Chromophore Assisted Retinal Break Detection To Manage Challenging Situations In Retinal Detachment Redo Surgery

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Abstract

BACKGROUND: The purpose of this case series is to demonstrate that subretinal blue dye injection, with and without 180 degree endolaser retinopexy, can be considered a useful tool in finding occult rhegmatogenous retinal breaks in eyes with recurrent retinal detachment. CASE PRESENTATION: Three patients with recurrent retinal detachment were treated between January and March 2018. In all cases the intraoperative internal search did not demonstrate any obvious break or hole. Membraneblu-dual (Trypan Blue 0.15% + Brilliant Blu G 0.025% + 4% PEG) was then injected into the subretinal space using a 41 Gauge cannula. The eye was rotated such that the dye was pushed through a tiny break which was causing the retinal detachment. A 180 degree laser retinopexy was performed on a single eye. After silicon oil removals and absorption of the gas tamponade respectively, retinas remained attached at three months follow up. CONCLUSIONS: Chromophore assisted occult retinal break detection can be considered a useful and safe surgical technique in managing some unexpected and challenging intraoperative situations. Keywords: chromophore, subretinal, occult, retinal, detachment

Background

Finding retinal holes or breaks is a key point for a successful retinal detachment repair. In redo surgery this goal is sometimes difficult to achieve because of the modifications of the retina, vitreous and sclera consequences of the previous surgery. Trypan blue dye assisted occult retinal break detection represents a relatively novel technique which can simplify identification of previously unseen retinal breaks (1) helping to achieve a better anatomical and functional success (2). The purpose of our case study is to demonstrate that subretinal membraneblu-dual injection (TrypanBlue 0.15% + Brilliant Blu G 0.025% + 4% PEG), with and without 180 degree endolaser retinopexy, can be considered an
additional safe and easy tool in managing some intraoperative challenging situations.

Case Presentation

Three patients with recurrent retinal detachment were treated at the Casa Sollievo della Sofferenza Hospital between January and March 2018. All of them underwent a standard three port pars plana vitrectomy as well as intraoperative indentation using a binocular indirect RESIGHT (Zeiss) fundus viewing system. The first patient attended vitrectomy having had previously a failed pneumoretinopexy retinal detachment repair; no holes or breaks were detected by intraoperative careful search so membraneblu-dual was injected into the subretinal space using a 41 Gauge cannula designed for macular translocation. Perfluorocarbon heavy liquid was then injected into the vitreous cavity displacing the subretinal fluid toward the retina periphery. The eye was rotated such that the dye was vented out of a very tiny break located just anteriorly to the preexisting corioretinal scar.

A second patient with a clinical history of multiple surgeries for retinal detachment (cryobuckle + PPV + circumferential and radial retinectomy) presented with a new onset macula off retinal detachment eight months after a successful silicon oil removal. On the superior temporal quadrant was still visible an apparently well buckled and partially treated tear with no obvious other hole or break. Again Membraneblu-dual was injected into the subretinal space and perfluorocarbon heavy liquid injected into the vitreous cavity displacing the subretinal fluid. The dye started leaking out of the superior temporal already buckled tear which was initially considered safe (VIDEO 1). In the third case, a standard pars plana vitrectomy was performed on a patient who had episcleral buckling procedure four years before. The retina was stiff and the 360 degree encircling band quite anterior and tight to making difficult the visualization of the retina just posterior to it. Indentation was also difficult by the presence of an extremely scarred tenon. A pocket was created in the subtenon space in order to reach the equator with very little improvement
in the indentation procedure. The encircling band was then removed with very minimal gain in the peripheral view because the thinned sclera maintained the pre-existing shape. Membraneblu-dual was again injected into the subretinal space and a BSS-perfluorocarbon heavy liquid exchange performed in order to displace the dye. Multiple areas of leakage were visible in the inferior quadrants just at the posterior edge of the indentation. As some of the retinal breaks were still not easily accessible due to the eyeball shape, a fluid-air exchange was carried out in order to improve the peripheral view. Finally, 180 degrees endolaser retinopexy was performed (VIDEO 2). After silicon oil removals in the first and second cases and gas absorption in the third, retinas remained attached with no sign of failure at three months follow up.

Discussion And Conclusions

Missing retinal breaks during retinal detachment surgery is a well-recognized cause of failure in primary repairs (1). In some cases, Lincoff’s rules may address toward the hidden tear (3) but, even so, occasionally, no breaks are found and this represents a very challenging surgical situation. In episcleral buckling procedures, failure occurs nearly as frequently because the buckle is inadequate, it is poorly placed, it is too narrow or too shallow (3). Also, sutures tend to release after some time and retina can detach again if tears are not properly treated at the time of the first surgery. On the top of it, sclera can keep the shape given by the pre-existing encircling band even after its removal, creating additional viewing problems and subsequent risk of missing one or more breaks. In these conditions, chromophore-assisted break detection may be a useful and safe surgical technique in preventing surgical failure (4,5). In our experience, a wide endolaser retinopexy does not represent a first line choice but can be occasionally considered to reduce the incidence of failure (6) after silicone oil removal in all situations where rhegmatogenous tears cannot be directly seen and properly marked. Our case study
represents the first one in which an association of trypan and brilliant blu has been used; no evidence of retino-toxicity has been found in our three cases accordingly to what literature suggest for the trypan blu alone (7,8). At the same time, no other complications related with the 41-gauge subretinal injection has been reported. Anyway, even if membraneblu-dual is licensed in many countries, further studies are required to establish its safety for this specific purpose.

Abbreviations

REDO surgery (reoperative surgery), PEG (polyethylene glycole), PPV (pars-plana vitrectomy), BSS (Balance Salt Solution).

Declarations

FUNDING

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AVAILABILITY OF DATA AND MATERIALS

All the information supporting our conclusions and relevant references are included in the manuscript. There are no datasets related to this case report.

The manuscript has not been presented at any meeting/conference.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

CONSENT FOR PUBLICATION

Written informed consent was obtained from the patients for publication of this case report and any accompanying additional files.
COMPETING INTERESTS

The authors declare they have no competing interests.

AUTHORS’ CONTRIBUTIONS

All authors AB, MC, AL have contributed to the final version of the manuscript.

All authors read and approved the final version of the manuscript.

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Supplementary Files

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