Brazilian Guidelines for Ocular Graft-versus-Host Disease After Hematopoietic Stem Cell Transplantation: Recommendations from the Brazilian Society of Bone Marrow Transplantation

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ABSTRACT

Chronic graft-*versus*-host disease (GVHD) is the most significant long-term complication of allogeneic hematopoietic stem cell transplantation (HSCT), with ocular involvement, predominantly dry eye disease (DED), affecting 40–60% of patients and causing substantial morbidity. This consensus document, developed by the Ophthalmology Group of the Brazilian Society of Bone Marrow Transplantation, provides evidence-based recommendations for the diagnosis and management of ocular GVHD, graded according to GRADE methodology. Ocular GVHD results from donor-derived T-lymphocyte-mediated injury to the lacrimal gland, meibomian glands, and conjunctiva, producing a mixed aqueous-deficient and evaporative dry eye phenotype. Baseline ophthalmologic evaluation before HSCT is recommended to stratify risk and guide follow-up. Diagnosis integrates the 2015 National Institutes of Health (NIH) Consensus criteria for systemic chronic GVHD, the organ-specific scoring system proposed by the International Chronic Ocular GVHD Consensus Group (ICOGCG), and the Tear Film & Ocular Surface Society Dry Eye Workshop III framework for tear film homeostasis, combining symptom questionnaires (6-question version of the ocular surface disease index), Schirmer testing, tear break-up time, ocular surface staining, and osmolarity. Comparative and multicenter validation studies indicate that ICOGCG criteria outperform isolated NIH-based ocular assessment in diagnostic accuracy. Management follows a stepwise approach, beginning with preservative-free lubrication and progressing to topical anti-inflammatory agents, autologous serum, and meibomian gland dysfunction therapies. Systemic immunosuppression and surgical interventions, including scleral lenses, amniotic membrane transplantation, and tarsorrhaphy, are reserved for moderate to severe or refractory disease, requiring coordination with the hematology team. This guideline emphasizes a multidimensional, evidence-graded approach to ocular GVHD, integrating validated diagnostic tools with individualized, severity-based treatment strategies to preserve ocular surface integrity and quality of life in HSCT survivors.

Keywords: Graft vs host disease; Dry eye syndromes; Hematopoietic stem cell transplantation; Meibomian gland dysfunction.

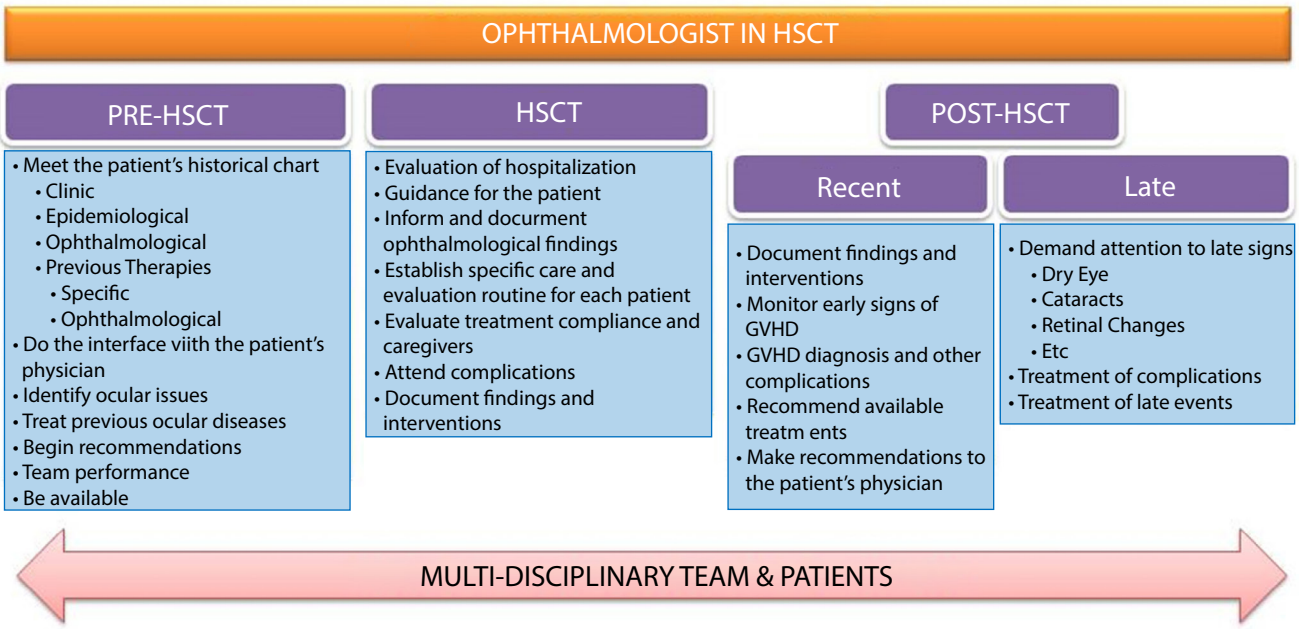
INTRODUCTION

Chronic graft-*versus*-host disease (GVHD) remains the most significant long-term complication of allogeneic hematopoietic stem cell transplantation (HSCT), constituting a major cause of late morbidity and reduced quality of life among survivors[1]. Preventive strategies, early diagnosis, and prompt initiation of therapy are essential to mitigate systemic and ocular complications[2]. The present consensus recommendations for the diagnosis and management of GVHD were developed according to evidence-based principles, with grading based on strength of recommendation and quality of evidence[3].

