

1 **Efficacy for Sustained Use of Topical Dorzolamide Therapy for Cystic Macular**
2 **Lesions in Patients with Retinitis Pigmentosa and Usher Syndrome**

3 **Mohamed A. Genead, MD; Gerald A. Fishman, MD**

4 **Institute affiliation:** Department of Ophthalmology and Visual Sciences, University of
5 Illinois at Chicago, Chicago, Illinois, USA.

6 **Correspondence to:** Gerald A. Fishman, MD

7 Department of Ophthalmology and Visual Sciences (MC 648), Room 3.85, Eye and Ear
8 Infirmary, 1855 W Taylor Street, Chicago, Illinois 60612-7234.

9 Tel: +1- 312-996-8939; Fax: +1-312-996-1950; email: gerafish@uic.edu

10 **Address for requests of reprints:**

11 Department of Ophthalmology and Visual Sciences (MC 648), Room 3.85,
12 Eye and Ear Infirmary, 1855 W Taylor Street, Chicago, Illinois 60612-7234.

13 Tel: +1- 312-996-8939; Fax: +1-312-996-1950

14 None of the authors have any proprietary interest in this work.

15 Total word count for text: 2574

16 Word count for references: 624

17 Total word count: 3198

18

19

20

21

22

23

24

25

26

27

28 **Abstract**

29 **Objectives:** To determine the efficacy for **sustained** use of topical therapy with
30 dorzolamide hydrochloride 2% on visual acuity and cystic macular lesions in retinitis
31 pigmentosa (RP) and Usher (USH) syndrome patients.

32 **Design:** Retrospective case series.

33 **Setting:** University hospital.

34 **Patients:** Sixty-four eyes of 32 patients with RP or USH syndrome who received
35 treatment with topical dorzolamide formulation for a duration ranging from 6-58 months
36 were enrolled.

37 **Main Outcome Measures:** Changes in visual acuity (**ETDRS**) and central foveal zone
38 thickness on optical coherence tomography during follow-up for the duration of
39 treatment.

40 **Results:** Among the study cohort, a positive response occurred in 20 of 32 patients (63%)
41 in at least one eye and in 13 patients (41%) in both eyes. Four patients (20%) showed an
42 initial response and a subsequent rebound of macular cysts. In 8 patients (25%) there was
43 no response to treatment and the macular cysts worsened when compared with the
44 pretreatment level. Ten patients (31%) had improvement in visual acuity by ≥ 7 letters in
45 at least one eye at the most recent follow-up visit. Sixteen patients (67%) showed a
46 reduction of $>11\%$ in the central foveal zone thickness in at least one eye when compared
47 with the pretreatment level.

48 **Conclusion:** Treatment of cystoid macular edema with topical dorzolamide in patients
49 with either RP or USH syndrome and followed by an OCT-guided strategy showed a
50 decrease in central foveal zone thickness in the majority of cases. Visual acuity improved
51 in almost 1/3 of the cases, suggesting a potential corresponding visual benefit.

52

53

54

55 **Introduction**

56 Retinitis pigmentosa (RP) is a genetically heterogeneous group of inherited retinal
57 dystrophies caused by progressive loss of photoreceptors and characterized by night
58 blindness, peripheral visual field loss, and retinal pigment deposits visible on fundus
59 examination.¹ Usher (USH) syndrome is an autosomal recessive disorder characterized
60 by the association of congenital sensorineural hearing loss and retinitis pigmentosa.²

61 Previous studies have demonstrated the presence of cystoid macular edema
62 (CME) in RP and USH patients.³⁻⁷ The association between CME and antienolase and
63 anticarbonic anhydrase antibodies in the serum of RP patients has been previously
64 described.⁸ The successful use of either oral or a topical form of carbonic anhydrase
65 inhibitor (CAI) for treatment of CME in RP patients has been previously reported.⁹⁻¹³

