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ORIGINAL RESEARCH

Efficacy and Safety of Intravitreal Brolucizumab in Chronic Central Serous Chorioretinopathy: A Retrospective Cohort Study

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Purpose: To evaluate the anatomical and functional outcomes and treatment burden of intravitreal brolucizumab in chronic central serous chorioretinopathy (cCSCR) over 12 months in a real-world setting.

Patients and Methods: In this retrospective, single-center cohort, 29 eyes with cCSCR received pro re nata intravitreal brolucizumab. Baseline OCT angiography excluded macular neovascularization. Patients were seen monthly for three months, then as needed through month 12. At each visit, best-corrected visual acuity (BCVA), central retinal thickness (CRT), and presence of SRF, intraretinal fluid (IRF), and pigment epithelium detachment (PED; including PED height) were recorded. Total injections per eye were tallied.

Results: Twenty-nine eyes (mean age 55.2±11.0 years; 72% male) with cCSCR received 1.72 ± 0.62 intravitreal brolucizumab injections over 12 months. Vision improved from BCVA 0.59 ± 0.23 logMAR at baseline to 0.46 ± 0.22 at one month (P=0.002), 0.40 ± 0.20 at three months (P<0.001), and 0.39 ± 0.20 at month 12 (P<0.001). Mean CRT reduced from 340 ± 140 µm to 260 ± 110 µm at one month and stabilized at 230 ± 98 µm by month 12 (P<0.001). Mean PED height decreased from 48 ± 55 µm at baseline to 13 ± 17 µm at month 12 (P<0.001). Fluid resolution was rapid and sustained; SRF cleared in 63% at one month (P<0.001) and 88.9% at 12 months (P<0.001), IRF in 85.7% by month 3 (P=0.016) and 71.4% by month 12 (P=0.063), and PEDs in 43.8% at one month (P=0.021) rising to 68.8% at month 12 (P=0.001). No ocular or systemic adverse events occurred.

Conclusion: Intravitreal brolucizumab provided significant and sustained visual and anatomical improvements in cCSCR with a low injection burden over 12 months. Given the off-label use and absence of a control group, findings should be interpreted cautiously and confirmed in prospective controlled studies.

Keywords: brolucizumab, neovascular age-related macular degeneration, real-world, retinal fluid

Introduction

Central serous chorioretinopathy (CSCR) is a phenotypic manifestation within the pachychoroid spectrum, characterized by a constellation of choroidal thickening, attenuation of the choriocapillaris, and dilated Haller's layer vessels ("pachyvessels") leading to focal breakdown of the retinal pigment epithelium (RPE).[1–3] Enhanced-depth imaging optical coherence tomography (EDI-OCT) and swept-source OCT have elucidated hallmark features, including increased subfoveal choroidal thickness (SFCT; ≥300 µm), focal hyperpermeability on indocyanine green angiography, and posterior vortex vein stasis, that underscore the disease's pathobiology.[1–4] Acute CSCR typically resolves spontaneously within three to four months; however, persistence of subretinal fluid beyond four months signifies transition to chronic CSCR (cCSCR), a state associated with retinal pigment epithelium (RPE) decompensation, photoreceptor disruption, outer retinal atrophy, and consequent, often irreversible, visual impairment.[1,2]

Management of cCSCR remains challenging due to the heterogeneous nature of its presentation and the lack of uniformly effective, low-risk therapies. Conventional focal laser photocoagulation aims to seal RPE leaks but is limited

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by the risk of iatrogenic scotoma and RPE atrophy when applied near the fovea.[5] Photodynamic therapy (PDT) with half-dose or half-fluence verteporfin has emerged as a mainstay in many practices, achieving up to 80% fluid resolution and modest visual gains.[6] However, access to verteporfin and the need for specialized equipment restrict its use in resource-limited settings, and concerns about choroidal ischemia and long-term RPE atrophy persist.[1,5,6] Mineralocorticoid receptor antagonists (eplerenone, spironolactone) provide an oral, non-laser alternative by targeting choroidal vascular permeability, but response rates vary (30–60%) and may take several months to manifest.[1,5,6]

