Sub Macular Perfluorocarbon Liquid Case Report

By
Mohamed Elahmady
A 55-years-old male, cardiac patient
bilaterally pseudophakic
presented with a recent visual loss in his left eye
Visual acuity CF 50cm..(not corrected)
He was found to have a subtotal retinal detachment with a superotemporal break.

He underwent a 23-G PFCL-assisted pars plana vitrectomy with silicone oil injection.
Visual acuity improved after operation from counting fingers to 5/60 after 2 weeks.
Case report

- After 3 weeks, the patient complained of gradual decrease in visual acuity of left eye.

- Visual acuity: 1/60

Case report

- Although retina was well attached, indirect ophthalmoscopy revealed a single dome-shaped elevation beneath the fovea!!!
OCT revealed a well-defined cyst-like hyporeflective lesion in submacular space with a central macular thickness of 241 μ. The retina above the cystic lesion was thinned out.
Differential Diagnosis

- Differentiation of subretinal PFCL from subretinal fluid may pose a problem.
- New imaging modalities such as SD-OCT is quite helpful in this regard.

<table>
<thead>
<tr>
<th></th>
<th>SubretinalPFCL</th>
<th>subretinalfluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>retinal contour</td>
<td>$\Omega$</td>
<td>hat</td>
</tr>
<tr>
<td>Angle ( ) RPE &amp; NSR at base</td>
<td>Acute</td>
<td>Obtuse</td>
</tr>
<tr>
<td>retinal layers above</td>
<td>undefined</td>
<td>Clearly differentiable</td>
</tr>
</tbody>
</table>
Subretinal PFCL

Subretinal Fluid

Indication of PFCL in Vitreoretinal Surgery
- **Giant Tears**;
  - stabilizes the detached retina during vitrectomy and displaces the subretinal fluid

- **Diabetic Retinopathy**;
  - to flatten shrunken retina, also efficient to flatten retinal detachments that appeared when relieving tight vitreoretinal adhesion
  - provides a better condition to perform panretinal photocoagulation if needed with lower energy.
Floating the Foreign Bodies in the Vitreous Body;
- can lift the foreign body away from the retina, thus simplifying the procedures of removal and improving the safety of the process

Posterior Dislocated Crystalline and Intraocular Lenses;
- PFCL is injected at the posterior pole to fill the vitreous cavity. The dislocated lens flotation on the PFCL, and the injection is ceased once the lens is rised to the iris plane and then removed from A.C
Retinal Detachment with Severe PVR:

- injection of PFCLs after initial dissection of posterior PVR aids in opening the funnel to provide better visualization of proliferative membranes and provide better removal.

Intraoperative complications:

- used to evacuate subretinal blood from under the macula or prevent blood from reaching the submacular area
Hemorrhagic choroidal detachment;

- It may facilitate the drainage by pushing suprachoroidal blood anteriorly, which can then be removed by performing a sclerotomy.
R.F of subretinal migration of PFCL

- Breaking up of PFCL into small bubbles
- Large retinal break.
- Large peripheral retinotomy >120 degree.
- High velocity of infusion.
- Retinal tractions.

How to Prevent Subretinal Migration of PFCL??
The speed of injection of PFCL should be slow and continuous to avoid breaking up of the PFCL into multiple small bubbles.

Bubble formation also can be avoided by keeping the cannula tip inside the PFCL bubble during the entire process of injection.
During injection of PFCL, the tip of the canula should be centered over the optic disc if it is visible and avoid directing the flow of PFCL toward retinal breaks.
How to Treat Retained Subretinal PFCL??

- Subretinal PFCL beneath the fovea or at risk for migration beneath fovea should be considered for removal as soon as possible.

As Retained Submacular PFCL can lead to
- functional visual loss,
- central scotoma,
- irreversible retinal structural damage.
Surgical removal by aspiration via 40-G needle through a single therapeutic retinotomy adjacent to subfoveal PFCL bubble in three-port pars plana approach
How To Treat Retained Subretinal PFCL

- Surgical removal by aspiration leads to retinal morphologic restoration and functional improvement..

But carries more risks!!

such as damage to RPE, photoreceptors, retinal nerve fibers, subretinal hemorrhage.
Other alternative surgical option is displacement in the subretinal space of retained subfoveal PFCL toward the inferior periphery with therapeutic retinal detachment and postoperative upright head positioning. Seem to be more safe than direct aspiration of PFCL through juxtafoveal retinotomy.

If a bubble of subretinal PFCL is found outside the fovea postoperatively, careful observation and follow up is needed as spontaneous resolution may occur within weeks postoperatively with subsequent anatomic and visual improvement.
Characteristically PFCLs have

- high specific gravity,
- low surface tension, and viscosity.
- These physical properties make PFCL an ideal tool in vitreoretinal surgery.
A recognised risk of using PFCL during vitrectomy surgery is that some bubbles may be trapped under the retina and become positioned under or near the macula.

Although the subfoveal retention of PFCL is a rare complication of vitreoretinal surgery, it causes irreversible visual loss as it causes outer retinal atrophy, and photoreceptor loss, via mechanical compression, the direct toxic affect or an inflammatory response including the macrophages phagocyted PFCl.
This complication is reported following surgeries for giant retinal tears, in cases where there is incomplete removal of tractional membranes.

PFCL enters the subretinal space through retinal breaks/posterior retinotomy during surgery.

Retained PFCL causes retinal toxicity through presumed mechanical compression and chemical toxicity.
The presence of subretinal PFCL does not seem to affect visual and anatomic success when located outside the macula, but deterioration of the central vision will occur when it involves the macular area, especially the fovea.