66 Prior reports showed a recurrence of CME in patients with RP on treatment with
67 the use of an oral CAI.^{14,15} While a previous study by Fishman and Apushkin has shown a
68 beneficial effect from the use of a topical form of CAI in patients with RP,¹⁶ their study
69 had a limited number of patients followed for a short period of time. Therefore, the aim
70 of the present study was to determine the efficacy for **sustained** use of topical therapy
71 with dorzolamide hydrochloride 2% on visual acuity (VA) and cystic macular lesions, as
72 determined by OCT, in 32 patients with retinitis pigmentosa and Usher syndrome over a
73 more extended period of time.

74

75

76

77

78

79 Patients and Methods**80 Patients**

81 Sixty-four eyes of 32 patients with RP and USH syndrome were enrolled in the present
82 study. The study was conducted in the Department of Ophthalmology at the University of
83 Illinois at Chicago. It followed the tenets of the Declaration of Helsinki and was
84 approved by an institutional review board at the University of Illinois at Chicago. An
85 informed consent was obtained from all subjects. The study was conducted in accord with
86 The American Health Insurance Portability and Accountability Act (HIPAA) regulations.

87

88 Inclusion criteria included patients with RP and USH syndrome who were treated with
89 topical dorzolamide 2% from January 5, 2004, through November 25, 2009 (range, 6-58
90 months). All patients were 18 years of age or older, and had stable ocular fixation.
91 Exclusion criteria consisted of pseudophakic and aphakic patients, posterior uveitis,
92 diabetic retinopathy, optic neuropathies, past history of glaucoma, or any central media
93 opacity sufficient to hinder an OCT examination. None of the patients had been treated
94 with systemic or topical corticosteroids, thiazide diuretics, or non-steroidal anti-
95 inflammatory drugs prior to or during the course of the study. One patient had used an
96 oral form of CAI in the past before being enrolled in the present study.

97

98 Ocular Examination

99 All subjects underwent a complete ocular examination, including assessment of visual
100 acuity (VA) by using an early treatment diabetic retinopathy study (ETDRS) chart in
101 most of the patients (28 patients) at their initial and most recent visits while a Snellen
102 acuity chart was used in 4 patients at their initial visits. Slit-lamp biomicroscopic

103 examinations, intraocular pressure (IOP) measurements with Goldmann applanation
104 tonometry, and dilated fundus examinations using direct and indirect ophthalmoscopy
105 were performed on all patients.

106 **Optical Coherence Tomography (OCT) Techniques**

107 All patients included in the study underwent OCT examinations at each visit to monitor
108 any changes in their macular cysts using a time-domain system **with axial resolution of**
109 **10 μm** (TD-OCT) (Stratus OCT, version 4.0.1; Carl Zeiss Meditec Inc, Dublin,
110 California) in 20 patients or a spectral-domain system (SD-OCT) **with axial resolution**
111 **of 5 μm** (RTvue, with software version 3.5; Optovue Inc, Fremont, California) in 23
112 patients. The examination protocols used for monitoring the macular cystic changes were
113 as previously described.¹⁷

114 **Data Analysis**

115 To analyze the OCT findings qualitatively, the overall response or nonresponse to the
116 topical dorzolamide formulation in all of the study patients was evaluated and graded as:
117 improvement, improvement with a subsequent rebound, no improvement, and no
118 improvement with worsening of the macular cysts. In addition, we assessed the degree of
119 the response to treatment, which was graded as: no response, improvement (mild,
120 moderate, or marked), and worsening (mild, moderate, or marked). Quantitative OCT
121 evaluations were done by calculating the changes in the central foveal zone (CFZ)
122 thickness (defined as the central area with a diameter of 1000 μm , centered on the
123 foveola) to monitor the response to treatment. A change in the CFZ thickness from the
124 pretreatment of $> 11\%$ (mean ± 2 SDs) was considered as a statistically significant inter-
125 visit change as reported previously.¹⁸ Central foveal zone thickness data obtained by TD-
126 OCT were compared with those reported by Chan et al.,¹⁹ (mean [SD] central foveal
127 thickness is 212 [20] μm). The foveal zone thickness data obtained by SD-OCT were
128 compared with normative data provided by the manufacturer which were not corrected

129 for age and that were retrieved from 268 eyes of 134 normative control subjects (mean
130 [SD] age of 44.1 [15.5] years, mean [SD] foveal thickness was 265.8 [23.9] μm).

