Mean near visual acuity improved by 6.3 Jaeger lines in presbyopic patients receiving carbachol 2.25 and 3.0 per cent in the non-dominant eye, Stephen C Kaufman MD, PhD, told the innovators session at the annual ASCRS symposium. The pilot test suggests that drug treatment may be viable for presbyopia in some patients.

“The pharmacologic treatment of presbyopia with one drop a day in the non-dominant eye permits acceptable reading vision for many presbyopes. It does not blur distance vision as does typical monovision therapy, and the perception of normal brightness in the untreated eye eliminates symptoms of dimming from the smaller pupil of the treated eye,” Dr Kaufman said. The treatment may also enhance near vision for monofocal IOL and contact lens patients.

However, topical miotic treatment carries a small risk of retinal detachment in patients with retinal pathology, Dr Kaufman noted. Other local risks include ocular inflammation, iris cysts and frontal headaches, while systemic side effects could include cardiovascular and digestive problems. A dilated fundus exam should be conducted before treatment to reduce risks.

**Pinhole effect** Rather than tackle presbyopia with multifocal or accommodating lenses, pharmacologic treatment relies on the pinhole effect – increasing depth of focus by reducing aperture, Dr Kaufman said. The principle is being successfully applied in corneal inlays implanted in the non-dominant eye to enhance near vision, he noted.

To achieve a similar effect with reasonable patient effort, a pharmacologic agent must create significant and long-lasting pupil constriction. So Dr Kaufman, at the University of Minnesota, Minneapolis, US, and his colleagues, Alessandro Meduri, Italy, and Salomon Esquenazi, US, tested several widely available topical miotics alone and in combination. These were the cholinergic agonists pilocarpine and carbachol and the alpha 2 agonist brimonidine.

Pilocarpine, pilocarpine with brimonidine, carbachol, and carbachol with brimonidine in various doses were tested against a placebo in a masked trial involving 12 patients in carbachol and 12 in pilocarpine groups. Each combination was tested in each patient with a washout time in between.

Pre-treatment near and distance visual acuity were compared with post-treatment values at one, two, four and eight hours after drops. Adverse symptoms and subject satisfaction were assessed. The goal was to determine if a parasympathomimetic and brimonidine are synergistic, and if a single dose in the non-dominant eye would provide reading vision without symptoms of dimness or blurring of distance vision.

In the pilocarpine groups, the optimal dose was one per cent, which yielded a mean near vision improvement of J-2.3 alone, and J-3.0 combined with brimonidine. The optimal dose of carbachol was 2.25 and 3.0 per cent, yielding a J-6.3 improvement alone and in combination with brimonidine, though the higher concentration of carbachol and the combined treatment lasted longer.

“We were very surprised,” Dr Kaufman said. Mild drop-associated discomfort was noted in 10 per cent to 30 per cent of all groups, including placebo.

Beyond medically significant side effects, treatment considerations include the cosmetic appearance of a constricted pupil, degraded effect due to corneal or lenticular opacities, and reduced effect in combination with non-steroidal anti-inflammatory drugs, Dr Kaufman said.

Still, 90 per cent of test subjects said they would use the drug therapy if it were available. Dr Kaufman pointed out that these drugs are already used by subspecialists in limited circumstances, and there is great potential for broader use.

“I think it’s exciting. Think about it.”

By Howard Larkin in Chicago