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CRYOTREQ: A NEW OPTION FOR RETINAL CRYOTHERAPY

According to early surgeon experience, this device could be a complete game-changer in vitreoretinal surgery.

Introduction

BY FRANK RUSELER

Cryogenic technologies in health care are not new. For many years now, cryotherapy—using extreme cold to perform cryocoagulation of human tissue—has been used in dermatology to treat skin conditions. More recently, cryotherapy techniques have been applied in general and thoracic surgery, oncology, proctology, and urology.

Cryotherapy was introduced in ophthalmology around 1933 to induce adhesive choroiditis. In the early 1960s, cryotherapy was used for intracapsular cataract removal and croypexy was used for treatment of retinal tears with or without retinal detachment.

CryoTreq (Vitreq, a BVI company), recently introduced to the market in Europe, is the first and only disposable, standalone, handheld instrument for ophthalmic cryosurgery. It does not rely on an external energy source or require maintenance, and it is not connected to a large-volume external gas cylinder. It is indicated for retinal detachment, glaucoma, cataract extraction, trichiasis, and retinopathy of prematurity.

HOW IT WORKS

Retinal indications for cryotherapy include tears and detachment where extreme cold applied on the episcleral tissues creates an adhesive scar that seals the retina against the wall of the eye. Cryotherapy, an alternative to laser photocoagulation, induces chorioretinal adhesion by using a cold metal probe rather than heat from a laser. The drawback to traditional cryotherapy is that it employs expensive and cumbersome equipment connected to a foot-controlled cryoprobe that requires time-consuming priming. Moreover, reusable cryoprobes are known to malfunction due to excess moisture accumulation after sterilization.

Cryopexy with CryoTreq is straightforward and effective. CryoTreq eliminates the complexities related to managing traditional ophthalmic cryosurgery equipment. The tip of the CryoTreq technology reaches cryogenic temperature within a few seconds of activation. Inside the handle, a sealed micro-tank holds liquid nitrous oxide. When the device is activated, the liquid evaporates and gas expands to create a tip at cryogenic temperatures. The device delivers a minimum of 15 freeze dots in the same patient.

ADVANTAGES

CryoTreq has obvious advantages over traditional cryotherapy techniques. It can be used in the OR for retinal tears and detachments and in the office for pneumatic retinopexy. Moreover, CryoTreq doesn't require any special training for handling and preparation, which is particularly advantageous in hospitals without specialized ophthalmic clinic staff. Finally, it does not require sterilization and can be disposed of at the end of the procedure.

In early experience with the device, surgeons have reported that it is reliable, and they appreciate its brief preparation and activation time. They also like that it provides an opportunity to enhance efficiency. CryoTreq is a standalone, hand-controlled, maneuverable device that does not rely on staff support to activate the footpedal.

Based on surgeons' feedback, we are convinced that CryoTreq will be a game-changer, helping ophthalmic surgeons take another step forward in patient care, especially in the vitreoretinal world. Commercialization of the device has begun in Europe, with future expansion to other major markets including the United States, Japan, Canada, and Australia.

FRANK RUSELER
- President, Vitreq Innovation Unit, a Beaver-Visitec International company
- FRuseler@bvimedical.com
- Financial disclosure: Employee (Vitreq)

CryoTreq in the OR

BY STANISLAO RIZZO, MD

In certain fields of health care, standalone handheld cryoprobes have been successfully used for years. In ophthalmology, however, the lack of significant modernization in cryosurgery has made it an unattractive and inefficient procedure. About 2 years ago, I contacted Vitreq and proposed that the company look to replicate the functions of dermatological disposable standalone cryoprobes in vitreoretinal surgery, with the goal of providing patients with a better, more efficient surgery.

In my early experience with CryoTreq, I have enjoyed great function and reliability in the device, which requires only a few simple steps for use and offers the advantages of a disposable device, with higher standards in terms of hygiene and efficiency. In this article, I overview the differences between traditional cryotherapy and CryoTreq and outline the steps of the procedure.

COMPARISON

There are many differences between hand-controlled (CryoTreq) and foot-controlled (traditional) ophthalmology-specific cryotherapy devices. The new hand-controlled device is not only economically convenient, but it also decreases the organizational time

Figure 1. The CryoTreq is the first and only disposable handheld instrument for ophthalmic cryocoagulation (A,B).

Figure 2. The probe of the CryoTreq device.

and effort required of the OR staff to prepare the cryo equipment, connect the cryoprobe, ensure there is enough pressure in the gas bottle, and initiate the priming cycle. The latter step can take up to 90 seconds to complete, which negatively impacts OR efficiency.