In recent years, the role of anti-vascular endothelial growth factor (anti-VEGF) agents in the management of CSCR has gained increasing attention, particularly in chronic cases complicated by pigment epithelial detachments (PEDs) or secondary macular neovascularization (MNV).[7–10] While VEGF is not considered the primary driver of CSCR pathogenesis, it plays a significant role in modulating choroidal vascular permeability and angiogenesis.[7,8,11] This has led to the off-label use of intravitreal anti-VEGF agents as a therapeutic strategy aimed at reducing choroidal hyperpermeability and fluid leakage. Several agents, including bevacizumab, ranibizumab, aflibercept, and brolucizumab, have been evaluated in both neovascular and non-neovascular CSCR, with mixed outcomes reported across studies.[12–16]

Brolucizumab, a single-chain antibody fragment (scFv) of 26 kDa, affords a higher molar dose per injection and enhanced retinal penetrance relative to earlier agents.[17,18] Preclinical choroidal vascular permeability assays suggest that brolucizumab induces more robust suppression of choroidal hyperpermeability, offering a mechanistic rationale for its potential efficacy in pachychoroid-driven disorders such as cCSCR.[19] Early clinical experience in neovascular age-related macular degeneration (nAMD) has demonstrated superior drying efficacy and extended dosing intervals compared to aflibercept, albeit with a recognized risk of intraocular inflammation (IOI) and retinal vasculitis.[20]

To date, real-world evidence for intravitreal brolucizumab in cCSCR is limited to small case series and isolated reports, each with follow-up curtailed at 3 months.[21,22] These preliminary data indicate modest visual acuity gains and fluid resolution, but are insufficient to define its long-term anatomical efficacy, durability of response, or incidence of adverse events over extended periods.

To address these gaps in knowledge, we conducted a retrospective study of patients with cCSCR who received intravitreal brolucizumab and were followed for 12 months. This real-world data aims to shed light on the efficacy, durability, and safety of brolucizumab in this setting. The findings may help retina specialists make more informed decisions about its use in managing cCSCR, weighing its potential benefits against possible risks.

Materials and Methods

This retrospective, single-center cohort study was conducted at Retina Institute of Bengal, Siliguri, India, encompassing all eligible patients treated for cCSCR between September 2023 and March 2025. The study protocol was approved by the Institutional Review Board of Retina Institute of Bengal in Siliguri, India, and adhered strictly to the tenets of the Declaration of Helsinki. Informed consent was obtained from all participants for both the treatment and the use of anonymized clinical data for research purposes.

Eligible eyes were those of adults (≥18 years) with a documented history of persistent subretinal fluid (SRF) on spectral-domain OCT (SD-OCT) for at least four months and a SFCT of ≥ 300 μm. All patients underwent baseline OCT angiography (OCTA) to exclude MNV. We excluded eyes with any coexisting retinal or choroidal pathology, such as diabetic retinopathy, high-myopia, uveitis, or inflammatory chorioretinopathies, that could confound treatment response. Prior systemic corticosteroid use, a known risk factor for CSC, was not an exclusion criterion, and 10 eyes had such a history. However, eyes with prior pharmacological treatment directly targeting the choroid, such as mineralocorticoid receptor antagonists, were excluded. Additional exclusions comprised recent PDT or intravitreal anti-VEGF injections within three months prior to the study period, significant media opacities precluding reliable imaging, and a history of vitreoretinal surgery (other than uncomplicated cataract extraction) within the preceding six months.

At baseline, all patients underwent a comprehensive ophthalmic examination performed by a fellowship-trained retina specialist. Best-corrected visual acuity (BCVA) was assessed using a Snellen chart and converted to logarithm of the minimum angle of resolution (logMAR) for analysis. Intraocular pressure (IOP) was measured by Goldmann applanation tonometry, and slit-lamp biomicroscopy was performed to evaluate the anterior segment. Dilated fundus examination was carried out using both 90D and 20D lenses. Multimodal imaging was performed using the Heidelberg Spectralis system

(Heidelberg Engineering GmbH, Heidelberg, Germany). SD-OCT was acquired as 6×6 mm macular cube scans. FAF, and FA or ICGA were obtained as clinically indicated. OCTA (6 x 6 mm) was performed at baseline and at every follow-up visit to rule out the presence of subclinical or emerging MNV and to monitor for any neovascular complications throughout the study period. Segmentation for OCTA was reviewed and manually adjusted as needed. Quantitative OCT assessments included manual measurements of SRF and PED heights using the Spectralis in-built caliper tool, measured at the maximum height. Intraretinal fluid (IRF) presence was noted at each visit.

