

## 5 rules to repair DALK ruptures

**While there is steep learning curve to procedure, these cases are not difficult to handle**

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Worried about rupture during a deep anterior lamellar keratoplasty (DALK)? You may be overreacting.

While rupture is the most common complication of DALK, its repair is not as difficult as commonly thought.

A retrospective study of more than 1,000 eyes with descemet membrane (DM) ruptures during



DALK found 91 ruptures. All of the ruptures were successfully repaired and there were no conversions to penetrating keratoplasty (PK).

“There is a very difficult and steep learning curve when a surgeon begins to perform DALK,” explained Enrica Sarnicola, MD, international fellow in cornea, Cincinnati Eye Institute, Cincinnati, OH, from the Università degli Studi di Siena, Italy. “In the very beginning, it is nice to know that conversion to PK can be used as a safety net. But as soon as a surgeon becomes comfortable with DALK, he should start repairing ruptures.

“Saving the host endothelium is the key to avoid endothelial rejection, provide a good and stable endothelial cell count, and allow for a long-term graft survival,” she added.

Ruptures happen to even the most experienced surgeons and we have seen very consistently that when they happen, repair should be the first choice.”

### DALK study

Dr. Sarnicola discussed the results from a retrospective study of DALK, conducted by DALK surgeon Vincenzo Sarnicola, MD, Clinica degli Occhi Sarnicola, Grosseto, Italy, on 1,084 eyes

of 908 patients.

Not only were all of the DM ruptures repaired, but the rupture rate was quite low, 8.4%. DM rupture rates reported in the recent literature range from 4 to 39%, and PK conversion from 0 to 60%. Surgeon experience appears to be the best predictor of rupture risk and conversion into PK.

Most ruptures are small micro perforations, tears in the DM that occur when the surgeon goes just a little too deep during a manual dissection. Macro perforations, ruptures larger than 2 mm, occur during the removal of residual peripheral stroma in big bubble cases.

Of the 1,084 DALK procedures in the study, 889 were descemetec DALK (dDALK) procedures and 195 were manual DALK. There were 91 DM ruptures (8.4%) in the entire study population, of which 62 (7%) were in dDALK and 29 (15%) in manual DALK.

Most of the ruptures (79%) were micro perforations and 21% were macro perforations. Micro ruptures were more common in both dDALK and manual DALK procedures (76% and 86%, respectively) compared with macro ruptures. Of the macro ruptures, 24% occurred in dDALK and 14% in manual DALK.

### [5 rules for manual DALK ruptures](#)

## **5 rules for manual DALK ruptures**

Manual DALK is prone to rupture, with 15% of the manual procedures resulting in rupture compared to 7% of dDALK procedures. The majority of the ruptures, 87 (96.6%), were peripheral.

Of the peripheral ruptures, 39 (44.8%) were lateral, 32 (36.8%) were superior, and 16 (18.4%) were inferior. Only four (4.4%) ruptures were central or paracentral—all of them in the manual DALK group.

Whatever the site and size of the rupture, five general rules can help assure successful repair.

1. Always complete the stromectomy before beginning repair, Dr. Sarnicola said. Completing the stromectomy avoids the formation of any stromal steps between donor and recipient tissue. These steps can prevent good host-donor attachment and can keep the rupture open.
2. Rather than immediately injecting air into the anterior chamber, first suture the donor graft in place. Once the donor tissue is firmly placed, then inject air into the anterior chamber.
3. The next step is to move the eye to remove interface fluids that may have collected. The most important step is proper head positioning for the patient.
4. The air bubble must be left in the anterior chamber for several hours after surgery so that the rupture is sealed.
5. Patients with a lateral rupture should be on their sides. Patients with a superior rupture should be seated with the head tilted to the side. Patients with an inferior rupture should be lying the back with the head straight back and the chin hyperextended. The main concern in repairing ruptures is convincing patients to keep their head in the correct position—even if it does not feel comfortable.

Dr. Sarnicola advised a patient discussion about the possibility of rupture before surgery and explain that it can be repaired. If it happens, the patient will not be surprised. The surgeon then has another opportunity to discuss the importance of proper head positioning.

“Rupture during DALK is the most common complication,” Dr. Sarnicola said. “Residents and fellows and newer DALK surgeons will have more ruptures, but it happens to even the most experienced surgeon. We should always at least try to fix the rupture, keeping in mind the repairing rules and the advantages of preserved a self-endothelium.”

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