

The Next Generation Machines for Modern Vitrectomy

A candid, tell-it-like-it-is review of the available systems.

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At the 2011 Association for Research and Vision in Ophthalmology (ARVO) meeting, the Vit-Buckle Society met to discuss three current-generation vitrectomy machines. 2010 was a banner year for vitreoretinal surgical equipment. To help start a discussion about the surgical platforms, Christopher Riemann, MD; Derek Kunimoto, MD; and Jorge Fortun, MD, presented a quick summary of the Dutch Ophthalmic USA (Exeter, NH), Bausch + Lomb (Aliso Viejo, CA), and Alcon Laboratories, Inc. (Fort Worth, TX), systems, respectively (three lectures linked to EYETUBE.NET).

In the first half of the year, the Constellation Vision System (Alcon Laboratories, Inc.) gained significant traction in hospitals, universities, and some ambulatory surgical centers (ASCs). In the second half of the year, all kinds of excitement broke loose with two new machines introduced (the Associate [Dutch Ophthalmic USA]; and the Stellaris PC [Bausch + Lomb]) and the voluntary recall of the Constellation by Alcon. Indeed, the second half of 2010 was the equivalent of a soap opera. Our hospital had purchased two Constellations in the last weeks of June, just prior to the recall. In fact, our in-service training was scheduled to take place on the Monday morning that the recall occurred. It was a dark day indeed, but there was an unexpected silver lining beneath the disappointment. Not knowing the actual date that the Constellation would be returned to



us, the hospital decided to explore other options. Dutch Ophthalmic USA and Bausch + Lomb were very receptive to the idea of placing machines in our OR giving us the chance to trial these new platforms. In this article, I attempt to highlight some of the good and the maybe-not-as-good for each system, detailing both my experience and the presentations and conversations that we had at the Vit-Buckle Society meeting during ARVO in Fort Lauderdale earlier this year.

THE ASSOCIATE

The Dutch Ophthalmic USA Associate comes in a surprisingly small form. Not much larger than a suitcase, it looks so simple that it makes you ask “can the Associate really do all people say it does?”

The Pros

Indeed, it does some remarkable things for a machine that is about one-third the size of an Accurus (Alcon Laboratories, Inc.) unit. The Associate, which has been used in Europe for several years, has all the basic functionality of a vitrectomy unit. On top of this, it has a built-in light-emitting diode (LED) light source with

ports for three fibers and a wireless footpedal (this was not available at the time of our trial). The best aspects were the dual-linear functionality and the valved cannulas/trocars. The unit can be set to mimic the Accurus 3D settings, but in my opinion this is akin to putting a governor on a sports car. The dual-linear function gives the surgeon total control of vacuum (up/down on the pedal) and cut rate (by yawing to the left or right depending on the footpedal setup). The linear nature of each allows independent control of aspiration and cutting and eliminates the need to toggle between on and off on your cutter to induce a posterior vitreous detachment. You can also use the probe like forceps by aspirating fibrosis tissue and then activate the cutter with a simple twist of your foot to cut the held tissue. Although it requires some getting used to, after five or six cases things seem to move pretty quickly and effortlessly.

The entry system, however, is controversial (more discussion on this point will be addressed in the next issue of *Retina Today*). Although I thought it was the best of all the systems I used, Dr. Riemann believes that it is inferior to the Constellation entry system. In my opinion, the Dutch Ophthalmic blade design is first class and creates an incision that “wants” to seal. The funneled cannulas are hidden behind a unique, simple valved system that keeps a stable eye. I had no problem getting in and out of the eye with instruments during 25-gauge cases without having to turn on the scope lights. The Associate also supports 27-gauge surgery.

The Cons

There are, however, a few negatives for the Associate that should be mentioned. First, the setup of the machine is difficult, according to our technicians. Our hospital was one of the first to trial the Associate, and so it is possible that the difficulty was related to it being the first demo. The second negative to the Associate is that, to us, it seemed more like an Accurus “plus” system rather than a “next-generation” system. Cut rates are increased to 3000 cpm (not 5000 as on the Constellation or Stellaris), and the fluidics are gravity-fed (although a vented option is now available). Although it offers both venturi and peristaltic pump options, I do not see the benefit of having both. It performed on par with the Accurus from the standpoint of a flow and cutter performance. The handpiece and lighting options were not as refined as on the Accurus but were very capable. Finally, Dutch Ophthalmic is making its initial foray into the US market and is still in the process of assembling sales and support.

The Overall Assessment

I was not expecting so much from such a small and inexpensive machine as the Associate. The machine and packs are very affordable, the entry system is stellar, and 27-gauge surgery was surprisingly effective and fun. In my opinion, the Associate is an ideal machine for an ASC setting.

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THE STELLARIS PC

For a long time, the Stellaris was the “Great White Buffalo” of vitreoretinal machines. This mythical creature was going to combine high cut rates, a sleek package, different lighting options, and a price point to make next-generation surgery in the ASC setting a reality. I was first introduced to the Stellaris PC in a hotel room at the American Academy of Ophthalmology meeting in Atlanta what seems like a decade ago (it was actually 2008). It was a slim beauty with subtle curves. The only thing that could be shown on that model was the various lighting options with filters for seemingly every different wavelength of light. At the time, the Constellation was just starting to make its way to market, and, given its hefty price tag, the thought of a machine capable of performing the core functions of a next-generation device at half the price was extremely appealing. Initially, I eagerly awaited the launch of the Stellaris PC—then I waited, and waited, and waited some more.

