

## ABO SELF-DIRECTED IMPROVEMENT IN MEDICAL PRACTICE ACTIVITY (CLINICAL)

### Topic

<b>Title of Project:</b>	Reduction in Incidence of Post-Intravitreal Injection Corneal Abrasion
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### Project Description

Describe the quality gap or issued addressed by this activity. (Included in your response to this question should be a description of the resources that informed your decision to pursue this topic, a description of what the literature says about the issue you identified, and the rationale for choosing to address this clinical project	In September of 2017, a new Ophthalmic Technician was added to the Medical Retina Clinic staff after departure of the clinic Registered Nurse several weeks prior. During the next two months, roughly one patient per week presented with a corneal abrasion (1 case of corneal abrasion per 50 injections each week, for estimated incidence of 2%). This was assumed to be related to specific patients with smaller palpebral fissures and strong eyelid closure, but others presented without these preconceived risk factors. The staff and the provider (author) began identifying trends and proposed ideas to reduce these events.
<b>Background Information:</b> The month you pulled the baseline IRIS performance report and any additional information that me be pertinent:	The clinic opened its doors in October 2015 with this author as the sole provider. Over the first two years of the clinic's existence, roughly 4000 intravitreal injections were performed with no cases of documented endophthalmitis and only rare cases of corneal abrasions. The estimated risk of corneal abrasion in two large studies of intravitreal injections is roughly 0.15% (1 in 750). <sup>1-2</sup> After a cluster of distinct patients returning same day or next day for eye pain diagnosed with corneal abrasions in the injected eye, the group proposed that it should identify root causes in order to reduce the frequency of these events.
<b>Project Setting:</b> (Please select from options below): <ul style="list-style-type: none"> <li>• Group Practice</li> <li>• Healthcare Network</li> <li>• Hospital</li> <li>• Multi-Specialty Group</li> <li>• Solo Practice</li> <li>• Surgical Center</li> <li>• Other</li> </ul>	Multi-Specialty Group
<b>Study population:</b> (describe the type of patient for whom the care process will be improved, e.g., all patients in your practice, patients with diabetes, patients presenting for emergency care:	The goal of this project is two-fold: 1) Summarize features regarding patients who developed corneal after intravitreal injections during the period of September 2017 through November 2017 (3-month period) at the clinic and 2) Review cases of post-intravitreal injection corneal abrasions in the same clinic population from December 2017 through February 2018 (3-month period). This data will be reviewed to determine if the interventions reduced the frequency of post intravitreal injection corneal abrasions in this population.

## Quality Indicators / Performance

### Measures:

It is important to carefully define outcome or performance measures that will be quantified at baseline (before the care process is changed) and at re-measurement (after you have implemented the proposed improvement) to quantify the impact of your care process change. There are two basic types of performance measures - process of care measures and outcomes of care measures.

- Process of care measures (e.g. timely treatment of diabetic retinopathy) can influence outcome measure (e.g. decreased risk of severe vision loss);
- Outcome measures can be linked to processes of care that can be improved. Generally, performance measures are expressed as rates, often as percentage rates. For example, if the intent of a project is to improve the quality of glaucoma care in your practice, you may choose to improve your rate of establishing a goal IOP in patients with newly diagnosed glaucoma, measured over a 3-month period.
- The numerator of this process measure would be the number of newly diagnosed patients during this time who have a goal IOP recorded in the medical record.
- The denominator would be the total number of patients diagnosed during that same time period.

Continuous variables (e.g. the refracted spherical equivalent after cataract surgery) can often be simplified and transformed then into percentage rates by setting a quality threshold (within 0.5 diopters in the intended spherical equivalent) which, if attained, would qualify the patient to be in the numerator (e.g. number of patients within 0.5 diopters / total number of patients). It can be advantageous but not mandatory to have more than one quality measure in order to gauge the impact of your process change. In the example above, an additional outcome measure might be the percentage of patients in whom the goal IOP is attained within the first 6 months after diagnosis. If possible, measure quality indicators for at least 30 individual patients or data points during the baseline and again during the follow up period.