131 **Statistical Analysis**

132 The main outcome measurements were visual acuity (VA) and CFZ thickness measured
133 by OCT. In the 4 patients tested by Snellen acuity on their initial visits, their acuities
134 were converted to logMAR for statistical analysis. An increase in VA was defined as a
135 gain of greater than or equal to 7 letters based on a previous report.²⁰ The paired Student's
136 *t*-test was used to compare the change in VA and OCT thickness from the pretreatment
137 level. $P < 0.05$ was considered to be statistically significant.

138

139

140

141

142

143

144

145

146

147

148

149

150

151

152

153

154

155 **Results**

156 Of the 32 patients included in our study, 26 patients (81.2%) had RP, 3 patients (9.4%)
157 had USH syndrome type II, and 3 patients (9.4%) had USH syndrome type I. Among the
158 RP group of patients, our cohort was divided into 13 cases (50%) with autosomal
159 dominant inheritance, 5 (19%) autosomal recessive, and 8 (31%) isolated cases. Among
160 the study cohort, there were 18 females (56%) and 14 males (44%). Based on ethnicity,
161 there were 27 white (84%), 4 African American (13%), and 1 Asian (3%) patients. Seven
162 patients were genetically tested for disease causing mutations, in 4 patients (13%), the
163 abnormal disease causing gene mutations were previously identified (**Table 1, online**
164 **only**).

165 The mean (SD) age of the patients at their initial baseline visit was 38.2 (14.5) (median,
166 39; range, 19-67) years. The mean (SD) age at the most recent follow-up visit was 39.8
167 (14.6) (median, 40; range, 20-68) years. The average number of the visits was 5.8 (3.6)
168 (median, 4; range, 3-14). The overall mean (SD) duration of follow-up was 19.0 (15.2)
169 (median, 13; range, 6-58) months (**Table 1, online only**). Sixteen patients (50%) were
170 followed-up for a duration more than 12 months.

171 The mean logMAR VA at the initial baseline visit was 0.33 (0.21) (median, 0.30; range,
172 0-1.08), whereas the mean logMAR VA at the most recent follow-up visit was 0.28
173 (0.24) (median, 0.18; range, 0-1.30) ($p=0.005$) (**Table 2, online only**).

174 On their most recent follow-up visit while receiving treatment with topical dorzolamide,
175 9 patients (28%) reported a subjective improvement in their central vision.

176 Among our 32 study patients, 13 eyes (20%) of 10 patients (31%) had improvement in
177 their BCVA by ≥ 7 letters on an ETDRS chart in at least one eye at the most recent
178 follow-up visit. Regarding the right eyes, 6 eyes (19%) had improvement in their BCVA
179 by ≥ 7 letters on an ETDRS chart at the most recent follow-up visit. Thirteen eyes (41%)
180 did not show significant improvement in their BCVA (0.02-0.10 logMAR). While 6 eyes

181 (19%) did not have a change from the initial baseline (pretreatment) level, 7 eyes (21%)
182 showed a decrease in their BCVA from 1 to 9 letters on an EDTRS chart (0.02-0.18
183 logMAR) when compared with their baseline level.

