The role of injection assistant devices in establishing a nurse-led AMD service

BY HANI HASAN

The author shares his experience of setting up a nurse-led service to deliver anti-VEGF intravitreal injections and how injection assistant devices supported training.

Pre-filled syringes for ranibizumab treatment have been developed to reduce preparation time and variation in preparation steps [13]. In addition, injection assistant devices such as the InVitria® (FCI Ophthalmics, USA) and SPeye™ (Surgitrac Instruments, UK), have been developed to aid with identifying injection location (Figure 1), further reducing the preparation time and preventing the injecting needle from coming into contact with the eyelashes and eyelid [14]. InVitria® is made from a transparent polycarbonate mould that fits around the cornea with a central window.
The central pressure mark correctly lined up (Figure 3). A gentle downward pressure with a 45-degree turning force ensures the eye becomes fixed in place (Figure 4); alternatively, if the visual acuity is good the patient is asked to look at a certain spot. The patient is then unable to see the needle. The nurse injector inserts the needle into the eye using the guide tube of the InVitria® device, which has a pre-set angle, depth and distance from the limbus of 3.5mm, and the drug is injected into the eye. The needle is removed and the InVitria® device removed using a reversed 45-degree turning movement. This results in a stepped injection puncture due to the displacement of the conjunctiva. Topical Chloramphenicol 0.5% and Sodium hyaluronate 0.4% preservative free drops are instilled to the eye following injection.

**Cost analysis**

Table 1 shows cost breakdown for intravitreal injections standard pack compared to the InVitria® device, the saving achieved by using InVitria® is more than 50% of the cost. This becomes more significant when the overall number of injections per list is considered, we managed to increase the number of injections per list to 16 in average (from 13 injections per list) with a total reduction of the cost from £257.78 (16.08x16) down to £128.8 (8.05x16).

This cost propagates to become even more obvious when the total number of injection lists is considered, we are now able to run more injection lists as more nurses use InVitria® to carry out injections and patients are significantly happier with the results (Hasan H, et al.) so the yearly saving by using InVitria is £45,000.

Added to the savings is the revenue generated by increasing the capacity, the total number of injections per list multiplied by the weekly number of injections per week by 44 working weeks per year has increased from £377,530 to £619,200.

**Discussion**

We have successfully trained five nurses to perform intravitreal injections independently using the InVitria® device to facilitate injections. The project started with one staff nurse in 2014 and the training scheme was piloted to highlight any issues and resolve them on a small scale prior to initiating further training of ophthalmic staff nurses. The average time for this individual to be a fully competent injector was six months, at which point they had completed over 200 injections. Following this training period, it took a further six months to establish fully functional nurse-led clinics and ensure all clerical processes were completed.

Following this pilot scheme, four more nurse injectors were trained. This took on average 10 weeks for training to be completed with 50 injections completed under supervision by each nurse injector. This second wave of training took a significantly shorter time to complete, this is largely because the training modules were fully developed and the use of InVitria® as an assisting device was established, in addition to the administrative processes which were already in place. Since initiating this project, the first nurse injector has successfully completed over 1250 intravitreal injections without significant complications.

There are multiple learning points which have arisen from running this training programme. These maybe of use for other units developing their own nurse-led injector training programmes. We believe it is important to have a pilot phase with a single nurse being trained as an injector so any issues can be resolved on a small-scale. Specifically, we encountered a delay in organising nurse-led training clinics as this required a doctor to be present for at
least eight clinics in total and reassigned from other clinical duties. Therefore, it is important to anticipate changes to clinical duties in advance and plan for assignment of a doctor to at least eight injection clinics per nurse injector. Initially it was difficult to recruit the first nurse injector. Improved transparency on what to expect and detailed consultation on the injection process may have helped with this in the first instance, as the second wave of training was met enthusiastically by more than the number of places available.

We also have two administrative staff members who are specifically responsible for coordinating all intravitreal injections and follow-up appointments. This has ensured a smooth transition from the initial training phase where only eight to ten patients are booked per list, to the independent nurse-led injector clinics with 16 patients booked per clinic.

For ease of training we chose to use the Invitria® device to facilitate the administration of all intravitreal injections. This device received good feedback from all five nurse injectors, who report that Invitria® is easy to handle and easy to get used to. In particular, it has been useful in stabilising the eye prior to injection, ensuring the correct location and position of the injection. Ultimately this removes the need to use a sterile drape, or measure and mark the site, resulting in a quicker, safe and more cost-effective injection process. We obtained feedback from the patient about Invitria®, there have been no issues reported. Some of the nurse injectors have reported that patients with deep-set or small eyes are often more difficult to apply the device. Specifically, the device can induce squeezing of the eye against it, which theoretically may increase the risk of abrasion when removing it.

References:

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Figure 5: The medical retina team at the Great Western Hospital.