Laser surgery for cataracts. It’s the first new technique for removing cataracts in roughly three decades. Last week the physicians at UCH’s Eye Center became the first in the metro area to start using it.

First teaching hospital in the nation to use it

UCH Eye Center Debuts Laser Cataract Surgery

University of Colorado Hospital recently became the first teaching institution in the country to use a new technology that could transform surgical treatment for cataracts, a vision-distorting problem that affects millions of people.

The hospital treated its first patient Nov. 21 with the new LenSx® laser, which enables surgeons to make the precise incisions they need to remove eye lenses clouded by cataracts and substitute new, clear artificial lenses – without using blades.

“It’s a paradigm shift,” said Richard Davidson, MD, one of the two Eye Center ophthalmologists who will perform the procedure. Michael Taravella, MD, also a faculty member at the School of Medicine, is the other. “It will ultimately be the standard of care. I think in five years it will be rare for us to use other methods.”

The new technology, which is the first Food and Drug Administration-approved laser technology for cataract surgery, also gives eye specialists their first new technique for removing cataracts in roughly three decades, Davidson said.

Eye surgeons perform about 3 million procedures a year to remove cataracts, a condition caused by age, trauma or disease that produces cloudiness in the lens of the eye. The opacity prevents light from passing into the eye, which in turn makes it more difficult to see.

Up until the early 80s, Davidson explained, surgeons made long (roughly 11-millimeter) incisions in the eye to remove the lens, all in one piece, and replace it with a clear artificial version.

By the late 80s, however, a majority of surgeons were using ultrasound for cataract surgery, and it remains the standard technique.

After they take measurements, surgeons use a small blade to make a small incision – about 2.4 millimeters, Davidson said – in the cornea. They then make a circular tear in the “skin”, or capsule, of the natural lens, pulse the lens with ultrasound to break it up, suction out the natural lens and insert the new, artificial one through the incision they made.

The procedure is very safe, Davidson said, and it transformed a surgery that had once required a lengthy hospital stay to an outpatient procedure. But surgeons still must make the incision in the cornea and

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the circular tear in the capsule by hand. That means, inevitably, the tear may be slightly irregular or a little off center. The result: the new lens might not sit quite as perfectly in the eye as the surgeon wants.

**A perfect circle.** With LenSx, developed by Fort Worth, Texas-based Alcon, surgeons set the precise measurements of the capsular tear and all corneal incisions in a computer, Davidson explained.

An imaging system produces real-time images of the eye as well as cross-section pictures that show the thickness of the lens. The cross-sectional images help surgeons program the depth of the cuts. With the system programmed, a laser then fires pulses in femtoseconds – quadrillionths of a second – that generate strings of gas bubbles that help to cut the capsule and other structures with near-perfect precision.

“With a perfect circle, the new lens sits better in the eye,” Davidson noted. “And the more precise the position of the lens, the better the outcomes. We customize the cut pattern for every patient’s eye, but it’s the same type of incision every time,” Davidson noted. “What you want is what you get. This results in more safety and better outcomes for the patient.”

Surgeons also use the LenSx laser to chop up the natural lens into very small pieces or even liquefy it. That means less power required to suction it out. That, in turn, reduces the amount of cells lost from the inside layer of the cornea during the procedure, Davidson explained.

“You lose cells in any surgery,” he said, “but if you lose too many, patients can develop swelling of the cornea.”

**Beginning the change.** Davidson said he and Taravella trained to use LenSx with online courses, by observing other physicians and practicing on model eyes.

Patients normally will pay for the procedure out of pocket. However, the first 10 or so patients will get it for no extra charge, so the practice can build volume and begin collecting data to demonstrate outcomes, Davidson said.

Going forward, the practice has worked out a billing structure that meets requirements of the Centers for Medicare and Medicaid Services (CMS), the federal health care payer.

Under CMS rules, Davidson explained, practices must charge the same amount for cataract surgery, regardless of the technique or technology, but they can charge extra for special artificial lenses that correct astigmatism, near vision and other conditions. They can also charge extra for incisions made in the cornea to correct astigmatism.

So for patients who choose the LenSx surgery, Davidson said, the Eye Clinic will bundle the cost of the special lenses with the cost of the astigmatism correction performed by the LenSx laser during the procedure.

Whatever the payment arrangement, Davidson expects rapid growth for the new technology. “Initially, it should make up 30 to 40 percent of our volume,” he said. “But of the patients we do surgery on now, 80 percent are candidates.”

*The LenSx machine. The screen on the right gives surgeons cross-sectional images of the eye. The laser fires from the apparatus below the screen. Photo courtesy Alcon.*