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Research Report

Ocular surface disease related to tisotumab vedotin-tftv

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ABSTRACT

Introduction: To report a series of patients who developed ocular surface disease related to tisotumab vedotin-tftv (TV), an antibody-drug conjugate (ADC) approved for the treatment of recurrent or metastatic cervical cancer.
Methods: This was a multicenter retrospective chart review study of patients who developed ocular surface disease related to TV between April 1st, 2022 to August 31st, 2023.
Results: Five patients were identified who developed ocular surface disease while on TV. All patients received a standard ocular adverse event prophylaxis regimen with each infusion per the product label, including a cool ocular compress, topical vasoconstrictor, topical steroid, and artificial tears. All five patients developed conjunctival subepithelial fibrosis. Two patients developed bilateral pseudomembranous conjunctivitis, one of whom subsequently developed conjunctival scarring. Two patients developed a bilateral culture positive conjunctivitis, which responded to topical antibiotics. One patient developed bilateral infectious keratitis and was treated with partial thickness corneal transplantation of both eyes.
Conclusion: TV can be associated with ocular surface disease, including conjunctival scarring and infectious keratitis. Some cases may require surgical intervention. Oncologists and ophthalmologists should be aware of the possibility of these ocular complications, especially as more ADCs are approved. Further studies are required to determine toxicity mechanisms as well as optimal prophylaxis and management strategies.

1. Introduction

Tisotumab vedotin-tftv (TV) is an antibody-drug conjugate (ADC) that is FDA-approved for the treatment of recurrent or metastatic cervical cancer with disease progression after chemotherapy (Arn et al., 2023; Hong et al., 2020). ADCs are a form of targeted cancer therapy in which an antibody directed against an antigen expressed by tumors cells facilitates the delivery of a cytotoxic payload to those cells (Li et al., 2021). Ocular adverse events (AEs) can occur due to on-target toxicity, in which the eye expresses the same target antigen as tumor cells, or off-target toxicity, which may be related to one or more of a variety of mechanisms, including pinocytosis (Li et al., 2021; Markham, 2021).

TV is directed against cell surface-expressed tissue factor (TF) to deliver a toxic load to tumor cells. High levels of TF expression can be found in a variety of cancers including cervical, non-small cell lung, endometrial, prostate, ovarian, esophageal, and bladder cancer (Markham, 2021; Karpel et al., 2023). TF is also expressed by vascular endothelial cells. Patients treated with TV have been frequently reported to develop conjunctival hyperemia as an ocular AE. This may be a manifestation of on-target toxicity, given the expression of TF in the conjunctival vascular endothelium (Li et al., 2021; Farooq et al., 2020).

In an attempt to mitigate the risk of ocular AEs, patients receiving TV are managed with the following protocol: 1) an ophthalmic exam at baseline and in between each TV treatment cycle approximately 3 weeks apart; 2) an eye drop regimen pre-specified by the manufacturer which includes vasoconstrictor drops before TV infusion, topical dexamethasone 0.1 % 3 times daily for 3 days, and ongoing preservative-free artificial tears; 3) ocular cold packs during infusion; 4) avoidance of contact lens use; and 5) TV dose modification or cessation when AEs occur (Supplemental figure) (Li et al., 2021; Seagan and Genmab. TIVDAK required eye care. Published online, 2024). The cases of conjunctival hyperemia associated with TV are thought to be mild and transient

Abbreviations: TV, tisotumab vedotin-tftv; ADC, antibody-drug conjugate; AE, adverse event; TF, tissue factor; SCC, squamous cell carcinoma; MGD, meibomian gland dysfunction; FML, fluorometholone.

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in most cases, while more serious side effects are considered to be rare (Arn et al., 2023; Farooq et al., 2020; Parikh et al., 2024). Here we present a series of patients who developed moderate to severe ocular surface disease while on TV.

2. Methods

A multi-site retrospective chart review identified five patients who developed ocular surface disease while being treated with TV at the University of Chicago Medical Center (Chicago, IL) or Mercy Clinic Eye Specialists (St. Louis, MO, and Springfield, MO), between April 1st, 2022 to August 31st, 2023. This study was conducted according to the tenets of the Declaration of Helsinki. The study was approved by the institutional review board at the University of Chicago (IRB23-1134) and approval was waived by the institutional review board at Mercy Clinic Eye Specialists. For all patients, Snellen visual acuity charts were used to quantify each patient's vision. If patients could not read any lines on the Snellen visual acuity chart, then they were evaluated for counting fingers, hand motion, and light perception.