Intravitreal brolucizumab (6 mg/0.05 mL) was administered on a pro re nata (PRN) basis. Injections were performed under aseptic conditions in a dedicated minor procedure room. After instillation of topical anesthesia and application of 5% povidone-iodine to the ocular surface and periocular area, a 30-gauge needle was used to deliver the injection via the pars plana, 4.0 mm posterior to the limbus in phakic eyes and 3.5 mm in pseudophakic eyes. The decision to retreat was based on the presence of any intraretinal or subretinal fluid (IRF or SRF) on OCT, or an increase in PED height greater than 50 µm, and/or the development of new visual symptoms attributable to disease activity. No routine prophylactic topical antibiotics were prescribed post-injection.

Patients were evaluated monthly for the first three months following the initial injection and then at intervals determined by disease activity and physician discretion. A scheduling buffer of ±2 weeks was permitted around the 6-month time point to accommodate variability in visit timing, ensuring complete data availability for this analysis. At each follow-up visit, BCVA, IOP, slit-lamp biomicroscopy, and dilated fundus examination were repeated. SD-OCT and OCTA imaging were performed at every visit to document changes in SRF, IRF, and PED, as well as to monitor for any new neovascularization. Any unscheduled visits prompted additional assessments if patients reported new symptoms such as decreased vision, photopsia, or ocular discomfort.

The primary efficacy endpoint was the change in BCVA from baseline to the final follow-up visit at 12 months. Secondary endpoints included changes in SRF height, proportion of eyes achieving IRF and SRF resolution, and PED height as measured on SD-OCT. The incidence of adverse events, including IOI, were also recorded. All imaging and quantitative analyses were performed by a single experienced grader (S.C.) who was masked to clinical data to ensure consistency and minimize bias. In cases of uncertainty, a second grader (J.S.) was consulted, and consensus was reached.

Statistical Analysis

Statistical analyses were performed using SPSS version 23.0 (IBM Corp., Armonk, NY, USA). Continuous variables such as BCVA, SRF height, and PED height were expressed as mean ± standard deviation (SD). Changes from baseline at each follow-up visit were evaluated using paired t-tests. For categorical variables, including the presence or absence of SRF or IRF, McNemar's test was used to compare paired proportions at baseline and at the final visit. A two-sided *P*-value of less than 0.05 was considered statistically significant for all analyses.

Results

Twenty-nine eyes from 29 patients with cCSCR were included in this study. The mean age at presentation was 55.2 (± 11.0) years, with a range from 34 to 75 years. The cohort was predominantly male, comprising 21 men (72.4%) and 8 women (27.6%).

Table 1 demonstrates the demographic characteristics and treatment profile of the study eyes.

Visual Acuity Outcomes

At baseline, the mean BCVA was 0.59 (± 0.23) LogMAR. BCVA improved progressively after treatment with intravitreal brolucizumab. At one month, the mean BCVA was 0.46 (± 0.22), representing a statistically significant improvement from baseline (P=0.002). This trend continued at subsequent visits: 0.43 (± 0.21) at two months (P=0.001), 0.40 (± 0.20) at three months (P<0.001), 0.41 (± 0.21) at six months (P<0.001), and 0.39 (± 0.2) at twelve months (P<0.001) (Table 2).

Anatomical Outcomes

Mean central retinal thickness (CRT) at baseline was 340 (± 140) µm. There was a significant reduction in CRT at each follow-up: 260 (± 110) µm at 1 month (P=0.003), 240 (± 100) µm at 2 months (P=0.001), 230 (± 95) µm at 3 months (P<0.001), 235 (± 100) µm at 6 months (P<0.001), and 230 (± 98) µm at 12 months (P<0.001) (Table 2).

Table 1 Demographic Characteristics and Injection Burden of the Study Cohort

Baseline Variables		Values	
Total number of Eyes	Mean ± SD	29	
Age (years)		55.2 ± 11.0	
Gender (M: F)		21 (72.4%): 8 (27.6%)	
Number of Brolucizumab injection received over twelve months		1.72 ± 0.62	
Distribution of the Study Eyes based on the number of Brolucizumab Injections administered during the Study Period	Number of injections (Percentage)	1	12 (41.4)
		2	13 (44.8)
		3	4 (13.8)

Abbreviations: SD, Standard deviation; M, Male; F; Female.

