

## Haemorrhoid sclerotherapy by light coagulation

Haemorrhoids are manifested by itching, burning, dull pain, weeping or bleeding. Haemorrhoidal complaints are frequently reported by patients during consultations. These complaints are as common as stomach complaints as shown by a survey conducted with 50 general practitioners and internal specialists. 1 - 5% of the patients reported haemorrhoidal complaints and 2 - 6% stomach complaints. Amongst our own cases, haemorrhoids were noticeable in 41% of 8420 proctologically examined patients.

Haemorrhoidal complaints can be treated medicinally, further thermally by heater or cold probes, by electrocoagulation, or by sclerosing injections. In any case the effect is diffuse and, particularly with sclerosing injections, can cause not only tiny necroses but also extensive destruction of tissue. Inflammatory necrotising reactions of this kind are predominantly due to Arthus' phenomenon type immunological reactions. Medicinal as well as bacterial substances and in particular their interaction can be assumed to be the triggering antigens. Five days after a sclerosing injection we observed an extended necrosis accompanied by a cylinder-shaped discharge of the entire rectal mucous membrane. This resulted in the development of a rectostenosis. After reports of further cases with similar complications we searched for a safe and technically simple sclerotherapy without foreign substances. One possible therapy was local irradiation that is converted into heat within the tissue and leads to coagulation of vessels and blood. We selected the light coagulator developed by Nath and Kreitmaier for haemostasis as a suitable means for this purpose particularly due to its ability to supply heat energy to the tissue in accurate doses and the anti-adhesive effect of the probe tip that does not adhere to the mucous membrane after irradiation and does not tear it like electro-coagulation probes.

The objective of every sclerotherapy is the obstruction of vessels by shrivelling tissue by scarring which can be achieved with the light coagulator in an appropriate manner. The light ray is generated by a 12 volt halogen lamp and is focused by a gold-coated reflector in a rigid light guide slightly bent for our purposes. The tip of this rod is coated with a radioparent polymer which allows the mucous membrane to be fully exposed to the radiation energy which generates within the tissue a temperature increase of 100°C on the surface and of approx. 60°C at a depth of 3 mm thus leading to coagulation of blood and vessels.

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Radiation exposure is limited by a timer integrated in the supply unit. In our experimental set-up the duration of exposure was 1.2 seconds. This produced a necrosis zone with a diameter and depth of approximately 3 mm. Neither electrocoagulation nor heater and cold probes nor sclerosing injections enable such an accurate dosage of the depth effect. An accurate prediction of the penetration depths into the tissue is not possible with these methods. For electrocoagulation, the penetration depth depends on the field density, for the heater and cold probes it depends on the transfer of energy to the tissue that can vary depending on the contact pressure of the probe on the tissue. For medicinal infiltration, the depth effect depends on the diffusion of the injected irritant. (Fig. 1).

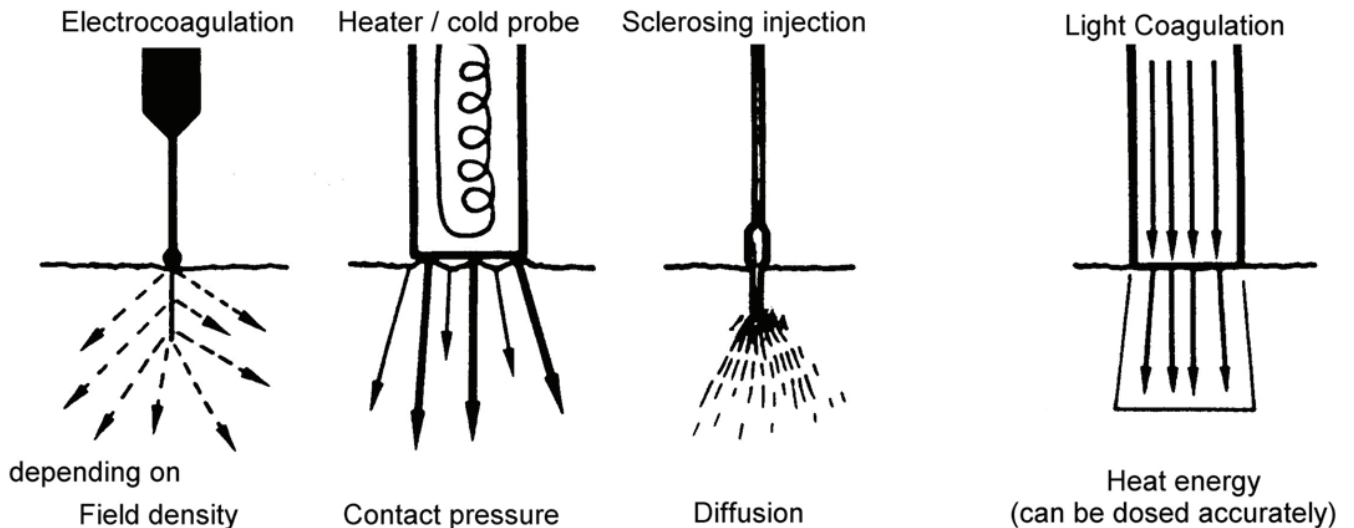


Fig. 1 Diagrammatic view of the various coagulation methods

An easy-to-grip pistol shape with a light guide with one slight bend was selected for the proctologic application (Fig. 2).