184 Regarding the left eyes, 7 eyes (21%) showed an improvement in their BCVA by ≥ 7
185 letters on an ETDRS chart at the most recent follow-up visit, whereas 13 eyes (41%) had
186 gained < 7 letters at their most recent visit (0.02-0.12 logMAR). Five eyes (16%) did not
187 have a change from the initial baseline level, while 7 eyes (21%) had a decrease in
188 BCVA from 1 to 11 letters on an ETDRS chart (0.02-0.22 logMAR) when compared with
189 their baseline level (**Table 2, online only**).

190 At the initial baseline visit, 20 patients (63%) had their macular cysts measured by the
191 TD-OCT and 12 patients (37%) by SD-OCT, while at the most recent follow-up visit, 23
192 patients (72%) had their macular schisis measured by SD-OCT and 9 patients (28%) by
193 TD-OCT.

194 Regarding the frequency of the administration of the topical dorzolamide hydrochloride
195 2%, all 32 study patients were prescribed the topical drops at a frequency of three times a
196 day in both eyes. In 4 patients (13%), the frequency was decreased to twice a day after a
197 mean period of 11.3 (10.2) (median, 8) months in both eyes owing to continued
198 improvement in the thickness of their macular cysts.

199 Based on qualitative analysis, our cohort showed that 33 eyes (51%) of 20 patients (63%)
200 had an improvement of their macular cystic changes to treatment in at least one eye and
201 in 13 patients (41%) in both eyes. Among those patients who responded positively to
202 topical dorzolamide 2%, an initial favorable response to treatment was noticed after a
203 mean (SD) period of 1.6 (0.7) (range, 1-3) months. At their most recent follow-up visits
204 of those who responded, 13 eyes (39.4%) of 8 patients showed a marked improvement in
205 the size and extent of their macular cysts (**Figure 1**), 10 eyes (30.3%) of 10 patients

206 showed a moderate improvement, and 10 eyes (30.3%) of 8 patients showed a mild
207 improvement as determined qualitatively (**Table 3, online only**).

208 Among the 33 eyes that showed a degree of response to treatment over the follow-up
209 period, 12 eyes (36%) of 8 patients (40%) showed a sustained improvement from
210 treatment over a mean period of 39.5 (15.8) months. Among these 12 eyes, 4 eyes (33%)
211 of 2 patients (25%) showed a sustained improvement on twice a day regimen. Seven eyes
212 (21%) of 4 patients (20%) showed an initial response to treatment and a subsequent
213 rebound of their CME on OCT testing over a mean period of 8.8 (5.7) (median, 9.5)
214 months owing to a decrease in the frequency of treatment administration from 3 times a
215 day to twice a day (**Figure 2**).

216 Our data showed that 19 eyes (30%) of 13 patients (41%) did not show any response to
217 treatment while the macular cysts did not worsen when compared with the pretreatment
218 level and 12 eyes (19%) of 8 patients (25%) which showed no response to treatment and
219 the macular cysts worsened when compared with the pretreatment level. The degree of
220 worsening was mild in 10 eyes (83%) of 8 patients (**Figure 3**) and moderate in 2 eyes
221 (17%) of 2 patients by using the qualitative method of analysis.

222 Based on quantitative analysis, at their most recent follow-up visits, our patient
223 cohort showed that 42 eyes (66%) of 24 patients (75%) had a degree of improvement in
224 their cystic macular lesions thickness to treatment on OCT testing in at least one eye
225 while 18 patients (56%) showed a positive response with improvement of their macular
226 thickness to treatment in both eyes.

227 The overall mean (SD) CFZ thickness at the initial baseline visit was 356.0 (98.8) μm ,
228 while it was 326.1 (92.0) μm at the most recent follow-up visit ($p=0.0004$). When we
229 used the criterion of a change in the CFZ thickness from pretreatment of $> 11\%$ (mean
230 ± 2 SDs) as a statistically significant inter-visit change as previously reported,¹⁸ twenty
231 five eyes (60%) of 16 patients (67%) showed more than an 11% decrease in the CFZ

232 thickness from the initial baseline level in at least one eye and 9 patients (38%) in both
233 eyes (**Table 3, online only**).

