CASE REPORT

Management of postvitrectomy retinal detachment due to multiple laser-induced retinal holes

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Accepted 10 September 2016

SUMMARY

A 25-year-old man presented with retinal detachment in his right eye 20 days after pars plana vitrectomy, epiretinal membrane peeling and endolaser assisted panretinal photocoagulation performed for non-resolving vitreous haemorrhage secondary to Eales disease. Inferior retina of the right eye showed multiple (around 120) retinal holes in relation to the previous photocoagulation marks. The patient was managed with repeat vitrectomy, endolaser and silicone oil infusion. The aetiology of multiple holes, precautions to prevent them and their management are described.

BACKGROUND

Retinal laser photocoagulation employs transient localised hyperthermia by the application of laser pulses with duration ranging from 10 to 500 ms.¹ It is an integral component of treatment of various retinal diseases and retinal surgery. Laser photocoagulation may be associated with a host of complications including loss of visual function (accommodation, colour vision, contrast sensitivity), vitreous haemorrhage, choroidal detachment, choroidal neovascular membrane (CNVM) and rarely formation of retinal break.² We describe a case of retinal detachment due to multiple laser-induced breaks and its management.

CASE PRESENTATION

A 25-year-old man presented with sudden onset diminution of vision in right eye for 2 days. The patient was a known case of Eales disease and had non-resolving vitreous haemorrhage in the right eye for the past 4 months. The patient had undergone right eye standard three-port pars plana vitrectomy with epiretinal membrane removal and endolaser-assisted panretinal photocoagulation for non-resolving vitreous haemorrhage 20 days back. The patient reported some visual improvement after the surgery followed by diminution of vision again 2 days back. The best-corrected visual acuity (BCVA) was hand movements and 20/20 in the right and left eyes, respectively. The left eye was normal. The right eye anterior segment examination was unremarkable apart from relative afferent pupillary defect. Dilated fundus examination revealed mild pallor of the optic disc, macular scar, small residual proliferation along superotemporal arcade, multiple sclerosed vessels and inferior rhegmatogenous retinal detachment due to multiple laser-induced breaks in the inferior and temporal retina (figure 1). Approximately 120 holes were seen. The retina in the intervening area of these

Figure 1 Ultrawide-field pseudocolour photograph of the right eye of the patient showing inferior rhegmatogenous retinal detachment due to multiple laser-induced breaks in inferior and temporal retina.

holes appeared healthy. Superior and nasal retina was attached with pigmented chorioretinal scars due to laser photocoagulation.

DIFFERENTIAL DIAGNOSIS

The laser burns if intense can lead to retinal breaks. Application of laser photocoagulation in the presence of traction could also lead to retinal breaks. However, the traction was not significant enough to cause retinal detachment in this patient.

TREATMENT

After informed consent was obtained, the patient underwent right eye encircling band (2.5 mm wide), removal of residual proliferation, fluid air exchange and endolaser photocoagulation. Endolaser was feasible due to large gaps in between the laser spots applied during first surgery. Silicone oil was injected at the end of surgery.

OUTCOME AND FOLLOW-UP

At 1 week follow-up, BCVA was 20/1000, intraocular pressure (IOP) was 22 mm Hg, the retina was attached and whitish laser photocoagulation marks were visible (figure 2). At 1-month follow-up, BCVA had improved to 20/800, IOP was 18 mm Hg, the retina was attached and laser photocoagulation marks had become pigmented (figure 3). The visual acuity did not improve further because of the macular scar. The patient was advised regular follow-up and Silicone oil removal after 3 months.

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To cite: Kumar V, Jain S, Chandra P, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2016-216887

Figure 2 Ultrawide-field pseudocolour photograph at 1 week follow-up showing attached retina, fresh whitish laser spots and macular scar.

Figure 3 Ultrawide-field pseudocolour photograph at 1 month follow-up showing pigmented chorioretinal scars due to laser photocoagulation and attached retina.

DISCUSSION

Endolaser photocoagulation is an indispensable tool in the armamentarium of vitreoretinal surgeons. However, it must be used cautiously as it may be associated with many complications. In this case panretinal endolaser photocoagulation was performed during the first surgery as proliferative retinopathy was noted intraoperatively. The multiple breaks found on postoperative follow-up are typical of those resulting from high-intensity burns. During retinal photocoagulation, retinal pigments namely melanin absorb laser energy and convert it into heat energy in a localised area in short span of time resulting in necrosis and apoptosis of retinal cells.^{3 4} The burns if intense can lead to full thickness retinal necrosis causing retinal breaks. A case of intense demarcation laser photocoagulation-induced retinal necrosis and rupture resulting in large retinal tear formation has been reported in the literature.⁵

Two important factors associated with laser-induced complications are smaller spot size and higher power settings. This increases the energy density (laser energy per unit area). Increased energy density may cause damage to the neurosensory retina leading to retinal breaks and retinal detachment and/or damage to retinal pigment epithelium (RPE)/Bruch's membrane complex leading to CNVM formation.⁶ Surgeons should be particularly cautious while using endolaser at continuous mode because chances of high-intensity burns are particularly common in this mode than repeat mode. This is especially true for surgeon/residents in the learning phase. Another important factor to consider during endolaser photocoagulation for proliferative retinopathy is the end point of laser photocoagulation. One should aim for low-to-medium white burns, as the purpose is to destroy RPE cells and not retinopathy.

In this case because the distance between the holes due to laser spots was more, we could achieve retinopathy by using smaller laser spots. In case of endolaser photocoagulation a smaller spot size can be achieved by using lower laser power and shorter pulse duration. This allows the endolaser tip to move closer to the retinal surface and hence providing smaller laser spots.

To conclude though endolaser is an important tool for vitreoretinal surgery, it may be associated with various complications. Care must be taken during its application to reduce the complications.

Learning points

- ▶ Excess energy used for endolaser photocoagulation can lead to retinal hole formation and hence endolaser must be used cautiously.
- ▶ The size of laser spot on retina depends on the distance of tip of laser probe from the retina.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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