InVitria® for Intra-Vitreal Injections: A Pilot Study

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Nathalie Chiam, Andrew Tsai, Soh Yu Qiang, Anna Tan, Edmund Wong
Singapore National Eye Centre

Introduction

Intravitreal injections of anti-angiogenic agents is a common treatment for retinal diseases such as diabetic macular oedema, proliferative diabetic retinopathy and choroidal neovascularization.

Problem: Motivation for the study

The advent of ophthalmic anti-angiogenic agents over the past two decades have revolutionized the treatment of retinal disease. Intra-vitreal agents are increasingly becoming the mainstay treatment.

InVitria® (Medical Workshop Group, Netherlands) is a device designed to assist with the administration of intravitreal injections. Potential advantages over the conventional method of injection include greater predictability and greater patient comfort. We thus evaluated the feasibility of adopting InVitria® in our clinic practice in a bid to enhance the efficiency and quality of our intra-vitreal services.

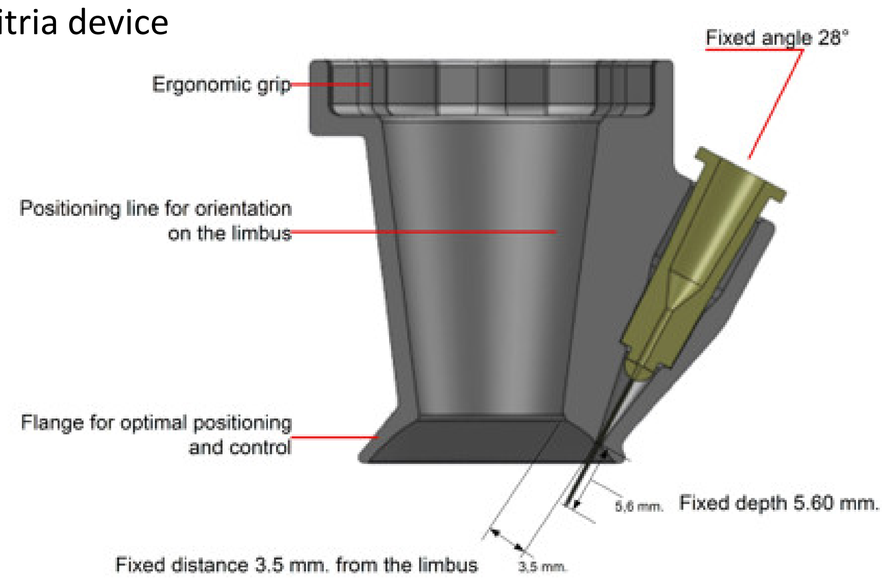
Methodology

Forty patients from the Singapore National Eye Centre who required intravitreal injections of anti-angiogenic agents were randomized to receive injections by either the conventional method (n = 20) or via the InVitria® device (n = 20).

In the conventional injection technique, the eyelid is first retracted with a speculum, followed by identification of the appropriate injection site with a pair of calipers. InVitria® has been designed to serve both functions simultaneously upon placement on the ocular surface. Doctors viewed an instructional video from the device manufacturer and were allowed hands-on experience with a sample device before the procedure.

Injections on actual patients were performed by either first-year ophthalmology residents (Group 1), senior residents (Group 2) or senior ophthalmologists (Group 3). Outcome measures included time taken for the completion of each injection, post-procedure pain score as well as feedback from both patients and doctors.

Figure 1: InVitria device



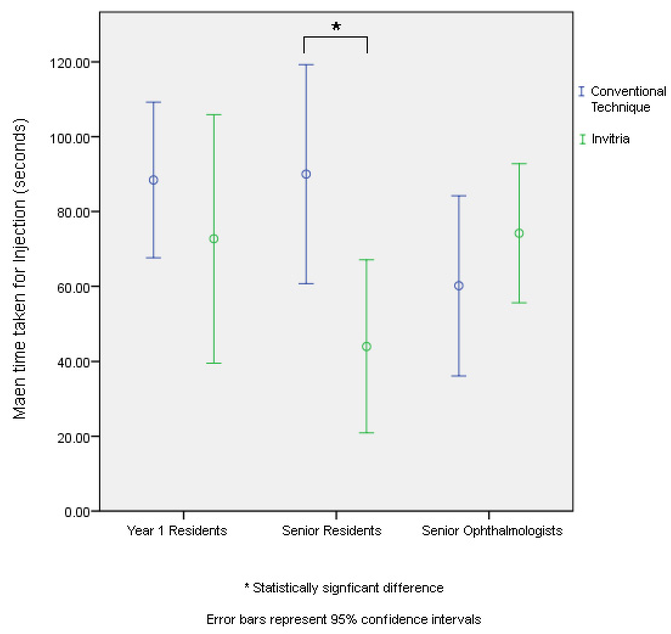
Results

There was no significant difference in the time taken for injection between the conventional and InVitria® injection for junior residents and senior ophthalmologists. However, the InVitria® technique was faster than the conventional technique for senior residents (44.0 ± 25.0 vs 90.0 ± 31.7 seconds, p = 0.033).

Junior residents felt most strongly that the InVitria® device was safer than the conventional method, followed by senior residents and senior ophthalmologists.

Other aspects in which the InVitria® device contributed towards quality improvement are summarized in Table 1. No adverse outcomes were encountered in any patient, with both the conventional and InVitria® methods.

Figure 2: Time taken for Injections



* Statistically signficant difference

Error bars represent 95% confidence intervals

	Year 1 Residents	Senior Residents	Senior Ophthalmologists
Conventional Method	88.4 ± 22.5	90 ± 31.7	60.1 ± 22.9
Invitria	72.7 ± 35.9	44 ± 25.0	74.2 ± 17.7
p	0.346	0.033	0.264

Values expressed in terms of means +/- SD

Table 1: Additional aspects of Quality Improvement

Before implementation (problem)	After implementation (result)
Some patients may be unable to control their eye movements during the injection procedure due to anxiety or inattentiveness	InVitria® allowed for immobilization of the patient's eye, which enhanced safety and predictability of the procedure
Some patients reported distress on visualization of a needle approaching their eye, prior to administration of the injection, with the conventional technique	InVitria® blocked the view of the approaching needle, and patients reported greater comfort and lower pain scores, compared to the conventional technique
Multiple steps are required using the conventional injection technique, which may lead to longer procedural times	Placement of the InVitria® device combines lid retraction and site identification into a single step, which led to shorter procedural times, especially amongst junior and senior ophthalmology residents
Manpower, time, and logistical support is required to sterilize the lid speculums and calipers used in the conventional injection technique	Being a single-use device, InVitria® eliminates the need for sterilization, allowing manpower and cost savings
Due to the large number of patients who require injections daily, and the lead-time required for sterilization of lid speculums and calipers, it has become necessary to stock and maintain a large quantity of these instruments	Inventory management has been streamlined with utilization of InVitria®, due to it being a single-use device, which eliminates the need for post-usage inventory tracking and device maintenance.

Conclusion & Future Directions

The InVitria® device is a comparable alternative to the conventional method for delivery of intra-vitreal injections. It makes the intra-vitreal injection process safer and more comfortable for the patient while providing logistic benefits.

Further testing of the InVitria® on larger numbers of patients will provide greater clarity on its usability and safety. With ease of use, future studies may also explore the possibility of intra-vitreal injections being administered by nurse practitioners.