

# A modified method for suprachoroidal fluid drainage in kissing choroidal detachment

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## Abstract

• **AIM:** To introduce a new method for suprachoroidal fluid drainage before 23-gauge pars plana vitrectomy.

• **METHODS:** A 15° side-port blade was firstly used to create a sclerotomy into the suprachoroidal space for initial drainage. A 30-gauge needle was then applied to inject balanced saline solution through the existing sclerotomy for further drainage. After most of the suprachoroidal fluid was drained, standard 3-port 23-gauge pars plana vitrectomy was performed.

• **RESULTS:** We have succeeded in using this technique to treat five patients with retinal detachment and kissing choroidal detachment (KCD). The choroidal detachment was visibly recessed in all cases after drainage with no intraoperative complications. After removal of silicon oil at 3mo follow-up, all patients obtained a reattached retina. No postoperative complications such as hypotony and endophthalmitis occurred.

• **CONCLUSION:** The new technique is efficient and safe for suprachoroidal fluid drainage for patients with rhegmatogenous retinal detachment. In future, further larger series are needed to attest to its safety and efficacy.

• **KEYWORDS:** choroidal detachment; retinal detachment; vitrectomy; suprachoroidal fluid

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## INTRODUCTION

Choroidal detachment is a rare condition which occurs when there is an accumulation of fluid or blood between the choroid and sclera. The causes of choroidal detachment include secondary to trabeculectomy, trauma, inflammation, retinal detachment, infection, growth of neoplasms and drug-induced processes. Choroidal detachment has also been considered a major preoperative complication of rhegmatogenous retinal detachment (RRD) even though with a rare occurrence (2% to 4.5%)<sup>[1-2]</sup>. Severe choroidal detachment, or so called “kissing” choroidal detachment (KCD), may still exist for some patients at the time of pars plana vitrectomy (PPV) even with preoperative administration of steroids. In the era of micro-gauge PPV, a 20-gauge sclerotomy is still favorable for choroidal detachment drainage before the 23- or 25-gauge transconjunctival PPV. In cases with KCD, however, the 20-gauge stab incision is not easy because of the concurrent hypotony. Intravitreal injection of balanced saline solution (BSS) may be helpful to restore the intraocular pressure (IOP) before the sclerotomy<sup>[3-4]</sup>. Nevertheless, the needle tip may not be identified through pupil because of the severe KCD, and thereby has the change to damage the opposite retinal and choroid, and exacerbate the KCD if it stabs into the suprachoroidal space.

Herein, we describe a new method for suprachoroidal fluid drainage before 23-gauge PPV in the treatment of combined kissing choroidal detachment and retinal detachment (CDRD).

## SUBJECTS AND METHODS

**Ethical Approval** This study was conducted in compliance with the principles of the Declaration of Helsinki and was approved by the Ethics Committee of the First Affiliated Hospital of Nanjing Medical University (No.2016-SR-178). Informed consent was obtained from all patients receiving the treatment.

The step-by-step technique is described here following: 1) Retrobulbar anesthesia with 3.5 mL 1% ropivacaine; 2) The conjunctiva was open and the sclera exposed; 3) Sclerotomy was made 3.5 mm posterior to the limbus with a 15° side-port blade, in either of the quadrant depending on where the ultrasound or indirect ophthalmoscope indicate the most prominent choroidal detachment. The size of sclera incision was 1 to 1.5 mm. As soon as sclerotomy was made into the

**Table 1 Pre- and postoperative information of patients underwent the new technique**

Case No.	Age (y)	Duration of VA loss (wk)	Axial length (mm)	Preop. VA	Preop. IOP (mm Hg)	Postop. IOP (mm Hg)	Last postop. VA	Follow-up (mo)
1	29	4	25.4	HM	4.0	15.4	20/40	4
2	48	2	26.5	FC	4.5	17.8	20/120	4
3	47	3.5	27.1	FC	5.2	16.9	20/80	5
4	56	5	24.3	HM	5.6	21.4	20/200	6
5	48	1	28.8	HM	5.4	23.4	20/80	4