Moreover, I have experienced malfunction of traditional cryoprobes due to blockage after resterilization. These traditional devices also take longer to defrost at the tip and have variable performance due to poor gas pressure. Foot-controlled equipment also has higher running costs for service, sterilization, and acquisition of the bottle than hand-controlled technology such as the CryoTreq. Additionally, with CryoTreq I have fewer wires on the floor and no longer need large-capacity gas cylinders in the OR.

All these considerations translate into more efficient patient flow and a safer environment when the CryoTreq is used.

ERGONOMIC DESIGN

The CryoTreq has an ergonomic design (Figure 1A). Once the button on the CryoTreq is pushed (see *Activation Procedure*), the blue activation lever is manually lifted and the micro-container is unsealed (Figure 1B). The device is now activated. As the liquid evaporates, the gas expansion creates a tip at cryogenic temperatures. The device is ready to be used in contact with the eye once the cryo-ball forms around the tip. The probe of the CryoTreq is placed on the exterior surface of the eye (Figure 2).

When the activation bottom is released, the expansion of the gas is interrupted, and the device defrosts. Any residual gas in the container is dispersed into the air.

PROCEDURAL BASICS AND SURGICAL TIPS

CryoTreq is approved for ab external procedures including retinal tear and detachment; scleral buckling with and without cryopexy or laser photocoagulation; and vitrectomy with laser photocoagulation, retinopexy, or cryopexy. It should not be used in patients who have undergone intraocular gas tamponades within the past 3 past months.

During treatment, freezing and unfreezing cycles are applied to the affected area to achieve tissue scarring and sealing. These cycles should be repeated until coagulation is visually successful. Several surgical tips can be helpful to maximize the benefits of the procedure.

Tip No. 1. Transitioning from a foot-controlled to a hand-controlled device requires patience. Familiarize yourself with the device to understand what finger is best to activate the device. This will depend on the position of the lesion you are treating.

Tip No. 2. When the activation button is pressed, the tip probe cools; when the button is released, the tip defrosts. The probe should be kept in contact with the sclera during freezing. Only when the tip is defrosted is it safe to pull it back and repeat the process if required. I always use a syringe filled with balanced saline solution to facilitate defrosting.

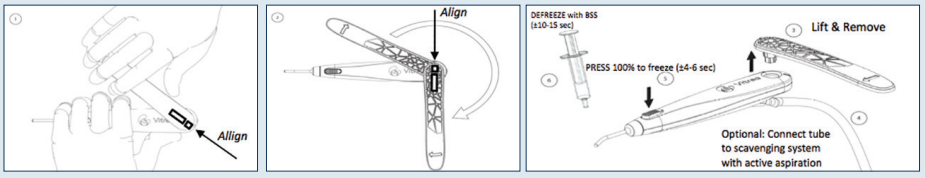
Tip No. 3. With experience, the surgeon can start to adjust the duration of each freezing cycle and the number of freezing cycles. This should coincide with the extension and location of the lesion. Complications, although rare, are typically due to inflammatory responses caused by over-freezing or freezing the nontarget tissue.

Tip No. 4. When managing retinal detachments, endolaser treatment is ineffective in the presence of subretinal fluid. Liquid perfluorocarbon (PFCL) is then used to drain the subretinal fluid, and the endolaser is applied to promote chorioretinal adhesion. In those cases, CryoTreq becomes an attractive alternative because it does not use PFCL. CryoTreq does not require chorioretinal approximation, is simple to perform, and is less expensive.

CONCLUSION

CryoTreq is a promising device that I expect to completely change the way I perform vitreoretinal surgery. It is the innovation in cryotherapy that ophthalmologists have been waiting for. ■

Activation Procedure



- Visually inspect packaging for possible damages and expiration date. Devices from previously opened or damaged packaging or devices past the expiration date must be deemed unsterile and discarded. Unpack the CryoTreq for introduction into a sterile environment *(see 1)*.
- The CryoTreq is intended to be used in a well-ventilated room with a downflow system; if unavailable, attach the hose to the exhaust of the CryoTreq and a scavenging system *(see 4)*.
- A syringe with sterile balanced saline solution at room temperature (22°C/72°F) may be used to speed up tip release after freezing *(see 6)*.
- Rotate the activation lever clockwise in a fluent motion by following the direction shown on the lever to prepare the CryoTreq; this may require a limited amount of force *(see 2)*.
- After rotating the lever over 270° and aligning stripes on the lever and the tool, the lever can be manually removed by pulling it upward *(see 3)*.
- Always check proper functioning of the CryoTreq without tissue contact to the tip of the probe. In less than 2 seconds, push the activation button while pointing the tip downward; the point of the tip should become white from the drop in temperature *(see 5)*.

STANISLAO RIZZO, MD
- Professor and Chair, Department of Ophthalmology, Università Cattolica del Sacro Cuore, Policlinico Universitario, A. Gemelli, Rome
- stanislao.rizzo@unicatt.it
- Financial disclosure: None

CryoTreq is currently not available in the United States