Ocular involvement is one of the most frequent manifestations of chronic GVHD, typically emerging within the first six months after HSCT. Dry eye disease (DED) represents the predominant clinical presentation, with variable severity and involvement of the tear film and ocular surface structures[4]. According to the updated definition proposed by the Tear Film & Ocular Surface Society DEWS III report (DEWS III), DED is a multifactorial disorder characterized by loss of tear film homeostasis accompanied by symptoms, in which tear film instability, hyperosmolarity, inflammation, and neurosensory abnormalities interact in a self-perpetuating cycle[5].

In ocular GVHD, DED results from donor-derived T-lymphocyte–mediated immune injury directed against recipient tissues, leading to inflammation, fibrosis, and dysfunction of the lacrimal gland, meibomian glands, and conjunctiva. This process produces a mixed dry eye phenotype, combining aqueous deficiency and evaporative mechanisms[6]. Although similarities exist with Sjögren's syndrome, GVHD is characterized by more pronounced fibrosis and predominant ductal involvement, with evidence suggesting a contributory role of donor-derived fibroblasts in ocular surface remodeling[7,8].

Clinical manifestations range from dryness, fluctuating vision, foreign body sensation, hyperemia, and photophobia to severe complications, including meibomian gland dysfunction, pseudomembranous conjunctivitis, punctate or filamentary keratitis, cataract secondary to corticosteroid therapy, corneal thinning, perforation, and secondary infection[9]. Baseline ophthalmologic evaluation prior to HSCT is recommended to identify pre-existing ocular surface disease, stratify risk, and guide longitudinal follow-up (Fig. 1).



Source: Elaborated by the authors.

Figure 1. Ophthalmological follow-up in hematopoietic stem cell transplantation (HSCT).

INCIDENCE AND RISK FACTORS FOR OCULAR GRAFT-*VERSUS*-HOST DISEASE

GVHD develops in approximately 25–70% of patients undergoing HSCT, with variability attributed to evolving transplant practices, including the increasing use of unrelated donors, older recipients, peripheral blood stem cells, and differing conditioning and prophylactic regimens, as well as the lack of sensitive and specific screening biomarkers[7,10].

Ocular involvement in chronic GVHD affects 40–60% of transplant recipients and constitutes a significant source of morbidity. Identified risk factors include non-Caucasian recipient status, donor seropositivity for Epstein–Barr virus, and diabetes mellitus[4]. Increased risk is also associated with greater systemic GVHD severity,

multisystem involvement, prior acute GVHD, use of peripheral stem cells, specific conditioning strategies, and pre-existing ocular surface abnormalities, particularly prior signs or symptoms of DED[11–14]. Table 1 presents the main risk factors associated to GVHD.

Table 1. Risk factors for ocular graft-*versus*-host disease (GVHD).

Related to recipient	Related to procedure
Age: older recipients	Use of antithymocyte globulin
Non-caucasian	Use of total body irradiation
Carriers of diabetes mellitus type 2	Donors with incompatibilities
Previous ocurrence of acute GVHD	Donors with positive serology for Epstein-Barr virus
Chronic GVHD GII to IV	Use of peripheral stem cells
More than two organs involved by GVHD	Unrelated donors
Previous dry eye disease	Female donor for male donor

Source: Elaborated by the authors.

DIAGNOSTIC CRITERIA FOR OCULAR GRAFT-*VERSUS*-HOST DISEASE

The diagnosis of DED associated to ocular GVHD is primarily clinical and requires structured symptom quantification, preferably using validated questionnaires such as the 6-question version of the ocular surface disease index (OSDI-6). Objective evaluation includes assessment of tear volume (Schirmer test, meniscometry), tear film stability (tear break-up time and meibomian gland evaluation), tear osmolarity when available, conjunctival hyperemia, and ocular surface integrity with vital dyes (fluorescein and lissamine green). A complete ophthalmologic examination, including visual acuity, intraocular pressure, slit-lamp biomicroscopy, and funduscopy, should be performed before and after allogeneic HSCT. Some diagnostic criteria have been developed and applied such as the National Institutes of Health (NIH) Consensus[15] and the International Chronic Ocular GVHD Consensus Group (ICOGCG)[16].

The 2005 NIH Consensus established standardized criteria for the diagnosis of chronic GVHD and rating of disease severity through a scoring system, considering its impact on daily life activities[17]. In 2015, NIH update clarified diagnostic controversies related to the minimum criteria for the diagnosis of chronic GVHD (Table 2) and to refine the definition of the subcategories of chronic GVHD and the score of the specific gravity of the organ (Table 3)[15].

Table 2. Signs and symptons of chronic graft-versus-host disease (GVHD) according to the National Institutes of Health criteria (2015).

Organ or local	Diagnosis (enough to establish the diagnosis for chronic GVHD)	Distinct (seen in chronic GVHD, but insufficient individually for the diagnosis of chronic GVHD)	Other characteristics or non-classified entities	Common (present in both acute and chronic GVHD)
Eyes		Dry, sand feeling, or pain; Conjunctival scarring; Keratoconjunctivitis sicca; Confluent areas of punctate keratopathy.	Photophobia; Periorbital hyperpigmentation; Blepharitis (erythema of the eyelids with edema).	