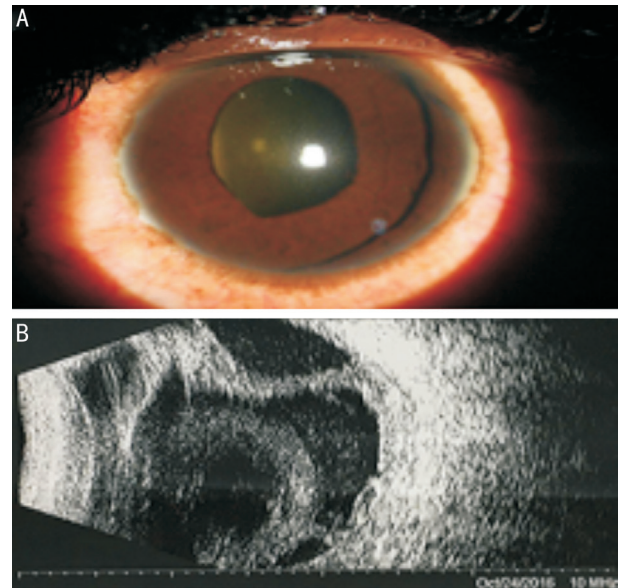
VA: Visual acuity; HM: Hand movement; FC: Figure counting.

suprachoroidal space, a yellowish or clear fluid escaped from the sclera opening. 4) A 30-gauge needle was used to inject BSS into the center of the vitreous cavity through the same sclerotomy. The raise of the IOP would facilitate the outflow of the remaining suprachoroidal fluid. Of note, the needle in the vitreous cavity must be visualized through the pupil before injection. Intravitreal injection of BSS can be repeated until no more fluid comes out. 5) At this point, most of the choroidal detachment visibly recessed. Standard 3-port vitrectomy was then performed through limbar access using the Alcon Constellation (Alcon Laboratories, Fort Worth, TX, USA) under a noncontact viewing system Resight 700 (Carl Zeiss Meditec AG, Jena, Germany). Perfluorocarbon liquids (PFCL) were used to drain the subretinal fluid and retinal breaks were treated by endolaser under PFCL. 6) As the vitrectomy proceeded and PFCL injected up to the ora serrate, any remaining suprachoroidal fluid was mechanically displaced and the choroidal detachment was almost completely resolved. 7) Silicone oil (1300 or 5700 centistokes) was injected as tamponade after the air-fluid and air-PFCL exchange. In the end, the conjunctiva was closed with 10-0 vicryl sutures overlying the unsutured sclerotomy. 8) All patients were required to posture “facedown” postoperatively.

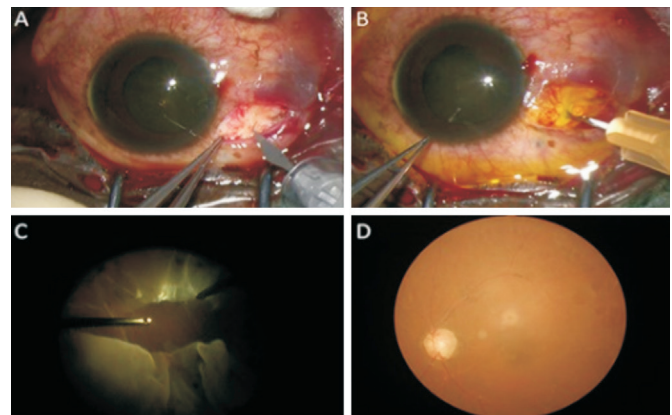
## RESULTS

Five patients with concurrent CDRD were operated with the above mentioned technique (Table 1). Pre-operatively all patients had an IOP<10 mm Hg. B-scan ultrasonography showed “kissing” appearance of detached choroid in vitreous in all eyes. No patient reported with a history of previous surgery such as glaucoma. After surgery, IOP on the first postoperative day ranged from 15.4 to 23.4 mm Hg. Retina was re-attached in all patients during follow-ups. After removal of silicon oil, best corrected visual acuity at the last follow-up ranged from 20/200 to 20/40.

