

External drainage for exudative retinal detachment secondary to central serous chorioretinopathy

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Background: To report the outcomes of external drainage of subretinal fluid (SRF) in exudative retinal detachment secondary to central serous chorioretinopathy (CSCR).

Methods: Retrospective observational analysis of six eyes with exudative retinal detachment secondary to CSCR who underwent external drainage of SRF between 2004 and 2014 was performed. Collected data included demographics, steroid usage, surgical details, and visual acuity preoperatively and postoperative visual acuity and clinical examination data were collected.

Results: Six eyes of six subjects were included with mean age of 45 years (range, 32 to 61 years). All subjects were male. Mean duration of symptoms was 4.6 months (range, 3 to 8 months). The pre-operative best-corrected visual acuity (BCVA) ranged from perception of light to 20/60. Four eyes were treated with conventional external drainage and two underwent Chandelier-assisted external drainage. Three cases had laser treatment before drainage and one case underwent photodynamic therapy (PDT) after drainage. The BCVA at last follow-up ranged from 20/2,000 (counting fingers at 2 feet) to 20/20. No recurrences were noted in any of the cases till the last follow-up. Mean duration of follow-up was 38 months.

Conclusions: Our study demonstrates successful management of exudative retinal detachment secondary to CSCR with external SRF drainage without any complications.

Keywords: Central serous chorioretinopathy (CSCR); subretinal fluid (SRF); subretinal fluid drainage (SRF drainage)

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Introduction

Bullous exudative variant of central serous chorioretinopathy (CSCR) has been reported to occur spontaneously as well as following steroid therapy (1-3). Frequently, this variant is a diagnostic dilemma and may lead to inappropriate diagnosis of rhegmatogenous or serous detachment due to inflammatory causes (1). Ophthalmologic and angiographic findings are useful to establish the correct diagnosis.

Persistence of submacular fluid for longer duration may lead to permanent damage to retinal pigment epithelium as well as outer retinal structures. Persistent subretinal fibrin may lead to subretinal fibrotic scar formation. Traditionally, the treatment of CSCR consists of either argon laser photocoagulation or photodynamic therapy (PDT) (4). However, occasionally, when the retinal detachment is

bullous, this focal treatment is not possible. Therefore, the fluid has to be drained first to continue with laser/PDT treatment, in eyes with non-resolving bullous exudative retinal detachment.

There are two known methods for draining the subretinal fluid (SRF): internal and external approach. There are previous reports on successful internal drainage of SRF with good visual outcome (5-7). The disadvantages with internal approach are drawbacks associated with any intraocular procedure such as risk of infection; cataract progression; need for intraocular tamponade; need for perfluorocarbon liquid; reopening of the retinotomy and risk of proliferative vitreoretinopathy. Furthermore, internal surgical drainage with a retinotomy may lead to the development of rhegmatogenous retinal detachment

Table 1 Clinical characteristics of patients

Case #	Age (years)	Sex	Eye	Associated systemic disease/ocular	History of steroid exposure	Duration of disease before surgical intervention (months)	BCVA at baseline	Laser treatment	Duration of follow-up (months)	BCVA at last follow-up
1	40	M	RE	None	No	8	PL only	None	15	20/2000
2	46	M	RE	HTN, DM	No	3	20/60	Yes, post-op only	14	20/100
3	32	M	RE	None	Yes	5	20/2,000	Yes, pre-op only	78	20/20
4	51	M	LE	HTN	Yes	4	20/4,000	Yes, pre-op only (post-op PDT)	1	20/200
5	40	M	LE	HTN	Yes	13	20/200	Yes, pre-op only	84	20/160
6	61	M	RE	HTN, DM	No	4	20/4,000	None	1 week	20/600

RE, right eye; LE, left eye; HTN, hypertension; DM, diabetes mellitus; BCVA, best corrected visual acuity; PL, perception of light; PDT, photodynamic therapy; M, male.

in CSCR since choroidal hyperpermeability may persist post-operatively and SRF may re-accumulate around the retinotomy site. Therefore, a safe surgical approach for external drainage of SRF could be the choice.