Source: Jagasia et al.[15].

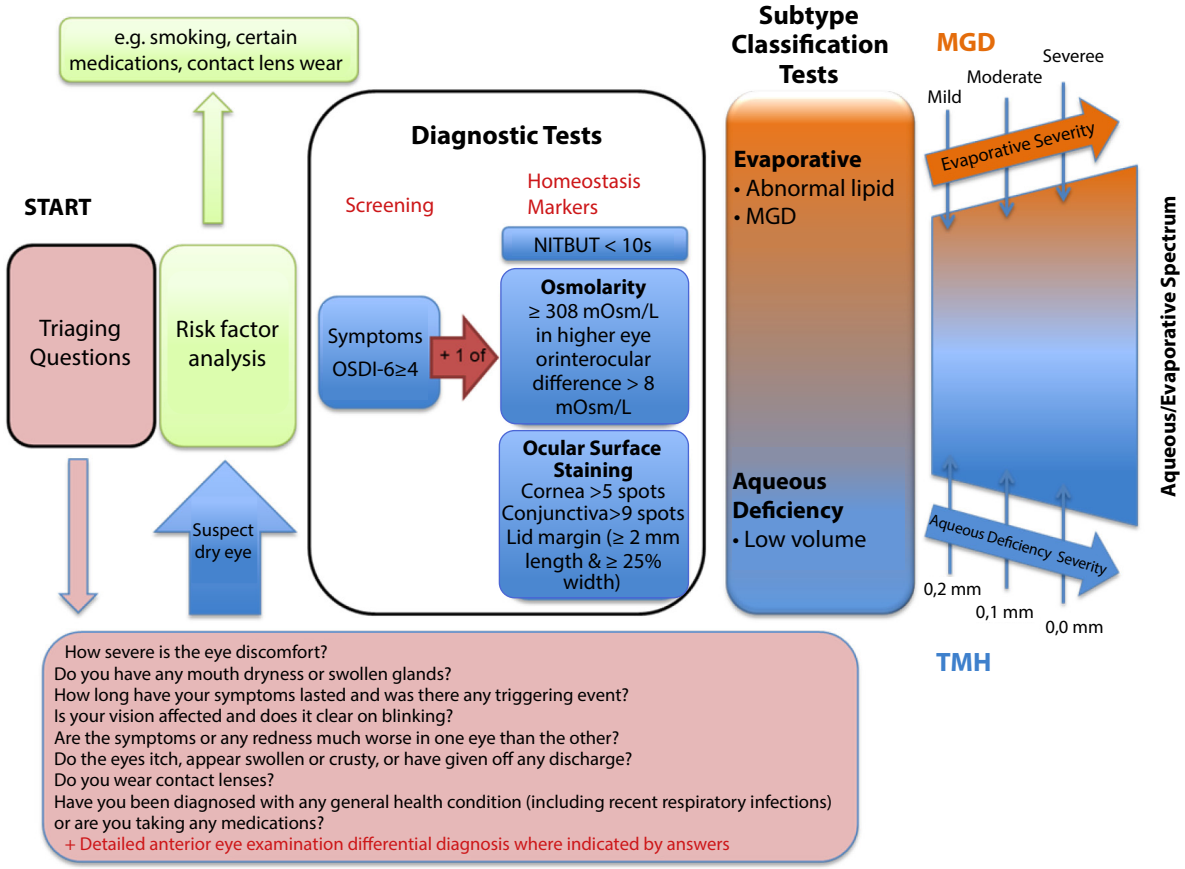
Table 3. Score of organs with chronic graft-*versus*-host disease (GVHD) according to the National Institutes of Health criteria (2015).

Eyes	Score 0	Score 1	Score 2	Score 3
Keratoconjunctivitis sicca, confirmed by the ophthalmologist: • Yes; • No; • Not examined	No symptoms	Mild symptom of dry eye does not affect basic daily activities (it requires lubricant eye drops < three times a day)	Moderate symptom of dry eye partially affects the daily activities (it requires lubricant eye drops > three times a day or tear duct ligature), without worsening visual acuity	Severe symptoms of dry eye that significantly affect daily activities or unable to work due to ocular symptoms or vision loss due to keroconjunctivitis sicca

Source: Elaborated by the authors.

Ocular symptoms of dry eye, foreign body sensation or recent onset pain; and the findings of conjunctival scarring; keratoconjunctivitis sicca; and confluent areas of punctate keratitis are defined as manifestations of chronic GVHD by the NIH report, whereas photophobia, periorbital hyperpigmentation, and blepharitis are classified as unclassified manifestations[17,18]. However, isolated ocular findings are not sufficient for the diagnosis of chronic GVHD without systemic involvement, potentially limiting sensitivity in patients with predominantly ocular disease[15].

According to DEWS III, dry eye diagnosis requires report of symptoms plus at least one objective marker of tear film homeostasis loss. Evaluation begins with symptom questionnaires (OSDI-6) and confirmation through tear film instability, ocular surface staining, and osmolarity when available (Fig. 2)[19]. Mimic conditions such as allergy or toxicity should be excluded, and disproportionate symptoms without signs may suggest neurosensory dysfunction. Phenotypic subclassification into evaporative, aqueous-deficient, or mixed DED is based on meibomian gland function, lipid layer status, and tear volume[19].