Figure 1 shows a representative case with CDRD. A 29-year-old male presented with a vision loss of 4wk. On presentation, visual acuity was hand movement, and IOP was 4.0 mm Hg. Examination showed a deep anterior chamber, mild lens opacity, and lens-iris diaphragm retropulsion (Figure 1A). The B-scan ultrasonography showed a typical CDRD involving four



**Figure 1 A preoperative photograph (A) and B-scan ultrasonography (B) of the left eye with KCD.**



**Figure 2 Sclerotomy into the suprachoroidal space for initial drainage of suprachoroidal space (A) and a 30-gauge needle being used to inject BSS through the existing sclerotomy for further drainage (B). After drainage, choroidal detachment was recessed (C) and retina reattached with a best corrected visual acuity of 0.4 after 3mo (D).**

quadrants (Figure 1B). We performed the above technique of KCD drainage prior to PPV. A total amount of 4 mL BSS was injected and the yellowish suprachoroidal fluid was drained (Figure 2). Before the PPV started, the choroidal detachment was visibly recessed and the CDRD became the pure retinal

detachment. There was no intraoperative complications such as lens damage and suprachoroidal hemorrhage, no postoperative complications such as hypotony and endophthalmitis during the follow-ups.

### DISCUSSION

Eyes with KCD are characterized by low IOP, uveitis, deep anterior chamber, and choroidal detachments in at least two quadrants. Since the eye may become softer, restoration of IOP is necessary before the drainage. Rossi *et al*<sup>[5]</sup> placed an infusion line in the anterior chamber through a clear corneal paracentesis and Yang<sup>[3]</sup> inserted a 6-mm-long infusion cannula into the vitreous cavity for CDRD. The 6-mm-long infusion may be useful for normal CDRD. However, considering the low IOP in KCD, the insertion is not an easy procedure in either method. Besides, the long infusion may still be not enough for KCD and it may cause damage to surrounding tissue such as lens and pars plana. The 23-gauge cannulas was also been reported for the drainage of suprachoroidal fluid or suprachoroidal hemorrhage<sup>[5]</sup>. However, the trocar may potentially inserted into the suprachoroidal space, which can exacerbate the choroidal hemorrhage and cause iatrogenic retinal breaks. Furthermore, the trocar employed is actually an obstacle for choroidal detachment drainage. The trocar has to be pulled back into the suprachoroidal space<sup>[5]</sup>, which is not easily controlled. In addition, the edge of the trocar may increase the risk of damage to the pars plana, which may exacerbate the hemorrhage. After the drainage, for the following 3-port PPV, Loo *et al*<sup>[6]</sup> used the 20-gauge blade to re-enter the sclerotomies, through which the choroidal fluid had drained. Unlikely, we left the sclerotomy open and created 3 new ports with 23-gauge cannulas in the purpose of drainage of more suprachoroidal fluid during PPV.

We believe the present technique has several advantages. First, the sharp 15° side-port blade slightly cuts the sclera instead of stabbing the sclera with a cannula, which may not be efficient and may lead to the eyeball shape distortion. Second, the 30-gauge needle is pretty sharp and punctures only through the “softer” pars plana (compare to sclera), which makes the puncture with a lower resistance and a more controllability even under the condition of hypotony. Third, there is no need for another sclerotomy or anterior chamber paracentesis for infusion line to increase IOP. Besides, the infusion line, even with a long size (6 mm in length), may not be suitable in

consideration of the high choroidal detachment. Finally, the sclerotomy is left open until the end of the surgery, facilitating the more remaining suprachoroidal fluid coming out during vitrectomy.

We propose yet another simple and quick surgical drainage technique that may improve management of patients with KCD. The use of same sclerotomy for both drainage and injection indeed conforms to the concept of minimal invasion. Further larger series are needed to attest to its safety and efficacy.

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**Authors' contributions:** Hu ZZ and Ji JD were the guarantor of integrity of entire study. Hu ZZ and Ji JD, and Liu QH were involved in study design. Hu ZZ, Ding YZ, and Su Y were involved in examination and data acquisition. Hu ZZ, Ji JD, and Liu QH were involved in manuscript preparation and revision. Ji JD was involved in the approval of the manuscript's final version.

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**Conflicts of Interest:** Hu ZZ, None; Liu QH, None; Ding YZ, None; Su Y, None; Ji JD, None.

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