The history of intravitreal injections has evolved over several decades although more recently it has revolutionized what we can do for our patients with retinal disease.

Intravitreal Treatment for Intraocular Infections
   Endophthalmitis

Intravitreal Treatment for Infectious Retinopathy
   CMV Retinitis

NOW WHAT WE HAVE……
Within the past decade there has been an explosion in the field of retina allowing us better options for retinal disease treatment with intravitreal agents.

- Foscavir (foscarnet sodium)
- Macugen (pegaptanib)
- Triescence (triamcinolone acetonide)
- Avastin (bevacizumab)
- Lucentis (ranibizumab)
- Ozurdex (dexamethasone)
- Eylea (aflibercept)
- Jetrea (ocriplasmin)

There are many more drugs coming and some have yet to be given a name.

This will prove challenging on many levels.

Patient Education

<table>
<thead>
<tr>
<th>What can we treat?</th>
<th>What we cannot treat?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uveitis</td>
<td>ERM</td>
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<td>Diabetic Retinopathy (PDR)</td>
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<td>Stage 4 MH</td>
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<td>Retinal Vascular Disease (RVO)</td>
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<td>Cystoid Macular Edema</td>
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<td>Neovascular AMD</td>
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Intravitreal Injections: What We Must Know!

Patient Education
Just because we can treat it does not mean insurance covers this!

AND….. Unless the drug is APPROVED by the FDA for use in the eye it becomes the patients responsibility to cover the costs.

AND….. Even if APPROVED the patient is left with a balance and many retina patients have fixed incomes already.

Intravitreal Injections: What We Must Know!

Procedure
Early recommendations for sterile intravitreal injections:

Pre and Post op topical antibiotics
Betadine cleanse of adnexa area
Lid Speculum
Betadine cleanse of the conjunctiva
Sterile Drape
1 day post op appointment

Variable anesthesia used
topical gel, pledget, subconjunctival lido

Intravitreal Injections: What We Must Know!

Procedure
Current recommendations for sterile intravitreal injections:

Betadine cleanse of adnexa area
Lid Speculum
Betadine cleanse of the conjunctiva
Phone call in 24-48 hours as opposed to an office visit

Variable anesthesia used
topical gel, pledget, subconjunctival lido
Patient Expectations

Mode of anesthesia is variable among retina doctors

- Subconjuctival Lidocaine
- Lidocaine gel
- Pledget placed over injection site

Subconjunctival hemorrhage that may be striking – reassurance
Scratchy sensation for up to 24 hours – betadine irritation
Blurred vision – transient and likely from corneal irritation
Floaters – compound related but most often rare

Warning Symptoms

The risk of endophthalmitis is rare however…..

NOT IF IT IS IN YOUR CHAIR…

Symptoms of endophthalmitis:

- Pain
generally global pain as opposed to a surface irritation like complaint

- Sudden loss of vision
generally due to AC flare/fibrin and vitreous haze

Onset 3-7 days – compared to CE/IOL day 0-2
### Intravitreal Injections: What We Must Know!

#### Complications

<table>
<thead>
<tr>
<th>Condition</th>
<th>Risk</th>
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<tbody>
<tr>
<td>Endophthalmitis</td>
<td>less than 1%</td>
</tr>
<tr>
<td>Retinal Tear or Detachment</td>
<td>less than 3%</td>
</tr>
<tr>
<td>Vitreous Hemorrhage</td>
<td>rare</td>
</tr>
<tr>
<td>Hyphema</td>
<td>rare</td>
</tr>
<tr>
<td>Uveitis</td>
<td>highly variable</td>
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<td>Sterile versus infectious</td>
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#### Intravitreal Injections: What We Must Know!

#### Complications

Uveitis: Sterile vs. Infectious Endophthalmitis

**THIS IS NOT UP TO THE OPTOMETRIST TO DIFFERENTIATE.**

**REFER BACK TO RETINA 100% OF THE TIME!**

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#### Intravitreal Injections: What We Must Know!

#### Complications

Uveitis: Sterile vs. Infectious Endophthalmitis

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Intravitreal Injections: What We Must Know!

So what compounds are currently available

Macugen – gaining popularity with AMD (stroke patients)

Avastin – not FDA approved for use in the eye (colorectal CA)

Lucentis – approved for DME (0.3mg), WET AMD (0.5mg) and retinal edema following any RVO (0.5mg)

Intravitreal Injections: What We Must Know!

