Dual pump system – the best of both worlds

Stefanie Petrou Binder MD
in Berlin

THE Whitestar Signature fusion fluidics dual pump system (Advanced Medical Optics) combines peristaltic and venturi pump technologies for optimal phaco results, reported Y Ralph Chu MD at the XXVI Congress of the ESCRS.

“One of the things I found truly beneficial with the Whitestar Signature system is that there is a true dual pump. You can actually have both the peristaltic pump active and the Venti pump active all within the same case. You can switch on the fly between the two, and use both pumps simultaneously. The surgeon can programme the pump choice with mode/sub mode,” Dr Chu said.

In the peristaltic system, the maximum flow rate is 60 cc/min and the maximum vacuum is 650 mmHg. The maximum vacuum in the Venti system is 600 mmHg.

The Venti system has a constant vacuum, he said. It is fast, efficient, and ideal for cortex removal and vitrectomy. The Venti pump may be slightly more risky for some surgeons because of the speed with which vacuum is achieved. It is also associated with the risk of capsule rupture, he observed.

While retinal surgeons prefer the Venti system, anterior segment surgeons opt for the peristaltic system because of the control it offers the surgeon, even though it may be slightly less efficient for cortical removal and vitrectomy. The peristaltic system has separate vacuum, flow and rise time. It is ideal for nuclear fragmentation and epinuclear clean-up, and is associated with high safety and control, although less efficient than the Venti, Dr Chu maintained.

“When I switch back and forth, I like doing the nuclear fragmentation with the peristaltic system. This is an advanced peristaltic system that provides excellent safety and control at very high vacuum levels. I do irrigation/aspiration with either the Venti or the peristaltic. OVD removal is best with the Venti,” he noted.

One advantage of adding a Venti pump to a system is for the complete removal of OVD. This is an important factor with presbyopic IOLs, leading to good postoperative outcomes with minimal intraocular pressure spikes. All the presbyopic IOLs (multifocal IOLs and accommodating IOLs) demand excellent cortical clean-up, he observed.

One of the weaknesses of the peristaltic system is the cortical clean-up, which is, by contrast one of the strengths of the Venti system, he noted. Having this ability to use the Venti for cortical clean-up helps the surgeon improve outcomes, not just improve efficiency. It allows a pristine and fast cortical clean-up, maintaining reading function, clarity of vision, and reduces the chance of PCO.

“Even with a vacuum setting of 600 mmHg, you see only a little bit of bounce in the anterior chamber. The chamber is extremely stable even at this high limit. We use a supracapsular nuclear removal technique. I would switch to the Venti mode and use the Venti irrigation/aspiration to remove the cortex. With the vacuum on all the time with the Venti system, you do not have all those fibril to worry about all the time and the cortical removal is extremely efficient. The software is advanced enough to not even have to grab the capsule, and allows an even polish,” Dr Chu explained.

Dr Chu prefers bimanual irrigation/aspiration and believes he can get better cortical clean-up with the bimanual technique. Although he still implements co-axial in some cases, he uses bimanual much of the time, he said.

“Dual pump technology is the best of both worlds. Better fluidics equals better outcomes. There is less phaco energy, less inflammation, less endothelial cell loss, better postoperative outcomes, reduced chance of PCO and reduced IOP spikes. It really moves cataract surgery to the realm of refractive surgery, making the dual pump system the ideal system for the refractive cataract surgeon,” he explained.

“The signature senses pressure increases, reacts within 26 milliseconds, and reduces the vacuum to a preset level to prevent surge. The improved software helps to control the fluidics inside the anterior chamber.

There is approximately 56 per cent less surge with a 20-guage tip, according to an Advanced Medical Optics study, compared to older fluidics systems. There is software within the unit itself that senses occlusion breaks, even at very high flow and vacuum levels of 45 cc/min and 500 mmHg, respectively.

The dual pump system allows the surgeon to treat more difficult cases in a more routine fashion, such as an intracapsular floppy iris or capsules with weak zonules. Having the ability to go to the low flow setting on the Signature in clinical practice, for instance to 24 cc/min and 100 mmHg of vacuum, allows the surgeon to completely remove a cataract, without having to use a lot of iris manipulation with hooks and rings. The surgeon can accomplish many complicated cataract removals with the dual system, he said.