Table 2 Changes in the Best-Corrected Visual Acuity (BCVA), Central Retinal Thickness (CRT), and Pigment Epithelium Detachment (PED) Height in the Study Cohort

Parameter	Visit	Values (Mean ± SD)	*P*-Value
LogMAR BCVA	Baseline	0.59 ± 0.23	—
	1 month	0.46 ± 0.22	0.002*
	2 months	0.43 ± 0.21	0.001*
	3 months	0.40 ± 0.20	<0.001*
	6 months	0.41 ± 0.21	<0.001*
	12 months	0.39 ± 0.20	<0.001*
CRT (μm)	Baseline	340 ± 140	—
	1 month	260 ± 110	0.003*
	2 months	240 ± 100	0.001*
	3 months	230 ± 95	<0.001*
	6 months	235 ± 100	<0.001*
	12 months	230 ± 98	<0.001*
PED Height (μm)	Baseline	48 ± 55	—
	1 month	29 ± 34	0.01*
	2 months	19 ± 25	0.002*
	3 months	15 ± 21	<0.001*
	6 months	14 ± 18	<0.001*
	12 months	13 ± 17	<0.001*

Notes: *, Statistically significant.
Abbreviations: BCVA, Best-corrected visual acuity; CRT, Central retinal thickness; PED, Pigment epithelium detachment.

At baseline, IRF was present in 7 eyes (24.1%), SRF in 27 eyes (93.1%), and PED in 16 eyes (55.2%). The number of eyes with IRF decreased to 2 (6.9%) at 1 month (71.4% reduction, P=0.063 and further to 1 (3.4%) at 3 months (85.7% reduction, P=0.016), with this improvement largely maintained through 12 months (P=0.063). SRF resolved in the majority of eyes, with only 10 (34.5%) showing persistence at 1 month (63.0% reduction, P<0.001), and just 3 (10.3%) at 12 months (88.9% reduction, P<0.001). PED was present in 16 eyes at baseline and reduced to 9 (31.0%) at 1 month (43.8% reduction, P=0.02), and 5 (17.2%) at 12 months (68.8% reduction, P=0.001). All anatomical improvements were statistically significant at most visits as illustrated in Table 3.

Mean PED height at baseline was 48 (± 55) μm, which decreased significantly at each visit: 29 (± 34) μm at 1 month (P=0.01), 19 (± 25) μm at 2 months (P=0.002), and 13 (± 17) μm at 12 months (P<0.001). Importantly, no MNV was detected during follow-up on serial OCTA imaging. All anatomical improvements were statistically significant at most visits as illustrated in Table 3.

Table 3 Proportion of Eyes with Resolution of Intraretinal Fluid (IRF), Subretinal Fluid (SRF), and Pigment Epithelial Detachment (PED)

Parameter	Visit	Number of Eyes with IRF/SRF/PED	% Change from Baseline	*P*-Value vs Baseline
IRF	Baseline	7	—	—
	1 month	2	71.4% ↓	0.063
	2 months	2	71.4% ↓	0.063
	3 months	1	85.7% ↓	0.016*
	6 months	2	71.4% ↓	0.063
	12 months	2	71.4% ↓	0.063
SRF	Baseline	27	—	—
	1 month	10	63.0% ↓	<0.001*
	2 months	7	74.1% ↓	<0.001*
	3 months	5	81.5% ↓	<0.001*
	6 months	4	85.2% ↓	<0.001*
	12 months	3	88.9% ↓	<0.001*
PED	Baseline	16	—	—
	1 month	9	43.8% ↓	0.021*
	2 months	8	50.0% ↓	0.011*
	3 months	7	56.3% ↓	0.006*
	6 months	6	62.5% ↓	0.003*
	12 months	5	68.8% ↓	0.001*

Notes: *, Statistically significant.
Abbreviations: IRF, Intraretinal fluid; SRF, Subretinal fluid; PED, Pigment epithelial detachment.

The mean number of brolucizumab injections over 12 months was 1.72 (± 0.62) per eye. Of the 29 eyes, 12 (41.4%) required only one injection, 13 (44.8%) required two, and 4 (13.8%) required three injections during the study period (Table 1).

Safety Analysis

No ocular or systemic adverse events related to brolucizumab injection were reported in any patient during the 12-month follow-up. Figure 1 and 2 are representative cases from the study cohort.

