# Best Practice Guidelines for Intravitreal Injections

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## Introduction

Intravitreal injections are a common and essential procedure in modern ophthalmic practice. Ensuring optimal safety and efficacy requires adherence to best practices that minimize complications such as post-injection endophthalmitis (PIE). These guidelines summarize current expert consensus and research-based recommendations on procedure setting, antisepsis, equipment, and mask use.

## 1. Clinical Setting

Internationally, intravitreal injections are given in different settings: the operating room (OR), in-office or in a dedicated procedure room. Although operating rooms may have filtration and air flow systems, there is limited evidence that this significantly reduces the risk of endophthalmitis. Multiple studies indicate comparable endophthalmitis rates between different settings. Local regulations in Belgium allow intravitreal injection in an OR or dedicated procedure room. In-office injections are not allowed.

There is not enough clinical evidence regarding the use of filtration air flow. Although preclinical research shows a limitation of bacterial growth using these systems, research in cataract surgery shows no added benefits regarding infection risk.

**Recommendations: Intravitreal injections can be given in an OR or dedicated procedure room.**

## 2. Topical Antisepsis

Topical antisepsis is the cornerstone of intravitreal injection (IVI) asepsis. Its goal is to significantly reduce the ocular surface microbial load, thereby minimizing the risk of post-injection endophthalmitis (PIE). Two main antiseptic agents are considered in clinical practice: Povidone-Iodine (PI) and Chlorhexidine (CH).

### Povidone-Iodine (PI)

#### Spectrum and Mechanism of Action

Povidone-Iodine exhibits broad-spectrum microbicidal activity, eliminating all pathogenic vegetative bacteria, multidrug-resistant organisms, mycobacteria, fungi, and most viruses, although it does not inactivate spores. Its action is based on the release of free iodine, which reacts in an electrophilic reaction with microbial enzymes and cell membranes, leading to rapid, non-selective killing.

#### Kill Time and Application

- PI demonstrates a fast kill time.
- 30 seconds of contact time significantly reduces bacterial load compared to 15 seconds.

- Liberation of free iodine is concentration-dependent: while high concentrations maintain effective iodine reservoirs, lower concentrations require reapplication to sustain efficacy.
- A small case series confirmed repeated application is superior to a single instillation.

#### Concentration

- A 5% PI solution is standard and shows better efficacy than 1% in reducing post-irrigation cultures.

#### Safety

- No reports of anaphylaxis with ophthalmic PI use.
- PI entering the vitreous cavity during IVI does not harm the eye.
- Adverse reactions are typically local and irritative; there is no scientific basis for iodine allergy in this context.

### Chlorhexidine (CH)

#### Spectrum and Mechanism of Action

Chlorhexidine is a low-level disinfectant with a narrower antimicrobial spectrum compared to PI. It is effective against most vegetative bacteria, some fungi, and inactivates certain viruses. It shows limited activity against MRSA and does not kill mycobacteria. Its antimicrobial effect is based on disruption of microbial membrane proteins.

#### Efficacy and Use

- Though inferior in spectrum, CH has been shown in retrospective case series and a recent meta-analysis to have comparable endophthalmitis rates to PI.
- It is considered a safe alternative for patients who experience ocular surface irritation with PI.
- A 0.1% solution should be used

**Recommendations**

- **5% Povidone-Iodine applied for at least 30 seconds remains the gold standard for IVI preparation.**
- **Reapplication of PI after speculum introduction can enhance microbial kill.**
- **Chlorhexidine 0.1% may be used as a second-line agent for patients with PI intolerance, with careful attention to concentration.**

## 3. Gloves

The use of standard hand hygiene measurements (washing + disinfection) and surgical gloves is required for every surgical intervention according to the WHO guidelines.

Although no prospective randomized controlled trials have directly evaluated their role in intravitreal injection safety, the use of surgical gloves is consistent with modern infection control practices and is therefore recommended by the Euretina expert consensus.

**Recommendations: the use of standard hand hygiene and surgical gloves is required**

## 4. Draping

The use of sterile drapes is considered optional, since no clear evidence supports its use. No significant differences have been observed in bacterial growth with or without drapes.

However, since draping has secondary effects (clean surface, decreased risk of patient touching the eye,…) their use is recommended but not mandatory.

**Recommendations: the use of sterile drapes is recommended but not mandatory**

## 5. Lid Speculum

The goal of using a lid speculum is preventing involuntary eyelid closure and minimizing contamination risk of the needle by touching the lashes or skin. Evidence supports the use of a lid retractor since it lowers the endophthalmitis risk. Although expression of meibomian glands may occur when placing a lid speculum, research does not demonstrate this resulting in higher bacterial loads.

Alternatives for a lid speculum are: bimanual retraction, cotton-tip applicators, conjunctival molds or Desmarres retractors. Any method that reliably prevents the eyelids and lashes from contacting the needle can be considered acceptable.

**Recommendations: the use of a lid speculum or alternative method of eyelid retraction is recommended**

## 6. Use of Facial Masks

### Facial Mask Use by Healthcare Providers

The proximity of the physician's face to the ocular field during intravitreal injections (IVI) presents a clear theoretical risk for transmission of oropharyngeal microorganisms via aerosolized droplets. This has prompted both expert panels and professional societies—such as Euretina and the Royal College of Ophthalmologists (RCO)—to recommend facial mask use for the operator, although it is not mandated.

Supporting evidence includes:

- A meta-analysis of over 100,000 IVIs showing a disproportionately high rate of streptococcal isolates in post-injection endophthalmitis (PIE) compared to intraocular surgeries, where masking is standard. This suggests a link between unmasked oral flora and increased PIE risk.
- While no randomized controlled trials (RCTs) exist specifically addressing physician mask use and endophthalmitis rates, the precautionary principle and low burden of mask use favor its routine adoption.

Therefore, face masks are recommended for providers during all IVI procedures.

### No-Talking Policy

In conjunction with mask use, a no-talking policy has been shown to reduce PIE rates:

- Retrospective case series found a reduction in PIE, especially cases associated with oral pathogens, when a strict no-talking policy was instituted.
- While evidence remains limited, the policy is low-risk and logically supported, and should be enforced consistently during IVIs.

### Facial Mask Use by Patients

The role of patient masking is more controversial:

- Some retrospective studies reported an increased risk of PIE when patients wear masks, possibly due to upward airflow (venting) toward the periocular region.
- However, multiple retrospective studies subsequently were published reporting no increase in the risk of PIE

**Recommendations:**

- **Masks are mandatory for health care providers**
- **A no talking/sneezing/coughing policy is mandatory for all staff and patients during the procedure**
- **Patients masks use may be considered based on institutional policy and local epidemiological context**

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