OSDI-6: 6-question version of the ocular surface disease index; NITBUT: non-invasive tear break-up time; TMH: tear meniscus height.
Source: adapted from TFOS DEWS II[4].

Figure 2. Survey flowchart of dry eye adapted from Tear Film & Ocular Surface Society DEWS III report.

To improve the definition, grading, and staging of ocular GVHD, the ICOGCG proposed specific diagnostic criteria that may allow ocular GVHD to serve as an independent diagnostic indicator of chronic GVHD[16]. The criteria include:

- OSDI questionnaire;
- Schirmer I test (without anesthesia);
- corneal fluorescein staining;
- conjunctival injection.

Table 4 shows that the score of the ocular criteria and the sum of the points obtained must be checked as to the presence or absence of systemic GVHD, as shown in Table 5.

Table 4. Chronic ocular chronic graft-*versus*-host disease (GVHD) severity scale: International Chronic Ocular GVHD Consensus Group (ICOGCG).

Severity	Schirmer I test	Corneal fluorescein staining	OSDI	Conjunctival hyperemia
0	15 >	0	< 13	None
1	11–15	< 2	13–22	Mild/moderate
2	6–10	2–3	23–32	Severe
3	£ 5	£ 4	> 33	

OSDI: ocular surface disease index. Source: adapted from International Chronic Ocular GVHD Consensus Group[10].

Table 5. Diagnostic criteria of chronic ocular graft-*versus*-host disease (GVHD): International Chronic Ocular GVHD Consensus Group (ICOGCG)*.

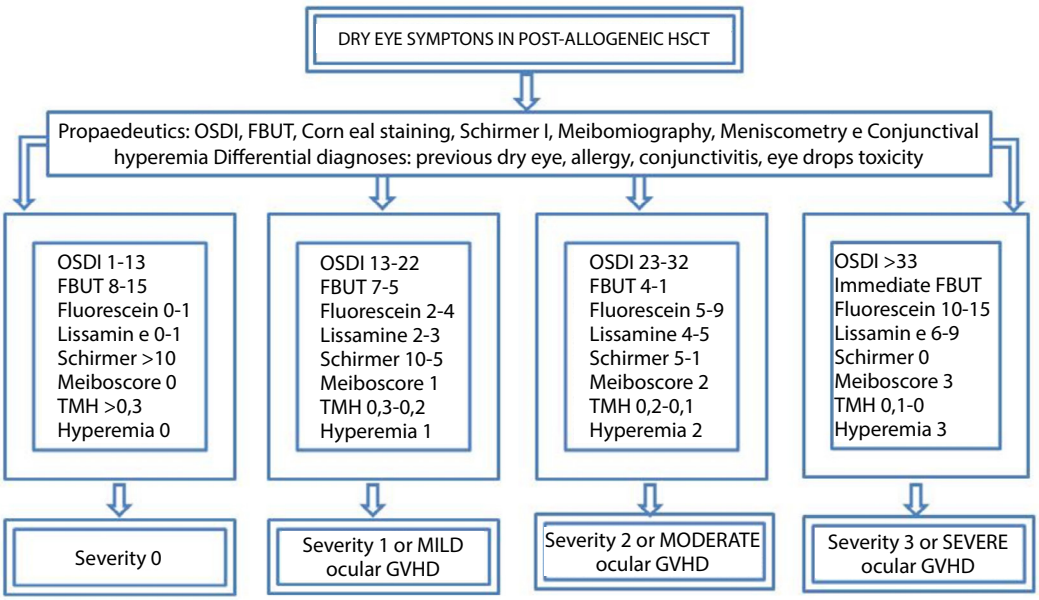
	Negative	Probable GVHD	Definitive GVHD
Systemic GVHD (-)	0–5	6–7	≥ 8
Systemic GVHD (+)	0–3	4–5	≥ 6

*Diagnosis of chronic ocular GVHD: total score (Schirmer test + corneal fluorescein staining + ocular surface disease index + conjunctival hyperemia): negative = 0–4; mild/moderate = 5–8; severe = 9–11, and presence or not of systemic GVHD. Source: adapted from International Chronic Ocular GVHD Consensus Group[10].

Comparative studies suggest that the stricter ICOGCG criteria better differentiate ocular GVHD than the 2005 NIH criteria[20]. A recent multicenter prospective validation study confirmed the diagnostic performance and reproducibility of the ICOGCG criteria, demonstrating improved sensitivity and specificity compared with NIH-based ocular assessment alone[21].

Finally, contemporary evidence supports a multidimensional diagnostic approach that integrates DEWS III based assessment of tear film homeostasis with validated organ-specific scoring systems, such as the ICOGCG criteria, interpreted within the broader criteria of systemic chronic GVHD.

Figure 3 shows diagnostic criteria and severity scores for the investigation of ocular GVHD.



OSDI: ocular surface disease index; FBUT: fluorescein break-up time; TMH: tear meniscus height. Source: Elaborated by the authors.