Discussion

Our study evaluated the long-term efficacy and safety of intravitreal brolucizumab in cCSCR. Over 12 months, treated eyes showed significant improvements in visual acuity and retinal anatomy with a low treatment burden. This contrasts with prior pooled data, where anti-VEGF therapy showed only a non-significant trend toward visual improvement.[23] For instance, a meta-analysis of 20 studies (339 eyes) reported BCVA improvement from 0.39 to 0.28 logMAR (P=0.069), with most eyes starting at ≈20/50, possibly explaining the smaller gains.[23] In contrast, our cohort had worse baseline vision and showed clear visual benefit. Differences may relate to study design, patient selection, or brolucizumab's potency. Notably, previous studies have identified cCSCR subgroups that improve with anti-VEGF. Chung et al[24] reported significant visual gains in chronic and recurrent CSCR treated with bevacizumab, but not in atypical (bullous) forms. Similarly, our findings suggest that in carefully selected cases, especially after excluding CNV with OCTA, cCSCR patients can experience meaningful visual improvement with potent VEGF inhibition.

Anatomically, brolucizumab produced marked reductions in IRF, SRF, CRT, and PED, indicating its robust drying effect in cCSCR. This aligns with prior evidence of anti-VEGF reducing choroidal hyperpermeability. A meta-analysis found SRF resolution in ~68% of cases,[23] whereas our cohort achieved nearly 90%. Similarly, Huang et al[22] reported higher fluid resolution at 1–2 months with brolucizumab (61–77%) than aflibercept (28–33%), along with greater choroidal thinning.[22] In our patients, we observed significant reduction in macular thickness and presumed choroidal congestion, consistent with this potent vascular effect.

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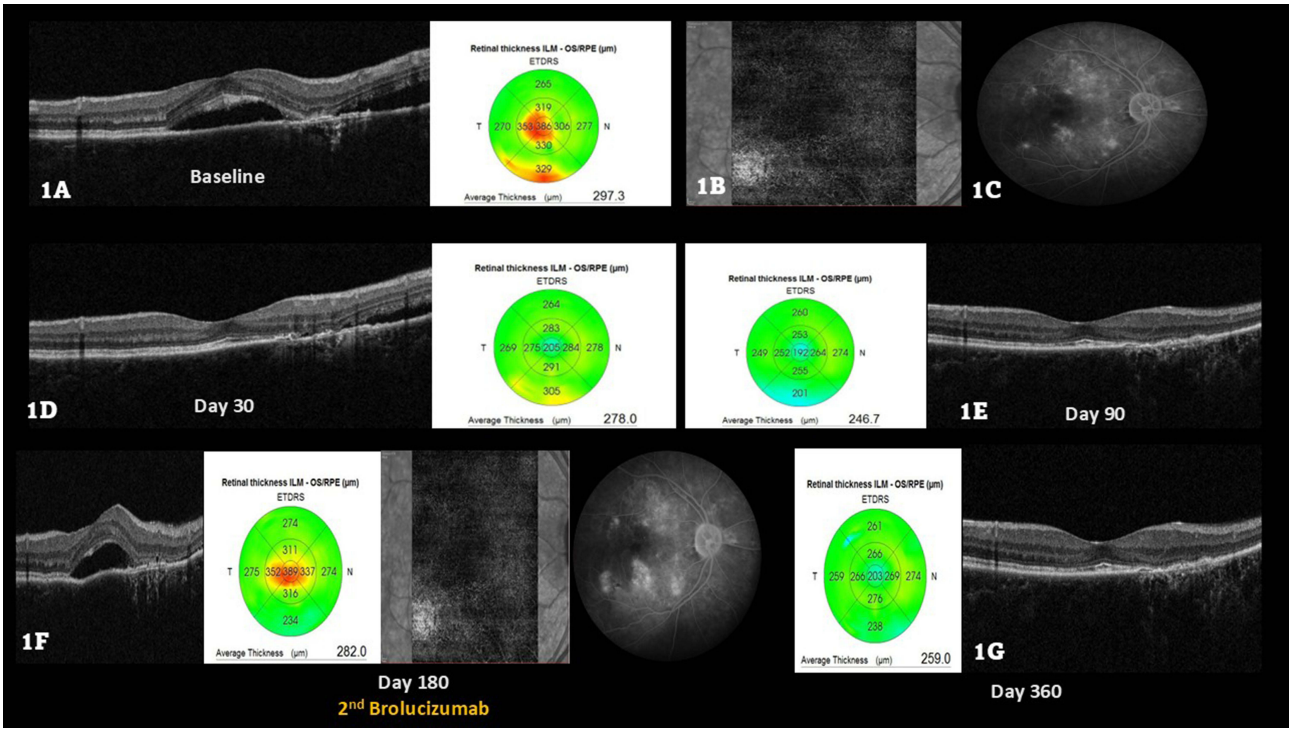

