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Fluorescence Proves for the First Time Its Effectiveness in Imaging Without Tracer of Parathyroid Glands During Surgery

Grenoble - Near-infrared fluorescence imaging proves for the first time to be an effective, accurate and non-invasive method of real time visualization of the parathyroid glands during thyroid and parathyroid surgery, according to the results of two studies, one French and one American.

Researchers at the Institut Gustave Roussy (IGR, France) and a team from the Cleveland Clinic in Weston (Florida) and the University of Buenos Aires (Argentina) were able to prove that fluorescence made it possible to view these glands, and without any injection of a fluorescent agent. During surgery, the surgical teams have been able to identify by autofluorescence, in real time, the parathyroid glands in all the patients, thanks to the near infrared (NIR) light provided by Fluobeam® Imaging System developed by the French company Fluoptics.

"We are very happy about this medical first. Our imaging system is for the moment the only system in the world capable of detecting the parathyroid glands by autofluorescence. This is a new frontier that is opening for fluorescence imaging. Our technology demonstrates its usefulness in helping surgeons in this type of sensitive intervention and in improving the outcome for the direct benefit of the patient by reducing the complications and the associated morbidity when these glands are accidentally injured", said Fluoptics' CEO Odile Allard, expressing her satisfaction.

The results of these studies are published in the *World Journal of Surgery*⁽¹⁾ and in the *Journal of the American College of Surgeons*⁽²⁾.

The detection of the parathyroid glands during surgery can be a challenge as these glands are very difficult to detect because of their small size – they are just a few millimeters. If the glands are damaged during thyroidectomy, the calcium metabolism is disturbed, and this may lead to hypercalcemia.

In fact, only the surgeons who perform at least one hundred thyroid surgeries per year are able to clearly detect the parathyroid glands. And even for these surgeons, the parathyroids are difficult to detect in about 20% of cases, and the risk of damaging them while searching for them is not negligible. For example, in the United States, half the thyroid and parathyroid surgeries are performed by surgeons who make less than 30 interventions of this type per year.

"Therefore, fluorescence imaging may quickly become indispensable in this type of surgery," concludes Odile Allard.

In the first study conducted by Gustave-Roussy Institute, near infrared fluorescence imaging was used during surgery in 35 patients and 81 parathyroids have been identified in vivo, an observation complemented and confirmed by identification ex vivo in 28 patients. In 80 of 81 cases, the fluorescence signal could be visualized in real time with very high sensitivity.

¹ De Leeuw F., Breuskin I., Abbaci Mr. et al. *Intraoperative Near-infrared Imaging for Parathyroid Gland Identification by Autofluorescence: A Feasibility Study*. *World Journal of Surgery*. 2016 May 24.

² Falco J., Dip F., Quadri P., et al. *Cutting Edge in Thyroid Surgery: Autofluorescence of Parathyroid Glands*. *Journal of the American College of Surgeons*. 2016 May 19.

"Near infrared imaging, based on parathyroid glands' autofluorescence is a quick, safe and non-invasive method. These are very encouraging results for the real time identification of these glands during surgery," added the IGR team leaders.

The second study, led by Dr. Jorge Falco and Fernando Dip, from Hospital de Clinicas Jose de San Martin of Buenos Aires (Argentina), was conducted in 28 patients (19 women, 9 men) having to undergo thyroid or parathyroid glands surgery. Seven were suffering from primary hyperparathyroidism, four from hyperthyroidism, three had a goiter, eleven were suffering from cancer of the thyroid, and three patients had several of these pathologies.

"The glands demonstrated statistically higher fluorescence intensity compared with the thyroid gland and the surrounding area. It is a secure, feasible, and non-invasive method for real-time identification of these glands during surgery", confirmed the leaders of this study.

About Fluoptics

Created in 2009, Fluoptics is specialized in the development and commercialization of innovative solutions in the field of fluorescence optical imaging guided surgery. This technology finds many applications in the field of surgical oncology for removal of malignant tumors or the detection of sentinel lymph nodes but also in cardiovascular surgery, reconstructive surgery, and hepatic surgery. Headquartered in Minatoc (Grenoble) and in Boston in the United States, Fluoptics has 23 employees. In 2015, Fluoptics had a consolidated turnover of 1.6 M€. For more information please visit: www.fluoptics.com

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