

CONGRESS REPORT: WORLD GLAUCOMA CONGRESS 2025 – HONOLULU, HAWAII

Joanna K. DEREŃ-SZUMELDA

Department of Ophthalmology, Military Institute of Aviation Medicine (WIML), Warsaw, Poland

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Author's address: Joanna K. Dereń-Szumelda, Military Institute of Aviation Medicine, 54/56 Krasynskiego St., 01-755 Warsaw, Poland, e-mail: jderen@wiml.waw.pl

Abstract: The World Glaucoma Congress (WGC) 2025 gathered global experts to discuss advances in glaucoma prevention, diagnostics, surgery, and pharmacotherapy. This report provides a comprehensive thematic summary of the main sessions, innovations, and training opportunities relevant to clinical practice. This report is structured into prevention and pharmacological therapy, basic glaucoma surgery, MIGS and innovative surgical devices, wetlabs and practical training, new research and notable studies, and the Presidential Symposium and international collaboration. WGC 2025 reinforced the need to combine technological innovation with mastery of foundational clinical skills. Hands-on wetlabs enriched surgical competencies, while scientific discussions provided insights that will directly inform future projects at the Military Institute of Aviation Medicine.

Keywords: Glaucoma prevention; Pharmacotherapy; MIGS; Surgical training; Artificial intelligence; International collaboration

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REPORT

The World Glaucoma Congress (WGC) 2025 took place on June 25–28 in Honolulu, Hawaii (Fig. 1), attracting more than 3,000 delegates. It remains the largest global meeting devoted exclusively to glaucoma. Beyond lectures and posters, the event

included wetlabs, film festivals, industry symposia, and social gatherings that fostered collegial exchange. For the Department of Ophthalmology at the Military Institute of Aviation Medicine (WIML), participation provided an opportunity not only to present original data (Fig. 1), but also to benchmark clinical practice against international standards.



Fig. 1. (left) Hawaii Convention Center, venue of the World Glaucoma Congress 2025. (right) Joanna Katarzyna Dereń-Szumelda, MD, PhD, presenting a scientific poster on selective laser trabeculoplasty outcomes, prepared at the Department of Ophthalmology, Military Institute of Aviation Medicine (WIML), Warsaw, Poland.

Prevention and Pharmacological Therapy

Lifestyle modification was presented as an underutilized yet powerful adjunct in glaucoma care. Epidemiologic data from Asian and European cohorts suggest that regular aerobic activity reduces the risk of glaucoma onset, while Mediterranean diet patterns may slow disease progression. Experts highlighted the role of nocturnal hypotension, which can compromise optic nerve perfusion. Attention was also given to sleep disorders, including sleep apnea, with evidence that continuous positive airway pressure (CPAP) may modify glaucoma risk. Pharmacological advances included selective EP2 receptor agonists that enhance uveoscleral outflow and ROCK inhibitors that remodel trabecular meshwork architecture. Combination therapies targeting multiple outflow pathways were introduced as strategies for patients with progressive disease. Despite innovation, poor adherence remains the dominant challenge. Psychological barriers, cost

of therapy, and regimen complexity contribute significantly. Studies indicate that almost 50% of patients discontinue drops within one year. Practical solutions proposed included once-daily formulations, sustained-release inserts, and patient education workshops (see ZAP trial [1]; OHTS [2]).

Basic Glaucoma Surgery

Classic filtration surgery was re-examined in light of long-term data. Trabeculectomy remains the benchmark for intraocular pressure (IOP) lowering, with five- and ten-year follow-up studies confirming durable efficacy. However, complication profiles such as hypotony, bleb leaks, and infection continue to challenge outcomes. Surgeons debated optimal flap dimensions, antimetabolite dosing, and suture techniques. Drainage devices, including Ahmed and Baerveldt implants, were compared. While they provide predictable IOP reduction in refractory glaucoma, issues of diplopia and corneal decompensation were highlighted. A recurring

theme was subconjunctival fibrosis, identified as the Achilles heel of all filtration procedures. New antifibrotic molecules and biodegradable scaffolds are in development. Special focus was given to pseudoexfoliation glaucoma, where inflammatory mediators complicate healing and demand a more aggressive approach (see TVT study [3]; CIGTS [4]).

MIGS and Innovative Surgical Devices

Minimally invasive glaucoma surgery (MIGS) generated intense debate. Proponents emphasized safety, rapid recovery, and compatibility with cataract surgery. Critics argued that MIGS rarely achieves the target pressures required in advanced glaucoma. Comparative studies between Xen Gel Stent and Preserflo MicroShunt were presented. Xen, inserted via an ab interno approach, minimizes tissue disruption but may occlude more frequently. Preserflo, placed ab externo, achieves lower pressures but requires conjunctival dissection. The KDB GLIDE® was demonstrated for excisional goniotomy, while the VIA360™ and STREAMLINE® systems illustrated canal-based approaches. Long-term registry data suggest that sustained outcomes are achievable if fibrosis is carefully managed. Imaging-guided procedures using OCT and angiography are likely to become standard (see bleb outcomes grading [5]).