3. Results

3.1. Case 1

A 50-year-old female with stage IIIB endocervical adenocarcinoma and no other past medical history presented for baseline ocular examination prior to starting TV. She had received chemoradiation with cisplatin and brachytherapy at initial cancer diagnosis, and then after disease recurrence she had received chemotherapy including various combinations of carboplatin/paclitaxel/pembrolizumab for 12 cycles, with disease progression on imaging and serum tumor markers. Baseline ocular examination was unremarkable, and she began the ocular medications per manufacturer protocol with an ocular exam in between TV cycles. Hyperemia of the bilateral palpebral conjunctiva was noted after the first TV cycle. After her fourth TV cycle, she developed palpebral conjunctival erosions bilaterally prompting an increase in her topical dexamethasone 0.1 % eyedrop dosing to once every morning in addition to study protocol dosage as well as moxifloxacin 0.5 % drops for prophylaxis. She continued to have stable mild conjunctival injection and irritation of both eyes, for which a lubricating gel was added at bedtime.

Bilateral pseudomembranous conjunctivitis, which is characterized by fibrin coagulates on the palpebral conjunctiva, hyperemia, and mucopurulent discharge, ensued after the eighth TV cycle, and the pseudomembranes were debrided. After the ninth TV cycle, she developed keratin on the nasal aspect of her lower palpebral conjunctiva and caruncles bilaterally. These areas were debrided and sent for pathological analysis which showed "anuclear epithelial cells" consistent with epithelial metaplasia. The patient was instructed to apply erythromycin 0.5 % ointment four times daily to the ocular surface for both lubrication and infection prophylaxis. She subsequently developed conjunctival subepithelial fibrosis in both eyes. After completing 10 cycles of TV, she was switched to a different therapy due to cancer progression. Her ocular findings remained stable 8 months after starting TV.

3.2. Case 2

A 31-year-old female with stage IIB cervical squamous cell carcinoma (SCC) presented for baseline ocular examination prior to starting TV. She had previously failed chemoradiation, external beam radiation, and chemotherapy including carboplatin/taxol/bevacizumab, and pembrolizumab. Baseline ocular examination was unremarkable. At the next visit, the patient had developed bilateral conjunctival hyperemia. The patient was started on fluorometholone eye (FML) 0.1 % drops daily in both eyes.

The following visit, the patient was found to have persistent conjunctival hyperemia as well as conjunctival subepithelial fibrosis bilaterally. The patient also developed mild corneal punctate epitheliopathy in the left eye only. Conjunctival culture was obtained but showed no growth. The patient was started on moxifloxacin 0.5 % eye drops three times a day for infection prophylaxis in both eyes and FML was continued. Moxifloxacin was chosen given its broad coverage and availability. She continued TV during this time at a reduced dosage of 1.3 mg/kg (after cycle 5) given the severity of her ocular surface disease. The following visit, a new area of keratin was noted on the surface of the right eye (Fig. 1). She was started on doxycycline 20 mg orally twice a day and vitamin A ointment QHS in both eyes to improve the health of the ocular surface by reducing ocular surface inflammation and promoting lubrication (Shlager et al., 2023). The conjunctival hyperemia improved. Her ocular surface remained stable 18 months after starting TV.

3.3. Case 3

A 59-year-old female with recurrent stage IV endocervical adenocarcinoma with ovarian metastases presented for baseline ocular examination prior to starting TV. Past medical history was otherwise significant only for hypertension on amlodipine and lisinopril. Prior to TV, her oncologic treatment had included laparoscopic hysterectomy and bilateral salpingo-oophorectomy, external beam radiation therapy, brachytherapy, chemotherapy with cisplatin/5-fluorouracil, carboplatin/paclitaxel/bevacizumab, and various holistic treatments including Ivermectin, pyrantel pamoate, praziquantel, nystatin, wormwood, gallbladder–ND, A–FNG, and vitamin C. Baseline ocular examination was unremarkable. Two weeks following the second TV cycle, she presented with left eye discomfort and discharge and was diagnosed with left pseudomembranous conjunctivitis. The pseudomembranes were debrided, and she was started on topical moxifloxacin 0.5 % and prednisolone acetate 1 % (both three times daily) and erythromycin 0.5 % ointment nightly in the left eye for lubrication. Her ocular surface normalized rapidly and these treatments were stopped 1 week later.

