THE POWER OF REGISTRY DATA

Acquiring some insights ... and many more questions.

BY ARSHAM SHEYBANI, MD

Part of participating in the era of interventional glaucoma involves approaching the disease in a data-driven way. Large data sets can be extremely valuable to clinicians, but their proper use hinges on our understanding and interpretation. Although with registry data the search for answers often yields more questions, we can glean substantial insights from this information and better locate the gaps in our analyses and application of the data.

Prior to its inaugural meeting, the Interventional Glaucoma Congress (IGC) partnered with Verana Health to conduct a glaucoma-specific analysis of data from the AAO's Intelligent Research in Sight (IRIS) Registry. This article details findings from that analysis and poses questions about the potential role of registry data in glaucoma going forward.

GLAUCOMA AND THE IRIS REGISTRY

As of September 2019, the IRIS Registry contained 253 million de-identified patient encounters; 61 million unique de-identified patients; 15,284 eligible ophthalmologists and clinicians; 55 electronic health record systems; and 6-year longitudinal data. A total of 9,207 physicians contributing to the IRIS Registry were focused on glaucoma or the anterior segment, with 10% of participants specializing in glaucoma. The registry included 3.68 million primary open-angle glaucoma patients and 328,725 MIGS procedures, captured between 2013 and 2019.

IGC AND VERANA ANALYSIS

The purpose of the IGC and Verana Health analysis of the IRIS Registry data was to determine the incidence of subsequent glaucoma procedural intervention in patients who underwent combined cataract surgery with MIGS versus cataract surgery only.

Inclusion criteria were (1) any type of glaucoma diagnosis, including ocular hypertension and glaucoma suspect, on or 6 months prior to an initial glaucoma procedure and (2) at least one combined cataract and MIGS procedure or cataract surgery only. Patients without demographic information and laterality were excluded from the analysis. For a list of the codes included in the analysis, see *ICD and CPT Codes Used*.

The key outcomes, evaluated using logistic regression, were subsequent glaucoma procedural interventions at 1-year, 2-year, 3-year, and 4-year follow-up. For this analysis, subsequent glaucoma procedures included tube shunt surgery, trabeculectomy, and even bleb revisions, as detailed in Table 1.

FINDINGS AND LIMITATIONS

We found that individuals with a MIGS procedure at index had a higher percentage of subsequent procedures than individuals with a cataract procedure at index (3.2% vs 2.8%; $P = .0001$ at 1-year follow-up; Table 2).

ICD AND CPT CODES USED

Glaucoma Diagnosis of Interest

- ICD-9: 365.X
- ICD-10: H40.X

Index Procedures of Interest

- Cataract Surgery
  - Extracapsular With IOL: 66984
  - Complex With IOL: 66982
- Combined Cataract Surgery and MIGS
  - iStent/Hydrus (Initial): 0191T
  - Each Additional iStent: +0376T
  - iStent inject: 0191T + 0376T
  - iStent Supra: 0253T
  - Goniotomy/Kahook Dual Blade/GATT: 65820
  - Visco360/Canaloplasty: 66174, 66175

There may be several explanations for this, as the analysis did not evaluate disease severity or control for IOP. We also found that individuals who underwent MIGS had a longer time interval between the index and subsequent procedure (70 days vs 15 days at 1-year follow-up; Table 3). This suggests that we may be delaying surgery down the line.