There is no literature available on outcomes of external drainage in exudative retinal detachment secondary to CSCR. In this article, we report six cases of CSCR with exudative retinal detachment and their anatomical and visual outcome.

Patients and methods

A retrospective chart review of six eyes that received external drainage of SRF for CSCR at the L V Prasad Eye Institute, Hyderabad, India between 2004 and 2014 was done. The institutional review board approved the retrospective analysis of charts for the study, and all the procedures adhered to the tenets of the Declaration of Helsinki. Inclusion criteria included exudative retinal detachment secondary to CSCR, which underwent external SRF drainage. Eyes with exudative retinal detachment secondary to CSCR who were treated by laser (six eyes) or PDT (one eye) were excluded. The collected data included patient demography (age at the time of presentation, and gender), and clinical details (laterality, visual acuity, ocular examination findings, systemic and other ocular comorbidities, steroid usage, past surgical treatments, and details about the surgical procedures), follow-up and visual outcome postoperatively.

All patients underwent conventional technique of SRF drainage as described by Steve Charles (8), except two subjects (cases 1 and 6). Those two subjects underwent Chandelier-assisted external drainage under direct visualization and continuous monitoring. One subject (case

6) had a complication of subretinal haem while attempting conventional external drainage, before Chandelier-assisted drainage.

Results

We analyzed six eyes of six patients. Patient characteristics are summarized in *Table 1*. Mean patient age was 35 years (range, 32 to 61 years) and all (100%) were male patients. The surgical indications included non-resolving exudative retinal detachment (three eyes), and failure of laser treatment (three eyes).

Major presenting symptom at the time of diagnosis of exudative retinal detachment was decrease in vision. Two of six patients (33%) had a history of diabetes and four of six patients (66%) had a history of hypertension and three of six patients (50%) were on steroids at the time of presentation. Pre-operative best-corrected visual acuity (BCVA) ranged from perception of light only to 20/60. The mean duration of disease before surgical intervention was 4.6 months (range, 3 to 8 months). In three cases, laser treatment was tried before external drainage performed. In one case, there was a need for PDT post-drainage. Four of six cases underwent conventional external drainage and two cases underwent chandelier-assisted external drainage. Postoperatively, all patients had a better outcome subjectively and objectively, with no complications noted. The BCVA at last follow-up ranged from 20/2,000 (counting fingers at 2 feet) to 20/20. One patient had a very short follow-up of 1-week and then lost to follow-up, however the rest were followed-up at a mean of 38 months (range, 1 to 84 months). None of the patient had recurrent retinal detachment till their last follow-up.

Case series

Case 1

A 40-year-old male presented with history of poor vision in the RE for the past two months with no complaints in the left eye (LE) and no other significant systemic illness. On examination, his visual acuity was perception of light only in the right eye (RE) and 20/50 in the LE. Anterior segment examination was unremarkable in both eyes. Fundus examination revealed bullous retinal detachment in the RE and numerous retinal pigment epithelial detachments (PEDs) at the macula with inferior retinal detachment in the LE. Ultrasonography and fundus fluorescein angiography (FFA) confirmed the clinical findings, and a diagnosis of exudative retinal detachment secondary to CSCR in the both eyes was made.

Given the nature of the disease, the patient was asked to follow-up monthly. At 5-month follow-up, there was no change in exudative retinal detachment in both eyes. Therefore, he underwent conventional external SRF drainage in the RE with a 26G needle. As the BCVA in LE was 20/40, observation was preferred over any intervention. At 1-month follow-up, BCVA was counting fingers close to face (20/4,000) in the RE and LE was stable. At 9-month follow-up, BCVA was counting fingers at 2 feet (20/2,000) in the RE with no recurrence of retinal detachment. At 15-month follow-up, BCVA was stable, counting fingers at 2 feet (20/2,000) in the RE and 20/25 P in the LE. Fundus examination of both eyes showed no SRF, however, RPE atrophy was present at the macula.

