Intravitreal bevacizumab for exudative retinal detachment post laser therapy for retinopathy of prematurity

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ABSTRACT

Retinopathy of prematurity (ROP), a leading cause of pediatric blindness, predominantly affects premature and low-birth-weight infants. Although many cases are self-limiting, a minority progress to retinal detachment despite treatment. Exudative retinal detachments, although uncommon, have been reported after conventional laser therapy.1–3 We report 2 cases of exudative retinal detachment after laser therapy for prethreshold and threshold ROP that responded favourably to a series of intravitreal bevacizumab injections.

La rétinopathie des prématurés (RDP), cause importante de cécité pédiatrique, affecte de façon prédominante les enfants prématurés ou d’un poids insuffisant. Bien que plusieurs cas se limitent d’eux-mêmes, une minorité progresse jusqu’au décollement de la rétine malgré le traitement. Les décollements exsudatifs de la rétine, bien que rares, ont été signalés après une thérapie au laser conventionnelle. Nous faisons état de 2 cas de décollement exsudatif de la rétine après une thérapie au laser pour RDP pré-seuil et au seuil qui a répondu favorablement à une série d’injections de bévacizumab intravitréen (BIV).

Case 1: A 26 week, 780-g neonate underwent an initial examination for ROP at 31 weeks gestational age and was found to have zone 2 stage 1 disease with no plus OU. Her course was complicated by bronchopulmonary dysplasia, apnea of prematurity, a bowel perforation, and an intraventricular hemorrhage. Serial examinations eventually revealed the development of zone 2 stage 3 plus OU at 41 weeks gestational age. Because of the inability to maintain mydriasis, indirect laser photocoagulation (0.1 msec, 650 mW) was administered to both eyes over 2 consecutive days, delivering a total of 2112 and 2046 burns to the right and left eyes, respectively. The neonate tolerated the procedure well with no complications. Ten days later, examination revealed bullous exudative retinal detachments with plus disease OU (Fig. 1). After an extensive discussion with the parents regarding risks and benefits, intravitreal bevacizumab (IVB; 0.625 mg, 0.025 mL) was injected 1 mm behind the limbus OU using a 30-gauge needle. In addition, 2 doses of 1 mg intravenous dexamethasone were given 12 hours apart. One week after the initial injections, a marked reduction in subretinal fluid and plus disease was noted OU (Fig. 2). Two additional IVB injections were administered OU at 1-week intervals. Nineteen days after the final IVB injections, examination revealed a flat retina with complete resolution of the macular hard exudates, whereas examination of the left eye revealed a flat retina, perifoveal atrophy, and complete resolution of the macular hard exudates. The Canadian National Institute for the Blind found the toddler to be visually aware at 8 inches in front of the face.

Case 2: A 25 week, 1040-g neonate underwent an initial examination for ROP at 32 weeks gestational age and was found to have zone 2, stage 2 ROP with no plus. At 34 weeks gestational age, zone 2, stage 3 ROP with no plus was found. At 35 weeks gestational age, threshold disease was found OU. Laser treatment was administered, and 1 week later a total exudative retinal detachment was found OD (Fig. 4A). IVB was administered the following day, and 10 days later the exudative RD was found to be slightly reduced with persistent plus disease, so an additional IVB injection was administered. One day after the second IVB injection, only slight temporal subretinal fluid was noted with no plus disease (Fig. 4B).

DISCUSSION

It is possible that the instability of the inner blood retinal barrier seen in stage 3+ ROP combined with further inflammatory insult secondary to laser therapy may lead to a vasoactive response that results in subretinal exudate accumulation and detachment. In Case 1,
although we were unable to determine the individual effect of intravenous dexamethasone and IVB on diminishing this response, the combination appeared to have a significant effect in decreasing subretinal fluid. In Case 2, a longer period (11 days) was required for almost complete resolution of the subretinal fluid compared with 7 days in Case 1. This difference may be because of the added effect of the dexamethasone in Case 1.

Muni et al.\textsuperscript{3} identified an exudative retinal detachment in an infant born at 27 weeks, weighing 595 g, who previously received laser therapy for zone II stage 3+ disease at 40 weeks. They elected to observe the eye, and a complete resolution of the exudative detachment was noted at 50 weeks with residual macular subretinal exudates. Lalwani et al.\textsuperscript{2} reported a case of bilateral exudative retinal detachments 3 weeks after laser therapy. Both eyes were subsequently treated with IVB (OS then OD 1 week apart). Supplemental laser was then administered in both eyes, and an additional IVB injection OS was done 2 weeks after the first injection to reduce vascular engorgement. After treatment, the left eye remained stable, whereas the right eye developed a tractional retinal detachment. Kychenthal et al.\textsuperscript{1} saw a remarkable decrease in subretinal fluid 1 week after IVB injection for a patient whose detachment had a significant exudative component and was waiting a vitrectomy.

Mintz-Hittner et al.\textsuperscript{4} demonstrated an increased efficacy of IVB over conventional laser therapy in preventing disease recurrence for zone I stage 3+ ROP. Although the trial was too small to assess safety, no complications secondary to IVB were seen. If future studies demonstrate an acceptable safety profile for IVB use in ROP, and a similar efficacy for zone II disease, then perhaps the earlier case scenario can be avoided by eliminating the need for

Fig. 1—Case 1. RetCam photos (A, B) with corresponding B-scan ultrasonograms (C, D) 10 days after laser treatment.
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Fig. 2—RetCam photos (A, B) with corresponding B-scan ultrasonograms (C, D) 1 week after initial intravitreal bevacizumab injections.

Fig. 3—(A, B) RetCam photos 6 weeks after initial intravitreal bevacizumab injection.
laser. In the meantime, it appears that both IVB by itself\textsuperscript{1–3} and in combination with intravenous dexamethasone are effective in reducing subretinal fluid after laser therapy.

**REFERENCES**


