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EDITORIAL

Should we still be performing macular laser for non-centre involving diabetic macular oedema? No

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Macular laser treatment used to be the standard treatment for diabetic macular oedema after the Early Treatment Diabetic Retinopathy Study was published in 1985, but it has definitely taken a backseat after the introduction of anti-VEGF therapy. The EDTRS from 1985 showed that macular laser treatment for patients with clinically significant diabetic macular oedema (DMO) reduced the risk for visual loss of ≥15 letters from 24 to 12% within three years [1]. Nevertheless, the ETDRS Report 19 found that the treatment effect is limited in "eyes with less extensive retinal thickening and lesser retinal thickening at the centre of the macula". Therefore, they recommended an initial period of observation for those eyes instead of immediate laser treatment; particularly if the leakage to be treated arises close to the centre of the macula and thus increasing the potential risk of laser side effects [2].

With non-centre involving DMO (NCI-DMO) visual acuity will be unaffected, and only a small proportion of these patients will progress to visual loss over time due to foveal involvement. If the centre is involved, anti-VEGF treatment has been shown to be more effective than laser. Even if there is foveal involvement, observation may still be the best option as long as visual acuity is good. The DRCR.net protocol V compared patients with centre involving-DMO (CI-DMO) and visual acuity of ≥20/25, which were initially treated with aflibercept, laser photocoagulation or observation, and the two latter groups only received aflibercept in case of visual loss. There was no significant difference in visual loss at two years and in the number of injections needed between the treatment groups, even if laser had been given. The majority of patients (63%) in the observation group did not need anti-VEGF injections within the two years of the study [3]. The OBTAIN study investigated the same question in a real-world setting and showed that the majority of patients with DMO and visual acuity of ≥20/25 maintained their vision over 12 months, irrespective of whether they received treatment or not. In fact, in the subgroup without treatment, 73% did not have a visual loss of >5 letters within a year [4]. These studies support the approach of initial observation and deferred treatment until there is visual loss for patients with CI-DMO and good visual acuity. In the UK, the indication for anti-VEGF therapy is CI-DMO of >400 µm and only a small proportion of NCI-DMO would progress to this in the course of a year without treatment. It is reasonable not to treat these patients initially instead of exposing patients with good visual acuity to the potential risks of macular laser treatment.

Macular laser treatment works better for focal DMO, while it does not prove to be as effective in more diffuse DMO [5, 6]. On the other hand, anti-VEGF therapy is effective for focal and diffuse DMO. It is a safe treatment and severe adverse events such as infectious endophthalmitis are rare [7]. Another advantage of anti-VEGF therapy is its positive effect on the severity of diabetic retinopathy [8]. The potential complications of conventional macular laser include paracentral scotomas, accidental foveal burns, secondary choroidal neovascularisations, and enlargement of laser scars over time. Regarding the latter, it must be taken into account that laser spots enlarge even more at the posterior pole than in the periphery. A study showed that the mean annual expansion rate is about 13% at the posterior pole, but of course, it depends on the laser machine used [9]. The risks of macular laser treatment might be substantially lower with newer techniques, such as subthreshold micropulse or NAVILAS laser [10, 11]. However, their true effectiveness has not been clearly shown. Nevertheless, the costs also have to be considered, and anti-VEGF therapy is still a costly treatment. Yet, in protocol V, the difference in the number of injections needed between the observation and laser group was only marginal. On average, the patients with vision loss that were initially observed needed 8.5 injections within two years compared to 7.8 injections for patients that received initial laser treatment. Furthermore, the costs are likely to decrease substantially once biosimilars, longer-lasting agents and port-delivery systems are implemented.

Nonetheless, there might be a small subgroup of patients with focal NCI-DME that will benefit from a macular laser treatment. For instance, patients with contraindications to anti-VEGF therapy, severe anxiety of injections, the patient's preference not to have injections or no possibility of repeated injections due to poor compliance or longer absence due to travel. However, these situations will have to be evaluated and discussed with the patient independently. Concern about central lipid deposition if lipid is close to the fovea but the fovea is yet not involved may also be a reason to consider macular laser treatment, although these patients can also be treated with anti-VEGF therapy [12]. In the UK, the use of anti-VEGF therapy for DMO is constrained by the requirement of CI-DMO with a central macular thickness of >400 µm, following NICE guidance, but that is not the case in most countries and is not the licensed indication [13].

In conclusion, anti-VEGF therapy remains the first-line treatment for patients with DMO and visual loss. In the subgroup with NCI-DMO and good visual acuity, observation with deferred anti-VEGF treatment only in case of visual loss is a reasonable approach. These patients tend to preserve good visual acuity even without treatment, and it might be wise not to expose them to a potential harmful laser treatment.

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IM has written the initial draft of the paper and updated subsequent drafts following comments from co-author. SJT has contributed to all drafts of the paper.

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SJT: advisory board for Bayer and Novartis; speaker fees from Bayer and Novartis; involved in research with Bayer, Novartis, Roche and Boehringer Ingelheim. The remaining author declares no competing interests.

ADDITIONAL INFORMATION

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