THE EFFECT OF A NOVEL SELENIUM SULFIDE-CONTAINING TOPICAL TREATMENT ON OCULAR SIGNS AND SYMPTOMS IN SYMPTOMATIC CONTACT LENS WEARERS: AN EXPLORATORY STUDY

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BACKGROUND

- Contact lens (CL) discomfort is common, affecting up to 88% of wearers[1] and is associated with reduced wearing time and discontinuation from wear[2, 3]
- Meibomian gland changes consistent with Meibomian Gland Dysfunction (MGD) including gland plugging, poor expressibility and poor secretion quality occur in symptomatic CL wearers[4,5]
- Consistent evidence exists for structural gland changes, alterations in meibum and morphological changes to the lid margin in CL wearers[6-9] with changes such as gland expressibility and dropout persisting after discontinuation from wear[8]
- While the natural history of gland change associated with CL discomfort is unknown, signs of MGD are a strong predictor of subsequent symptomatic disease[10]

AIM

To evaluate the effects of a novel topical ointment AZR-MD-001 1%, containing selenium sulfide, on Meibomian gland signs and ocular symptoms in symptomatic CL wearers in a 4-month prospective vehicle controlled double masked randomised trial.

METHODS

- 19 symptomatic CL wearers (Contact Lens Dry Eye Questionnaire-8 [CLDEQ-8] score >12) with evidence of MGD (Meibomian gland secretion quality score [MGS] ≤12 for 15 glands of the lower lid; Figure 1) in both eyes were enrolled
- Participants were randomly assigned to receive either the active AZR-MD-001 1% or vehicle ointment to the lower eyelid margin twice per week (NCT03972501)
- MGS and number of Meibomian glands yielding liquid secretion (MGYLS; 0 or 1 for each of 15 glands of the lower lid; Figure 2) were measured at baseline and after 2, 4, 6 weeks and 2, 3 and 4 months of treatment.
- CLDEQ-8 was completed at baseline, 1 and 4 months
- The eye with lower MGS score at baseline was assigned as the study eye for statistical analysis
- Differences between active and vehicle were analysed relative to baseline using ANCOVA

Figure 1: Meibomian Gland Secretion Quality Score

1 Inspissated/ tooth-paste consistency

2 Cloudy liquid secretion

3 Clear liquid secretion

RESULTS

- 14 subjects (5M:9F, aged 30.8 ± 13.8 years) completed the study. 5 subjects discontinued after screening: withdrawal due to personal reason (n=2); adverse event (n=3). Baseline data are shown in Table 1
- MGS over time is shown in Figure 3:
  - Compared with baseline, change in MGS significantly improved in the active group after 2 weeks (Mean 3.4 ± 6.1, p<0.05) and continued to improve to four months (19.5 ± 7.6, p<0.0001)
  - In the vehicle group, change in MGS from baseline improved at month 4 (Mean 16 ± 10.1, p<0.005)
- MGLYS over time is shown in Figure 4:
  - Compared with baseline, the change in MGLYS was not significant in the active group after 2 and 4 weeks (Mean 0.7 ± 1.8; 2.1 ± 3.4, respectively), but improved after 6 weeks (3.5 ± 3.4, p<0.001) and remained significantly improved by month 4 (3.4 ± 4.1, p<0.0005)
  - In the vehicle group, change in MGLYS from baseline was improved at 4 months only
- The active reached statistical superiority over the vehicle in both change in MGS and MGLYS at 6 weeks onwards (p<0.05)
- Ocular symptoms over time are shown in Figure 5 and 6:
  - Both active and vehicle showed a statistically significant improvement in CLDEQ-8 score at 1 and 4 months (Figure 5; p<0.01)
  - There was a significant improvement in the visual symptoms subscale (frequency and severity of fluctuating vision) of the CLDEQ-8 in the active compared with vehicle (Figure 6; p=0.02).