After her fifth TV cycle, she developed bilateral conjunctival hyperemia with discharge, and topical moxifloxacin 0.5 % and prednisolone acetate 1 % were re-initiated to treat any infection and to improve inflammation on the ocular surface, respectively. Her conjunctivitis worsened in the left eye after the sixth TV cycle, leading her oncology team to withhold TV therapy. Cultures from the left eye grew *Staphylococcus epidermidis* that showed resistance to ciprofloxacin and

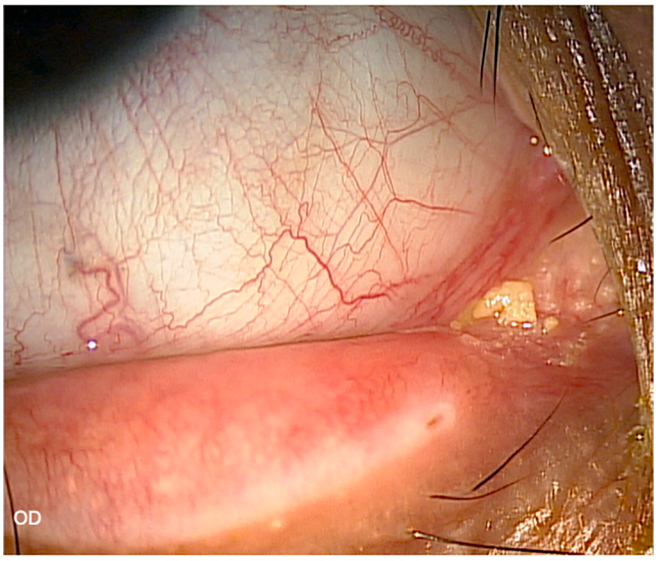

Fig. 1. Color slit lamp photo demonstrating deposition of whitish material (known as keratin) overlying the caruncle (case 2). This can occur in the setting of chronic inflammation.

erythromycin, intermediate resistance to moxifloxacin, and sensitivity to trimethoprim-sulfamethoxazole. Topical antibiotic therapy was thus switched to polymyxin B/trimethoprim drops and polymyxin B/bacitracin ointment both four times daily, and she was continued on topical prednisolone acetate 1 % drops.

The conjunctivitis improved, but new areas of conjunctival scarring (called symblephara) were noted in both eyes, along with conjunctival subepithelial fibrosis, leading to a temporary pause of TV. She had self-discontinued topical therapy and so topical prednisolone acetate 1 % and frequent preservative-free artificial tears were resumed, with the addition of topical cyclosporine 0.05 % drops twice daily in both eyes to reduce inflammation. Her ocular surface stabilized. Due to increased tumor activity, TV was eventually restarted after a 4-month hiatus, but it was eventually discontinued again due to recurrent urinary tract infections. She was found to have a stable ocular surface with persistent conjunctival symblephara at 16 months after initiating TV therapy.

3.4. Case 4

A 50-year-old female with a past medical history of obesity, hypertension, hyperlipidemia, pre-diabetes, and stage IIB cervical SCC presented for a baseline ocular exam prior to starting TV due to cancer recurrence after completing radiation, carboplatin, taxol, and pembrolizumab. Her baseline exam was significant for meibomian gland dysfunction in both eyes and she was started on warm compresses and preservative-free artificial tears. After one round of treatment, she returned to clinic with mild conjunctival hyperemia and itching in both eyes. She was started on a mild topical steroid (FML) daily in both eyes and oral doxycycline 20 mg twice a day.

