

3rd International Gastric Cancer Congress
April 27 – 30, 1999
Korea, SEUL

990427/C/5398

Effects of PILER light therapy on wound healing in patients operated due to stomach carcinoma

- A. SIMIC** Department of Esophagogastric Surgery, First University Surgical Hospital, Clinical Center of Serbia, Belgrade, Yugoslavia
- D. STOJAKOV** Department of Esophagogastric Surgery, First University Surgical Hospital, Clinical Center of Serbia, Belgrade, Yugoslavia
- P. SABLJAK** Department of Esophagogastric Surgery, First University Surgical Hospital, Clinical Center of Serbia, Belgrade, Yugoslavia
- I. JEKIC** Department of Esophagogastric Surgery, First University Surgical Hospital, Clinical Center of Serbia, Belgrade, Yugoslavia
- M. BJELOVIC** Department of Esophagogastric Surgery, First University Surgical Hospital, Clinical Center of Serbia, Belgrade, Yugoslavia
- P. PEŠKO** Department of Esophagogastric Surgery, First University Surgical Hospital, Clinical Center of Serbia, Belgrade, Yugoslavia

SUMMARY

INTRODUCTION

MATERIALS AND METHODS

RESULTS AND CONCLUSION

CAPTIONS

SUMMARY

On a large scale of medical indications a valuable effect of Polarised Polichromatic Incoherent Low Energy Radiation (PILER) has been documented. 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. This is the first investigation concerning the effect of PILER therapy on surgical wound healing. At our Department we investigated the quality of wound healing in 26 patients that have been operated due to stomach carcinoma through the upper middle incision. In all patients total gastrectomie with D2 lymphadenectomy and Roux anastomosis have been performed. In 14 pts a BIOPTRON[®] PILER light therapy has been added to the standard way of operative wound treatment. In our investigation we found that the application of PILER therapy significantly decreases the incidence of seroma and infection of the wound. So far no side effects of this therapy have been noticed. We conclude that PILER light therapy should be applied to the standard way of treatment in all surgical wounds in pts 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 one of the most natural ways of therapy, constantly proves great potentials. The way of its function is by employing the defensive mechanisms of the healthy tissue and fastening the healing in damaged ones. Investigations concerning the positive effects of the light therapy had gained much of the appreciation in the last decade.

Positive effects of the Polarised Polichromatic Incoherent Low Energy Radiation (PILER) has been documented in many medical indications: general disorders, inflammatory interactions, infectious, cardiovascular, and dermatological diseases as well as in the skin wounds, burns and ulcers. PILER therapy is used by superficial application on the whole body or one of its parts. Positive effects of the PILER therapy are shown in the effect of shortening the period of hospitalization, better and faster wound healing, lowering the incidence of infections and other wound complications as well as shortening the period of wound pain and its intensity.

Polarized BIOPTRON light therapy is functioning 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 imunoglobulins (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 antitoxic influence on the free radicals.

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

MATERIALS AND METHODS

In the period between March 1st and September 1st, 1998., at our Department, we investigated the quality of wound healing in 26 patients that have been operated due to stomach carcinoma through the upper middle incision. In all patients total gastrectomies with systematic D2 lymphadenectomy and Roux anastomosis have been performed. In 14 pts a BIOPTRON® 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. Once a day application of the PILER therapy started on the 2nd 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 apparatus was 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 during the 10 postoperative days. Excellent wound healing was acknowledged as the one that healed without seroma or infection and the sutures were removed on the 8th postoperative day. 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 fascia dehiscence.

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 group of patients there was 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 pathofisiologic processes have been significantly disturbed with changed nutritive and absorptive as well as imunobiological function of the organism. Most of the treated patients are of the group of elderly with significantly decreased regeneration potentials of the organism. These surgical procedures are one of the most demanding procedures in surgery, whose type, length of operation and possibility of complications significantly induces further stress to the patients.

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 hospitalization. At the end we can conclude that PILER light therapy should be applied to the standard way of treatment in all surgical wounds in patients operated due to stomach carcinoma. Also we can conclude, since we treated one of the most demanding groups of surgical patients, that since our results indicate excellent results, PILER light therapy should be used in almost all kinds of surgical wounds.

REREFENCES

- 1) KARU TI. Photobiological fundamentals of low power laser. Journal of Quantum Electronics. 23: 1703-1717; 1987.
- 2) KERTES L, FENYO M, MESTER E, BATHORI G. Hypothetical physical model for laser biostimulation. Optics and Laser Technology. 171: 907-908; 1982.
- 3) KUBASOVA T, FENYO M, SOMOSY Z, GAZSO L, KERTESZ I. Investigation on biological effect of polarized light. Photochemistry and photobiology. 48: 505-509; 1988.
- 4) FENYO M. Theoretical and experimental basis of biostimulation. Optics and Laser Technology. 16: 209 - 215; 1984.

- 5) BOLTON P, DYSON M, YOUNG S. The effect of polarized light on the release of growth factors from the U-937 macrophage-like cell line. Original article. Polarized light and fibroblast proliferation. 33 - 37; 1982.
- 6) YOUNG SR, DYSON M, BOLTON P. The effect of light on calcium uptake by macrophages. Laser Therapy. 2: 53-57; 1990.
- 7) VAREGIO L, HOLDEN HT. Regulation of lymphocyte activation: macrophage dependent suppression of T-lymphocyte protein synthesis. Journal of Immunology. 125: 1694-1701; 1980.
- 8) STEGMANN W. Phlebotomy and Proctology 1985. In: Hollister BA, Fontana GP. BIOPTRON lamp research review. 1990.
- 9) Milan Burn Center. Milan, Italy. Unpublished reports. In: Hollister BA, Fontana GP. BIOPTRON lamp research review. 1990.

CAPTIONS

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.