234 **Comment**

235 The purpose of this study was to evaluate the functional and anatomic effects of topical
236 dorzolamide therapy 2% on cystic macular lesions for patients with retinitis pigmentosa
237 and Usher syndrome over a more extended period of time. All treatment decisions were
238 based on OCT imaging.

239 In our current series, based on qualitative assessment, we demonstrated that 33 eyes
240 (51%) of 20 patients had a positive response to treatment with topical dorzolamide
241 formulation, which was evident by an improvement of the cystic macular lesions on
242 OCT. Our findings agree with previous reports that showed similar efficacy of topical
243 dorzolamide hydrochloride therapy in the resolution of cystoid macular edema (CME) on
244 OCT testing in patients with RP.^{16,18}

245 In our current study, among those 33 eyes that showed a favorable response to treatment,
246 12 eyes showed sustained improvement in their macular cysts over a mean (SD) period of
247 39.5 (15.8) months, which was a longer duration of follow-up compared to a previous
248 report on 8 patients that showed the same sustained efficacy of topical dorzolamide
249 [mean (SD) 11.6 (2.4) months].¹⁶

250 Among our cohort of patients, 9 (28%) reported a subjective improvement in their central
251 vision after initiating the use of the topical therapy for at least 3 months. Thirteen eyes
252 (20%) of 10 patients (31%) showed a significant improvement in their BCVA by ≥ 7
253 letters on an ETDRS chart in at least one eye at the most recent follow-up visit during a
254 mean (SD) period of 23.5 (16.2) months.

255 In general, the changes in VA did not correlate well with the changes of cystic macular
256 lesions on OCT. This finding was similar to previous studies that reported a poor
257 correlation between the change in VA and decrease in retinal thickness on OCT.^{16,18,21}

258 Also in our current series, some patients did not respond to topical dorzolamide. We
259 found that in 12 eyes (19%) of 8 patients, their macular cystic lesions worsened when
260 compared with the pretreatment level, as noted on both their results on clinical fundus
261 and OCT examinations.

262 Currently, we know of no way to predict which patients will fail therapy. An
263 explanation for this finding may be related to different genetic mutations causing
264 different mechanisms of protein dysfunction in such disorders. It may also depend on the
265 residual function of the retinal pigment epithelial cells in individual patients as a CAI has
266 been shown to affect the pumping mechanism in these cells.²²⁻²⁴ It would be beneficial to
267 conduct a future study that correlates the different genetic mutations in such patients with
268 a response to topical dorzolamide formulation.

269 Our study also showed that 7 out of 33 eyes (21%) showed a rebound in macular cysts
270 when the CFZ thickness and extent of the cysts on OCT returned to at least baseline
271 levels over a mean (SD) period of 8.8 (5.7) (median, 9.5) months. Our current study
272 showed less of a rebound rate with the use of topical dorzolamide over an extended
273 period of time when compared to previous reports on a fewer number of patients
274 followed for a shorter period of time which showed a higher rate of rebound for CME in
275 patients treated with a CAI.^{14,15,16,18}

276 Limitations of our study include its retrospective nature and that the normative data for
277 macular thickness provided by the manufacturer for the SD-OCT system was not
278 corrected for age. In addition, some patients were initially followed up with TD-OCT and
279 subsequently underwent SD-OCT. Longitudinal change in CFZ thickness could not be
280 calculated precisely because of the difference in the measurements between the two
281 systems. However, previous reports,^{25,26} showed that differences between TD and SD
282 OCTs are minimal and not likely to be clinically relevant.

283 In conclusion, the present study demonstrates that treatment of CME in patients with RP
284 and USH syndrome with topical 2% dorzolamide hydrochloride can reduce central foveal
285 thickness on OCT testing in a notable percentage of cases. Visual acuity may also
286 improve in some cases.