Three weeks later, the patient developed superior limbic keratoconjunctivitis in both eyes, at which point the patient was started on vitamin A ointment and the patient's TV dose was decreased from 2 mg/kg to 1.3 mg/kg due to concerns of worsening ocular surface disease. Despite treatment, the patient developed purulent discharge from both eyes concerning for infectious conjunctivitis. FML was stopped in the setting of acute infection, and she was started on moxifloxacin 0.5 % four times a day in both eyes. Ocular cultures grew rare *Dolosigranulum pigrum*, few *Corynebacterium simulans*, and rare coagulase-negative Staphylococcus. After a discussion with her oncologist, the fourth dose of TV was held. At the following visit, the conjunctivitis had resolved, but she was found to have conjunctival subepithelial fibrosis in both eyes (Fig. 2) as well as mild keratin formation. Her cycle 4 TV dose was again reduced to 0.9 mg/kg. Four months after starting TV, the patient's ocular condition remained stable.

3.5. Case 5

A 36-year-old female with stage IV metastatic squamous carcinoma of the cervix presented with bilateral corneal ulcers (Fig. 3). She had a history of 6 cycles of TV initiated 5 months prior to presentation to ophthalmology. After her third TV cycle, the patient reportedly developed bilateral ocular discharge for which she had been prescribed tobramycin-dexamethasone drops by her optometrist. Prior to TV, her initial cancer had been treated with cisplatin-based chemoradiotherapy, and recurrent cancer treated on a clinical trial with CAR-T followed by IL-2 and pembrolizumab. Past medical history was significant for hypertension on carvedilol.

At presentation, her visual acuity was light perception (LP) only in the right eye, and 20/300 in the left eye. Her presentation was highly concerning for worsening bacterial keratitis. Ocular cultures grew *Streptococcus agalactiae* (Group B strep), *Streptococcus mitis (S. oralis)*, and *Staphyloccocus epidermidis* that were all susceptible to moxifloxacin and vancomycin. Fungal cultures were negative.

A self-retained, cryopreserved amniotic membrane was placed on the right eye, and fortified vancomycin and fortified tobramycin eye drops were started hourly in both eyes for more adequate treatment of her corneal ulcers, along with oral vitamin C 500 mg twice daily (for anti-collagenase effect) and topical atropine 1 % drops twice daily (for comfort). Given the severity of the patient's corneal ulceration, the oncologist was contacted, and TV was held per manufacturer protocol. A self-retained, cryopreserved amniotic membrane was placed on the left eye to promote re-epithelialization of the cornea. She was also started on topical insulin drops (25 units/ml in peg 400-propylene glycol) and oral doxycycline 50 mg twice daily to promote corneal healing.

The patient was hospitalized elsewhere for respiratory issues and was lost to follow-up for one month. She returned with an overall improved ocular surface but persistent small epithelial defects bilaterally. She subsequently developed new corneal infiltrates in the left eye, suggesting new infectious corneal ulcerations. Fortified topical vancomycin and tobramycin were re-initiated. Cultures grew rare *Staphylococcus epidermidis*. To promote corneal healing, a partial thickness corneal transplant using a modified acellular Descemet's membrane allograft was applied as an onlay (StarMEM, BrightStar Therapeutics) in the left eye followed 2 weeks later by the same procedure in the right eye. Histological analysis demonstrated host corneal tissue fibrosis without significant acute inflammation. Her vision improved to 20/60 in the right eye and 20/400 in the left eye 6 months after her initial visit.

