

Photocoagulation works best in non-ischaemic diabetic macular oedema

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in Nürnberg

LASER photocoagulation can provide a very useful preservation of vision in some cases of diabetic macular oedema, but patients must be carefully selected or the procedure can do more harm than good, said retina specialist Johann Roider MD, University Clinic Schleswig-Holstein, Germany.

At present, the general guidelines for laser coagulation therapy are based on the extent of clinically significant diabetic macular oedema. Therefore, the conventional indication for the intervention is thickening of the retina within 500 microns of the fovea, with or without hard exudates. However, a more specific set of selection criteria may better optimise the procedure's risk/benefit ratio, Dr Roider told the annual Congress of the German Ophthalmic Surgeons (DOC) in Nürnberg.

"The classification is based on statistical analyses. The question is, should the definition alone be the overriding indication for laser treatment? Is it wise to wait for the oedema to spread and possibly include the fovea before initiating laser treatment? Sometimes, it may be best to treat cases without exudates," he commented.

Dr Roider explained that experience shows that the anatomic structure of the retina plays a role in fluid motion. The fluid build-up in the retina inevitably moves toward the fovea. He argued that early laser treatment could curb oedema and help save the fovea.

However, the examiner has to distinguish between focal, diffuse, or ischaemic diabetic maculopathy, and cystoid macular oedema, as each condition needs to be treated differently.

For example, several studies

have verified that focal macula oedema responds to laser coagulation. Those eyes profit from laser therapy and vision is preserved. In contrast, the value of repeat photocoagulation treatment for diffuse macula oedema is still under dispute. The same situation prevails with cystoid macular oedema.

The cardinal signs for focal macular oedema are circumscribed zones of oedema, focal capillary lesions seen with fluorescent angiography, microaneurysms, and dilated capillary segments. Meanwhile, in cases of diffuse diabetic macula oedema and of cystoid macular oedema there is usually evidence of diffuse leakage, which is often due to ischaemic maculopathy. This common pathological feature explains why photocoagulation is often ineffective in such cases.

"There are many diabetic maculopathies that are ischaemic. They show substantial exudation. The evidence suggests that the higher the capillary loss is, the less likely laser coagulation will work."

He noted furthermore that although the fundus may look better in such cases after laser photocoagulation, the patient's vision is generally neither preserved nor improved. In fact, the procedure may even destroy the patient's remaining central vision.

Dr Roider advised caution when performing a third photocoagulation. Otherwise there is the danger of overcoagulating the retina leaving the patient with decent distance vision but unable to read. Therefore, in such cases surgeons should set the beam much lower, so that it is hardly visible, he said. A therapeutic effect could come about even

without actually seeing the beam. Laser parameters for a third treatment are set at a maximum of 100 microns from the fovea and 200 microns from the outside. This is considered a modified third coagulation, he said.

Dr Roider noted that a diabetic patient with significant visual deterioration resulting from a foveal cyst due to a microaneurysm may respond best to treatment with special unconventional lasers. Such devices specifically target the coagulation of microaneurysms in the deeper avascular areas, thereby causing a resorption of the cyst fluid.

Dr Roider emphasised that angiography is critical to determine the need for repeat treatments. It helps evaluate the therapeutic effect of previous treat-

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ments. Digital angiography is particularly useful as it enables the examiner to visualise exudates thanks to image enhancement with light and dark options.

To best method available to follow the course of exudations and decide on retreatment, however, is OCT. It allows the examiner to see the extent of exudation and decide the further therapeutic course. One can also visualise the presence of fluids both cross-sectionally and topographically.

Dr Roider mentioned that patients frequently present a combination of diabetic maculopathy with proliferative changes. His guidelines were clear for these cases, with treatment either at the same time, or first treatment of diabetic maculopathy (with laser) followed six weeks later by treatment of proliferative changes

(panretinal laser coagulation), and never the other way around.

As a rule, Dr Roider advised that re-lasering should not be done prior to three months after the first laser treatment, to allow for the effects of therapy to play out.

We followed our patients systematically and found that changes in the autofluorescence effect were to be seen at three, six, even 12 months after laser treatment. We can assume that there are long-term reconstructive effects in the tissues, as a reaction to laser coagulation."

Dr Roider said that laser coagulation effects changed over time through the atrophic effects on the pigment epithelium. What might look like poor laser treatments years later, are in reality the successive demise of neighbouring pigment epithelial cells causing large atrophic areas.

He said that although it was not quite clear what the mechanism of action of laser photocoagulation is, there are a few theories. One theory proposes that the procedure allows more oxygen to enter from the polycapillaris into the retinal tissue. This leads to a secondary vasoconstriction and reduced exudation.

Another theory is related to the pathophysiological mechanism of disease. It is known that exudations occur due to a loss of pericytes. This theory postulates that laser coagulation causes the lower retinal pigment epithelial cells to wander in from the periphery toward the centre. They proliferate and stimulate certain growth factors while at the same time inhibiting other growth factors, which all seems to achieve the therapeutic affect.

It's better to use lower dose laser strength to avoid damage to cells, especially the photoreceptor cells, which when damaged are responsible for local visual field defects and reading problems, he said.

Dr Roider highlighted the benefits of SRT (Selective RPE-Therapy) laser. This method provides a therapeutic option that allows the therapist to avoid retinal damage, as only the retinal pigment epithelium is treated. The difference between SRT and conventional laser is that the SRT laser shoots in microseconds so that the retina per se is not damaged.

Specialists implement SRT laser in the earlier stages of diabetic macula oedema. It accounts for improved vision in 50% of cases and thinning out of the retina that is seen on OCT, he noted.

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