ROP

Diode laser versus cryotherapy in treatment of ROP

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Advantages of laser therapy

Neonatal medicine now faces a dilemma primarily because advances in this area have reduced the age at which the fetus can survive outside the womb to as little as 23 weeks. In the United States, the approach to management of these infants is that of survival at all costs. This contrasts with the Netherlands, where a more pragmatic line is adopted, based on the high incidence of mental and physical handicap in very premature babies who survive. Paediatric ophthalmologists are faced with the challenge of screening for retinopathy of prematurity (ROP) and providing effective timely treatment to prevent blindness in infants who are frequently very sick and unstable. They must provide follow up for ongoing or anticipated ocular problems. Blindness from ROP is a significant problem, accounting for 8% of children registered in developed countries¹ and 40% in developing countries.²

Knowledge of the pathophysiology of ROP and progress in its treatment has been enormous. The 1984 classification provided an impetus for the CryoROP study.³ The longer term published data of this cohort of patients have been of enormous benefit in enhancing our knowledge and improving our approach to management of this disease.⁴⁻⁵ Great progress has been made in experimental laboratory studies, particularly regarding the role of vascular endothelial growth factor in the regulation of ROP, but as yet this has not translated into development of a preventative treatment.⁶

Cryotherapy and laser have been the preferred methods of treatment since 1988 and the presence of threshold disease formed the indication for treatment.⁷ For many ophthalmologists, deferring treatment until the development of threshold disease was a cause of concern, as treatment was instigated too late in many babies, resulting in blindness. Understandably, clinical impression was no match for a scientific randomised trial and as a result there was reluctance to challenge the guidelines. Adhering to the guidelines provided

protection from peer criticism and ironically from litigation. Fortunately, with the publication of the ETROP study, this issue has to a large extent been resolved⁸ as earlier treatment is recommended.

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Many babies who develop ROP subsequently become myopic.⁹ This myopic tendency is augmented by both cryotherapy and laser treatment of the disease. The question remains regarding which modality is the superior form of treatment and in particular, which form induces less myopia. The mechanism for the development of myopia post treatment has been controversial and interesting. Knight-Nanan and O'Keefe, in a 3 year non-randomised retrospective study demonstrated lower myopia following laser treatment.¹⁰ This was subsequently confirmed by other studies¹¹ most importantly by a 10 year prospective non randomised trial by Ng *et al.*¹² However, these findings were not universally accepted because these studies lacked randomisation and other studies reported no difference in the degree of myopia induced by both forms of treatment.¹³ Kent *et al* compared both treatments¹⁴ and found less myopia in the laser treated eyes. The cryo treated eyes had shallower anterior chamber depth and thicker lenses compared to control eyes that did not have ROP and increased axial length and posterior segment length compared to laser treated eyes. Axer-Siegel *et al*, in this month's *BJO* (p 491) have compared both cryopexy and argon laser on growing rabbits eyes. Axial length measurements and histological findings were reported. In an excellent paper they provide very important useful scientific data. In contrast with the human studies it shows an increase in anterior chamber depth, more marked in the cryo treated eyes than the diode laser treated eyes. No thickening of the lens

was found. Interesting and significant histological findings were made. In the cryo treated eyes, the area of treatment revealed peripheral chorioretinal scar and retinal atrophy up to the pars plana. There was heavy pigment dispersion noted in the ciliary body. There was also adhesion and condensation of vitreous fibres to the areas of chorioretinal scarring. In contrast, however, with the laser treated eyes, the area of treatment demonstrated chorioretinal scarring with hyperplasia of the retinal pigment epithelial cells. Significantly, there was a larger area of chorioretinal adhesion and destruction of the normal choroid architecture in the cryo treated eye. This, they state, would change the structure of the sclera and must make it more susceptible to stretching. This may explain the higher prevalence of high myopia in cryo treated than in laser treated eyes.

So what conclusion can we draw from this study? Importantly, an animal model was used which differs from premature infant eyes. In addition, the eyes did not have ROP. However, in our view it is a very important study with significant findings which complement human studies that report less myopia in laser treated eyes. It further confirms the advantages of laser over cryotherapy. Laser should now be considered the mainstay of treatment not only in developed countries but also in developing countries where ROP accounts for up to 40% of childhood blindness.

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