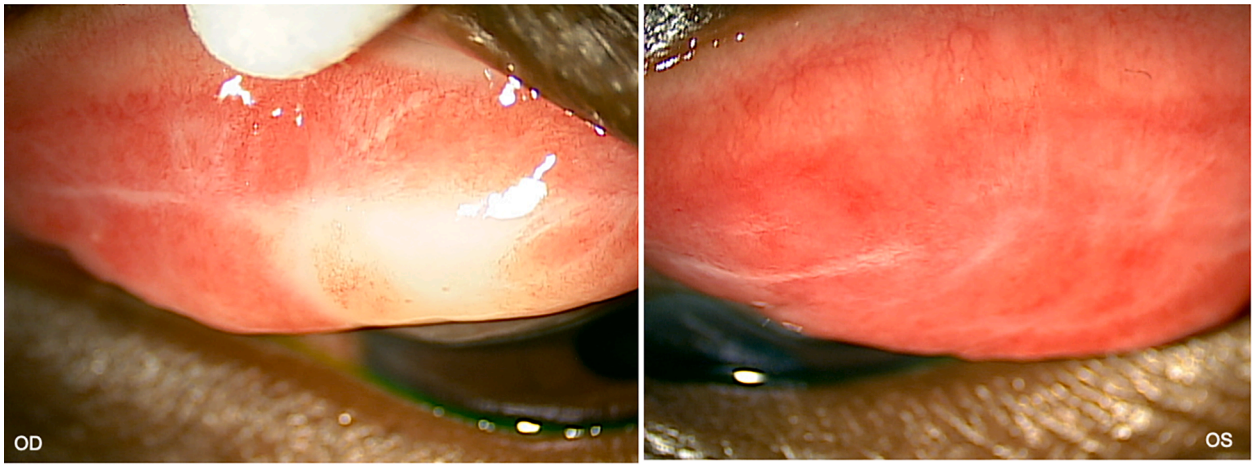

Fig. 2. Color slit lamp photos demonstrating linear bands of scarring (i.e., subepithelial fibrosis) involving the palpebral conjunctiva (case 4). This scar formation typically develops after severe inflammation of the ocular surface.

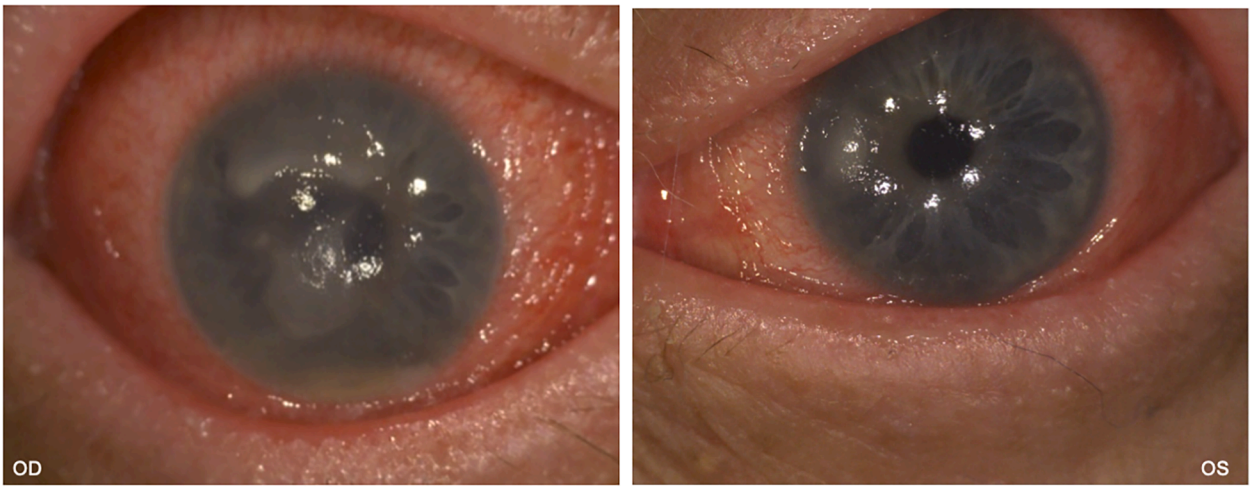

Fig. 3. Color slit lamp photos demonstrating severe infectious keratitis at presentation after 6 cycles of TV (case 5). Notably, there is an infiltrate present on the central and superior portion of the cornea, diffuse corneal haze, and a small hypopyon (layer of white blood cells in the inferior portion of the anterior chamber).

4. Discussion

The list of ADCs approved by the FDA to treat refractory and/or metastatic cancer continues to grow (Li et al., 2021). TV is an ADC that targets TF to deliver a cytotoxic payload to cervical cancer cells, and has been found to cause ocular AEs (Li et al., 2021; Zhao et al., 2018). In a multicenter phase 2 trial of patients treated with TV, 53 % of participants experienced ocular AEs. Common ocular AEs included dry eye (23 %), keratitis (11 %), and conjunctivitis (26 %), whereas 2 % experienced a severe ocular AE (two cases of ulcerative keratitis) (Arn et al., 2023; Kim et al., 2022). Approximately 86 % of ocular AEs resolved based on safety follow-up 30 days after the last dose. The median time to onset for ocular AEs was 1–4 months, and median time to resolution was 0–7 months (Arn et al., 2023).

