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SHORT COMMUNICATION

Primary phacoemulsification and aspiration combined with 25-gauge single-port vitrectomy for management of acute angle closure

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PURPOSE. *To describe a technique using phacoemulsification and aspiration (PEA) combined with 25-gauge single-port vitrectomy as a primary treatment for acute angle closure (AAC).*
METHODS. *Seventeen consecutive cases of AAC were treated with 1) transconjunctival limited single-port vitrectomy with a 25-gauge vitrector and 2) transcorneal PEA and cortex removal followed by implantation of foldable intraocular lenses (IOL).*
RESULTS. *Intraocular pressure (IOP) control was achieved in all 17 eyes examined. Mean preoperative IOP was 51.8±13.1 mmHg, and mean IOP on postoperative day 1 was 18.3±8.5 mmHg. Additional anti-glaucoma surgery was necessary in one eye. IOL could not be implanted because of zonular dialysis in one eye. Postoperative complications were seen in three cases (one retinal hemorrhage and two papilledema).*
CONCLUSIONS. *The PEA procedure is efficient as a primary treatment of AAC. Single-port vitrectomy with a 25-gauge vitrector facilitated PEA and IOL implantation. (Eur J Ophthalmol 2008; 18: 450-2)*

KEY WORDS. *Phacoemulsification and aspiration, Acute angle closure, Vitrectomy, 25-gauge*

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INTRODUCTION

Acute angle closure (AAC) is caused by a sudden obstruction of the angle in the anterior chamber and results in a severe increase in intraocular pressure (IOP).
Recent studies have indicated that the phacoemulsification aspiration (PEA) procedure with intraocular lens (IOL) implantation can widen the anterior chamber angle and reduce IOP because lens thickness and anterior apposition contribute to AAC (1, 2). However, the PEA procedure in AAC eyes suffers from a number of technical difficulties: poor visibility due to corneal edema, poor mydriasis, and crowded anterior chamber due to weak zonules.
Vitreous tap techniques have been reported to facilitate the PEA procedure (3-5). Chang (4) and Dada et al (5) performed vitreous tap via the pars plana and deepened anterior chamber using a 20- or 23-gauge vitrector, respectively. We introduced the PEA procedure combined with 25-gauge single-port vitrectomy as a primary treatment for AAC.

METHODS

This study was performed in adherence with the Declaration of Helsinki. The institutional ethics committee decided approval was not required for this study.
The study population consisted of 17 Japanese subjects (11 women and 6 men, admitted between January 1, 2005, and December 31, 2006). In all cases, surgery was performed within 6 hours after diagnosis of AAC.

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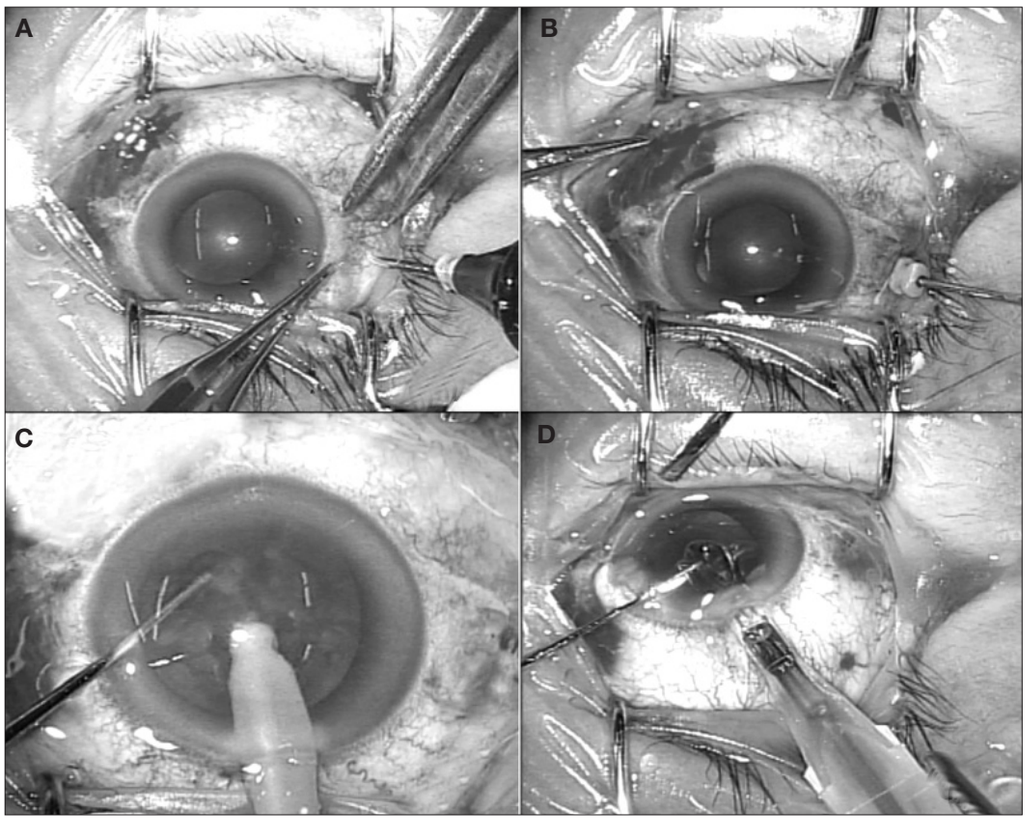

