Incidence of Ocular Adverse Events Associated With Mometasone Implants Among Patients With Nasal Polyposis

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Background

- Mometasone furoate-eluting implants, Propel and Sinuva are approved for use in patients immediately following endoscopic ethmoid sinus surgery (EESS) or frontal sinus surgery, and for the treatment of nasal polyps in adults 18 years and older who have had EESS.
- Long term use of systemic steroids has been linked to the development of cataracts and increased intraocular pressure.
- It remains unknown whether mometasone sinus implants carry similar risk, given the route of administration (endoscopically), location of implant placements (sinus), and continuous drug delivery.

Objective

To examine the use of mometasone sinus implants in real-world data, and to obtain the incidence rates of diminished visual acuity, glaucoma, or cataracts among patients who received these implants.

To compare the incidence proportions from our study to national crude prevalence rates of examination-based glaucoma and cataract surgery from the National Health and Nutrition Examination Survey (NHANES) database.

Methods

Data

- In this retrospective cohort study we identified mometasone stent users from January 1, 2016 to September 30, 2019 using data from 16 commercial, Medicaid, and Medicare health plans contributing to the FDA Sentinel System.

Study Population

- We required patients to be at least 18 years old on the day of implant insertion (index date) and have a diagnosis of nasal polyps in the 183 days prior (baseline period), and at least six months of continuous medical and drug coverage.
- We excluded patients with diminished visual acuity, glaucoma, or cataracts diagnosis during the baseline period, as well as patients who received treatment for glaucoma and those with evidence of eye laser surgery, trabeculoplasty or cataract surgery.

Exposure Assessment

- We identified incident mometasone sinus implant cohorts (Propel and Sinuva) who met the above criteria and no prior sinus implant use in the baseline period. For the Sinuva cohort we included those with prior Propel and no prior Sinuva implant use. Only the first qualifying implant was included.

Outcome Assessment

- Follow-up began on the index date for a maximum of one year or earliest of the following events: outcome, loss of medical or drug coverage, study end date or death.
- We assessed the following 3 outcomes during follow-up among Propel and Sinuva cohorts: glaucoma, cataracts, and diminished visual acuity.

Data Analyses

- We used the Sentinel Common Data Model Cohort Identification and Descriptive Analysis (CIDA) tool, version 8.0.3.
- We calculated incidence rates for the 3 study outcomes among incident Propel and Sinuva implant cohort as the ratio of the number of events to total person-time accrued.

Results

- We identified 3,340 and 118 incident users of Propel and Sinuva implants, respectively. The Sinuva users were younger (mean: 47.4 years) than Propel users (55.9 years). Both cohorts had higher proportion of males than females (Table 1.)
- Most patients had a dispensing of oral steroids in the six months prior to Propel (74.0%) and Sinuva (79.7%) implant insertion.
- The incidence of glaucoma, cataracts and diminished visual acuity was 42.1, 141.2 and 20.1 per 1,000 person-years for Propel users. For Sinuva users, the incidence of glaucoma and diminished visual acuity was 46.2 and 15.7 per 1,000 person-years respectively. Risk increased with age and males had a higher incidence of ocular events than females.

Cataracts

- The highest incidence rates were observed for cataracts among incident users of Propel implants (141.2 per 1,000 person-years). No cataract events were observed during follow-up of the Sinuva cohort.
- Incidence of cataracts increased with age from 4.7 (25-40 years) to 308.5 per 1,000 person-years for those 65 years and older among Propel users. Males had a higher incidence of cataracts compared to females (Table 2.) Compared to national prevalence rates, Propel users had higher incidence of cataracts (Table 3).

Glaucoma

- The incidence rates of glaucoma were 46.2 and 42.1 per 1,000 person-years for the Sinuva and Propel cohorts, respectively.
- The incidence of glaucoma also increased with age; males also had higher incidence of glaucoma compared to females (Table 2). Compared to national prevalence rates, Propel users also had higher incidence of glaucoma (Table 3).