287

288

289

290

291

292

293

294

295

296

297

298

299

300

301

302

303

304

305

306

307 **Acknowledgements**

308 Supported by funds from the Foundation Fighting Blindness, Owings Mills, Maryland;
309 Grant Healthcare Foundation, Lake Forest, Illinois; NIH core grant EYO1792; and an
310 unrestricted departmental grant from Research to Prevent Blindness.

311 The authors had full access to all the data in the study and take responsibility for the
312 integrity of the data and the accuracy of the data analysis

313

314

315

316

317

318

319

320

321

322

323

324

325

326

327

328

329

330

331

332

333 **References**

- 334 1. Marmor MF, Aguirre G, Arden GB, et al. Retinitis pigmentosa: A symposium on
335 terminology and methods of examination. *Ophthalmology* 1983; 90:126-131.
- 336 2. Rosenberg T, Haim M, Hauch AM, Parving A. The prevalence of Usher
337 syndrome and other retinal dystrophy-hearing impairment associations. *Clin*
338 *Genet.* 1997; 51: 314-321.
- 339 3. Walia S, Fishman GA, Hajali M. Prevalence of cystic macular lesions in patients
340 with Usher II syndrome. *Eye* 2009; 23:1206-1209.
- 341 4. Hajali M, Fishman GA. The prevalence of cystoid macular edema on optical
342 coherence tomography in retinitis pigmentosa patients without cystic changes on
343 fundus examination. *Eye* 2009; 23:915-919.
- 344 5. Fetkenhour CL, Chromokos E, Weinstein J, Shoch D. Cystoid macular edema in
345 retinitis pigmentosa. *Trans Am Acad Ophthalmol Otol.* 1977; 83:515-521.
- 346 6. Fishman GA, Fishman M, Maggiano JM. Macular lesions associated with retinitis
347 pigmentosa. *Arch Ophthalmol.* 1977; 95:798-803.
- 348 7. Ffytche TJ. Cystoid maculopathy in retinitis pigmentosa. *Trans Ophthalmol Soc.*
349 *UK* 1972; 92:265-283.
- 350 8. Wolfensberger TJ, Aptsiauri N, Godley B, et al. Antiretinale Antikörper assoziiert
351 mit zystoidem Makulaödem. *Klin Monatsbl Augenheilkd* 2000; 216:283-285.
- 352 9. Fishman GA, Gilbert LD, Anderson RJ, et al. Effect of methazolamide on chronic
353 macular edema in patients with retinitis pigmentosa. *Ophthalmology* 1994;
354 101:687-693.
- 355 10. Wolfensberger TJ. The role of carbonic anhydrase inhibitors in the management
356 of macular edema. *Doc Ophthalmol.* 1999; 97:387-397.

- 357 11. Cox SN, Hay E, Bird AC. Treatment of chronic macular edema with
358 acetazolamide. *Arch Ophthalmol.* 1988; 106:1190-1195.
- 359 12. Fishman GA, Gilbert LD, Fiscella RG, Kimura AE, Jampol LM. Acetazolamide
360 for treatment of chronic macular edema in retinitis pigmentosa. *Arch Ophthalmol.*
361 1989; 107:1445-1452.
- 362 13. Grover S, Fishman GA, Fiscella RG, Adelman AE. Efficacy of dorzolamide
363 hydrochloride in the management of chronic cystoid macular edema in patients
364 with retinitis pigmentosa. *Retina* 1997; 17:222-231.
- 365 14. Apushkin MA, Fishman GA, Grover S, Janowicz MJ. Rebound of cystoid
366 macular edema with continued use of acetazolamide in patients with retinitis
367 pigmentosa. *Retina* 2007; 27:1112-1128.
- 368 15. Fishman GA, Glenn AM, Gilbert LD. Rebound of macular edema with continued
369 use of methazolamide in patients with retinitis pigmentosa. *Arch Ophthalmol.*
370 1993; 111:1640-1646.
- 371 16. Fishman GA, Apushkin MA. Continued use of dorzolamide for the treatment of
372 cystoid macular edema in patients with retinitis pigmentosa. *Br J Ophthalmol.*
373 2007; 91:743-745.
- 374 17. Genead MA, Fishman GA, Walia S. Efficacy of sustained topical dorzolamide
375 therapy for cystic macular lesions in patients with X-linked retinoschisis. *Arch*
376 *Ophthalmol.* 2009 (In press).
- 377 18. Grover S, Apushkin MA, Fishman GA. Topical dorzolamide for the treatment of
378 cystoid macular edema in patients with retinitis pigmentosa. *Am J Ophthalmol.*
379 2006; 141:850-858.
- 380 19. Chan A, Duker JS, Ko TH, Fujimoto JG, Schuman JS. Normal macular thickness
381 measurements in healthy eyes using Stratus optical coherence tomography. *Arch*
382 *Ophthalmol.* 2006; 124:193-198.