Table 1: Baseline data

	MGS	MGYLS	CLDEQ-8	CLDEQ-8 Vision Subscale
All subjects (n=19)	4.6 ± 2.8	0.4 ± 0.8	18.1 ± 4.1	3.8 ± 2.2
Completed subjects (n=14)	4.2 ± 2.4	0.3 ± 0.6	18.1 ± 3.5	3.8 ± 2.1
Active Treatment (n=7)	4.0 ± 2.7	0.6 ± 0.7	18.6 ± 2.4	4.6 ± 1.8
Vehicle (n=7)	4.4 ± 2.0	0.0 ± 0.0	17.6 ± 4.2	3.0 ± 2.1

Figure 3: Change in Meibomian Gland Secretion Score (MGS) from Baseline

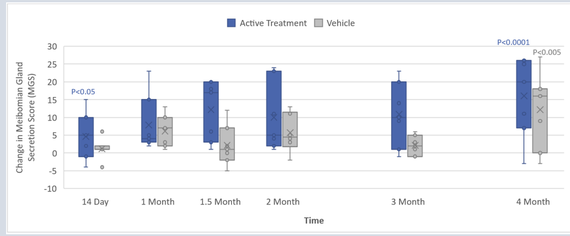


Figure 4: Change in Meibomian Gland Yielding Liquid Score (MGYLS) from Baseline

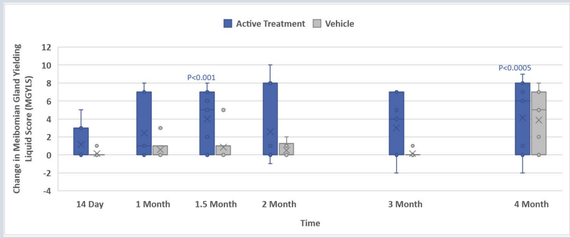


Figure 2: Meibomian Glands Yielding Liquid Secretion

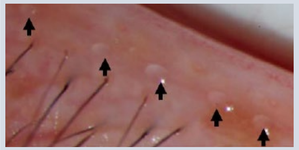


Figure 5: Change in CLDEQ-8 scores from Baseline

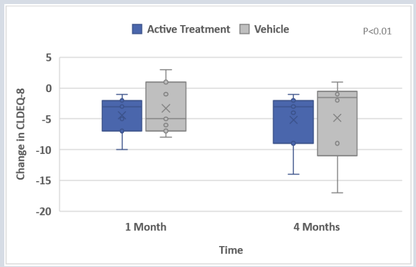
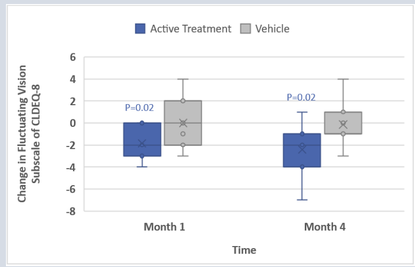


Figure 6: Change in Fluctuating Vision Subscale of CLDEQ-8 from Baseline



DISCUSSION

- This exploratory study demonstrated improvement in Meibomian gland patency and secretion in symptomatic CL wearers with signs of MGD, following biweekly use of a topical ointment containing selenium sulfide. Selenium sulfide is thought to reduce keratinocyte activity and soften keratin in skin and to increase lipid secretion in sebaceous glands[11]
- The magnitude of change in MGS observed in this study was substantially greater than other MGD treatments including intense pulsed light[12], Quantum Molecular Resonance electrotherapy[13] and microblepharon exfoliation[14], even when controlling for differences in the number of glands evaluated
- The effect of other treatments has been reported for 10 days[14], 1 month[13] and 8 weeks[12] after ceasing treatment. While the active improved Meibomian gland signs and ocular symptoms during use, exploration of the maintenance effect following discontinuation of treatment is required
- Symptoms measured using the CLDEQ-8 were significantly improved from baseline in both groups. However, the items describing vision fluctuation were significantly improved in the active only. Larger studies to explore changes in symptomatology in CL discomfort and the validation of patient reported outcome measures sensitive to changes in this condition are warranted
- The natural history of gland changes in CL discomfort are unknown and further epidemiological studies are needed to better understand the time course in treated and untreated CL discomfort

CONCLUSION

Twice weekly use of a topical ointment containing selenium sulfide, designed to treat hyperkeratinisation at the gland orifices, appears to improve Meibomian gland patency and secretion by more than 30% in symptomatic CL wearers after a minimum of 6 weeks, compared to vehicle. Improvements were maintained to 4 months of use. These early findings associated with improved visual symptoms warrant further exploration.

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DISCLOSURES

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