Diminished Visual Acuity

- The incidence rates of diminished visual acuity were 20.1 and 15.7 per 1,000 person-years for Propel and Sinuva, respectively.

Table 1. Patient Demographics and Clinical Characteristics of Incident Propel and Sinuva Users From January 1, 2016 to September 30, 2019

Characteristic	Propel N=3,340	Sinuva N=118
Demographics	%/Mean±SD	%/Mean±SD
Mean Age	55.9±12.9	47.4±10.8
Age: 18-24 years	*****	*****
Age: 25-40 years	17.5	*****
Age: 41-64 years	*****	70.3
Age: 65+ years	38.3	*****
Gender (Female)	39.7	41.5
Gender (Male)	60.3	58.5
Recorded history of:		
Blepharitis	0.5	0.0
Cardiovascular Disease	49.0	28.0
Diabetes	15.2	*****
Raw diabetic retinopathy	0.9	0.0
Macular degeneration	1.1	0.0
Sinus Surgery	2.3	20.3
Oral Steroids	74.0	79.7
Intranasal Steroids	35.9	28.8

*****Data are not presented in these cells due to a small sample size or to assure a small cell cannot be recalculated through cells presented

Table 2. Incidence rates (per 1000 person-years) of Ocular Adverse Events Following Insertion of Mometasone-Containing Sinus Stents Within 1 Year of Follow-Up

	Diminished Visual Acuity		Glaucoma		Cataracts	
	Propel	Sinuva	Propel	Sinuva	Propel	Sinuva
Overall	20.1	15.7	42.1	46.2	141.2	-
Age Groups (Years)						
18-24	43.6	-	-	-	-	
25-40	13.7	63.7	11.7	-	4.7	-
41-64	15.7	-	32.3	72.8	68.4	-
65+	25.3	-	69.9	-	308.5	-
Gender						
Male	15	-	42.3	53.8	142.8	-
Female	27.9	38.5	41.7	36.1	138.7	-

Table 3. Incidence Proportion* of Ocular Events Following Insertion of Mometasone-Containing Implants and National Crude Prevalence

	Glaucoma or Exam-based Glaucoma			Cataracts or Cataract Surgery		
	Propel	Sinuva	NHANES	Propel	Sinuva	NHANES
Overall	3.1	*****	2.1	10.0	-	6.3
Age Groups						
18-24	*****	-	-	*****	-	-
25-40	*****	-	-	*****	-	-
41-64†	2.4	*****	0.9	5.0	-	2.6
65+‡	5.2	-	4.8	20.7	-	23.8
Gender						
Male	3.1	*****	2.4	10.1	-	5.4
Female	3.1	*****	1.9	9.8	-	8.5

*Incidence proportion was calculated as the number of incident events divided the number of patients at risk.
*****Data are not presented in these cells due to a small sample size or to assure a small cell cannot be recalculated through cells presented
¶ National Crude Prevalence Rates were obtained from the National Health and Nutrition Examination Survey (NHANES) – Vision and Eye Health Surveillance
†NHANES reported crude prevalence rate was 40-64 years
‡NHANES reported crude prevalence rate was 65-79 years

Conclusions

- To our knowledge, this is the first study to analyze a large, demographically and geographically diverse database of U.S. healthcare claims to evaluate the risk of adverse ocular events associated with sinus mometasone-eluting implants.
- We present the incidence of glaucoma, diminished visual acuity and cataracts with mometasone stent implants. Incidence of these ocular events increased with age and occurred more frequently among males.
- We observed higher incidence of glaucoma and cataract compared to national prevalence rates.
- Both intranasal and oral steroids carry an independent risk of these ocular events, thus it is unclear whether the observed risk following mometasone implant insertion is due to the implant, prior corticosteroid exposure or both. Given the concomitant use of oral steroids in this population, teasing out the contribution of the implant will be difficult..
- As noted in the prescribing labels, close monitoring for vision changes and intraocular ocular pressure should continue for patients who receive mometasone stents.
- Additional studies are needed to isolate these exposures the risk of these adverse events.

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