Introduction
Pathologic myopia is characterized by excessive axial elongation with progressive degeneration of the posterior pole. It is often associated with posterior staphylocoma or patchy chorioretinal atrophy of posterior pole. In addition, it may lead to various complications requiring surgical management including myopic traction maculopathy and macular hole with or without retinal detachment. Recently, the introduction of surgical instruments in vitrectomy have facilitated the use of small gauge vitrectomy in complex cases with pathologic myopia. However, the retinal surgeons, especially beginners, may meet the obstacles during vitrectomy in cases with pathologic myopia. This report represents several surgical tips of small gauge vitrectomy in pathologic myopia-related complications for the beginning retinal surgeons.

Contents
Approach to posterior pole

It is well known that high myopia may be associated with the presence of a posterior staphyloma, which is a progressive sclera ecstatica caused by axial elongation. Widely used instruments in small gauge vitrectomy have a limitation in the treatment of pathologic myopia-related complications. The extremely long axial elongation may interrupt the instrumentations from getting close to the retina, that resulting insufficient removal of the cortical vitreous. Several methods could be proposed to facilitate the access to the posterior pole of the eyes with pathologic myopia.

First, excessive compression of the globe with lower intraocular pressure may allow a closer approach to the retina. However, the increased corneal distortion may induce the poor visualization of retina. Second, the surgery may have the extra millimeters to approach the retina with removal of cannula for sclerotomies during the surgery. However, it may be difficult to identify two incision sites on conjunctiva and sclera when cannulas have been inserted with conjunctival displacement. Third, recently, several instruments for high myopia became available commercially. For example, DORC introduced 23 or 25 gauge microforceps and feedback instruments, which have 5 mm longer shaft than standard ones (developed in cooperation with Dr. Yasushi Ikuno). However, the surgeons have shoulder the additional cost.

Visualization of transparent adjuvant
Perfluorocarbon liquid (PFCL) is a widely used intraoperative adjuvant during vitrectomy. However, PFCL causes various complications, such as intravitreal PFCL has been shown to fluctuate between anterior and posterior segment. Several studies have reported that remaining PFCL compounds may be associated with toxicity in ocular tissue despite their stability. These findings showed the importance of complete removal of PFCLs at the end of vitrectomy. However, highly myopic eyes, severe chorioretinal atrophy, of the posterior pole makes it difficult to visualize transparent PFCL clearly. Despite advance in surgical instruments and techniques, complete removal of PFCL continues to demand skill and experience in the eyes with pathologic myopia.

Triamcinolone acetone (TA) is most commonly used as adjunct to vitrectomy for visualizing vitreous and retinal surface during vitrectomy. Intraoperative use of TA can visualize posterior hyaloid, peripheral retina, and the chorioretinal remnants. TA leakage at the end of vitrectomy can be a problem for visualization of vitreous. TA enables visualization of residual PFCL intraoperatively, which can make the procedure, complete removal of PFCL, very safe and effective at the end of vitrectomy.

Successful sutureless wound closure
With the advent of small gauge vitrectomy, transconjunctival sutureless approaches have become feasible. Sutureless surgery can reduce post-operative inflammation, discomfort and suture-induced astigmatism. Successful small gauge vitrectomy requires self-sealing of the sclerotomy wound after cannula removal. However, if self-sealing is not achieved, the sclerotomy wound will continuously leak, leading to various complications including hypotony, vitreous incarceration, choroidal detachment and endophthalmitis. Several techniques to avoid the wound leakage were proposed including oblique trocar insertion, use of tissue glue, releasable suture technique and single absorbable suture. Several reports demonstrated that myopia was associated with postoperative hypotony. Highly myopic eyes have thin sclera, a lower sclera rigidity and deranged sclera collagen fiber. These factors are associated with poor self-sealing, which leads to postoperative hypotony. In addition, the beginners have little experience with trocar insertion technique, which may increase the incidence of wound leakage. In complex cases, the sclerotomy sites may be affected by frequent movements of multiple instrumentation and large torque. The intensive procedures may induce dehiscence of conjunctiva. Then, the eyes with pathologic myopia should be inspected meticulously to identify the wound leakage at the end of surgery.

After removal of cannula, the sclerotomy sites massaged gently with a cotton swab. When moderate leakage was noted, an external cauterization may be applied on the sclerotomy site with conjunctiva and sclera by bipolar diathermy until the leakage is not detected. Thermal cauterization may not increase postoperative inflammation, irritation and astigmatism. Moreover, this technique allows the sealing of wound easily, even if conjunctival hemorrhage during cannula removal makes it difficult to detect the leaking point. While, if the leakage is profound, additional procedures might be needed including suture placement.

Conclusion
In this report, we demonstrated the three aspects of surgical tips for vitrectomy in the eyes with pathologic myopia including the methods to approach the posterior pole effectively, visualization of transparent surgical adjuvant and successful achievement of self-sealing wound. Those surgical tips of small gauge vitrectomy will be useful to handle the difficulties during vitrectomy for pathologic myopia-related complications, especially in the beginning retinal surgeons.

Reference