Figure 3. Severity scores of ocular graft-*versus*-host disease (GVHD).

TREATMENT

The treatment of ocular GVHD is challenging due to its heterogeneous presentations and potential complications[22]. The main goals are symptom relief, control of inflammation, and prevention of permanent tissue damage, with regular ophthalmologic follow-up[13]. Although topical therapy is often sufficient, systemic immunosuppression may be necessary in moderate to severe cases[23,24].

Lubrication with preservative-free artificial tears, gels, and ointments is first-line therapy. Autologous serum or platelet-derived products are recommended in moderate to severe epithelial disease due to their epitheliotrophic and anti-inflammatory properties[11,13,25].

Inflammation control is central. Short courses of topical corticosteroids may be used during flares, while long-term immunomodulation with cyclosporine (0.05–0.1%) or tacrolimus (0.02–0.03%) helps reduce T-cell–mediated inflammation and steroid dependence. Acetylcysteine (5–10%) may provide mucolytic benefit, though evidence is limited[24–26]. Management of meibomian gland dysfunction, including lid hygiene, warm compresses, oral tetracyclines/doxycycline (three–six weeks), and intense pulsed light when indicated, follows evaporative DED strategies therapy[24,27,28]. Oral omega-3 supplementation has not shown consistent benefit in randomized trials[29].

In severe or refractory cases, scleral lenses, amniotic membrane transplantation, or surgical procedures such as tarsorrhaphy may be required[30,31]. Coordination with the hematology team is essential when systemic immunosuppression is indicated.

Tables 6–8 summarize assessment and treatment recommendations, strength of recommendation, and levels of evidence, and Fig. 4 presents a treatment flowchart for ocular GVHD.

Table 6. Recommendations for graft-*versus*-host disease (GVHD) as to ophthalmologic manifestation and recommendation score.

Recommendations for assessment and treatment of ocular GVHD	Levels of recommendation and evidence
Ophthalmologic assessment	
Before transplantation	a-3
From three to six months after transplantation	a-2
In the diagnosis of chronic GVHD in any organ of the body	a-3
First-line systemic treatment for ocular GVHD	
Corticosteroids	a-1
Second-line systemic treatment ou subsequent treatment for ocular GVHD	
Extracorporeal photophoresis	c-2
Rituximab	c-2
Sirolimus	c-2
Mycophenolate mofetil	c-2
Topic treatment	
Preservative-free artificial tears	a-2
Artificial tears/viscous ointment	a-2
Cyclosporine eye drops	b-1
Tacrolimus eye drops	b-1

Continue...

Continuation.

Plugs for lacrimal punctum occlusion	b-2
Corticosteroids eye drops	b-2
Heated compresses and eyelid hygiene	b-2
Scleral lenses	b-2
Occluding glasses	b-2
Antibiotics eye drops/ointment	b-3
Autologous serum eye drops	c-2
Platelet-derived eye drops	c-2
Partial tarsorrhaphy	c-2
Superficial epithelial debridement	c-3
Amniotic membrane transplantation	c-3
Limbo-keratoplasty stem cell transplantation	c-3
Other treatmentss	
Low-dose oral tetracyicline/doxycycline;	b-2
Oral omega-3 supplement	c-1

Source: Elaborated by the authors.

Table 7. Assessment of the level of recommendation for treatment modalities.

