Adjustable suture use in strabismus surgery

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Introduction

Among many strabismologists, the general opinion towards adjustable suture strabismus surgery is that the technique results in better ocular alignment outcomes and long-term stability. In traditional (nonadjustable) strabismus surgery, postoperative misalignment may become evident as soon as twenty-four hours after surgery or as late as weeks following surgery.
The ability to correct postoperative overcorrections and undercorrections is the main advantage of using adjustable sutures in strabismus surgery, and the reoperation rate with adjustable sutures tends to be less than 10% (versus 20% in traditional strabismus surgery)
This article provides an overview of adjustable suture strabismus surgery and explores current advances in the surgical technique for children and adults.
Patient selection

Careful patient selection is particularly important, indeed crucial, for successful implementation of adjustable sutures.
Adults and older children being considered for adjustable suture strabismus surgery can be screened by touching a cotton swab to the medial or lateral aspect of the bulbar Conjunctiva.

Patients able to tolerate manipulation of the bulbar conjunctiva in the absence of topical anesthetic usually do well during adjustment. Although there is no true age limitation when it comes to using adjustable sutures, the adjustment technique often requires a second general anesthetic in children under the age of seven years.
Overview of surgical technique

- Traction suture
- Muscle insertion
- Adjustable suture noose
Timing of adjustment

In general, the strabismus surgeon should feel free to choose the timing of adjustment if adjustment is planned to occur 6 to 24 hours after surgery. The reason for this is because no significant difference tends to occur in the final ocular alignment when the postoperative adjustment is made 6 or 24 hours following surgery.
Anesthesia during surgical procedure

The adjustable suture technique requires a fully awake and cooperative patient, recovery from anesthesia, and return of muscle function. In all types of strabismus surgery, general anesthesia is used most often.
The ideal anesthetic, therefore, would provide the benefits associated with both general and local anesthesia. That is, the drug would allow individuals to return to the fully awake state soon after surgery and allow quick recovery of muscle function.
They used a combination of propofol and midazolam which, provides adequate hypnosis and unconsciousness for the duration of the surgery.

Since propofol has a short half-life, patients are able to regain consciousness in less than five minutes once surgery is completed eliminating extended time in the recovery room. In addition, the authors believe the combination of propofol and midazolam enhances patient comfort and convenience by performing the adjustment before discharge from the operating room.
**Anesthesia during muscle adjustment**

Although suture adjustment can cause anxiety even in motivated patients, the use of sedatives should be avoided to help ensure patient alertness and enhance full eye movement control during the procedure. Acetaminophen with codeine has been reported to provide a mild analgesic with little sedative effect and little influence on ocular motility.

A topical anesthetic drop should be used in all cases during adjustment to decrease ocular discomfort.
Modified surgical techniques specific for children

In this procedure strabismus surgery is performed under general anesthesia, and the muscle is secured as described previously (Fig.).

A separate scleral pass is then made in the fornix area, the sutures are securely tied and trimmed, and the conjunctiva is closed covering the tissues. Disadvantages associated with the modified procedure include the need for adjustment in the operating room with additional anesthetic and the additional scleral suture pass.
Complications

- Complications most often seen with adjustable suture strabismus surgery include:
  1. suture breakage resulting in a lost or slipped muscle
  2. a poorly sliding noose which can also lead to suture breakage
  3. bradycardia
  4. Scleral dellen is seen less commonly today due to the frequent use of fornix incisions during strabismus surgery compared with limbal incisions.
  5. hyphema
  6. foreign body granuloma
the main advantage of adjustable sutures in strabismus surgery is the ability to correct postoperative overcorrections and undercorrections.

Complications do still occur despite current advances in strabismus surgery with the use of adjustable sutures, and strabismus surgeons should particularly monitor patients for the development of bradycardia during adjustment, which can occur at any age.
THANK YOU