3rd INTERNATIONAL GASTRIC CANCER CONGRESS
Seoul, Korea, April 27-30, 1999

Editors
JIN-POK KIM, M.D., Hon FACS
JIN-SIK MIN, M.D., FACS • YOUNG-JAE MOK, M.D.

MONDUZZI EDITORE
INTERNATIONAL PROCEEDINGS DIVISION
Effects of PILER light therapy on wound healing in patients operated due to stomach carcinoma

A. SIMIĆ, D. STOJAKOV, P. SABLJAK, I. JEKIĆ, M. BJELOVIĆ, P. PEŠKO and M. Todorović*

Department of Esophagogastric Surgery
First University Surgical Hospital
Clinical Center of Serbia, Belgrade (YU)
*Zepter Dental Clinic, Belgrade (YU)

SUMMARY

In the last few years a BIOPTRON® light therapy, as the most advanced type of PILER therapy, has shown excellent results in the treatment of different dermatological diseases. At our Department we investigated the wound healing in 26 patients operated for cure, due to stomach carcinoma, through the upper middle incision. In 14 patients a BIOPTRON® PILER light therapy has been added to the standard way of operative wound treatment. According to our results PILER therapy significantly decreases the incidence of seroma and infection. No side effects of this therapy have been noticed. We conclude that BIOPTRON® light therapy should be applied to the standard way of treatment in all surgical wounds in patients operated due to stomach carcinoma.

INTRODUCTION

Different effects of light waves, different tissues and organic systems as well as diseases and pathologic conditions, represent a surrounding in which light, as the genuine natural therapy, constantly proves great potentials 1, 2. Light employs the defensive mechanisms of the healthy
tissue and fastening the healing in the damaged ones \(^3,^4\). Investigations concerning the positive effects of the light therapy have gained much appreciation in the last decade \(^1,^3\). Positive effects of the Polarized Polychromatic Incoherent Low Energy Radiation (PILER) has been documented in many medical indications: general disorders, diverse inflammatory reactions, infectious, cardiovascular, and dermatological diseases as well as in the skin wounds, burns and ulcers \(^2,^4,^5,^6\). PILER therapy could be superficially applied on the whole body or one of its parts. PILER therapy shortens the period of hospitalization, enables better and faster wound healing, lowers the incidence of infections and other wound complications as well as shortens the period of wound pain and its intensity \(^5,^7,^8\).

Polarized BIOPTRON\(^\text{®}\) light therapy functions over the well oxygenated surface (with high concentration of oxygen from Oxy spray) directly influencing following processes: 1) strengthening the defensive mechanism (T lymphocytes, cellular immunity); 2) increasing local concentration of immunoglobulins (B lymphocytes, humoral immunity); 3) increasing the production of collagen and elastic fibers; 4) increasing and fastening the proliferative cellular phase of the inflammatory processes and 5) antioxidantly, by toxic influence on the free radicals \(^3,^4,^7,^9\).

To our knowledge this is the first investigation concerning the effect of PILER light therapy on surgical wounds healing. The aim of this study was to investigate the effects of the PILER therapy on the surgical incisions in patients radically operated due to stomach carcinoma.

**MATERIALS AND METHODS**

In the period between March 1\(^{st}\) and September 1\(^{st}\), 1998, at our Department, quality of wound healing was investigated in 26 patients that have been operated due to stomach carcinoma through the upper middle incision. The same team of surgeons performed all operations. In all patients total gastrectomy with systematic D2 lymphadenectomy and Roux-en-Y anastomosis have been performed.

In 14 patients a BIOPTRON\(^\text{®}\) PILER light therapy has been added to the standard way of operative wound treatment. In this group of patients male / female ratio was 8 / 6, with a mean age of 60.23 year and average length of the upper medial incision of 17.2 cm. Control group, in which operative wounds were treated in standard manner, was represented by 12 pts. Male / female ratio in the control group was 7 / 5, with the mean age of 62.88 years and average length of the incision of 16.8 cm. PILER therapy was applied daily as a single exposure, starting on the 2\(^{nd}\) postoperative day and lasted 7 days. The duration of the light therapy application was 5 minutes and the distance from the incision to the PILER light source as 15 cm under the right angle. All patients have been treated in the same environment.

Types of wound healing were divided in four groups according to the presence of seroma and infection on the 10\(^{th}\) postoperative day. Excellent wound healing was acknowledged as the one that healed without seroma or infection and the sutures were removed on the 8\(^{th}\) postoperative day.
Figure 1. Wound healing of the patients in whom a total gastrectomy with systematic D2 lymphadenectomy due to stomach carcinoma have been performed according to the application of the BIOPTRON light therapy.

Satisfactory result was obtained in wounds in which there was a small amount of seroma but without infection and sutures were also removed on the 8th postoperative day. Unsatisfactory wounds were described as one with seroma and infection in which suture removal was delayed for a few days. Bad result was described in wounds in which a large scale of infection was present with the consecutive dehiscence of fascia.

RESULTS AND CONCLUSION

On the 10th postoperative day operative wounds treated with PILER light therapy healed excellent in 11 patients (78.57 %), satisfactory in 2 (14.28 %) and unsatisfactory in 1 (7.15 %) patient. In none of the above mentioned three groups of patients a side effects of the therapy have been noticed. In the control group operative wounds healed excellent in 4 patients (33.33 %), satisfactory in 6 (50.00 %), unsatisfactory in 2 (16.66 %) patients. In both groups of patients there were no bad results. Statistical analysis has shown that the above mentioned results indicate statistically significant difference (p > 0.05) between the two groups according to the application of the BIOTRON® light therapy.

All patients in whom the BIOPTRON® light therapy was investigated are of chronic type in whom pathophysiological processes have been significantly disturbed with compromised nutritional and absorptive as well as immunobiological function of the organism. Most of the patients were elderly, with significantly decreased regenerative potentials of the organism. These surgical procedures are one of the most demanding in surgery, whose type, length and potential complications significantly induce further stress to the patient.

Concerning our results and the above mentioned facts, we can conclude that PILER light therapy is a very simple and effective way of treatment of surgical wounds. In patients operated due to stomach carcinoma in whom a total gastrectomies with systematic D2 lymphadenectomies has been performed, we found that the application of BIOPTRON® PILER therapy significantly decreases the possibility of seroma or infection of the wound.
No side effects of this therapy have been noticed. Application of this type of wound therapy significantly shortens the postoperative hospital stay. Finally we in conclusion, PILER light therapy should be added to the standard way of treatment in all surgical wounds in patients operated due to stomach carcinoma. Also we can indicate, since we treated one of the most demanding groups of surgical patients, that PILER light therapy should be used in almost all kinds of surgical wounds.

REFERENCES