5 Discussion

Not only in China but also in the other countries all over the world, the breast cancer is one of the most malignant tumours which are harm to women's health. Taking surgery is still the key part in breast cancer treatment, and that makes postoperative subcutaneous effusion, infection and skin flap necrosis become common postoperative complications in most breast cancer patients, and that common postoperative complications can directly affect the development of subsequent chemotherapy and radiotherapy. The postoperative complications' occurrence rate is between 10% and 61% according to domestic and foreign comprehensive reports[1].

There are a lot of factors including the incision's location selection, the thickness of the flap, the reasonable use of electric knife; complete wound hemostasis and effective drainage can affect the healing process of the incision. High tense surgical incision is not conducive to healing of the wound. The skin flap necrosis often caused by the absolute shortage of tissue volume and the blood supply obstacle. Most surgeons are used to radio-knife for skin flap decoherence in the operation of breast cancer and because a lot of patients' fat layer is too thick, postoperative patients often suffer from skin flap necrosis or small area of the wound become ulcer and scabby. Uncompleted wound hemostasis is easy to cause subcutaneous effusion or accumulate blood which is not conducive to the wound healing. Inoperative drainage is easily to cause dead space below skin flap, which increase the leakage of the wound and the risk of infection. So the wound healing won't be good enough even the wound will be disunion. Therefore, surgeons should pay more attention to the five key points below to help postoperative patients' wound healing. Firstly, surgeons should select moderate skin tension of incision. Secondly, surgeons should keep a small amount of subcutaneous fat layer to ensure the blood supply. Third, surgeons should use low-power radio-knife as far as possible. Fourth, patients' wound hemostasis should be complete. Fifth, clinical medical stuff should keep drainage smooth [2].

As shown in Figure 2, the Carnation - 87 - c red light therapeutic apparatus can output the monochrome photon beam whose wavelength is between 600 and 700 nm. After irradiating high intensity photon beam irradiation on the wound, photon energy is absorbed by mitochondria in cells, stimulate a variety of the enzyme activities such as cytochrome oxidase in mitochondrial, promote the synthesis of adenosine triphosphate (ATP), improve the function of cell respiration and circulation, increase the amount of vascular endothelial cell factors and basic fibroblast growth factors in blood to facilitate the proliferation of fibroblasts and endothelial cells. Red light therapy can enhance leukocyte phagocytosis, improve the cellular immunity and humoral immunity functions, strengthen the ability to resist infection, get inflammation of resolution [3]. Red light treatment can obviously improve local blood circulation, reduce blood vessel permeability, reduce wound fluid seepage, improve the absorption of the drainage [4], so as to promote wound healing and shorten the length of hospital stay. In short, Carnation - 87 - c red light therapy can cure local tissue inflammation, get detumescence and analgesic effects and can obviously shorten the healing time, improve hospital's quality of medical therapy. In summary, red light irradiation has effect on local anti-inflammatory, detumescence, analgesia, which can significantly shorten the healing time to improve the quality of life of patients with breast cancer after operation and curative effect, and it has good expand prospect improve hospital quality of care.

Compound hops extract ointment contains, hops extract, gamma - evening primrose oil, vitamin B12, etc. Its main functions are antipruritic, analgesic and repairing vascular endothelial cells. It also has almost the same topical analgesic effect compared with cocaine and procaine [5]. It is reported that hops extract is antibacterial, antiviral, antitumor, antioxidant and sedative which can obviously inhibit the growth of the gram-positive bacteria such as staphylococcus aureus [6-8]. Hops extract compound ointment solves the problems such as drying easily, no persistent action time which are caused by external traditional drugs. When early injured skin micro vascular expansion happens, hops extract compound ointment can be fully absorbed by skin and directly be involved in RNA synthesis in skin cells, so blood vessel endothelial injury can be constantly repaired and vascular endothelial cells can be protected. According to the functional characteristics of hops extract compound ointment, the wound healing and good results were obtained successfully. Apply hops extract compound

ointment to the wound duly; keep appropriate negative pressure drainage unobstructed and use external pressure dressing to make the hops extract compound ointment integrated with the wound closely. This method can improve the anti-inflammatory and analgesic therapeutic effect of hops extract compound ointment on saprophytic muscle and accelerate the growth of epithelial cells. Because the medicine source is rich, the production technology is mature, the method of application is convenient and the curative effect is good without side effects, it is worth popularizing and applying in clinic.