Wetlabs and Practical Training

Practical courses were a highlight of WGC 2025. Delegates trained on porcine eyes, performing trabeculectomy step by step. Focus was placed on flap construction, scleral dissection, antimetabolite application, and closure techniques. Experienced faculty supervised every step, emphasizing meticulous tissue handling (Fig. 2).

In addition, the Tanito hook procedure was demonstrated by Prof. Victor Cvintal (Fig. 3). This modification involves controlled deroofing of Schlemm's canal through a small corneal incision, reducing healing variability. scleralts adaptability makes it suitable for surgeons transitioning from MIGS to more traditional filtration procedures. Thanks to this structured training, the technique can now be implemented by the author in her clinical practice using the Tanito hook.

The collaborative nature of wetlabs was equally valuable: surgeons from multiple continents exchanged insights on instrument choice, postoperative care, and complication management (Fig. 4). For WIML, this direct exposure to new methods will facilitate rapid clinical translation.



Fig. 2. Wetlab training during WGC 2025 – participation in practicing surgical techniques on model eyes under the guidance of international instructors.



Fig. 3. Practical wetlab on MIGS techniques with international instructors. The Tanito hook procedure was demonstrated by Prof. Victor Cvintal to Dr Joanna Katarzyna Dereń-Szumelda.

New Research and Notable Studies

Poster sessions reflected the vibrant landscape of glaucoma research (Fig. 5). Deep learning models for OCT interpretation were presented, showing sensitivity comparable to that of experienced clinicians. Real-world data on selective laser trabeculoplasty (SLT) confirmed its utility as a first-line option across age groups.



Fig. 4. Group photo with wetlab participants and faculty.

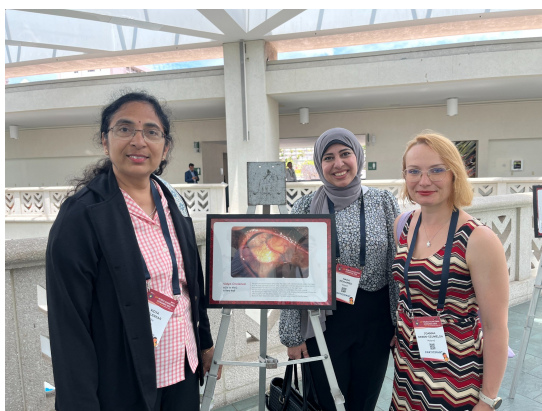


Fig. 5. Discussion with colleagues during poster and film festival exhibit.

Cost-effectiveness analyses underscored its potential to reduce health system expenditures. The author's own poster on SLT across age categories provided important evidence for the Polish population, where demographic differences may influence disease management (Fig. 6).

Major Randomized Controlled Trials (RCTs) were discussed extensively: the LiGHT trial demonstrated the superiority of SLT over medications in terms of cost and quality of life [6]; the ZAP trial confirmed that prophylactic iridotomy has limited utility in angle-closure [1]; the EAGLE study validated early lens extraction for angle-closure glaucoma [7]; the OHTS highlighted the role of early pharmacotherapy [2]; and the TVT trial compared outcomes of tubes versus

trabeculectomy [3]. Each trial has shifted clinical practice and serves as a cornerstone in guideline development.

Presidential Symposium and International Collaboration

The Presidential Symposium provided a sweeping overview of global glaucoma research. Analysis of bibliometric trends showed a surge in contributions from Asia, while North America and Europe continue to lead in multicenter trials. Neurodegenerative parallels, including similarities with Alzheimer's and Parkinson's disease, were highlighted, fueling exploration of neuroprotective strategies. The theory of 'double pressure' was debated, considering the combined effects of IOP and cerebrospinal fluid pressure.

Beyond science, the event celebrated community. Local ophthalmologists performed a traditional Hawaiian hula dance, which became a symbol of cultural exchange and collegiality. National society sessions (Belgian, Argentinian) enriched the dialogue by presenting unique regional challenges. Networking receptions and collaborative meetings laid the foundation for joint research projects that will influence glaucoma care for years to come.

During the Presidential Session of WGC 2025, ophthalmologists who had a significant impact on the advancement of glaucoma science and novel research were honored.



Fig. 6. Poster: Efficacy of Selective Laser Trabeculoplasty in Ocular Hypertension and Open Angle Glaucoma Across Different Age Groups.

CONCLUSIONS

WGC 2025 demonstrated the synergy between innovation and clinical fundamentals. AI applications, novel drugs, and advanced surgical devices are transforming glaucoma care, but emphasis on individualized treatment and mastery of core principles remains unchanged.

Participation in wetlabs provided practical

benefits directly applicable to WIML, while presenting original research increased institutional visibility.

The congress also reinforced the need for lifestyle-oriented patient education, holistic care, and global cooperation. For the author and her Institution, insights gained in Honolulu will guide both day-to-day clinical practice and future investigative work.

AUTHORS' DECLARATION

Joanna K. Dereń-Szumelda. The author declares that there is no conflict of interest.

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