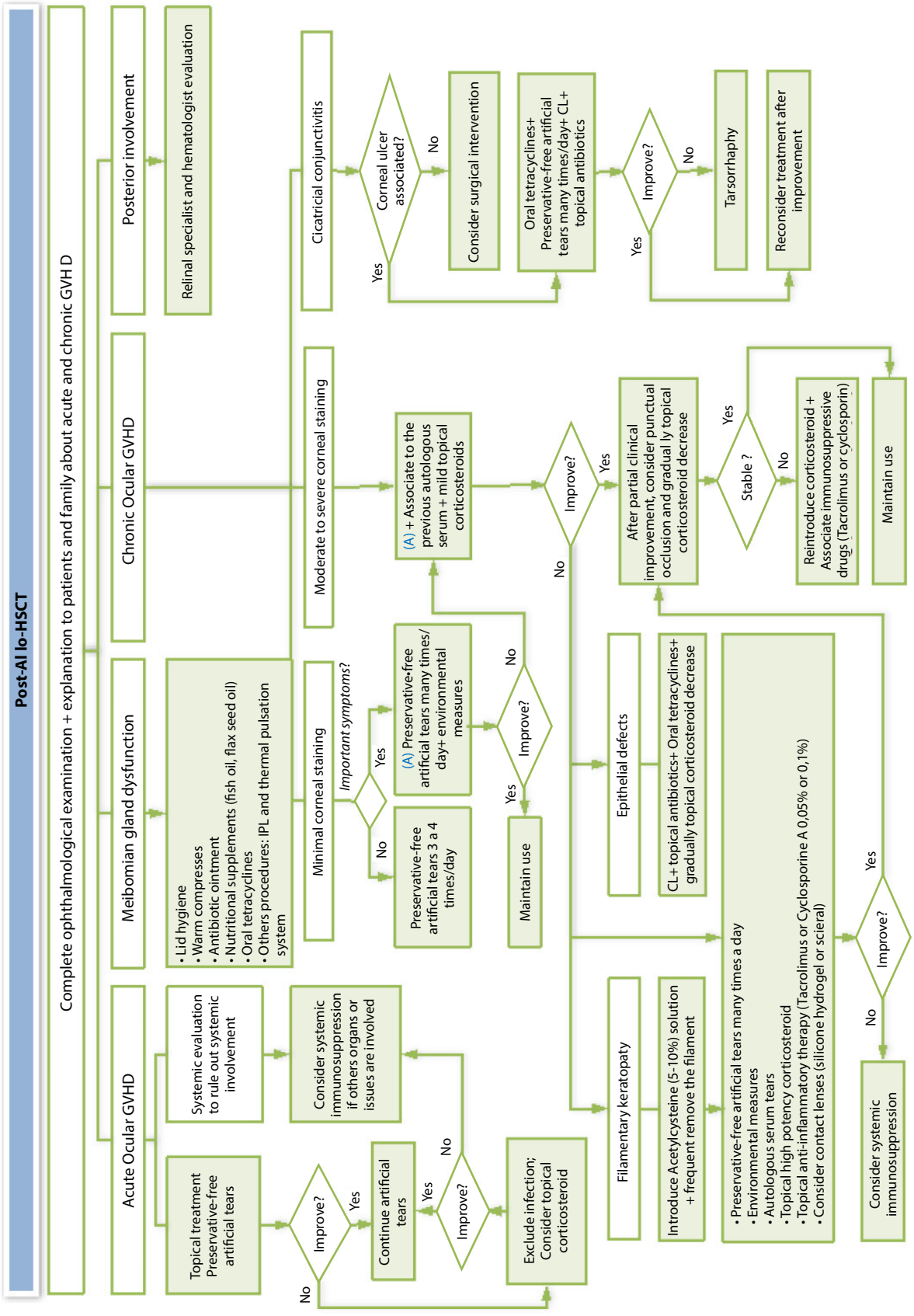
Strength of recommendation	
Strength of level of recommendation	**Definition of the level of recommendation**
A	It should always be offered
B	It should always be offered
C	The evidence of effectiveness is not enough to support or to be against; or the evidence may not compensate the adverse consequences or the cost of approach. Optional.
D	Moderate evidence that proves the lack of effectiveness or adverse results support a recommendation against the use. It shouldn't usually be offered.

Source: Elaborated by the authors.

Table 8. Assessment of scientific evidence level.

Quality of evidence for the recommendation	
Quality of evidence	**Definition of level of evidence**
I	Evidence of ≥ one controlled and appropriately randomized trial
II	Evidence of ≥ one well-designed clinical trial without randomization, from cohort or case-controlled analytical studies or from various time series or results from uncontrolled experiments
III	Evidence from opinions of respected authorities based on clinical experience, descriptive studies or expert committee report
III-1	Various reports of retrospective evaluations or small uncontrolled clinical trials
III-2	Only one small uncontrolled clinical trial, or retrospective evaluations
III-3	Only case reports available

Source: Elaborated by the authors.



HSCT: hematopoietic stem cell transplantation; GVHD: graft-*versus*-host disease. Source: Elaborated by the authors.

Figure 4. Ocular treatment flowchart.

CONCLUSION

Ocular GVHD is a frequent and potentially sight-threatening manifestation of chronic GVHD, requiring systematic screening and a structured, multidisciplinary approach involving ophthalmology and hematology teams. Integration of validated diagnostic tools, the NIH consensus criteria, the ICOGCG organ-specific scoring system, and the TFOS DEWS framework for tear film homeostasis improves early recognition and severity staging, allowing more accurate differentiation of ocular GVHD from other dry eye phenotypes. Treatment should follow a stepwise, severity-based algorithm, progressing from preservative-free lubrication and topical anti-inflammatory therapy to systemic immunosuppression and surgical intervention in refractory cases. Baseline pre-transplant ophthalmologic evaluation and longitudinal follow-up remain essential to preserving ocular surface integrity and quality of life in HSCT survivors. Further multicenter studies are warranted to validate standardized diagnostic thresholds and to strengthen the evidence base supporting individualized therapeutic decisions in this population.

CONFLICT OF INTEREST

Nothing to declare.

DATA AVAILABILITY STATEMENT

The data will be available upon request

AUTHORS' CONTRIBUTIONS

Substantive scientific and intellectual contributions to the study: Alves M and Trindade M; **Conception and design:** Alves M; **Acquisition of data:** Alves M and Trindade M; **Analysis and interpretation of data:** Alves M and Trindade M; **Technical procedures:** Alves M and Trindade M; **Manuscript preparation:** Alves M and Trindade M; **Manuscript writing:** Alves M and Trindade M; **Critical revision:** Alves M; **Final approval:** Alves M.

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DECLARATION OF USE OF ARTIFICIAL INTELLIGENCE TOOLS

The authors used Claude (Anthropic) to assist in refining the text language based on the content and references provided by the authors. The tool was not used to generate original scientific content, data, clinical recommendations, or literature findings.