Case 2

A 46-year-old male presented with decrease in vision in the RE since two months. He had a 2-3 years history of hypertension and diabetes. On examination, his BCVA was 20/60 P in the RE and 20/25 in the LE. Fundus exam showed exudative retinal detachment with subretinal fibrosis in the RE and pigment epithelial detachment in the LE. Clinical findings were confirmed on FFA and optical coherence tomography (OCT), and diagnosis of exudative retinal detachment secondary to chronic CSCR was made and patient underwent external SRF drainage using 26G needle and intravitreal avastin injection (1.25 mg in 0.05 mL) in the RE. Post-operatively his BCVA was 20/100.

At 3-week follow-up, his BCVA was counting fingers at 2 feet (20/2,000) in the RE with sub-total retinal detachment. Now, patient could be treated with focal laser in both eyes

as the macula was attached. At 3-month follow-up, BCVA was 20/200 in the RE with no SRF. LE was stable with BCVA of 20/20. At 14-month follow-up, both eyes were stable without any recurrence of SRF during follow-up.

Case 3

A 32-year-old male presented with defective vision in the RE for 3 months and in the LE for 3-4 days. He reported that he was on tapering oral steroids, which were started elsewhere considering the inflammatory ocular pathology. On examination, BCVA was counting fingers close to face (20/4,000) in the RE and 20/50 in the LE. Fundus exam showed subtotal exudative detached retina in the RE and inferior retinal detachment in the LE. The clinical findings were confirmed on ultrasonography and FFA. In view of active leak, the patient underwent focal laser in the LE. Conventional external SRF drainage using 26G needle was performed in the RE.

At 6-week follow-up, BCVA improved to 20/1,200 in the RE and 20/40 in the LE with no SRF on fundus exam. At 2-year follow-up, BCVA was 20/40 in the RE and 20/20 in the LE with normal intraocular pressures. No SRF was noted on fundus exam. At six and half year follow-up, BCVA was 20/120 in the RE and 20/20 in the LE. Fundus exam of both eyes showed attached retina with RPE atrophy at the macula with no evidence of SRF on OCT.

Case 4

A 51-year-old male with known history of CSCR in the LE, satisfactorily treated with laser 20 years ago, presented with decrease of vision in the LE since 20 days. Before presenting to our hospital, elsewhere, he was diagnosed to have choroiditis in the RE and was started on oral steroid for the last 3 weeks. On examination, BCVA was 20/40 in the RE and 20/25 in the LE. Anterior chamber was unremarkable. Fundus exam showed SRF, inferior retinal detachment, and RPE atrophy in the RE and SRF with exudative retinal detachment in the LE. The clinical findings were confirmed with FFA and OCT and diagnosis of CSCR in both eyes was made. The patient was recommended to stop oral steroid and follow-up after a month. At follow-up, the exam was unchanged and patient underwent focal laser in both eyes.

Three weeks post-laser, his BCVA dropped further to counting fingers close to face (20/4,000) in the LE. Fundus exam revealed exudative retinal detachment involving the macula in the LE. Patient was advised external drainage

which was performed using conventional technique as described by Charles *et al.* (8) However, in initial attempts it was dry tap and indirect ophthalmoscopy showed shifting of fluid posteriorly with no SRF in the periphery. Therefore, decision of external drainage using Chandelier illuminator using a 26G needle under direct visualization was performed in the LE. The procedure was successful and achieved complete retinal attachment at the end of the surgery. At 2-week follow-up, his BCVA improved to 20/200 with no signs of SRF on fundus exam. Patient underwent half-dose PDT in both eyes. At 1-month follow-up his BCVA in LE was 20/200 and that in RE was 20/40 with no SRF in both eyes.

Case 5

A 40-year-old male presented with complaints of decreased vision in LE>RE since 1 month. Before presenting to our hospital, elsewhere, he was diagnosed to have choroiditis in the RE and was started on oral steroid for the last one month. On examination, BCVA was 20/400 in the RE and 20/1,200 in the LE. Fundus exam revealed exudative retinal detachment in both eyes, which was confirmed with clinical and angiographic evaluation. He was diagnosed to have bullous CSCR secondary to steroid exposure in both eyes. Oral steroids were withdrawn promptly and treated with multiple sittings of laser in both eyes.

