NEW PRODUCT APPLICATIONS

BY KAREN APPOLD, CONTRIBUTING WRITER

Improving Safety During Retinal Detachment Surgeries

Device offers a new way to drain subretinal fluid.

Vortex Surgical's curved external drainage and depression (EDD) device provides a new way to drain subretinal fluid externally without requiring vitrectomy.

"Our goal was to create a safer way to drain subretinal fluid for scleral buckles, which would avoid complications and reduce buckling height," says Emmanuel Chang, MD, PhD, a retinal physician at Retina and Vitreous of Texas in Houston, who helped to develop and test the device. "We also wanted to introduce a novel way to remove subretinal fluid without introducing subretinal fluid into the preretinal space for vitrectomy, to reduce the rate of proliferative vitreoretinopathy and increase success rates."

The EDD's most common application is externally draining subretinal fluid for rhegmatogenous retinal detachment repair during both vitrectomy and primary scleral buckling, says Peter J. Belin, MD, a retina specialist at Retina Consultants of Minnesota in Minneapolis who uses the device regularly.

However, "Other applications such as exudative retinal detachment repair in conditions such a Coats disease or subretinal fluid biopsy for inflammatory or neoplastic processes are also promising," Dr. Belin says. "The objective is to efficiently drain subretinal fluid in a controlled manner while decreasing the risk of hemorrhage or retinal incarceration."

HOW IT WORKS

The curved EDD was intended to make simple drainage in nasal quadrants possible for all patients. "Some people's nasal bridge anatomy makes it difficult to fully flatten the straight EDD and gain entry into the subretinal space," Dr. Chang says. The curved EDD eliminates this issue.

In addition to a curved shaft, the device features a scleral depressor with a retractable 28-gauge needle that extends 2.4 mm at one end. The other end of the shaft is connected to 2 inches of extension tubing, which can be connected to the extrusion line during par plana vitrectomy or a syringe during primary scleral buckling for active drainage, or left open to air for passive drainage, Dr. Belin says. A slide button on the side of the depressor's handle can be used to extend and retract the needle.

The depressor head guards the needle while a surgeon positions the device into the appropriate area. The button is actuated and the needle penetrates through the sclera and into the subretinal space, says Bob Neu, vice president of product integration at Vortex Surgical in St. Louis, Missouri. Fluid can be withdrawn passively or actively through the vitrectomy extrusion line.

The curved EDD is a second-generation EDD device. Vortex Surgical's original device was a straight shaft designed with a slightly smaller depressor head. "The new design allows for better drainage access," Neu says.

The needle was designed to be a specific length for several reasons. First, it allows the device to penetrate the sclera, but not the retina, Neu says. Furthermore, the needle's length

Vortex Surgical's curved external drainage and depression (EDD) device. *Image courtesy of Vortex Surgical.*

gives surgeons the ability to withdraw the needle while drainage is occurring to minimize potential incarceration in the retina.

The new version of the needle is protected by the depressor head during positioning; previous methods had a nonguarded needle. The depressor allows for localization of drainage sites under direct visualization while the needle is slowly advanced into a safe location. "This enables users to easily see large chroidal vessels and avoid them to reduce the risk of hemorrhage," Dr. Belin says.

ERGONOMIC DESIGN

The curved EDD was designed to provide greater access for surgeons. "The new curved EDD is more ergonomic than its straight predecessor, allowing for easier positioning especially on the nasal side or with a deep and prominent orbit," Dr. Belin says. User-friendly features include a ribbed handle which allows for nonslip maneuverability and a high-flow tubing extension, which can be connected directly to any major vitrectomy machine extrusion tubing set, Neu says.

The ability to use the vitrectomy system's extrusion line and foot pedal control to titrate the rate of aspiration is smooth and controlled, Dr. Belin says. Some chronic detachmaents have thick subretinal fluid that requires higher aspiration pressure while also having the ability to slow down aspiration toward the end of the drainage as the retina comes closer to the needle. The needle can also be retracted at this time to get a thorough drain.

GOOD PATIENT OUTCOMES

In addition to reducing the risks associated with external drainage of subretinal fluid using a needle or scleral cutdown, research[1] has demonstrated a high single-surgery operation success rate, with low rates of proliferative vitreoretinopathy when using the curved EDD. Specifically, 83 patients had a favorable safety profile without any vision threating complications and a 97% anatomic success rate.

When used during vitrectomy, the subretinal fluid — which contains liberated retinal pigment epithelium cells and other inflammatory milieu — can be drained directly from the subretinal space rather than exposing the vitreous cavity and retinal surface to the these pro-proliferative vitreoretinopathy molecules, Dr. Belin says.

Furthermore, draining a bullous subretinal detachment initially with the EDD can allow for safer shaving of the vitreous over a less mobile retina. After draining with the EDD, draining retinotomy or perfluorocarbon liquid is not usually needed, Dr. Belin says. RP

REFERENCE

1. Belin PJ, Mundae R, Tzu JH, Chang E, Parke III DW. External drainage of subretinal fluid during rhegmatogenous retinal detachment repair. *Retina*. 2021;41(9):1828-1832.