P990021

SUMMARY OF SAFETY AND EFFECTIVENESS

I. GENERAL INFORMATION

Device Generic Name:	Diode Laser, Surgical Laser
Device Trade Name:	Diomed 630 PDT Laser, Model T2USA
Applicant's Name and Address (US Representative)	QLT PhotoTherapeutics, Inc. c/o Jonathan S. Kahan Hogan & Hartson 555 Thirteenth Street, N.S. Washington, D.C. 20004-1109
Laser Manufacturer Name and Address:	Diomed, Ltd. Cambridge Research Park Ely Road Cambridge, CB5 9TE United Kingdom
PMA Number:	P990021
Date of Notice to Applicant	JUN 30 2000

II. INDICATIONS FOR USE

The Diomed 630 PDT Laser is intended for use in Photodynamic Therapy (PDT) as a source for the photoactivation of PHOTOFRIN® (porfimer sodium) for Injection for:

a. palliation of patients with completely obstructing esophageal cancer, or of patients with partially obstructing esophageal cancer who, in the opinion of their physician, cannot be satisfactorily treated with Nd:YAG laser therapy,

b. reduction of obstructing and palliation of symptoms in patients with completely or partially obstructing endobronchial nonsmall cell lung cancer (NSCLC), and

c. treatment of microinvasive endobronchial NSCLC in patients for whom surgery and radiotherapy are not indicated.

Refer to the PHOTOFRIN® Package Insert for information and instructions for use of the drug and for information on laser power, duration, and light dose. Refer to the OPTIGUIDE Package Insert for information on use of the delivery fiber optic diffusers.

III. DEVICE DESCRIPTION

The Diomed 630 PDT Laser is an Aluminum Gallium Indium Phosphor (AlGaInP) diode laser with a wavelength of 630 ± 3 nm. The system is capable of delivering up to 2.66 watts of continuous wave radiation. Operator can select exposure time and energy output and these are displayed on the control screen. The Diomed 630 PDT Laser contains the regulatory compliance safety features (i.e. safety shutter, safety interlocks, key lock switch, etc...) and the Diomed 630 PDT Laser conforms to the requirements of 21 CFR 1040.10 and 1040.11.

IV. ALTERNATIVE PRACTICES AND PROCEDURES

Esophageal Indication

Esophageal cancer often blocks the esophagus and this prevents the patient from swallowing. Most treatments are palliative and focus on surgical methods of maintaining the lumen.

Surgical lasers, such as the continuous wave Nd:YAG laser, are used in the treatment of esophageal cancer. These lasers are used to ablate or otherwise remove cancerous tissue to maintain the lumen

Endobronchial Indications

Surgery is the standard therapy for patients with newly diagnosis Stage I, II or IIIa lung cancer. Radiotherapy is standard therapy for patients with early-stage disease who are inoperable.

V. MARKETING HISTORY

The Diomed 630 PDT Laser system has not previously been marketed in the United States or any foreign country.

VI. ADVERSE EFFECTS OF THE DEVICE ON HEALTH

Adverse effects of the Diomed 630 PDT Laser could be related to inappropriate laser powers or improper use. Such situations should not occur if the conditions and

instructions for use, as fully described in the PHOTOFRIN® and OPTIGUIDE Fiber Optic Diffuser Package Inserts, are followed.

If the laser power should drop so that the light dose delivered to tissue was below that needed to activate PHOTOFRIN®, the treatment would fail. If the power should be greater than expected, so that an excess light dose were delivered to tissue then some areas of adjacent normal tissue, that should have been spared treatment, might be damaged by the PDT effect. At very high laser power levels there would be a risk of damaging the OPTIGUIDE Fiber Optic Diffuser if the laser power levels were greater than the OPTIGUIDE Fiber Optic Diffuser rate value. This might cause nonuniform output, heating of the diffusing tip and eventual tip destruction. The inclusion of the built-in wavelength meter and integrated spherical power meter are intended to reduce these possible events.

VII. SUMMARY OF STUDIES

Non-clinical Studies

A study was designed to compare tumor response results from a commercially available Argon Pumped-Dye Laser approved for commercial use in PDT with PHOTOFRIN® to the 630 nm Diode Laser. The purpose of the study was to compare results obtained in an in vivo test system using the two different light sources, using PHOTOFRIN® (porfimer sodium) mouse bioassay as the test system. This mouse bioassay has been historically used in PHOTOFRIN® release, stability, and dose response testing. The results indicated statistically comparable in vivo performance in the photoactivation of PHOTOFRIN®.

A supportive study was performed to evaluate the in vitro cytotoxic effect of PHOTOFRIN® when activated by light produced by the same two lasers used in the in vivo study. It was determined that the diode laser provided comparable PHOTOFRIN® activation to the argon pumped-dye laser.

