消化器内視鏡のレーザー応用

Comparative study of the effects of Argon and Neodymium Yag lasers beams on the fundal wall in the Beagle dog.
Clinical applications of the Yag laser in gastroenterology.

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96 laser impacts and 141 mechanically induced haemorrhagic ulcers of the gastric fundal wall were studied in the Beagle dog. The degree of penetration, the efficiency of the photocoagulation and the rate of healing as compared with untreated lesions were studied in each dog. The number of the complete haemostases was significantly higher with the Nd-Yag. These

experimental results led us to choose the Nd-Yag laser for use in human digestive endoscopy. 48 patients were treated. Photocoagulation was tried in 13 cases and was shown to be effective in all cases of angioma. Volatilization was studied in 35 cases, mostly with benign tumorous lesions, and was shown to be very satisfactory.

To acquire the mastery of the use of the laser and to decide on the choice of a type of equipment, an experimental study was first carried out on the

Beagle dog.

This study analysed the effects of Argon and Nd-Yag lasers on the normal fundal wall and on mechanically induced

haemorrhagic ulcers in the stomach of the same animal. The parameters studied with the two types of irradiation on the gastric lesions were the degree of penetration into the healthy mucosa, the efficiency of photocoagulation and the rate of healing in the tissue in comparison with untreated lesions. The results were verified by a histological study performed in blind conditions.

The analysis was carried out on 96 laser impacts and on 141 ulcers on the posterior fundal wall. Two thirds of the haemorrhagic ulcers were photocoagulated and the remaining third was not treated and was used as a control.

The parameters used were : constant distance 12 mm, angle of attack 90° , angle of divergence of the radiation 10° , coaxial gas 75 ml/s.

Argon : power 7 W, duration 3 s, diameter of the fiber 0,4 mm, diameter of the spot 2,4 mm.

Yag : power 53 W, duration 1 s, diameter of the fiber 0,6 mm, diameter of the spot 2,6 mm.

The animals were sacrificed after 0, 7, 14 or 21 days. The results showed that :

- The appearance of the impacts on the first day and during healing was different for each type of irradiation.
- The healing was faster in the untreated ulcers than in the photocoagulated ulcers.
- In the experimental conditions chosen, no perforation was observed.
- Haemostasis was very variable whatever the type of laser.
- The number of complete haemostases was significantly higher with the Yag laser.

These results suggest that the Yag laser would be preferable for use in digestive endoscopy in man. We have treated 48 cases. Some lesions are better treated with photocoagulation and others with volatilization. The choice of the parameters differs according to the effects sought.

The photocoagulation obtained with a power of 50

to 60 W, and a duration of 0,7 s per shoot have been studied in several haemorrhagic syndromes.

In 13 haemorrhagic patients with an haemoglobin level less than 8 g/l, the treated lesions were divided as follow :

5 cases of gastro-duodenal angioma, 3 cases of angioma of the colon and 5 cases of oesophageal varicosity.

We did not consider it appropriate to treat by laser the Mallory-Weiss syndrome, stress or iatrogenic ulcers or thermometric ulcerations which usually heal spontaneously or during resuscitation.

Volatilization obtained using a power of 90 to 100 W with a duration of 0,2 s to 0,3 s per shoot was studied with 35 patients :

3 Schatski rings, 1 polyp of the soft palate, 1 polyp of the piriform sinus, 1 polyp of the epiglottis, 6 gastric polyps, 2 polyps of the bulb, 2 rectocolic polyps, 7 tumours of the anal canal and of the rectum (3 benign and 4 malignant), 2 hypertrophic papillitis of the anal canal, a section of a foreign bony body stuck crossways in the oesophagus, a section of a linking thread of Celestin surgical prothesis, 1 caustic diaphragmatic oesophageal stenosis, 1 congenital oesophageal stenosis, 4 cases of recurrent pointed condyloma, 2 cases of obstructive oesophageal tumours.

The results of the study in man showed that with a Nd-Yag laser : the photocoagulation was : curative in all the cases of angioma. No relapse has been observed in our oldest case who has been followed up for 16 months.

palliative in the oesophageal varicosity.

Volatilization was effective with all the benign tumours (polyps, villous tumours, hypertrophic papillitis, pointed condyloma) where the laser permits a precise progressive and painless destruction of the lesion.

In certain malignant tumours, in inoperable patients, the laser reduces the tumour volume. Certain small rectal cancers can be treated, using the laser by contact radiotherapy.