A comprehensive understanding of the classification and properties of ophthalmic viscosurgical devices (OVDs) is crucial to performing routine and complicated cataract surgeries, according to Steve Arshinoff MD.

"About nine-tenths of what we do in phacoemulsification is really about rheology and how we use fluids in this particular environment. If we understand how OVDs work, we have the potential to change that environment and make our surgeries easier and safer," he said.

There are currently more than 100 different OVDs on the market, and the list continues to grow, Dr Arshinoff, University of Toronto, Ontario, Canada, reminded delegates attending the joint European Society of Ophthalmology (SOE) and American Academy of Ophthalmology meeting.

With such an abundance of OVDs, Dr Arshinoff said that there was a clear need to try to categorise the various products according to their properties and capabilities.

"Back in the early 1990s, we divided OVDs into high viscosity cohesives and low viscosity dispersives. Broadly speaking, the cohesives were able to create space and maintain anterior chamber stability and the dispersives were better at remaining in the eye during phacoemulsification at high flow rates. Each of these categories of OVD could not do what the other one did and so the surgeon really had to predict what might go wrong in a given case to choose the optimal OVD. The categories expanded further with the development of viscoadaptives and we began to get sub-classes of the cohesives and dispersives, and then, with the arrival of DisCoVisc (Alcon), it was clear that we needed a broader method of classification that would take account of the cohesion/dispersion properties of the various OVDs," he said.

Discussing how an intimate knowledge of OVDs can be applied in surgical techniques, Dr Arshinoff said that the simple soft-shell technique he pioneered is a case in point.

"The idea is that we first put a low viscosity dispersive OVD in the eye followed by a higher viscosity cohesive viscoelastic, which allows us to maintain a thin layer of dispersive viscoelastic against the cornea that stays there throughout the procedure. In effect we have partitioned the eye by creating both a surgical space and a protected space where we have no flow. So we have achieved two different things in the same space by dividing it into two zones," he said.

During phacoemulsification, the high viscosity cohesive is swiftly aspirated out, but the dispersive OVD stays in place to protect the endothelium, he explained.

Dr Arshinoff noted that variations on the soft-shell technique are also useful in more complicated cataract cases, such as for patients with broken zonules or Fuchs' endothelial dystrophy.

Illustrating the possibilities of this approach with reference to a patient with broken zonules, Dr Arshinoff said that the first step is to place a dispersive OVD over the area of zonular dehiscence to isolate the vitreous during the procedure. A cohesive OVD is then introduced to apply pressure to the dispersive agent, thus pushing the vitreous posteriorly around the lens equator.

"With this approach you can now insert a capsular tension ring in the bag and proceed as if there were no broken zonules at all, since the flow does not remove the dispersive OVD and the area of zonular dehiscence remains protected throughout," he said.

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