### Example Measure:

- **Measure Type:** Outcome
- **Measure Name:** Frequency of corneal Abrasions after intravitreal injections
- **Numerator Statement:** Number of patients in who pain levels decreased by 2 points on a 1-10 scale
- **Denominator Statement:** Number of patients with post-intravitreal injection corneal abrasions after implementation of improved measures

We realize that this may not be feasible or appropriate for all projects. Please indicate at least one measure below; either a process or outcome measure:

**Example Measure:**

- . **Measure Type:** Process Measure
- . **Measure Name:** Patient pain level during intravitreal injection
- . **Numerator Statement:** Number of patients in who pain levels decreased by 2 points on a 1-10 scale
- . **Denominator Statement:** 30 consecutive patients undergoing intravitreal injection.

<p><b>Project Interventions:</b></p> <p>Quality improvement requires that you analyze your care delivery processes and identify changes, which if implemented, will improve care and outcomes. Generally, educational interventions are thought to be weak and demonstrate little impact. The introduction of tools, strategies or systematic approaches to care delivery is more powerful. A tool is a thing, for example a preoperative checklist, or written standardized process or protocol. Strategies include changes in procedures or policies like the introduction of a surgical time out before surgery is initiated. Systematic approaches to care delivery involve a comprehensive analysis of care process and the introduction of a combination of tools and strategies designed as a complete process. Please describe the changes to your care processes you intend to introduce:</p>	<p>It is the desire of this author that the frequency of corneal abrasions after intravitreal injections can be reduced with specific interventions in this clinic population. If specific risk reduction strategies can be gleaned from this review, the hope then would be that these may be utilized by other clinics which may experience higher than expected numbers of corneal abrasions after intravitreal injections.</p>
<p><b>Project Team:</b> (include roles for yourself and all members of your team):</p> <p>List the individuals who will be involved in your quality improvement project (i.e., solo project, partners in practice, office staff, OR personnel, anesthesiologists) and the roles they will contribute.</p>	<p>Author (diplomate) Medical Retina Clinic Staff (three Ophthalmic Technicians)</p>
<p>Will any other ophthalmologists be requesting MOC credit for participation in this SD-PIM?</p>	<p>No</p>

## Project Outcomes/Results

<p><b>Project Summary</b></p>	<p>In the following sections, please prepare a brief summary of the project highlighting the data collected, effectiveness of your measurement approach, interventions, and the overall impact of the project.</p>
<p><b>Baseline Data:</b> Quantify each of the quality indicators / performance measures described above for the baseline period (before interventions for improvement were introduced). Report the numerator, denominator and the calculated percentage rate for each measure.</p>	<p>From October 2015 through August 2017, roughly 4000 intravitreal injections were performed. During this period, the clinic performed roughly 50 injections per week and estimated 1 abrasion in every 500-700 injections, (0.14-0.2%). This is similar to the estimated risk of corneal abrasion in two large studies of intravitreal injections reported at roughly 0.15% (1 in 750).1-2</p> <p>In September 2017, a new Ophthalmic Technician was added to the Medical Retina Clinic staff after departure of the clinic Registered Nurse. Simultaneously, an existing Ophthalmic Technician in the Medical Retina clinic was recruited to assist with intravitreal injections. During the next two months (September 2017- November 2017), roughly one patient per week presented with a corneal abrasion (1 case per 50 injections each week, for an estimated incidence of 2%). This tenfold change in occurrences of corneal abrasions was initially assumed to be related to patients with smaller palpebral fissures and strong eyelid closure, but other patients presented without these preconceived risk factors. The staff and the provider (author) began identifying trends, sharing these with each other, and then began implementing strategies with the goal of reducing these occurrences.</p>
<p><b>Follow-up Data:</b> Quantify each of the quality indicators / performance measures described above for the re-measurement period (the period following implementation of the interventions for improvement).</p>	<p>The following modifications reduced the incidence of corneal abrasions after intravitreal injections:</p> <ol style="list-style-type: none"> <li>1) Provider Modification: As most of the corneal abrasions occurred in the left eye and the provider (author) is right-handed and typically stands on the same side as the eye injected, more careful placement and removal of the speculum was utilized. This helped to reduce the number of corneal abrasions after intravitreal injections.</li> <li>2) Staff Modifications: With a new technician and another pre-existing staff member assisting with injections, the group identified that many patients had been receiving additional tetracaine anesthetic drops. While the additional anesthetic drops likely reduced discomfort, the group hypothesized that this also weakened the corneal epithelium and pre-disposed patients to corneal abrasions. The provider and staff decided on a set number of anesthetic drops (five) and then the use of sterile lidocaine gel for those patients who needed additional anesthesia. This helped to reduce the number of corneal abrasions.</li> <li>3) Equipment modifications: A few months prior to identification of increased corneal abrasions after intravitreal injections, a new eyelid speculum model was purchased. While similar in design, this eyelid speculum was found to be more rigid and less well tolerated by patients. After resuming use of the original eyelid speculum, the number of corneal abrasions were reduced.</li> </ol>