So what compounds are currently available

Ozurdex – approved for uveitis, retinal edema following any retinal vein occlusion (RVO) and DME in a pseudophakic patient or planned CE/IOL

Eylea – approved for WET AMD, retinal edema following a CRVO and Diabetic Macular Edema (DME)

Intravitreal Injections: What We Must Know!

So what compounds are currently available

Jetrea – approved for the treatment of symptomatic VMA

Triescence – approved if failure to topical treatment for CME
Intravitreal Injections: What We Must Know!

So how much do these medications cost?
Cost to the RETINA clinic!

Avastin  $26.00
Macugen  $995
Ozurdex  $1,295
Eylea    $1,850
Lucentis $1,950
JETREA  $3,950

Financial Limitations

As a result of the cost same day consultation and treatment is not always an option for your patient.

Inventory on hand
Pre-authorization
Drug assistance programs
Reimbursement delays

Social Systems

Social Systems are slow to catch up with rapid evolution of options
State to state variability of drug coverage
Billing infrastructure is slow to catch up – delayed reimbursement to providers
Medicare is slow to approve and also varies state to state
Intravitreal Injections: What We Must Know!

Optometrist Education

What can we treat?  What we cannot treat?

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Intravitreal Injections: What We Must Know!

Treatment NOT a CURE!

Patients need to be educated on realistic expectations of what intravitreal treatment is designed to do……. FOR THEM.

Many retinal diseases are CHRONIC and may need intravitreal treatment for several years if not intermittently for the rest of their life (AMD)

Diagnosis dependent

However, the benefits of intravitreal treatment have been responsible for SAVING VISION…….

Intravitreal Injections: What We Must Know!

Referral Patterns for Optometry

AMD:
- Any subretinal fluid / CME seen on SDOCT
- Any new visual symptoms or amsler grid changes

The sooner these patients are treated the better the outcome!

Most common treatment pattern amongst Retina Specialists

Induction Phase: 3 monthly injections

Treat and Extend / PRN protocol
Referral Patterns for Optometry

Treat and Extend Concept

New Diagnosis of Neovascular AMD = Induction Phase
then 4 week follow up – if “dry” – treat
then 6 week follow up – if “dry” – treat
then 8 week follow up – if “dry” – treat
then 10 week follow up – if “dry” – treat
then 12 week follow up – if “dry” – follow

This will aid in determining the frequency of injections for an individual patient and identify the risk interval.

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Intravitreal Injections: What We Must Know!

Referral Patterns for Optometry

PDR – Rubeosis Iridis, or High Risk Characteristics
NVD, NVE with hemorrhage or vitreous heme

Consider referral within 1 week unless gonioscopy reveals NVA then prompt referral is advised.

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Intravitreal Injections: What We Must Know!

Referral Patterns for Optometry

Diabetic Macular Edema (DME)
Macular Edema following a Retinal Vein Occlusion
Central Serous Retinopathy
Uveitis
Vitreomacular Adhesion - symptomatic

Less Urgent referral however may depend on status of the fellow eye or the severity of the RVO (ie: ischemic vs. non-ischemic)
Role of Optometry

This is going to be variable depending on the need and wants of the retina specialist.

There is no need for the Optometrist to see the patient 1 week after an injection as we once did. This merely doubles the patient encounters however I would discuss with your retina specialist and defer to his/her recommendations.

Intravitreal Injections: What We Must Know!

Role of Optometry

AMD patients:

Once the patient has been treated and released back to the Optometrist then I would see them every 3-4 months and follow with SDOCT imaging – new symptoms or SRF/CME then refer

DME patients:

Once the patient has responded to therapy and has not shown recurrence in DME for 90 days then see every 6 months.

PDR patients:

See every 3-6 months depending on control of BS and A1c value

RVO patients:

These patients may need treatment for several years and it is common for the retina practice to see until the retinal edema resolves and is stable for 6 months – then see annually
Role of Optometry

Uveitis patients:
Given treatment is with steroids monitor IOP monthly while being treated then annually or PRN with new symptoms

Central Serous patients:
Lifestyle changes and see annually or PRN with new symptoms

Intravitreal Injections: What We Must Know!

Thank You!