Heavy silicone oils show potential in management of inferior retinal detachments

Murat Oncel

HEAVY silicone oils have shown promising results in the treatment of retinal detachments in the inferior quadrant in several studies. However, their use remains controversial, attendees at a symposium at the 7th EURRETINA Congress heard.

Proponents of silicone oil say that the specific gravity of these compounds makes them more efficient than conventional silicone oils in providing inferior tamponade in the vitrectomised eye, and that they are more effective in treating proliferative vitreoretinopathy (PVR). They also do not require patients to maintain a face-down position for long periods after surgery, said David Wong FRCSE, Royal Liverpool University Hospital, Liverpool, UK, who chaired the session.

“There are those who say that heavy silicone oil is absolutely wonderful. Retinal detachment, they say, is caused by PVR and PVR has a predilection for the inferior fundus. Therefore, if you have a heavy silicone oil it will tackle this inferior PVR problem and increase your chance of successful repair of the retinal detachment,” he explained.

O n the other hand, critics of heavy silicone oils maintain that they are too sticky, making them hard to remove. They also point out that they are more prone to emulsification than standard silicone oil, which in turn gives rise to inflammation, Dr Wong noted.

“It is the dispersion of tamponade agents into droplets that is largely responsible for the inflammation, quite apart from the fact that individual agents might be a stimuli for inflammatory reactions. The rationale behind the newer heavy silicone oils is that if we mix semi-fluorinated alkanes or alkenes and increase your chance of successful repair of the retinal detachment,” he explained.

In all cases, Dr Oncel and his associates were able to completely reattach the retina during the procedure. During the follow-up period and prior to silicone oil removal, 23 per cent of patients in the standard silicone oil group developed inferior retinal detachment, compared to none in the Densiron group.

After removal of the silicone oil, retinal detachments occurred in three (12 per cent) patients in the standard silicone oil group and nine per cent in the heavy silicone oil group. All retinal detachments were successfully treated with further surgery, Dr Oncel noted.

There were no intraoperative complications in either group. Postoperative complications included increased IOP in three patients in the Densiron group and four in the standard silicone oil group. Neither excessive inflammation nor significant emulsification was observed in either group during the follow-up period.

“The result of this prospective study shows that heavy silicone oils are safe and effective in the treatment of complicated retinal detachments predominantly in the inferior pathology and has better anatomic results in the early postoperative period due to its specific gravity being heavier than water,” Dr Oncel said.

A British study involving a series of patients who underwent vitrectomy with injection of heavy silicone oil supported the Turkish study’s findings regarding the efficacy of Densiron, reported Theodor Stappler MD, St Paul’s Eye Unit, Royal Liverpool University Hospital, Liverpool, UK.

The prospective study involved 122 eyes of 121 consecutive patients with a mean age of 59.9 years. The indications for surgery included inferior retinal breaks in 70 eyes (range 1-6 breaks), trauma in four eyes and macular translocation in six cases. PVR was present in 80 (65 per cent) cases, most of which were stage CP1 or CP2.

“The mean extent of the detachments was 2.21 quadrants with macular involvement in 54 per cent of cases. The retinal breaks were inferior in 82 per cent of cases and Dr Stappler and his associates removed the heavy silicone oil after a mean of 135 days.

In 87 (71 per cent) of patients the retina could be reattached with one retinal operation and no tamponade. In 102 (83.6 per cent) of patients the retina was reattached with more than one operation and no tamponade agent and in 112 (91.8 per cent) of cases retinal reattachment was achieved with tamponade in situ. Of the 35 patients who suffered a redetachment, 18 occurred with Densiron in situ and 17 occurred after the heavy silicone oil had been removed. These detachments occurred in the superior circumferenc. Further surgery included conventional oil in 31 and gas in four cases.

Mean logMAR visual acuity rose from 1.38 to 1.06. Visual acuity was better than 20/40 in about one third of patients and between 20/40 and 20/200 in the remaining patients, Dr Stappler noted.

In terms of side effects, IOP was mildly elevated in some patients during the first weeks following surgery, but all cases responded to medical treatment and none required drainage surgery, he said. Similarly, inflammation was mainly observed after the initial operation and its manifestation was generally mild. It resolved almost completely at three months in all but three patients.

Emulsification increased with time but in no patient did it obscure the retina.

Dr Stappler suggested that in view of his findings and those of other studies it may be that sequential administration of heavy and then conventional silicone oil can provide a more ideal tamponade approach.

A high success rate was also achieved with O xane HD in a prospective pilot study reported at the symposium by Francois Devin MD, Centre Paradis Monticelli, Marseille France.

The study involved 65 patients with retinal detachments in the inferior quadrant, 76 per cent of who had severe PVR and 63 per cent of who had large inferior or posterior breaks. In addition, 70 per cent had undergone previous unsuccessful surgery, including vitrectomy, scleral buckling, and classical silicone oil tamponade.

At one year’s follow-up, retinas remained completely reattached in 70 per cent of the 84 per cent of eyes from which silicone oil had been removed, and in 40 per cent of the 16 per cent of eyes in which the oil still remained in place. In addition, retinas remained attached in 56 per cent of eyes following silicone oil with no additional procedures.

Significant inflammation requiring silicone oil removal occurred in four per cent of patients. Inflammation was moderate to severe in five cases, two of which required silicone oil removal.

Less promising results

Maik Tilanus MD, N ijmegen, the Netherlands, reported less promising results with the two heavy silicone oils in a comparative trial.

The randomised trial involved 14 patients with retinal redetachments, complicated retinal detachment or PVR. Six eyes received O xane HD and eight eyes received Densiron. All eyes had undergone previous surgery. The mean tamponade time was 7.5 weeks for the O xane HD group and 8.7 weeks for the Densiron group.

Dr Tilanus noted that the rate of retinal redetachment was around 30 per cent in both groups of patients. In addition, pronounced inflammation was present in three eyes in the O xane HD group and six eyes in the Densiron group. In the O xane HD group, inflammation was not present after oil removal but it persisted mildly in three eyes after oil removal in the Densiron group for three months after removal of the silicone oils.

Dr Tilanus said he found O xane HD difficult to extract. The stickiness was generally moderate for O xane HD and mild for Densiron.

Research is currently under way to develop new oils that will be less prone to emulsification and therefore less likely to induce inflammation, said Rachel W illiams PhD, School of Clinical Sciences, University of Liverpool, UK.

Dr W illiams described the results of their experiments with new silicone oil preparations, which include high molecular weight silicone oil polymers.

“The use of a polymer modified tamponade agent maintains easier of injection, as the enhancement of low shear viscosity is relatively small. However, the effect of high molecular weight polymer on the extensional response is much more pronounced and should act to inhibit emulsification within the ocular cavity,” Dr W illiams added.

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