Figure 1 A 41-year-old male with chronic central serous chorioretinopathy (cCSCR) in the right eye (OD) underwent baseline multimodal imaging. At presentation (**A**), spectral-domain optical coherence tomography (SD-OCT) demonstrated a subfoveal neurosensory detachment with subretinal fluid (SRF) and best-corrected visual acuity (BCVA) of 20/80. OCT angiography (OCTA) confirmed absence of macular neovascularization (**B**), while fundus fluorescein angiography revealed diffuse retinal pigment epithelium damage (**C**). The patient received an intravitreal brolucizumab injection; one month later (**D**), SD-OCT showed resolution of subfoveal SRF with residual temporal pockets, and BCVA had improved to 20/40. By day 90 (**E**), SD-OCT revealed complete SRF resolution with BCVA of 20/32. At 6 months (**F**), recurrence of subretinal fluid was observed on SD-OCT alongside a BCVA decline to 20/60. Following a second brolucizumab injection, SD-OCT at 12 months (**G**) demonstrated full SRF resolution and BCVA recovery to 20/40.

cCSCR, a pachychoroid-spectrum disorder, is characterized by choroidal thickening, dilated Haller vessels ("pachyvessels"), and choriocapillaris attenuation.[1–4] Choroidal hyperpermeability and hydrostatic pressure are thought to cause RPE decompensation and SRF accumulation.[1–4] Unlike neovascular AMD, CSCR is not primarily VEGF-driven. VEGF levels in aqueous and plasma are typically normal or decreased.[25,26] Karska-Basta et al[26] reported lower plasma VEGF, and Lim et al[27] found no difference in aqueous VEGF between CSCR and controls. Thus, VEGF is not the dominant pathogenic factor in CSCR in the way it is in neovascular diseases. Some researchers propose that chronic choroidal ischemia or inflammation in CSCR may locally upregulate VEGF, contributing modestly to vascular permeability.[25] This hypothesis is partly supported by the development of secondary MNV in longstanding CSCR, where VEGF clearly plays a role.[10,25] However, on balance the available evidence indicates that VEGF levels are typically not elevated in simple CSCR, and that anti-VEGF therapy addresses disease symptoms rather than root causes in most cases.[25]

Although VEGF's role in CSCR is unclear, anti-VEGF efficacy remains debated with mixed evidence. Palakkamanil et al[23] reported significant retinal thinning and fluid resolution but no vision gain in cCSCR, while Ji et al[7] found no advantage over observation. Randomized trials show PDT outperforms anti-VEGF; Bae et al[28] found half-fluence PDT maintained SRF resolution at 12 months more effectively than ranibizumab, although ranibizumab still produced significant macular thinning; both approaches improved vision and macular thickness from baseline. Thus, in select cCSCR subtypes, anti-VEGF may be beneficial.

A case report described brolucizumab clearing fibrinous CSCR with vision improvement from 20/200 to 20/80,[12] theorized via enhanced RPE pump function. Chung et al[24] demonstrated that as-needed bevacizumab significantly improved acuity and reduced CRT in chronic/recurrent CSCR (n=77; $P<0.05$), but not in atypical multifocal forms. These observations suggest that anti-VEGF may help in eyes where choroidal permeability is mediated by VEGF-related pathways or where the RPE is still functional enough to pump fluid out once leakage is reduced. In contrast, eyes with diffuse RPE atrophy or bullous detachments ("atypical" CSCR) show little benefit from VEGF blockade. In this context, the higher rates of SRF clearance observed with