31 patients have no obvious side effects in the process of using Carnation-87C photon therapeutic apparatus combine with compound hops extract ointment and it has obvious advantages in the treatment of skin flap necrosis after breast cancer operation.

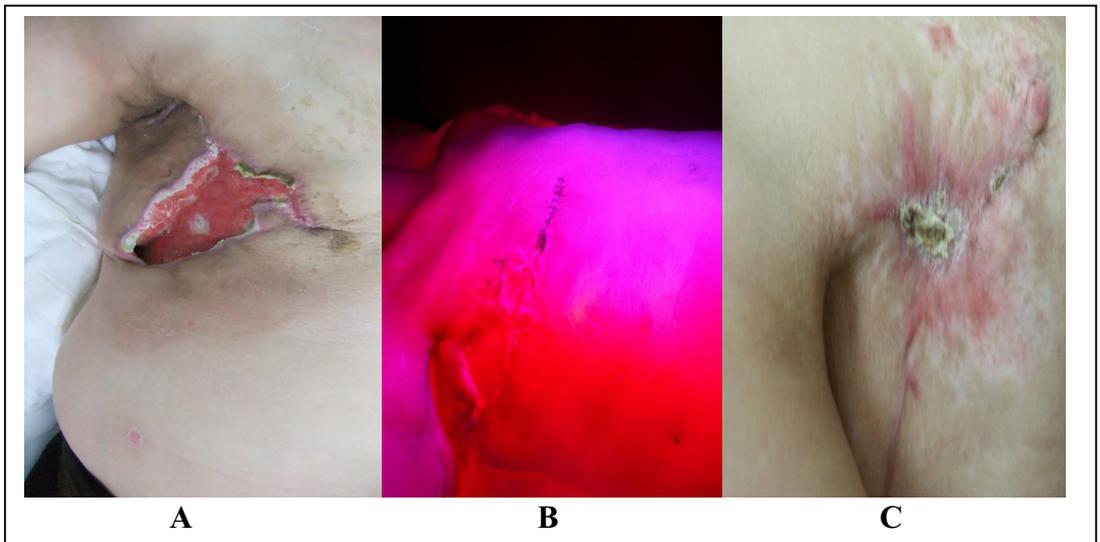


Figure 2. Headings 15 days after breast surgery. There is a 12.58×5.32cm² skin flap necrosis appear on this patient right chest. A: The incision before treatment. B: The photon therapeutic apparatus was working. C: The incision got healed after 4 weeks by using he photon the rapeutic apparatus combined with compound vitamin B12 ointment II.

References

1. Komorowski A, Zanini V, Regolo L, et al. Necrotic complications after nipple and areola sparing mastectomy J[J]. *World J Surg*, 2006, **30**(7):1410.
2. Olsen MA, Nickel KB, Margenthaler JA, et al. Increased risk of surgical site infection among breast-conserving surgery reexcisions [J]. *Ann Surg Oncol*, 2015, **22**(6):2003-2009.
3. Yinghong Xia, Chuanlong Miao, Shao Wang, et al. The inhibition of pain caused by Vitamin B12 ointment on inflammation. [J] *Journal of Bethune medical university*, 1996, 22 :597.
4. Yumei Liu, Chemical Composition and Pharmacological Effect of Hops: A Review. [D]. Xinjiang: Xinjiang University College of Chemistry and Chemical Engineering, 2009. 23-30.
5. YU Xue-ming, LI Juan, Clinical observation of the photon therapeutic apparatus in preventing its complications after flap surgery. *Chinese Journal of Aesthetic Medicine*, 2015, **20**:1008-6455.
6. Danbin Jia, Yu Zhu, Shan Liu, et al. Effect of red light irradiation on wound healing [J] *J Fourth Mil Med Univ*, 2008, **29**(13):1195-1197.
7. Aifeng Zhu, Hongbin Yang, Xuefeng Wan, et al. Curative effect observation of red light in the treatment of postoperative wound of condyloma [J]. *Practical clinical medicine*, 2010, **11**(1):67-69.

8. Bin Zhang, Bin Gao. Analysis of high energy and narrow spectrum photon therapy in the treatment of third degree pressure ulcers. [J] *Chinese medical equipment*,2013,**10**(2):15-17.