He was on regular follow-up. At 1-year follow-up, his BCVA was 20/200 in each eye. RE resolved well with extensive pigment migration at the macula with BCVA of 20/400. However, there was persistent exudative retinal detachment involving macula in the LE. It was challenging to localize all the leaks in the LE, so he underwent conventional external SRF drainage, followed by laser to leaking areas at 1 week post-op. Exudative retinal detachment resolved and had no recurrences till the last follow-up. His last BCVA in the LE was 20/160 at 6 years of follow-up.

Case 6

A 61-year-old man presented with a complaint of “black spot appearance” in the RE for the last 2 months. He was a known hypertensive and diabetic on treatment since past 10 years. On examination, his BCVA was 20/100 in the RE and 20/80 in the LE. Anterior segment was unremarkable in both eyes. Fundus examination of the RE showed bullous retinal detachment, pigmentary changes and LE showed

retinal pigment epithelium (RPE) atrophy with pigmentary changes. A diagnosis of exudative retinal detachment secondary to chronic CSCR in the RE and macular scar in the LE was made. The clinical findings were confirmed with fluorescein angiography (FFA). Laser application to leaks was not possible due to bullous retinal detachment. He was advised to follow-up after 6 weeks.

At 6-week follow-up, patient's BCVA deteriorated to counting fingers close to face (20/4,000) in the RE. Fundus examination of the RE showed pigmentary changes, RPE atrophy and persistent bullous retinal detachment. The patient underwent Chandelier-assisted external SRF drainage using 26G needle for aspiration of SRF under direct visualization. The retina was successfully attached at the end of the surgery. His BCVA improved to 20/600 at 1-week follow-up with no SRF. Patient was lost to follow-up.

Discussion

A variant of CSCR presenting as exudative bullous retinal detachment leads to permanent vision loss, more commonly in healthy males (1). This is commonly misdiagnosed as inflammatory pathology and gets aggravated by steroid supplementation. In our series, three of six eyes were misdiagnosed and were treated with oral steroid, which worsened the retinal detachment. Bullous exudative detachment involving the macula prevents laser photocoagulation; therefore, it becomes mandatory to perform an external drainage of persistent fluid, to be able to perform laser photocoagulation post-operatively.

In our series, we performed external drainage in six eyes out of 12 eyes with exudative retinal detachment secondary to CSCR. Out of these six eyes, in three eyes, laser was performed as initial treatment, however, the fluid was non-resolving, and therefore, the external drainage followed by laser was performed. In case 5, we performed external drainage followed by PDT in both eyes due to persistent activity. None of the subjects had recurrence till their last follow-up.

Various methods of external drainage of SRF have been reported including conventional scleral cut down, needle aspiration, external argon endolaser probe, and suture needle (8-11). External drainage can also be associated with complications such as retinal incarceration, subretinal haemorrhage, and loss of vitreous. Direct visualization using indirect ophthalmoscopy or Chandelier illumination helps the surgeon to identify imminent complications before the

damage occurs and manage them before they endanger the anatomic or visual outcomes.

Chen *et al.* reported external drainage of SRF using perfluorocarbon liquid after pars plana vitrectomy when the external drainage failed due to posterior shifting of SRF (5). We also faced the similar situation in case 4, therefore, we performed a needle drainage under direct visualization using Chandelier illuminator.

Kang *et al.* introduced an instrument, subretinal aspiration and injection device (SA-AID), designed to facilitate controlled external drainage of SRF (7). This device provides a safe approach to the sub retinal space because it penetrates the eye wall obliquely and allows a changeable, predetermined length of the needle tip. The surgeon can also directly observe the retina with an indirect ophthalmoscope during the drainage.

Limitations of our study include small sample size and retrospective nature. One patient had a follow-up of only 1 week, however, rest patients had a long follow-up. A group of internal drainage would have provided comparative results. However, fewer complications after external drainage compared to internal drainage, makes this procedure as preferred choice for such situation.

In conclusion, our study demonstrates that the exudative retinal detachment secondary to CSCR can be successfully managed with external drainage. External drainage avoids any complication related to intraocular procedure. Long-term results are promising with no recurrence and sustained visual recovery. Early drainage may prevent damage to retinal structures and helps to improve visual acuity.

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None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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