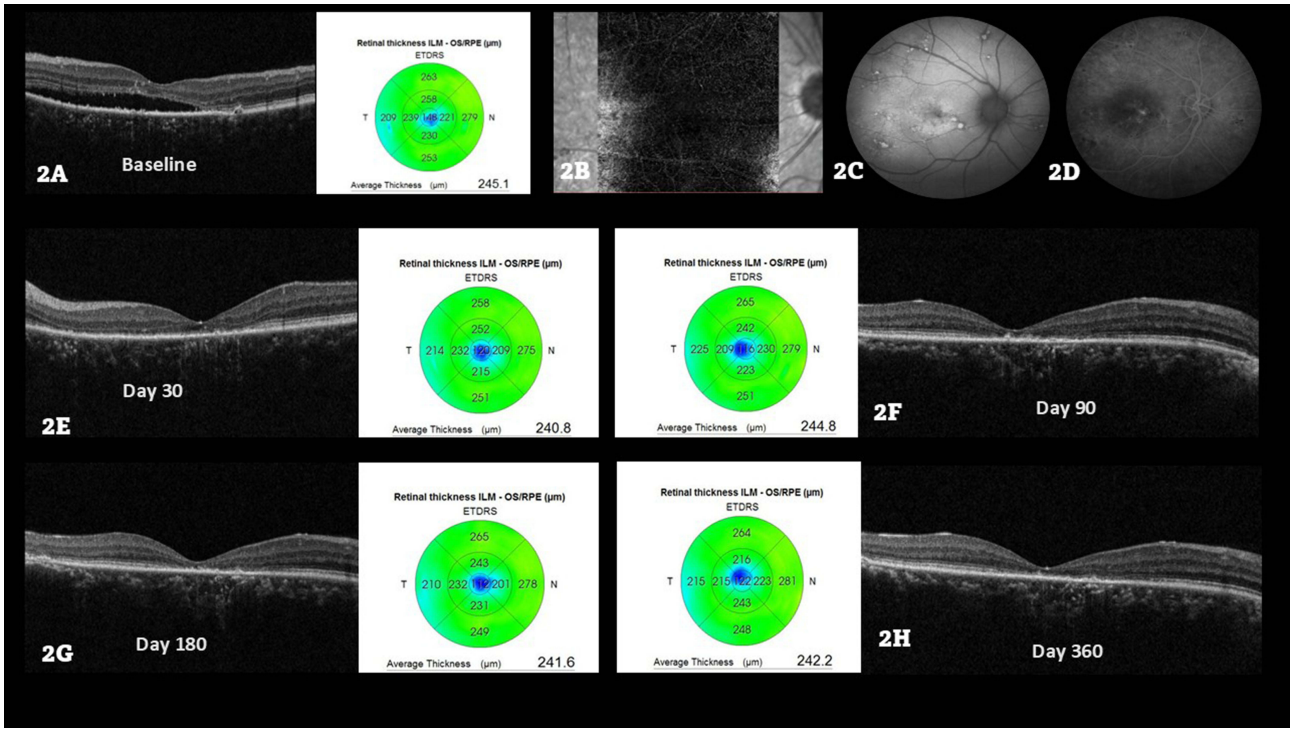

Figure 2 A 62-year-old male with chronic central serous chorioretinopathy (cCSC) in the right eye (OD) underwent baseline multimodal imaging. At presentation (**A**), spectral-domain optical coherence tomography (SD-OCT) demonstrated subfoveal subretinal fluid (SRF) with best-corrected visual acuity (BCVA) of 20/80. OCT angiography (OCTA) confirmed absence of macular neovascularization (**B**), while fundus autofluorescence showed hyperautofluorescence at the macula (**C**). Fundus fluorescein angiography revealed diffuse retinal pigment epithelium damage with a suspected subfoveal leak (**D**). The patient received a single intravitreal brolucizumab injection; one month later (**E**), SD-OCT demonstrated complete resolution of SRF with BCVA improvement to 20/60. The macula remained dry without further treatment at 3 months (**F**), 6 months (**G**), and 12 months (**H**), with BCVA stable at 20/60 throughout follow-up.

brolucizumab in our study may reflect its greater choroidal effect, supporting the hypothesis of a distinct therapeutic mechanism compared to other anti-VEGF agents.

Although anti-VEGF often fails to outperform observation or PDT in cCSCR trials, case series describe definite anatomical, and occasionally functional benefits in selected eyes. In our cohort, strict CNV exclusion via OCTA and targeted brolucizumab for persistent SRF yielded consistent fluid resolution and vision stability. Palakkamanil et al[23] concluded that anti-VEGF is a safe alternative when PDT is inaccessible, making it practical in resource-limited settings.

Brolucizumab's 26-kDa scFv structure and high molar dose (6 mg) confer enhanced retinal and choroidal penetration and greater VEGF-binding vs earlier agents.[29,30] These properties give it theoretical advantages in pachychoroid conditions. In nAMD it achieved superior retinal drying and longer dosing intervals vs aflibercept,[20] and preclinical models show robust suppression of VEGF-driven hyperpermeability.[19] Huang et al[22] showed a single brolucizumab injection cleared SRF and reduced subfoveal choroidal thickness more than ranibizumab or PDT at two months. Our 12-month cCSCR data confirm rapid, durable anatomical improvement,[21,22] underscoring its off-label promise. Mechanistically, VEGF blockade tightens endothelial junctions, lowering subretinal hydrostatic pressure, while the small scFv diffuses into the choriocapillaris to counter ischemia-driven VEGF.[31] Chakraborty et al[12] described enhanced RPE pump function post-brolucizumab, aiding fluid egress back to the choroid. By using OCTA at each visit to exclude neovascular membranes, we ensured fluid resolution reflected direct anti-permeability effects rather than CNV suppression.