For TV, clinicians generally follow the ADC dose modification guidelines proposed by the manufacturer, which include the following for corneal AEs: for nonconfluent superficial punctate corneal epitheliopathy, patients can be monitored at the same dose; for the first occurrence of confluent superficial punctate corneal epitheliopathy, a corneal epithelial defect, or a 3 line decrease in vision, patients can hold their TV dose until signs improve, after which TV can be resumed at a reduced dose; for the second occurrence of these signs, TV is discontinued. If patient develops a corneal ulcer, TV is also discontinued (TIVDAK ADMINISTRATION AND DOSE MODIFICATION). Guidelines are similar for conjunctival AEs. Notably, a consensus grading scale for ocular toxicity from targeted cancer drugs is currently being developed.

For those ocular AEs where a dose reduction is indicated (e.g. after a dose hold), TV is typically reduced from 2.0 mg/kg to 1.3 mg/kg, with the option for a second dose reduction to 0.9 mg/kg, depending on the AE (Arn et al., 2023; De Bono et al., 2019). In our cases, patients were additionally started on regimens by the treating ophthalmologist including topical steroids, topical antibiotics, oral doxycycline, and vitamin A ointment (Table 1); in one case, amniotic membrane transplantation followed by partial thickness corneal transplant was performed. One patient developed culture-positive bacterial conjunctivitis while on topical steroids. While resolution was achieved with a topical antibiotic, caution should be exercised if considering long-term topical steroids in these patients.

Our series suggest that patients on TV need careful monitoring to assess for the development of ocular surface disease, which in some cases can be vision and eye threatening. Oncologists should be aware of these concerns and ensure that their patients are being followed by an ophthalmologist. According to dose modification guidelines from the manufacturer, patients who develop corneal ulceration or symblephara are advised to discontinue TV (Arn et al., 2023). This may pose a difficult scenario for the patient if no other therapeutic options remain. In case 3, the patient chose to restart TV off-protocol despite having developed symblephara, since she had failed multiple prior cancer treatments. In discussion with her gynecologic-oncologist team, it was felt that the patient had “no other meaningful therapeutic options” to prolong life. Notably, since the end of our study, some of the patients in this series have died from cancer progression.

Table 1
Management of ocular side effects from TV.

Treatment	Rationale
Preservative free artificial tears	Lubricates the ocular surface and promotes healing. The preservatives in some artificial tears can be irritating to the ocular surface, and, therefore, preservative free options are preferred.
Vitamin A ointment	Promotes wound healing, helps treat ocular keratinization, and provides lubrication.
Insulin drops	Promotes corneal healing in severe dry eye or persistent epithelial defects.
Antibiotic drops or ointments	Prevents or treats infection.
Culture of ocular surface	Helps direct treatment of infectious conjunctivitis or keratitis.
Topical steroids	Reduces ocular surface inflammation. Should generally be avoided if there is concern for infection.
Amniotic membrane	Avascular fetal membrane that is used to promote healing of the ocular surface.
Oral Vitamin C	Promotes wound healing and reduces inflammation.
Oral doxycycline	Inhibits collagen breakdown. Also inhibits matrix metalloproteinases 2 and 9, as well as interleukin-1, to promote corneal healing.
Pseudomembrane debridement	Removal of pseudomembranes (membrane-like plaques of fibrinous inflammatory exudate) from the ocular surface can aid diagnosis (e.g. culture/pathology), improve comfort, and hasten ocular surface healing.

5. Conclusions

In summary, TV can be associated with ocular surface disease ranging from mild conjunctivitis to severe corneal ulceration (Arn et al., 2023; Heitz et al., 2023). Oncologists and ophthalmologists should be aware of the potential development of these ocular AEs. Dose holds, dose reductions, and drug cessation are important management tools. These patients require timely ophthalmologic consultation as well as ongoing communication with the treating oncologist. In some cases, oncologists, ophthalmologists, and patients may need to decide between drug

cessation for serious ocular AEs versus continuation of potentially life-prolonging cancer therapy. Further studies are required to determine toxicity mechanisms as well as optimal prophylaxis and management strategies.

6. Authorship

All authors attest that they meet the current ICMJE criteria for authorship.