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REFERENCES

1. Higman MA, Vogelsang GB. Chronic graft versus host disease. Br J Haematol. 2004;125(4):435-54. https://doi.org/10.1111/j.1365-2141.2004.04945.x

2. Guyatt GH, Oxman AD, Vist GE, Kunz R, Falck-Ytter Y, Alonso-Coello P, Schünemann HJ; GRADE Working Group. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. BMJ. 2008;336(7650):924-6. https://doi.org/10.1136/bmj.39489.470347.ad

3. Nassiri N, Eslani M, Panahi N, Mehravaran S, Ziaei A, Djalilian AR. Ocular graft versus host disease following allogeneic stem cell transplantation: a review of current knowledge and recommendations. J Ophthalmic Vis Res. 2013;8(4):351-8.

4. Perez VL, Chen W, Craig JP, Dogru M, Jones L, Stapleton F, Wolffsohn JS, Sullivan DA. TFOS DEWS III: executive summary. Am J Ophthalmol. 2026;282:135-45. https://doi.org/10.1016/j.ajo.2025.09.035

5. Shikari H, Amparo F, Saboo US, Dana R. Onset of ocular graft-versus-host disease symptoms after allogeneic hematopoietic stem cell transplantation. Cornea. 2015;34(3):243-7. https://doi.org/10.1097/ICO.0000000000000340

6. Lee SJ, Vogelsang G, Flowers ME. Chronic graft-versus-host disease. Biol Blood Marrow Transplant. 2003;9(4):215-33. https://doi.org/10.1053/bbmt.2003.50026

7. Ogawa Y, Okamoto S, Wakui M, Watanabe R, Yamada M, Yoshino M, Ono M, Yang HY, Mashima Y, Oguchi Y, Ikeda Y, Tsubota K. Dry eye after haematopoietic stem cell transplantation. Br J Ophthalmol. 1999;83(10):1125-30. https://doi.org/10.1136/bjo.83.10.1125

8. Lee SJ, Flowers ME. Recognizing and managing chronic graft-versus-host disease. Hematology Am Soc Hematol Educ Program. 2008;(1):134-41. https://doi.org/10.1182/asheducation-2008.1.134

9. Munir SZ, Aylward J. A review of ocular graft-versus-host disease. Optom Vis Sci. 2017;94(5):545-55. https://doi.org/10.1097/OPX.0000000000001071

10. Inamoto Y, Valdés-Sanz N, Ogawa Y, Alves M, Berchicci L, Galvin J, Greinix H, Hale GA, Horn B, Kelly D, Liu H, Rowley S, Schoemans H, Shah A, Lupo Stanghellini MT, Agrawal V, Ahmed I, Ali A, Bhatt N, Byrne M, Chhabra S, DeFilipp Z, Fahnehjelm K, Farhadfar N, Horn E, Lee C, Nathan S, Penack O, Prasad P, Rotz S, Rovó A, Yared J, Pavletic S, Basak GW, Battiwalla M, Duarte R, Savani BN, Flowers MED, Shaw BE, Petriček I. Ocular graft-versus-host disease after hematopoietic cell transplantation: expert review from the Late Effects and Quality of Life Working Committee of the Center for International Blood and Marrow Transplant Research and Transplant Complications Working Party of the European Society of Blood and Marrow Transplantation. Biol Blood Marrow Transplant. 2019;25(2):e46-e54. https://doi.org/10.1016/j.bbmt.2018.11.021

11. Giannaccare G, Pellegrini M, Bernabei F, Scorcia V, Campos E. Ocular surface system alterations in ocular graft-versus-host disease: all the pieces of the complex puzzle. Graefes Arch Clin Exp Ophthalmol. 2019;257(7):1341-51. https://doi.org/10.1007/s00417-019-04301-6

12. Jagasia MH, Greinix HT, Arora M, Williams KM, Wolff D, Cowen EW, Palmer J, Weisdorf D, Treister NS, Cheng GS, Kerr H, Stratton P, Duarte RF, McDonald GB, Inamoto Y, Vigorito A, Arai S, Datiles MB, Jacobsohn D, Heller T, Kitko CL, Mitchell SA, Martin PJ, Shulman H, Wu RS, Cutler CS, Vogelsang GB, Lee SJ, Pavletic SZ, Flowers ME. National Institutes of Health Consensus Development Project on criteria for clinical trials in chronic graft-versus-host disease: I. The 2014 Diagnosis and Staging Working Group report. Biol Blood Marrow Transplant. 2015;21(3):389-401.e1. https://doi.org/10.1016/j.bbmt.2014.12.001

13. Ogawa Y, Kim SK, Dana R, Clayton J, Jain S, Rosenblatt MI, Perez VL, Shikari H, Riemens A, Tsubota K. International Chronic Ocular Graft-vs-Host-Disease (GVHD) Consensus Group: proposed diagnostic criteria for chronic GVHD (Part I). Sci Rep. 2013;3:3419. https://doi.org/10.1038/srep03419

14. Shulman HM, Cardona DM, Greenson JK, Hingorani S, Horn T, Huber E, Kreft A, Longerich T, Morton T, Myerson D, Prieto VG, Rosenberg A, Treister N, Washington K, Ziemer M, Pavletic SZ, Lee SJ, Flowers ME, Schultz KR, Jagasia M, Martin PJ, Vogelsang GB, Kleiner DE. NIH Consensus development project on criteria for clinical trials in chronic graft-versus-host disease: II. The 2014 Pathology Working Group Report. Biol Blood Marrow Transplant. 2015;21(4):589-603. https://doi.org/10.1016/j.bbmt.2014.12.031