- 383 20. Grover S, Fishman GA, Gilbert LD, Anderson RJ. Reproducibility of visual
384 acuity measurements in patients with retinitis pigmentosa. *Retina* 1997; 17:33-37.
- 385 21. Greenstein VC, Holopigian K, Siderides E, Seiple W, Carr RE. The effects of
386 acetazolamide on visual function in retinitis pigmentosa. *Invest Ophthalmol Vis*
387 *Sci.* 1993; 34:269-273.
- 388 22. Marmor MF, Abdul-Rahim AS, Cohen DS. The effect of metabolic inhibitors on
389 retinal adhesion and subretinal fluid resorption. *Invest Ophthalmol Vis Sci.* 1980;
390 19:893-903.
- 391 23. Tsuboi S, Pederson JE. Experimental retinal detachment. X. Effect of
392 acetazolamide on vitreous fluorescein disappearance. *Arch Ophthalmol.* 1985;
393 103:1557-1558.
- 394 24. Kawasaki K, Mukoh S, Yonemura D, Fujii S, Segawa Y. Acetazolamide-induced
395 changes of the membrane potentials of the retinal pigment epithelial cell. *Doc*
396 *Ophthalmol.* 1986; 63: 375-381.
- 397 25. London NJS, Fung AE. Evaluating the nerve and macular thickness
398 measurements of the Optovue RTVue, Zeiss Stratus, and Cirrus OCTs [e-abstract
399 4241]. *Invest Ophthalmol Vis Sci.* 2008; 49:A334.
- 400 26. Fullerton JM, Kim JE, Xiang Q, Szabo A. Comparison of spectral domain OCT
401 and time domain OCT for measurements of retinal thickness [e-abstract 1073].
402 *Invest Ophthalmol Vis Sci.* 2009; 50:D1017.
- 403
- 404
- 405
- 406
- 407
- 408

409

410

411 **Figure Legends**

412 **Figure 1.** Horizontal OCT scans in 2 patients [1 patient with USH syndrome type-I (left
413 column) and 1 with RP (right column)] on treatment with topical dorzolamide
414 hydrochloride 2%. Both patients demonstrated marked improvement of their cystic
415 macular lesions on spectral-domain OCT (left column) and time-domain OCT (right
416 column).

417 **Figure 2.** Horizontal time-domain OCT scans of a patient with RP. The sequence of
418 scans demonstrate an example of an initial improvement of macular cysts and subsequent
419 rebound after decreasing the dose of topical dorzolamide hydrochloride 2% from three
420 time a day to twice a day followed subsequently by an improvement of the macular cysts
421 after an increase in the dose of topical dorzolamide back to three times a day.

422 **Figure 3.** Horizontal time-domain OCT scans of a patient with RP. The scans
423 demonstrate an example of mild worsening of macular cysts while on treatment with
424 topical dorzolamide hydrochloride 2%.