CRediT authorship contribution statement

Daniella Lent-Schochet: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Shachar Tauber:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Zachary Seagrave:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Grace L. Paley:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Asim V. Farooq:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

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Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: DLS, GP, and ZS have nothing to disclose. ST is a consultant for Johnson and Johnson and Sun Pharmaceuticals and sits on the Medical Advisory Board of OSRX. AVF is a consultant for Pfizer, GlaxoSmithKline, Amgen, Ambrx, Immunogen, Eisai, Mythic Therapeutics, Skye Bioscience, Sanofi, and is on a Data Safety Monitoring Committee for AstraZeneca.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.gore.2025.101676.

References

Arn, R., Aprn-Cnp, C., Halla, J., Msn, F.-C K., Gill, R.n. (Hons) S., 2023. Tisotumab vedotin safety and tolerability in clinical practice: managing adverse events. *J. Adv. Pract. Oncol.* 14 (2), 139–152. https://doi.org/10.6004/jadpro.2023.14.2.4.

De Bono, J.S., Concin, N., Hong, D.S., et al., 2019. Tisotumab vedotin in patients with advanced or metastatic solid tumours (InnovaTV 201): a first-in-human, multicentre, phase 1–2 trial. *Lancet Oncol.* 20 (3), 383–393. https://doi.org/10.1016/S1470-2045(18)30859-3.

Farooq, A.V., Degli Esposti, S., Popat, R., et al., 2020. Corneal Epithelial Findings in Patients with Multiple Myeloma Treated with Antibody-Drug Conjugate Belantamab Mafodotin in the Pivotal, Randomized, DREAMM-2 Study. *Ophthalmol. Ther.* 9 (4), 889–911. https://doi.org/10.1007/s40123-020-00280-8.

Heitz, N., Greer, S.C., Halford, Z., 2023. A review of Tisotumab Vedotin-tftv in recurrent or metastatic cervical cancer. *Ann. Pharmacother.* 57 (5), 585–596. https://doi.org/10.1177/10600280221118370.

Hong, D.S., Concin, N., Vergote, I., et al., 2020. Tisotumab Vedotin in previously treated recurrent or metastatic cervical cancer. *Clin. Cancer Res.* 26 (6), 1220–1228. https://doi.org/10.1158/1078-0432.CCR-19-2962.

Karpel, H.C., Powell, S.S., Pothuri, B., 2023. Antibody-drug conjugates in gynecologic cancer. *Am. Soc. Clin. Oncol. Educ. Book* 43, e390772. https://doi.org/10.1200/EDBK_390772.

Kim, S.K., Ursell, P., Coleman, R.L., Monk, B.J., Vergote, I., 2022. Mitigation and management strategies for ocular events associated with tisotumab vedotin. *Gynecol. Oncol.* 165 (2), 385–392. https://doi.org/10.1016/j.ygyno.2022.02.010.

Li, W., Guo, H., Li, L., Zhang, Y., Cui, J., 2021. The promising role of antibody drug conjugate in cancer therapy: combining targeting ability with cytotoxicity effectively. *Cancer Med.* 10 (14), 4677–4696. https://doi.org/10.1002/cam4.4052.

Markham, A., 2021. Tisotumab vedotin: first approval. *Drugs* 81 (18), 2141–2147. https://doi.org/10.1007/s40265-021-01633-8.

Parikh, A.A., Hanna, J., Shah, A.P., 2024. Acute keratoconjunctivitis associated with tisotumab vedotin-tftv for metastatic cervical cancer. *Am. J. Ophthalmol. Case Rep.* 33, 101979. https://doi.org/10.1016/j.ajoc.2023.101979.

Seagan and Genmab. TIVDAK required eye care. Published online 2024. https://www.tivdak.com/caring-for-your-eyes/.

Shlager, G., Nakhla, M.N., Pritchett, D., Brocks, D., 2023. Case report: Concomitant use of nightly vitamin A ointment with daily PROSE wear for ocular surface disease associated with chronic Stevens-Johnson syndrome. *Am. J. Ophthalmol. Case Rep.* 32, 101943. https://doi.org/10.1016/j.ajoc.2023.101943.

TIVDAK ADMINISTRATION AND DOSE MODIFICATION. https://www.tivdakhcp.com/dosing/.

Zhao, H., Atkinson, J., Gulesserian, S., et al., 2018. Modulation of macropinocytosis-mediated internalization decreases ocular toxicity of antibody–drug conjugates. *Cancer Res.* 78 (8), 2115–2126. https://doi.org/10.1158/0008-5472.CAN-17-3202.