## conferenceseries.com

## International Conference on Pancreatic Disorders and Treatment October 17-19, 2016 Chicago, USA

Evaluation of the best power setting of laser waves in pancreatic surgery: Experimental study for potential applications in necrosectomy and treatment of other pancreatic pathologies

Lorenzo Dioscoridi<sup>1</sup>, Silvia Sordi<sup>1</sup>, Luca Breschi<sup>2</sup>, Damiano Fortuna<sup>2</sup>, Gherardo Maltinti<sup>1</sup>, Sylvia Corbara<sup>2</sup> and Carlo Paparozzi<sup>1</sup> <sup>1</sup>University of Florence, Italy

<sup>2</sup>El En Group, Italy

**Background:** Pancreatic surgery is one of the most difficult and life-threatening surgery especially during necrotizing pancreatitis and solid neoplasm in advance stadium.

**Aim of the study:** To evaluate the possibility to use ECHO ND-YAG laser in pancreatic surgery and to establish the best power setting for the application on pancreatic tissue. We also consider two new points in our study: How the amylases content changes in pancreatic tissue treated with laser waves and what are the conditions of vessels walls in the heat damage area?

**Methods:** ECHO Laser ND-YAG 1064 nm, at the constant fluence of 1800 J/cm2 was used. The laser waves were inserted inside of the samples with optical fibers of 500 micron diameter for pre-established timing (11 min, 6 min and 4 min) in order to reach the constant fluence. Samples were then prepared for histological examination.

**Results:** At 3W power setting, the pancreatic tissue was not macroscopically modified except for increased cutting consistency. Histological examination showed no substantial microscopical differences in pancreatic cells that appeared only partially burnt (in fact, nuclei and membranes are still recognizable). The vessels in the surrounding area have the normal morphological aspects. At 5W, macroscopically the presence of an area, corresponding to the site of direct interaction of laser and tissue, completely burnt was found and the surrounding tissue did not appear substantially modified. Histological examination showed the complete absence of cells in the burnt area and an important heat damage of the surrounding cells till the 2nd centimeter from the site of laser application. The vessels in the heat damage area appeared completely coagulated. The enzymatic stain showed, At the power of 7 W , the burnt area was about twice than in the previous setting and histological examination showed the complete absence of cells in the burnt area and a larger heat damage of the nearest cells (till the 4th centimeter from the application site). The vessels in heat damage area were found completely coagulated.

**Conclusions:** A power setting between 4 and 6 W have been found as the best one for pancreas laser application because a complete destruction of the cells in the site of application but a limited heat damage in the surrounding healthy cells have been obtained. The study shows how laser waves destroy also amylases; that property in association with complete coagulation of small vessels in the heat damage area would reduce the damage of the rest of the organ and the risk of secondary bleeding.

## Biography

Lorenzo Dioscoridi, after humanistic study, he successfully completed his Medical Schooling in Florence. He studied and worked at Karolinska University in Stockholm, at Karlova University in Prague and at Niguarda-Ca' Granda Hospital in Milan. He is now working in Careggi Hospital (Florence) as resident of the last year at the Department of Surgery and Translational Medicine. He is Associate Editor of Pancreas Open Journal since 2015. He started to approach the laser technology since 2011. His main researches are about laser application on pancreatic and hepatic tissues. He is performing experimental studies using ND-YAG laser on pancreatic tissue to thermoablate tumours and cysts and using Holmium laser to destroy biliary stones in the common bile duct. He is using ND-YAG laser clinically to treat liver metastases and hepatocarcinoma.

dioscoridi.lorenzo@virgilio.it

Notes: