SURGEON'S CORNER

Modified External Needle Drainage of Subretinal Fluid in the Management of Rhegmatogenous Retinal Detachment Using a “Guarded Needle” Approach

John W. Kitchens, MD

External needle drainage of subretinal fluid is a useful technique to assist with retinal detachment surgery. This technique provides the ability to directly visualize the removal of subretinal fluid in a controlled manner. The major difficulty in learning this technique is the potential for overpenetration with the needle. Using a “guarded needle” approach can reduce this risk and increase the adoption of this useful method.

Drainage of subretinal fluid is a useful adjuvant to aid in the repair of retinal detachment during scleral buckling surgery. Since its initial description by Steve Charles in 1985, external needle drainage of subretinal fluid has served as a successful technique to assist with retinal detachment surgery. Other studies have demonstrated the advantages and low complication rate of this procedure. The benefits of this technique include the ability to directly visualize the removal of subretinal fluid in a controlled manner. Theoretically, these advantages may reduce the risk of drainage complications such as subretinal hemorrhage and retinal incarceration. Typically, external needle drainage takes place after cryotherapy has been applied and the scleral buckle has been placed around the eye with sutures or scleral tunnels. Drainage of subretinal fluid by either scleral cutdown or external needle drainage can be performed before or after tightening the anchoring sutures of the buckle.

One disadvantage of the external needle drainage technique is the steep learning curve. The most difficult portion of initial attempts at drainage involves identifying the location of the needle in the subretinal space. Intraoperatively, corneal edema as well as retinal clarity can make localizing the needle in the subretinal space difficult with indirect ophthalmoscopy. Iatrogenic damage from inadvertent needle placement can result in subretinal or choroidal hemorrhage, damage to the retinal pigment epithelium, and retinal tears or incarceration. In an attempt to better control the placement of the needle, the “guarded needle” approach was developed.

The guarded needle technique serves to address overpenetration of the needle during attempted drainage of subretinal fluid (Figure 1A and B). In addition to increased safety, this technique can be performed with standard scleral buckling elements and needles of various sizes (25-27 gauge) and lengths (3/8 to 5/8 in).

**TECHNIQUE**

After successful placement and tightening of the encircling element, the 26-gauge, 3/8-in needle is placed on a syringe (1 or 3 cm³). Before the needle is advanced into the subretinal space, the plunger is removed from the syringe to allow for passive egress of the subretinal fluid. An additional technique, which can aid in the drainage of subretinal fluid, involves the placement of a traction suture around the scleral buckle.
180° away from the proposed drainage site. The surgical assistant can retract this suture, increasing the intraocular pressure, to aid in the egress of fluid.

The guarded needle is prepared by sliding the buckle sleeve (element 270 or 70; Mira, Inc, Uxbridge, Massachusetts) over the shaft of the needle. Owing to the length of the sleeve, it will overlap the tip of the needle. Surgical scissors are used to trim the sleeve, revealing approximately 4 mm of needle tip when the sleeve rests at the base (hub) of the needle (Figure 2). Care should be taken when maneuvering the guarded needle into position for drainage because the sleeve can slide off the needle.

The needle is then positioned at the anterior edge of the scleral buckle in the most bullous area of retinal detachment. General principles in the drainage of subretinal fluid by the external needle technique include the avoidance of draining within the 1-o’clock position of the retinal break as well as in the area of any vortex veins. The bevel of the needle should be directed away from the retina (ie, bevel toward the sclera). This needle position theoretically reduces the risk of retinal incarceration into the needle tip. Gentle depression of the sclera with the needle can help to identify the potential area of entry. The needle should enter the subretinal space in a controlled fashion. The entry angle should be steep, almost parallel to the scleral buckle, to help prevent inadvertent perforation of the retina. Upon entry, the needle tip should be seen beneath the retina with either the indirect ophthalmoscope or the surgical microscope with the assistance of a chandelier light or other lighting source. The surgical assistant can retract the traction suture to aid in drainage of the fluid or to increase the intraocular pressure in the case of hemorrhage. As the retina begins to settle, it will begin to “flutter.” Once it draws close to the needle, the needle should be removed from the eye to avoid inadvertent perforation of the retina. Tension should remain on the globe (via the traction suture) to assist in draining the residual amount of subretinal fluid through the needle track (Figure 3). A brief video (http://www.archophthalmol.com) tutorial of the modified external drainage procedure is available online.

COMMENT

External needle drainage of subretinal fluid can result in successful reattachment of the retina.6,8 With this technique, the surgeon can monitor the drainage of the subretinal fluid to ensure a more complete drainage and identify the presence of hemorrhage during the drain. In addition, the elevated intraocular pressure of the tightened scleral buckle9 may reduce the risk of significant hemorrhage.
The difficulty that many surgeons have with adopting this technique is associated with identifying the needle in the subretinal space. This can lead to iatrogenic damage to the retina, the retinal pigment epithelium, or the choroid. Using the guarded needle technique ensures that the needle cannot penetrate the eye farther than the length of exposed needle. This can allow for an easier and safer transition to external needle drainage for retinal reattachment surgery.

Submitted for Publication: May 12, 2010; final revision received October 1, 2010; accepted October 5, 2010.

Correspondence: John W. Kitchens, MD, Retina Associates of Kentucky, 120 N Eagle Creek Dr, Ste 500, Lexington, KY 40509 (jkitchens@gmail.com).

Financial Disclosure: None reported.


REFERENCES