It is important to note that there were several limitations of this analysis. Because the IRIS Registry reflects real-world data from electronic health records, no attempt was made to verify the accuracy or validity of the clinical coding at the point of care. Endpoints were also routinely collected, and no

TABLE 1. SUBSEQUENT GLAUCOMA PROCEDURAL INTERVENTION GROUPS

Glaucoma Procedures	Glaucoma Procedures (Continued)	Laser Procedures	Cataract Surgery
Primary trabeluectomy (66170)	iStent/Hydrus - initial (0191T) Each additional iStent (+0376T)	Argon laser trabeculoplasty, Selective laser trabeculoplasty (65855)	Extracapsular cataract extraction with IOL (66984)
Complex trabeculectomy (66172)	Endoscopic cyclophotocoagulation (66711)	Laser peripheral iridotomy (66761)	Complex cataract surgery with IOL (66982)
Express Shunt (0192T/66183)	Goniotomy/Kahook Dual Blade/Gonioscopy-assisted transluminal trabeculotomy (65820)		
Ahmed, Baerveldt, Molteno Aqueous shunt (66180, 66179)	Xen Gel Stent (0449T) Each additional Xen (+0450T)		
Bleb revision (66250)	Diode cyclophotocoagulation (66711)		
Visco360/Canaloplasty (66174, 66175)			

TABLE 2. SUBSEQUENT SURGICAL INTERVENTIONS BY YEAR

	MIGS AT INDEX PROCEDURE			CATARACT AT INDEX PROCEDURE		
	Subsequent Procedure	Total	%	Subsequent Procedure	Total	%
1-Year Cohort	1,900	58,878	3.2%	17,612	646,467	2.8%
2-Year Cohort	1,991	37,883	5.3%	17,549	470,382	3.7%
3-Year Cohort	1,484	20,167	7.4%	14,246	310,148	4.6%
4-Year Cohort	886	8,598	10.3%	9,311	166,347	5.6%

TABLE 3. MEDIAN TIME TO SUBSEQUENT SURGICAL PROCEDURE

	MIGS PROCEDURE AT INDEX	CATARACT PROCEDURE AT INDEX
	Median Days (IQR)	Median Days (IQR)
1-Year Cohort	70.0 (208.0)	15.0 (111.0)
2-Year Cohort	249.0 (449.0)	50.0 (326.0)
3-Year Cohort	409.5 (634.75)	156.0 (577.0)
4-Year Cohort	529.0 (800.0)	258.0 (764.0)

further validations were performed for the purpose of this study. Additionally, no differentiation between revision and subsequent procedures was made. Last, the cohort was not matched, and analyses were not adjusted.

Further, this analysis highlights the difference between statistical significance and clinical significance. Compared with patients in the cataract-only group, patients in the combined cataract-MIGS group had a higher IOP that was statistically significant; however, that does not necessarily make a difference clinically. The cataract-MIGS group started with a higher IOP than the cataract-only group, and there were several patient-specific differences (eg, race and sex) between the groups. Mean IOP was available only for ≤50% of patients in the cataract-MIGS group and ≤40% of patients in the cataract-only group.

CONCLUSION

Data analyses do not always represent a complete view of patient care and can be skewed, making it difficult to determine what is clinically meaningful and relevant to our patient populations. As we collectively move toward a more proactive approach to glaucoma management, it will become increasingly important for us to make sense of the available data, to identify the gaps in our understanding, and to explore the additional questions that inevitably arise from analyses such as this. ■

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VERANA HEALTH

Verana Health was created with the goal of deriving deeper insights from the largest clinical databases in medicine in order to advance and accelerate research and to give physicians access to crucial information that can be used to improve patient care.

As the data curation and analytics partner of the AAO's Intelligent Research in Sight (IRIS) Registry, Verana Health aims to help physicians who contribute to the IRIS Registry get more from their own data. For example, Verana Practice Insights allows physicians to compare their own practice patterns for a disease, procedure, or therapy against anonymized aggregate data from other ophthalmologists. This data includes information such as the number of patients seen per day, types of imaging used, and patient outcomes. Currently available for cataract surgery, Verana Practice Insights will be available for other categories, including glaucoma, in the future.

Another physician offering is Verana Trial Connect, which is designed to simplify the way physicians identify potential clinical trial patients within their practices. As part of this program, Verana Health is facilitating no-cost genetic testing and counseling for patients with certain inherited retinal diseases. This has the potential to accelerate trial enrollment and open up new options to patients for whom limited or no treatments exist.