A notable finding was the low number of injections needed with brolucizumab. Mean injections per eye was only 1.72 over 12 months, and 86% of eyes required two or fewer injections. This lower treatment burden is clinically significant because it implies fewer visits and better compliance. The high molar dose and durability of brolucizumab likely underpin this effect.

None of our patients developed IOI or retinal vasculitis related to brolucizumab over one year. This safety profile compares favorably to reports in nAMD, where IOI (including occlusive events) has emerged as a known risk.[20] The small sample and careful selection (we excluded those with prior intraocular inflammation) may have contributed to the absence of complications. Nonetheless, safety must be emphasized whenever brolucizumab is used off-label.

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Our results add to a modest but growing body of evidence that anti-VEGF can be beneficial in cCSCR, particularly with newer agents like brolucizumab. In the future, multi-center trials could compare brolucizumab to current standards (PDT, mineralocorticoid antagonists) in refractory CSCR. Biomarkers that predict VEGF-dependence (eg OCTA flow patterns, genetic markers, or initial leakage intensity) might help tailor therapy. It is also conceivable that brolucizumab could be combined with other modalities (eg half-dose PDT) for synergistic effects on choroidal vasculature. For now, our findings suggest that in eyes without CNV who have failed standard management, brolucizumab is a viable off-label option, achieving fluid resolution and visual stability with fewer injections.[22]

This study's retrospective design and small sample size limit broad generalizability. Another important limitation is the absence of a control or comparator group, which restricts the ability to determine whether the observed improvements were exclusively attributable to brolucizumab, as some spontaneous resolution of SRF over time cannot be excluded. Being a single-center study, patient selection bias is possible. In addition, subgroup analyses (eg, stratification by baseline BCVA or presence of PED) were not performed, which may have provided further granularity regarding treatment response. Safety outcomes may also be underestimated due to the modest cohort size and limited follow-up, which may not capture infrequent adverse events. We also did not capture objective quality-of-life outcomes. Although OCTA was performed in all eyes, subclinical CNV may still have been missed. While a subfoveal choroidal thickness ≥300 μm was an inclusion criterion, precise longitudinal SFCT measurements were not consistently recorded, precluding assessment of dynamic choroidal changes with treatment, an aspect best addressed in prospective studies. Additionally, follow-up was limited to 12 months, and longer-term durability and late adverse events remain to be established. Finally, although PDT remains the gold standard for cCSCR, its unavailability in India limits its practical use as a comparator or treatment option, thereby increasing the relevance of exploring alternative therapies such as anti-VEGF agents in this setting.

Notwithstanding the limitations, our study has notable strengths. It is among the first to examine intravitreal brolucizumab in cCSCR over a 12-month period. Every visit included SD-OCT and OCTA grading by masked reader, ensuring consistent anatomical assessments and CNV exclusion. The uniform PRN protocol reflects real-world practice. Importantly, the encouraging rates of fluid resolution and visual gain in this difficult-to-treat population provide a strong signal of brolucizumab's potential.

Conclusion

In summary, intravitreal brolucizumab yielded significant visual and anatomic improvement in cCSCR over 12 months with relatively few injections. Although VEGF is not the primary driver of CSCR, the potent anti-permeability and choroidal-modulating effects of brolucizumab may account for its benefit in selected cases. Importantly, safety outcomes in this small cohort should be interpreted with caution, particularly in light of the known risk of inflammation. These findings, along with the established literature, indicate that anti-VEGF can play a role in select cCSCR cases, especially when more definitive treatments such as PDT are unavailable. Larger prospective studies are needed to confirm these results and to refine patient selection. Until then, our data suggest that brolucizumab may be a useful addition to the CSCR treatment armamentarium, offering durable fluid control and visual stabilization in chronic disease.

Disclosure

J.S. reports affiliation with Shantilal Shanghvi Foundation (SSF) (not relevant to the work under consideration). The authors declare that they have no other competing interests in this work.

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