Fig. 1 - *Surgical procedure of phacoemulsification and aspiration (PEA) combined with limited vitrectomy.* **(A)** *The entry site was made using trocars.* **(B)** *A 25-gauge vitrector was inserted.* **(C)** *PEA was performed.* **(D)** *An intraocular lens was implanted.*

Preoperative IOP-lowering treatment with intravenous mannitol or oral acetazolamide was applied in all cases.

Surgical technique

Surgery was performed under peribulbar anesthesia. At the beginning of surgery, a transconjunctival entry site of the vitrectomy probe was made 3.5 mm posterior to the limbus via the pars plana at 2 or 10 o'clock using 25-gauge trocars (Alcon; Fig. 1A). A 25-gauge high-speed vitreous cutter (MidLab) was introduced through the trocar. Limited core vitrectomy was performed (1500 cuts per min, 300 mmHg vacuum, Fig. 1B) to decompress and soften the eye. Following vitrectomy, an ophthalmic viscosurgical device was injected via a corneal side port to form a deep anterior chamber.

The PEA procedure was performed through a superior 2.5-mm corneal incision. The standard PEA procedure, including continuous curvilinear capsulorhexis, hydrodissection, phaco-chop nucleotomy (Fig. 1C), cortex removal with automated irrigation/aspiration, and implantation of foldable acrylic IOL (Fig. 1D) was performed.

RESULTS

The mean age of the patients was 70.6±5.0 years (mean ± SD). Clinical outcomes of IOP are shown in Figure 2. Mean preoperative IOP was 51.8±13.1 mmHg, and mean

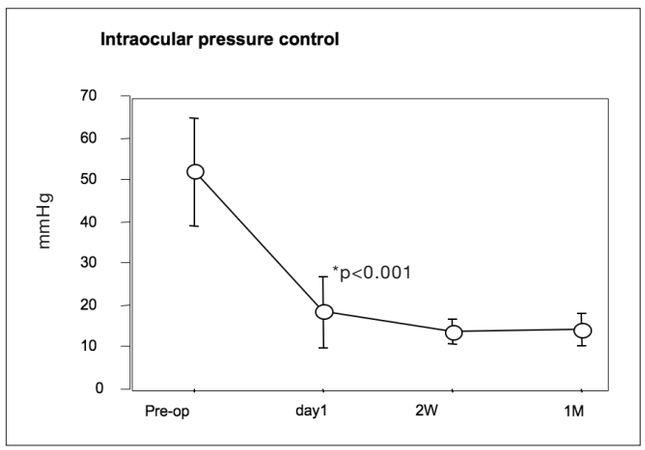

Fig. 2 - *Clinical outcome of intraocular pressure.*

IOP on postoperative day 1 decreased to 18.3±8.5 mmHg ($p<0.001$). We performed additional surgery in two cases. In one case, we performed a secondary operation consisting of IOL sulcus suture 2 weeks after the initial surgery, because the IOL could not be implanted due to zonular dialysis during the initial surgery. In the other case, we performed goniosynechialysis 1 week postoperatively. As postoperative complications, retinal hemorrhage and papilledema occurred in one and two cases, respectively.

DISCUSSION

In this report, we describe a technique consisting of the PEA procedure combined with limited core vitrectomy with a 25-gauge vitrector.

AAC involves obstruction of the anterior flow of aqueous humor within the eye. Certain anatomic characteristics, such as a shallow anterior chamber, short axial length, crowded anterior chamber, increased lens thickness, and weak zonules, contribute to the development of relative papillary block in AAC. Thus, crystalline lens extraction can potentially eliminate the cause of AAC. Some reports supported the efficacy of the PEA procedure in cases of AAC. However, we have encountered various difficulties during surgery, such as reduced working space due to crowded anterior chamber and poor visibility due to corneal edema. Vitreous tap or limited core vitrectomy have been reported to deepen the anterior chamber and facilitate the PEA procedure in cases with a crowded anterior chamber.

We used a 25-gauge vitrector for limited core vitrectomy prior to the PEA procedure. Our technique had a number of advantages. First, the sclerotomy wound required no sutures due to its small size. Second, the minimal conjunctival damage would not hamper future filtration surgery. Finally, our technique was simple and thus easy to perform during anterior segment surgery.

We relieved AAC and achieved IOP control in all cases postoperatively. Our results demonstrated the beneficial effects of the PEA procedure with limited vitrectomy although potential complications associated with vitrectomy, including retinal detachment and vitreous hemorrhage, should be addressed. Further long-term studies are required to evaluate the use of this technique in cases of AAC.

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