Finally, the Stellaris PC was launched in July 2010. Remarkably, the timing of the launch could not have worked out better for Bausch + Lomb. The Stellaris PC launched just as Alcon voluntarily recalled the flagship Constellation. Surgeons who had invested in a Constellation were frustrated, and those considering the investment were leery. Thus, a trial with the Stellaris PC was in high demand. We were fortunate to have the opportunity to perform one of the first trials of the Stellaris in our area.

The Pros

The Stellaris PC definitely fits within the next genera-

I try not to operate too long or with the light too close to the macular area so light toxicity never presents a major issue in my surgeries.

tion of vitreoretinal surgery machines and represents a monumental upgrade to the Millennium (Bausch + Lomb). I was most impressed by the flow, even at high cut rates. The Stellaris is almost too simple; one needs only to set the cut rate at a steady 5000 cpm and let the footpedal control the vacuum. It was amazing to see blood, indocyanine green, and vitreous leave the eye through a cutter moving at such a high speed. The machine is also beautiful in its design—very elegant and simple—and our staff reported that it is easy to set up.

Although it does not have all the bells (built-in gas) and whistles (built-in laser) of the Constellation, we already have a system down for using gas, and the OR had just invested in a laser a year earlier. Additionally, the wireless footpedal works flawlessly. Perhaps the most remarkable thing about the Stellaris PC was its low price and the price of the packs, which can save our hospital a significant amount of money compared to our current setup with Accurus.

The Cons

Alas, everything must have a downside. The downside for the Stellaris was that the launch caught many by surprise—possibly even some Bausch + Lomb staffers. The entry system was suboptimal in that it has no funnel and an inferior cannula/trocar system. At the time of our trial, there was no wide-angle light pipe (this was made available recently). One would imagine this would not have that great effect on a trial, but the limited view afforded by the more focused light pipe detracted from the overwhelming positives of this machine. During the evaluation, I plopped a Photon light source (Synergetics, O'Fallon, MO) on top of the svelte Stellaris PC and began using this wide-angle illuminated pipe. It is hard to imagine a machine so long in the works would not be totally ready in every aspect at launch. The only other disappointment in the system was with the multiple light filters. They just didn't seem to help me do anything better. The green light did not help with peeling. Some members of the audience at ARVO thought the amber light helped visualization through air; I thought it created a romantic ambience but did not do anything to "turn on" the vitreous. I try not to operate too long or with the

light too close to the macular area so light toxicity never presents a major issue in my surgeries.

The Overall Assessment

For something that I so hoped would take things to the next level, it really did not seem to be special. The pricing of the Stellaris PC places it right between the Associate and the Constellation and may secure its position in the hospital setting. For ASCs, it is an impressive option that, with a few easily correctable refinements, could be a star.

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THE CONSTELLATION

To say we were bitterly disappointed with the recall of the Constellation would be an understatement. I had lobbied hard for over a year for a trial of the system but to no avail. As if the retina gods were listening, our hospital found some excess capital that had to be spent prior to the end of the fiscal year, and this resulted in new anesthesia machines, a pair of new phaco machines, a new OR suite for the bariatric group, and two new Constellations. The only caveat to this windfall was that we had to decide if we wanted two Constellations decked out with lasers within 1 week. Of course, we opted for the lasers, and the hospital purchased two machines at the end of June 2010. One week later, the machines arrived and the excitement began to build. The timing of the in-service, the Monday following July 4th, could not have been worse—the same day as the recall. As many Constellation owners will attest, no one had any idea how long the recall would take (not even Alcon). Because of hospital policy, we were not allowed to use the Constellation for any reason during the recall. Alcon assured the hospital that they would do a full trial of the Constellation once they were off recall and that, if we were not completely satisfied, the units could be returned for a full refund. It was a long 5 months waiting for the US Food and Drug Administration, but in late November the recall was lifted and Alcon fixed the machines.

Many of my friends with Constellations had told me that I would be impressed. They spoke of shave mode and of core vitrectomies accomplished in minutes. Some of the accounts seemed so remarkable that I was doubt-

ful that the machine could really be all that it was cracked up to be. Given the recall timing and the positive experiences with both the Associate and Stellaris, part of me was hoping to not love the Constellation.

The Pros

I will be the first to admit that it lived up to the monumental wait and hype. First, the Constellation removes things from the eye—*fast*. Vitreous is gone in a matter of minutes, silicone oil comes out through a 25-gauge cannula with their new VFC cannula system that fits over the hub of the cannula, and blood in the eye is gone in a moment.

The machine also provides amazing vacuum, and the cutter is another huge improvement. Alcon added a removable extended handle to the cutter that makes it easier to control at difficult angles or in deep-set orbits. Shave mode is impressive over detached retina and when dealing with diabetic traction, and the IOP control is fantastic and worked without a hitch. Our staff reports that the setup was easy and on par with the Stellaris PC. The lighting on the Constellation is solid, as is expected from Alcon. As far as the recall was concerned, the machine worked flawlessly.

The Cons

The downside of the Constellation is simple: the cost is high. Packs are north of \$600, despite the hospital owning the machines. The built-in gas function is adequate, but it does not save that much time, and the proprietary gas syringe adds another \$40. Our hospital considered returning the units due to the recall occurring so closely to the time of purchase, but they would not re-allocate the capital for another machine. Because the surgeons were satisfied with the safety and performance of the Constellation, we ended up keeping the two loaded units and have been pleased with the system's performance.

The Overall Assessment

The Constellation is refined and without faults from a surgical standpoint. Its cost and pack prices place it solidly in the realm of the hospital OR.

SUMMARY

This is an introduction to our impressions of the machines. In the next issue we will present a panel discussion highlighting some of the controversies regarding these vitrectomy systems that were brought to light at the ARVO Vit-Buckle Society Meeting. ■

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