15. Arai S, Jagasia M, Storer B, Chai X, Pidala J, Cutler C, Arora M, Weisdorf DJ, Flowers ME, Martin PJ, Palmer J, Jacobsohn D, Pavletic SZ, Vogelsang GB, Lee SJ. Global and organ-specific chronic graft-versus-host disease severity according to the 2005 NIH Consensus Criteria. Blood. 2011;118(15):4242-9. https://doi.org/10.1182/blood-2011-03-344390

16. Wolffsohn JS, Benítez-Del-Castillo JM, Loya-Garcia D, Inomata T, Iyer G, Liang L, Pult H, Sabater AL, Starr CE, Vehof J, Wang MTM, Chen W, Craig JP, Dogru M, Perez VL, Stapleton F, Sullivan DA, Jones L; + TFOS collaborator group. TFOS DEWS III: Diagnostic Methodology. Am J Ophthalmol. 2025;279:387-450. https://doi.org/10.1016/j.ajo.2025.05.033

17. Giannaccare G, Versura P, Bonifazi F, Sessa M, Campos EC. Comparison among different diagnostic criteria for chronic ocular graft-versus-host disease applied with and without pre-transplant ophthalmological examination. Eye. 2019;33(1):154-60. https://doi.org/10.1038/s41433-018-0210-4

18. Ogawa Y, Dana R, Kim S, Jain S, Rosenblatt MI, Perez VL, Clayton JA, Alves M, Rocha EM, Amparo F, Seo KY, Wang Y, Shen J, Oh JY, Vanathi M, Nair S, Na KS, Riemens A, Sippel K, Soifer M, Wang S, Trindade M, Kim MK, Yoon CH, Yagi R, Hiratsuka R, Ogawa M, Shimizu E, Sato Y, Pflugfelder S, Tsubota K. Multicenter prospective validation study for international chronic ocular graft-versus-host disease consensus diagnostic criteria. Ocul Surf. 2022;26:200-8. https://doi.org/10.1016/j.jtos.2022.09.002

19. Flowers ME, Martin PJ. How we treat chronic graft-versus-host disease. Blood. 2015;125(4):606-15. https://doi.org/10.1182/blood-2014-08-551994

20. Wolff D, Gerbitz A, Ayuk F, Kiani A, Hildebrandt GC, Vogelsang GB, Elad S, Lawitschka A, Socie G, Pavletic SZ, Holler E, Greinix H. Consensus conference on clinical practice in chronic graft-versus-host disease (GVHD): first-line and topical treatment of chronic GVHD. Biol Blood Marrow Transplant. 2010;16(12):1611-28. https://doi.org/10.1016/j.bbmt.2010.06.015

21. Dietrich-Ntoukas T, Cursiefen C, Westekemper H, Eberwein P, Reinhard T, Bertz H, Nepp J, Lawitschka A, Heiligenhaus A, Seitz B, Messmer EM, Meyer-ter-Vehn T, Basara N, Greinix H, Datiles MB, Lee SJ, Pavletic SZ, Wolff D. Diagnosis and treatment of ocular chronic graft-versus-host disease: report from the German-Austrian-Swiss Consensus Conference on Clinical Practice in chronic GVHD. Cornea. 2012;31(3):299-310. https://doi.org/10.1097/ico.0b013e318226bf97

22. Ames P, Galor A. Cyclosporine ophthalmic emulsions for the treatment of dry eye: a review of the clinical evidence. Clin Investig. 2015;5(3):267-85. https://doi.org/10.4155/cli.14.135

23. Abud TB, Amparo F, Saboo US, Di Zazzo A, Dohlman TH, Ciolino JB, Hamrah P, Dana R. A Clinical trial comparing the safety and efficacy of topical tacrolimus versus methylprednisolone in ocular graft-versus-host disease. Ophthalmology. 2016;123(7):1449-57. https://doi.org/10.1016/j.ophtha.2016.02.044

24. Jones L, Craig JP, Markoulli M, Karpecki P, Akpek EK, Basu S, Bitton E, Chen W, Dhaliwal DK, Dogru M, Gomes JAP, Koehler M, Mehta JS, Perez VL, Stapleton F, Sullivan DA, Tauber J, Tong L, Travé-Huarte S, Wolffsohn JS; TFOS Collaborator Group. TFOS DEWS III: management and therapy. Am J Ophthalmol. 2025;279:289-386. https://doi.org/10.1016/j.ajo.2025.05.039

25. O'Byrne C, O'Keeffe M. Omega-3 fatty acids in the management of dry eye disease-An updated systematic review and meta-analysis. Acta Ophthalmol. 2023;101(2):e118-e134. https://doi.org/10.1111/aos.15255

26. Cosar CB, Cohen EJ, Rapuano CJ, Maus M, Penne RP, Flanagan JC, Laibson PR. Tarsorrhaphy: clinical experience from a cornea practice. Cornea. 2001;20(8):787-91. https://doi.org/10.1097/00003226-200111000-00002

27. Tseng SC. Amniotic membrane transplantation for ocular surface reconstruction. Biosci Rep. 2001;21(4):481-9. https://doi.org/10.1023/a:1017995810755