Endophthalmitis 'Tap and Inject': A Simulated Formal Educational Programme

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Background

Endophthalmitis is a serious and potentially blinding eye condition.[1] Timely diagnosis and treatment are paramount to optimise visual outcomes. 'Tap and Inject' is a key procedure to provide a microbiological diagnosis and deliver intravitreal antibiotics. Formal practical teaching opportunities are rare and the procedure is often performed under pressure in an emergency and/or out of hours, where supervision may be limited. There is evidence of improved trainee confidence in ophthalmic procedures following simulated education packages.[2] Our aim was to create an educational package with highly realistic simulations, to ensure trainees were confident to perform the procedure competently.

Methods

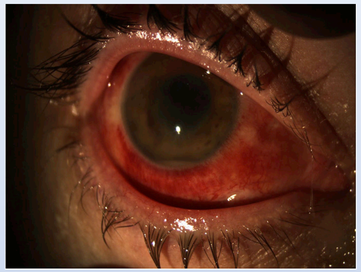
In this pilot study, eight trainees at Moorfields Eye Hospital (MEH) were given one-to-one teaching on management of acute endophthalmitis from diagnosis to discharge. Drug reconstitution was performed using out-of-date Amikacin and Vancomycin. Phillips Studio model eyes (discarded after use in cataract simulation) were filled with coupling gel using a syringe and 23g needle. A Phillips Studio SRT-Head held the model eye. During the scenario trainees performed vitreous and aqueous sampling with intravitreal injection as realistically as possible. It was completed in sterile conditions, in real-time and the sampled coupling gel was plated, initially with no instruction and then on a subsequent occasion following the introduction of a formal teaching package. The teaching package included a lecture, a demonstration video (click link / scan QR code) and a step-by-step Standard Operating Procedure, contained within a new 'Emergency Endophthalmitis Guideline'. The study was validated using a questionnaire (Fig 1) before and after teaching. Scenarios were timed and trainee procedural competence was assessed using a 10-point checklist (Fig 2).

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1. I am confident in diagnosing acute endophthalmitis					
2. It is easy to find the equipment needed for Tap & Inject					
3. I am confident in reconstituting intravitreal antibiotics					
4. I am confident in performing an AC tap without supervision					
5. I am confident in performing a vitreous tap without supervision					
6. I am confident in injecting multiple intravitreal antibiotics					
7. I am confident in plating samples correctly					
8. I know how to label samples and where to send them					
9. I have received adequate training on how to perform Tap and Inject for acute endophthalmitis					
10. I know where to find Trust guidance on how to perform a Tap and Inject procedure.					

Fig 1: Pre and post teaching questionnaires

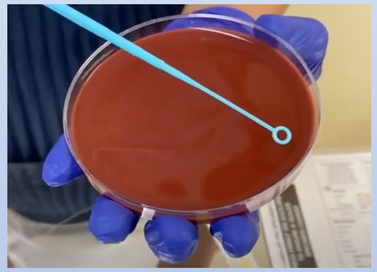
Step	YES	NO	Comments
1. Patient consented			
2. Eye marked			
3. Allergy status checked			
4. Equipment readily available			
5. Anaesthesia given correctly			
6. Intravitreal medications reconstituted correctly			
7. AC tap performed correctly			
8. Vitreous tap performed correctly			
9. Intravitreal injections given correctly			
10. Plating performed correctly including labelling and where to send			

Fig 2: Pre and post teaching procedural assessment









Results

All (8/8) participants stated that the simulation improved their confidence in managing endophthalmitis and performing 'Tap and Inject'. The time for completion of the procedure reduced by an average of 30mins after the teaching had taken place. Procedural competence improved following the teaching programme and the mean score improved from 4/10 on initial assessment to 9/10 in the post-teaching assessment.

The feedback was unanimously positive. Examples of feedback included:

- A fantastic session on a crucial treatment, it has been so helpful to run through steps in a safe environment.
- It is a stressful process and it has helped consolidate my knowledge and hugely boosted my confidence.
- The written guidelines and video are so clear and informative, I strongly feel this should be integrated into mandatory training.
- I now feel very confident performing tap and inject.

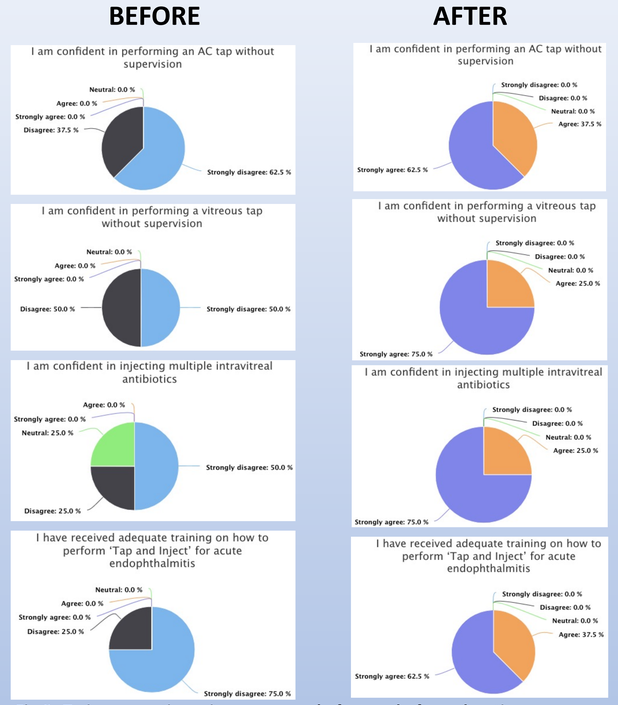


Fig 3: Trainee questionnaire responses before and after education programme (subset presented here as example)

Conclusion

Simulation allows trainees to acquire significant experience and technical skills without risk to patients. This simulation package was delivered at minimal cost, using discarded model eyes and antibiotics at no cost, alongside basic medical supplies kept as routine stock in the department. The success of this pilot study means that the 'Tap and Inject' simulation is now integrated as a core component of the educational programme for all new trainees at MEH Accident & Emergency department.

References

[1] Durand ML. Endophthalmitis. *Clin Microbiol Infect*. 2013;19(3):227-234.
[2] Barkmeier AJ. Cadaveric simulation improves ophthalmology resident confidence and preparedness for emergent ophthalmic procedures. *Can J Ophthalmol*. 2021;56(4):e133-e135.