## Project Impact

<p>Compare the baseline data to the re-measurement / follow-up data and quantify the impact of the process of care changes (your project interventions). The project hopefully resulted in improvement; however, some projects may result in a diminution in quality. If a lack of improvement or reduction in quality occurred, suggest other strategies that might be more effective.</p>	<p>After making changes in the intravitreal injection procedure (provider/staff/equipment) from December 2017-February 2018, the incidence in corneal abrasions after intravitreal injections in the clinic was dramatically reduced from 1 in 50 (2%) to 1 in 200 (0.5%) but has not returned to the original low rate of 1 in 500 (0.2%). After discussion with the clinic staff, the following were identified as opportunities for continued practice improvement:</p> <ol style="list-style-type: none"> <li>1) Increased utilization of a previously infrequently used pediatric sized speculum for patients with smaller palpebral fissures or tight eyelid closure has benefited a number of patients. As the number of these specula is limited, the staff have made note of those who benefit best from these specula and use them routinely for these patients.</li> <li>2) The newer speculum which was believed to increase risk of corneal abrasions was found to be helpful in patients with very large palpebral fissures. This was an unexpected finding and benefited a group of patients in whom the primary eyelid speculum was too loosely fitting. It is now being utilized more often in this group of patients.</li> <li>3) There has been an increased request by patients for artificial tears after intravitreal injections. The staff has been teaching and then watching patients self-administer artificial tears prior to injections. This has improved patient comfort in the hours after injections, but also hopefully reducing risk of unintentional self-inflicted corneal abrasions.</li> </ol>
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## Project Reflection

<p>Did you feel the project was worthwhile, effective?</p>	<p>Yes</p>
<p>How might you have performed the project differently?</p>	<p>While the project came out of unexpected occurrences, the lessons learned were valuable and can be applied to other practices. If the project were to be performed again, consideration would be given to earlier implementation of the above-mentioned steps to reduce the number of corneal abrasions after intravitreal injections.</p>
<p>Please offer suggestions for other ophthalmologists undertaking a similar project.</p>	<p>Quality improvement projects are often born out of a desire to improve on excellent outcomes, but they may also arise from unforeseen or unexpected circumstances. If there is an opportunity to improve on patient safety as well as outcomes, these are some steps which might be considered:</p> <ol style="list-style-type: none"> <li>1) Clearly define the goal or issue (e.g. reduction in post phaco refractive surprises, improved patient satisfaction scores, shorter wait times in the clinic).</li> <li>2) Ask clinic or, OR staff to make anecdotal observations and compile a list which can be viewable in a shared non-patient care space</li> <li>3) Review the observations as a group and identify common themes</li> <li>4) Decide as a group which changes will be implemented on a trial basis and which staff members will record observations during a fixed period of time/set number of patients/cases.</li> <li>5) After trial period, review the outcomes to determine if the quality improvement has occurred (e.g. did additional calculation improve targeted refractive outcomes?)</li> </ol> <p><i>- If the goal was met, the implemented change can become part of the standard work flow and utilized routinely</i></p> <p><i>- If the goal was not met or the issue not resolved, consider reviewing the observations again as a group (step 3) and find an alternative means to achieve the goal.</i></p>