The light guide end is applied by the proctoscope to the mucous membrane just above the haemorrhoid pile. Contact is made by a switch on the handle. Coagulation is carried out in weekly intervals at two opposite points according to the sclerosing technique. The radiation exposure point can be recognised by a circumscribed greyish mucosal change.

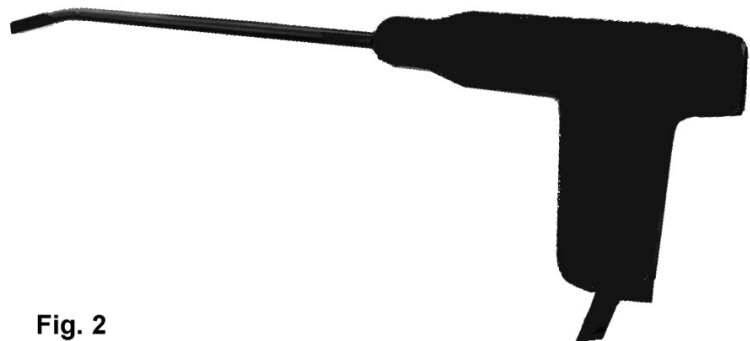


Fig. 2

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All that can be detected here after one week is a slightly indrawn spot turned reddish by capillarisation. After two weeks only a discreet scarred recession of the mucous membrane is visible. This is no longer detectable after three weeks because the normal mucous membrane has grown over the defect (Fig. 3 - 5). The macroscopically altered mucosal spots were excised with biopsy forceps and examined microscopically. Anabrosis and coagulation of tissue with oedema were detected immediately after radiation exposure. Three days later granulation tissue has grown into the submucous membrane. Coagulated vessels that contain hyaline material in their lumen can be detected amongst them. After two weeks the surface defect is covered by a simple epithelial layer. The thrombosed vessels are organised by the granulation tissue. In the deeper layers of the mucous membrane partially thrombosed vessels with narrowed lumen are detectable (Fig. 6 - 8). After three weeks a complete epithelium has developed so that the irradiation spot can no longer be detected macroscopically with an endoscope. We used the light coagulator for over 100 patients with bleeding haemorrhoids.

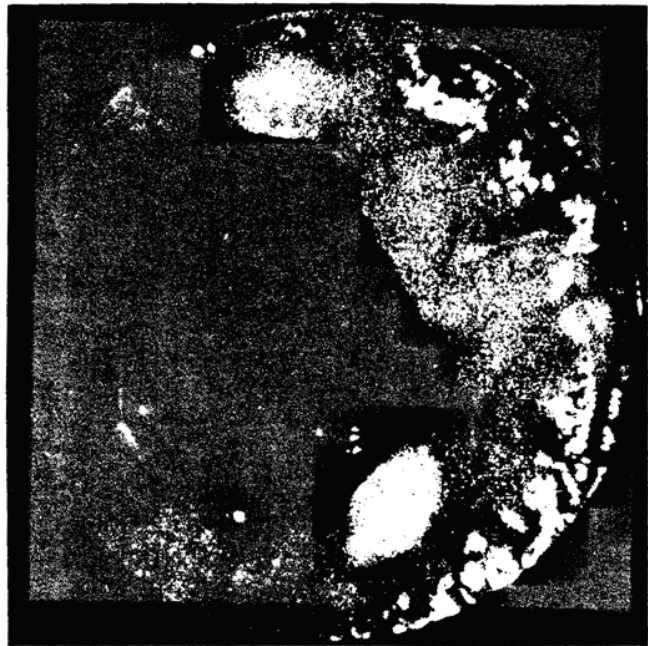


Fig. 3 Fresh coagulation spots in the anal canal (endoscopic view), turned greyish

The pictures were taken with the Hopkins optics by Karl Storz, Tuttlingen, Germany.



Fig. 4 slightly indrawn, reddish spot, one week after coagulation, on the right at 3 o'clock



Fig. 5 Scarred recession at 3 o'clock (on the right) weeks after coagulation

The therapeutic response occurred after 1 - 4 sclerosing sessions on two opposite points respectively, in 24% after one, in 43% after two, in 28% after three and in 5% after 4 treatments. A comparison with 100 patients treated by medicinal sclerosing shows that the therapeutic effect can be achieved more rapidly with light coagulation (Tab 1). We believe this method is a technically simple and safe alternative for sclerotherapy.



Fig. 6 Microscopic picture: immediately after radiation exposure: anabrosis

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Fig. 7

3 days later: Granulation tissue in the submucous membrane, coagulated vessels with hyaline material.



Fig. 8

2 weeks later: Surface defect covered by simple epithelial layer. Vessel organised by granulation tissue. (Fig. 5 - 7 were kindly provided by K. Moritz and P. Kiefhaber from the Medizinische Klinik Innenstadt of the University of Munich).

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Tab. 1 Disappearance of bleeding

After	Sclerosing injection therapy	Light coagulation
1 session	10	24
2 sessions	13	43
3 sessions	60	28
4 sessions	17	5
Patients	100	100

In accordance with the original purpose for haemostasis, the instrument can also be successfully used for haemorrhages after operative procedures in the anal region as well as after removal of papillary hyperplasia in the anal canal or rectal polyps and after mucosal biopsies.

### Literature

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