

CORNEA

How to Handle DSAEK Complications

BY MARIANNE DORAN, CONTRIBUTING WRITER

In the last five years, refinements in Descemet's stripping automated endothelial keratoplasty (DSAEK) have moved the procedure from experimental status to mainstream use. According to Mark S. Gorovoy, MD, a cornea surgeon in private practice in Fort Myers, Fla., and an early proponent of DSAEK, these grafts now account for at least half of the corneal transplants performed in the United States today.

DSAEK has several advantages over conventional penetrating keratoplasty (PK). But the procedure also has a significant learning curve and several potential complications that have come to light as more DSAEK transplants are being performed. These complications are generally manageable, and the risk tends to decline as a surgeon gains experience in the new surgical technique.

Advantages Aplenty

Steven I. Rosenfeld, MD, a cornea surgeon in private practice in Delray Beach, Fla., cited the main advantages of DSAEK as:

- a faster surgery,
- quicker visual recovery,
- less intraoperative risk and
- less postoperative irritation and astigmatism.

"DSAEK takes about 10 to 15 minutes to perform compared with traditional PK's 45 minutes to an hour," said Dr. Rosenfeld, who is also a voluntary associate professor at the Bascom Palmer Eye Institute in Miami. "Visual recovery after PK takes one to two



(1) Dislocation of DSAEK graft in a patient of Dr. Gorovoy, one day post-op and (2) rebubbling of same graft 24 hours later.

years, whereas recovery in a DSAEK operation requires only one to two months. You get your patients up and about and back to their activities of daily living significantly faster."

Dr. Rosenfeld added that DSAEK is a safer procedure than PK because the eye remains essentially intact as the disc of donor tissue is inserted through a small incision, while in PK there is a period of "open sky" when the host cornea is removed and the eye is very vulnerable to severe complications. In addition, experience has shown that DSAEK can be successfully performed on a patient whose traditional PK has failed over time.

Two Major Problems

Two common complications discussed below, disc dislocation and primary graft failure, should be considered by ophthalmologists approaching DSAEK.

Dislocations. Corneal transplants performed with DSAEK are vulnerable to dislocations because the donor tissue is held in place with an air bubble instead of sutures. After the donor tissue is placed against the host cornea, an air bubble is injected into the eye and presses against the graft to keep it in place.

"In the first day or two, or even the first week, the disc of tissue may move," Dr. Rosenfeld said. "It may dislocate just enough to keep it from being perfectly centered, or it may fully detach and not stay pressed against the host cornea."

According to Dr. Gorovoy, lack of a tight, full air bubble for at least 15 minutes is believed to be the most common reason that a graft does not properly attach to the host cornea. A graft also can dislocate if a patient rubs or puts pressure on the eye.

Dr. Gorovoy said that dislocations

will always be an issue with DSAEK. “No matter how much experience you have, the rate never goes down to zero. I have done more than a thousand cases, and I still have dislocations. Even with the best technique, it’s something we just have to deal with in some patients.” He added that a reasonable goal for a surgeon is to get the dislocation rate into single digits, ideally 5 percent or less.

The good news about dislocations is that rebubbling the graft may solve the problem. Dr. Rosenfeld noted that when a dislocated graft is discovered during the next-day follow-up exam, reattachment with rebubbling is often possible and does not necessarily require returning to the operating room or ambulatory care center. “Rebubbling often can be performed in a procedure room, and it can sometimes be done in the office if the patient is cooperative and the graft doesn’t require too much manipulation.”

Graft failure. Some patients experience primary graft failure just as in traditional corneal transplant surgery. “You perform the surgery and everything goes well,” Dr. Rosenfeld said, “but for some reason the endothelial cells don’t start pumping the way they should, leaving the cornea swollen.”

But endothelial cell loss can also result from the donor tissue being overmanipulated in the hands of a less experienced surgeon. “The more experienced the surgeon, the lower the rate of cell loss and the lower the rate of donor disc detachment in the immediate postoperative period,” Dr. Rosenfeld said. But the patient’s anatomy also plays a role, whether it’s a shallow anterior chamber, an anterior chamber lens implant or previous glaucoma surgery with tube shunts increasing trauma to the endothelium. Smaller incision size—going below 4 to 5 mm—also appears to increase cell loss.

Corneal transplant surgeons hope that better insertion devices will reduce trauma to the endothelial tissue. “People are trying to come up with better insertion devices to make the procedure more uniform,” Dr. Gorovoy noted. “These are becoming more

available, but long-term data aren’t available on any of these devices because they haven’t been around very long. There is some hope that they will make it easier to unfold the tissue and thereby prevent cell loss.”

A histopathologic study of failed grafts conducted by Leejee H. Suh, MD, and colleagues at Bascom Palmer, identified several other factors that contribute to graft dislocation, including interface debris, such as retained Descemet’s membrane and fibrovascular tissue. It also found epithelial ingrowth in every instance of decentered grafts.¹ Any type of debris or extraneous material in the interface can be a deterrent to graft attachment, according to the authors.

Problems Beyond the Cornea

In addition to dislocation and failure, complications extending to other ocular structures are a potential DSAEK risk. These include retinal detachment, cystoid macular edema, suprachoroidal hemorrhage, steroid-response glaucoma, pupillary block from the injected air bubble and IOL dislocation. “This is what we know so far, but we are still learning,” Dr. Rosenfeld noted. “When DSAEK first came out, many of these complications hadn’t been reported yet or hadn’t been fully recognized. Now we are realizing that this surgery—as good as we think it is—is still prone to the complications that you can see in many types of intraocular surgery.”

What to do with an anterior chamber IOL. Before proceeding with DSAEK, Dr. Gorovoy believes that all anterior chamber lenses should be removed. “I feel they contribute to the loss of endothelial cells chronically so by removing them you give the new graft a better chance of survival. Also, an obstructive AC object makes unfolding challenging and possibly injurious to the graft. Bubble management is also more difficult. More controversial is the practice of staging or combining multiple procedures with DSAEK,” he said. “I think there is an advantage in staging procedures because it gives your graft a better chance

to survive in a quieter environment without blood or viscoelastic.”

What to do with a healthy crystalline lens. “What do you do with younger patients who need this procedure and have clear lenses?” Dr. Gorovoy continued. “Do you render them pseudophakic because of the high incidence of cataract formation? I think most of us believe that anyone who is beyond the age of 40 would be better served by having a lensectomy first or at the same time. Again, I prefer to separate the procedures.”

When to refer an extra complex case. How experienced should a surgeon be before attempting to perform DSAEK on a patient with obvious complicating factors? “Eyes that have a lot of anterior segment problems, especially those without a complete AC to PC barrier, are the more challenging cases. Previous corneal transplant, synechiae, blebs or shunts also increase the difficulty,” Dr. Gorovoy said. “I would recommend that anyone who isn’t past their learning curve not even attempt these eyes and instead refer to someone else.”

Regarding learning curves, Dr. Rosenfeld said, “In my opinion, it takes about 10 cases to start feeling comfortable with DSAEK and about 50 cases to feel fully comfortable. But I can say that when you get together with other cornea surgeons who do DSAEK, we all still find it very humbling. On face value it looks like a rather simple, straightforward operation, but the infinite number of ways you can have little glitches during surgery never ceases to amaze us, and we are still learning how to handle them.”

Dr. Gorovoy noted that despite the challenges posed by some eyes, “At the end of the day, the outcome of DSAEK is so far superior to PK in every capacity that it’s worth doing this procedure even in the face of rebubbings and primary failures.”

1 Suh, L. H. et al. *Ophthalmology* 2009; 116(4):603–608.

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