At the Rotterdam Eye Hospital, doctors are taking a systematic approach to innovation in rhegmatogenous retinal detachment surgery.

by Cheryl Guttman Krader

**Pars plana vitrectomy (PPV) has become such a popular approach to the repair of rhegmatogenous retinal detachment that surgery trainees today are often not even taught the alternative of scleral buckling.**

However, according to Marc Veckeneer MD, vitreoretinal specialist at the Rotterdam Eye Hospital, surgeons who believe that this trend represents progress are misleading themselves because they are overlooking a fundamental issue, which is that functional and anatomic outcomes of PPV procedures today are no better than they were 20 years ago.

A recently published meta-analysis comparing outcomes of scleral buckling and PPV procedures for uncomplicated rhegmatogenous retinal detachment (RRD) [Soni et al. Ophthalmology 2013 Mar 16, Epub ahead of print] confirms that PPV has not been proven to yield better results than scleral buckling, Dr Veckeneer said.

Taking into account that many eyes undergoing PPV today are straightforward detachment cases with a good visual prognosis, contemporary functional outcomes for RRD repair could actually be worse using the PPV approach rather than the original methods of scleral buckling, he told *EuroTimes*.

“The newer sutureless small-gauge vitrectomy procedures clearly are associated with a benefit of improved patient comfort. Ultimately, however, we would hope that they would provide better anatomic and functional results,” Dr Veckeneer said.

“Unfortunately, it seems that the availability of high-tech vitreoretinal procedures and enthusiasm for their use is prompting some surgeons to ignore their expense and trade-offs while not even considering alternative, potentially less invasive solutions.”

**The drawbacks of PPV**

Dr Veckeneer’s interest in these issues was raised as he undertook historical research for a thesis project on the outcomes of vitreoretinal surgery. He believes that a lack of improvement in functional and anatomic outcomes using newer vitrectomy techniques may be explained by the fact that the procedure is not as “minimally invasive” as some surgeons think. Whereas the ocular surface impact of the procedure may be reduced, the intraocular portion remains, and its use in eyes with straightforward retinal detachments may be introducing unnecessary risks that compromise vision.

“Our advanced vitreoretinal surgery procedures were developed to salvage complex cases that would have otherwise been abandoned, such as eyes with post-traumatic detachment and dense vitreous haemorrhage. With the advent of small-gauge surgery, these techniques are being used in eyes that are not severely diseased and that could be easily managed using much less invasive procedures,” he explained.

Take for example younger patients with a retinal detachment. In these eyes where the aetiology of the detachment usually involves blunt trauma or high myopia, posterior vitreous detachment is usually absent. Therefore, vitrectomy is not necessary, and surgery via an external approach using drainage and retinopexy, with or without a scleral buckle can be successful.

“Regardless of the size of the entry incision or whether one is using newer vitrectomy systems featuring faster cut rates, the act of removing vitreous from the eye remains the same, and that has implications for early and late complications involving functionally relevant tissues,” said Dr Veckeneer.

He explained that induction of a posterior vitreous detachment during vitrectomy carries a high risk of additional trauma to the retina. In addition, removing vitreous causes cataract development making PPV an unattractive repair option for a simple retinal detachment in a younger, pre-presbyopic patient.

Despite important technological advances since its introduction more than three decades ago, pars plana vitrectomy has so far not yielded better outcome for uncomplicated RRD (Reproduced with permission from Dr Heinrich Heimann)

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A **fresh focus** at the Rotterdam Eye Hospital, Dr Veckeneer and colleagues have been taking a systematic approach to innovation in RRD surgery. Their research aims to understand retinal physiology in disease and health along with the aetiology for factors limiting postoperative anatomic success and functional recovery as a basis for developing novel targeted solutions.

These new concepts are evaluated in controlled trials.

Aiming to mitigate the risk of inadvertent scleral penetration during scleral buckling, they investigated securing the explant material with cyanoacrylate glue instead of sutures and found it was a safe and effective technique. Research focusing on the relationship between blood-ocular-barrier breakdown and the development of proliferative vitreoretinopathy led to studies of strategies for minimising the intraocular inflammatory insult, including preoperative subconjunctival steroid treatment and performing delayed laser retinopexy instead of cryotherapy at the time of scleral buckling surgery.

Understanding that persistent subretinal fluid after RRD surgery delays recovery and may limit the final visual outcome, a modified surgical drainage technique was developed to evacuate the fluid more completely and prevent its persistence.

However, the development of methods for early restoration of the attachment between the neuro-retina and the RPE should be a critical aim for future research.

“Within a few hours after a retinal detachment, there is a severe reduction in the physiological adhesion of the retina to the pigment epithelium that will remain so for days or even months after re-attachment.”

This fundamental issue remains largely unaddressed in our current therapeutic approach,” said Dr Veckeneer.

“A solution to this problem would allow detachment repair surgery that is truly less invasive, without buckling or vitrectomy. With future pharmacological advances in the field of neuroprotection, true progress with improved functional outcomes can be expected. In the meantime we must consider the fact that the broad application of technological novelties in micro-incisional vitreous surgery may not be the road to better outcome of RRD repair.”