A third study was performed to assess the compatibility of the Diomed 630 PDT Laser with the DCYL 100 and DCYL 200 series of fiber optic diffusers in the optical characteristics of power transmission and light output uniformity. The results indicated that the Diomed laser is compatible with the DCYL 100 and DCYL 200 series of fiber optic diffusers.

Finally, a report was prepared to combine the test data generated above from use of the diode laser as carried forward with one of the current lasers cleared for commercial use in PDT with PHOTOFRIN®. Based on in vivo, in vitro, and system compatibility testing, it was concluded that the Diomed 630 PDT Laser is comparable in performance characteristics to the commercially available pumped-dye lasers for activation of PHOTOFRIN® (porfimer sodium).

Clinical Studies

The clinical data considered in support of this PMA application is contained in QLT's New Drug Application (NDA) #20-451 for PHOTOFRIN, approved December 27, 1995 and is incorporated by reference. The photoactivation of PHOTOFRIN with a laser light source comprise a combination product as defined by 21 CFR 3.1(e). The primary mode of action for this combination product has been determined to be that of a drug. Therefore, the Center for Drug Evaluation and Research (CDER) reviewed the clinical studies that support the approval of the commercially available light device systems. CDRH reviewed and approved the PMA applications for the laser light sources.

The preclinical studies have demonstrated comparability between the Diomed 630 PDT Laser and the commercially available lasers in the photoactivation of PHOTOFRIN for its intended uses. FDA has concluded that the clinical data contained in NDA 20-451 is adequate to support the safety and effectiveness of the Diomed 630 PDT Laser when used in accordance with the indications for use. No further clinical testing is warranted.

VIII. PANEL RECOMMENDATIONS

Pursuant to the provisions of section 515(c)(2) of the Food, Drug and Cosmetic Act (FD&C) as amended by the Safe Medical Device Act of 1990 (SMDA 1990), this PMA was not referred to the General and Plastic Surgery Panel, an FDA advisory panel committee, for review and recommendation because the information in the PMA application substantially duplicates information previously reviewed by this panel.

IX. FDA DECISION

FDA issued an approval order on JUN 30 2000. FDA found the Diomed Ltd. Manufacturing facility to be in compliance with the Device Quality System Regulation (21 CFR part 820).

X. APPROVAL SPECIFICATIONS

Information on the use of the Diomed 630 PDT Laser system is found in the Operator's Manual. Instructions for the use of this laser as a photoactivation source for PHOTOFRIN® can be found in the PHOTOFRIN® Package Insert. Instructions for use of this device with OPTIGUIDE Fiber Optic Diffusers can be found in the OPTIGUIDE Package Insert.

The 630 PDT Laser is intended for use in photodynamic therapy (PDT) as a source for the photoactivation of PHOTOFRIN® (porfimer sodium) for Injection for:

- palliation of patients with completely obstructing esophageal cancer, or of patients with partially obstructing esophageal cancer who, in the opinion of their physician, cannot be satisfactorily treated with Nd:YAG laser therapy;
- reduction of obstruction and palliation of symptoms in patients with completely or partially obstructing endobronchial nonsmall cell lung cancer (NSCLC); and
- treatment of microinvasive endobronchial NSCLC in patients for whom surgery and radiotherapy are not indicated.

Warnings and Precautions

Adverse effects of the Diomed 630 PDT Laser could be related to inappropriate laser powers or improper use. Such situations should not occur if the conditions and instructions for use, as fully described in the PHOTOFRIN® and OPTIGUIDE* Fiber Optic Diffuser Package Inserts, are followed.

Use of incompatible Lasers that alter the required output characteristics of light for the photoactivation of PHOTOFRIN could result in incomplete treatment due to partial photoactivation of PHOTOFRIN, overtreatment due to over activation of PHOTOFRIN, damage to surrounding normal tissue, and/or damage to the fiber optic diffuser which could additionally create an optical hazard for medical personnel and/or patients.

Adverse Effects of the Device on Health

If the laser power should drop so that the light dose delivered to tissue was below that needed to activate PHOTOFRIN®, the treatment would fail. If the power should be greater than expected, so that an excess light dose were delivered to tissue then some areas of adjacent normal tissue, that should have been spared treatment, might be damaged by the PDT effect. At very high laser power levels there would be a risk of damaging the OPTIGUIDE* Fiber Optic Diffuser if the laser power levels were greater than the OPTIGUIDE* Fiber Optic Diffuser rated value. This might cause nonuniform output, heating off the diffusing tip and eventual tip destruction. The inclusion of the built-in wavelength meter and integrated spherical power meter are intended to reduce these possible events.

Refer to the PHOTOFRIN® package insert for information and instructions for use of the drug. Refer to OPTIGUIDE package insert for information and instructions for use of the fiber optic diffuser, information on laser power, duration and light dose.