

3D HEADS-UP OPHTHALMIC SURGERY COMES TO A POSTGRADUATE TEACHING CENTRE: WILL IT STAY?

Ophthalmic surgery is an essential and exciting part of being an ophthalmic surgeon. The eye is a complex structure in which its anatomy is difficult to appreciate in standard 2D settings especially for learning purposes. There have been many innovations in operating microscopes since the 1990s and the advancement in 3D technology has enabled 3D heads-up surgery with both surgeon and assistant not needing to look into the microscope during surgery. 3D heads up surgery is a revolutionary type of surgery using a television screen that displays images in 3D with the surgeon's head looking directly at the screen. In this manner, the audience may also watch in 3D with the same resolution as seen live by the surgeon. Both surgeon and observers use 3D glasses for viewing as shown in the pictures below.

The Department of Ophthalmology at Universiti Kebangsaan Malaysia Medical Centre (UKMMC) had the wonderful opportunity of being the first teaching hospital in Malaysia to host a demonstration of the new NGENUITY™ 3D Visualization System with DATAFUSION from Alcon Laboratories, Texas, USA from 7th August to 6th September 2019. This provided the opportunity for 7 surgeons to experience operating with this 3D viewing system and a number of operations (32 surgeries) including phacoemulsification, pterygium surgery, glaucoma surgery and vitreo-retinal surgery were performed during this period. A delighted audience of 33 trainee ophthalmologists also had the opportunity of a "surgeon's eye view". In order to determine the response to the demonstration, Dr Mae-Lynn Catherine Bastion, a senior consultant ophthalmologist and Professor of Ophthalmology (Vitreoretina) decided to



Attentive audience with 3D glass or clip on sees what surgeon sees

Prof Dr Mae-Lynn (surgeon) with her trainees, wearing the 3D glasses while looking at a big TV screen during phacoemulsification surgery in operating theater 16, UKMMC Main Operation Complex.

Screen at
1 meter
from
surgeon



A big TV screen is located about 1 meter from the surgeon and can be visualized by the operating surgeon, the assistant as well as the trainees who are observing the procedures in the operating theater.

embark on a questionnaire-based study entitled “Evaluation of 3D Heads-up Ophthalmic Surgery from The Perspective of Surgeons and Postgraduate Trainees” (ethics reference no: UKM PPI/111/8/JEP-2019-724) which was conducted at the end of the demonstration period and has just concluded. The study aimed to evaluate the perception of the students and surgeons regarding the learning-teaching methodology and their satisfaction with the experience.

3D Heads-up surgery from the perspective of postgraduate trainees

3D heads up surgery has a number of obvious advantages for trainee ophthalmologists from the perspective of teaching and learning. Being able to see the surgical field in 3D allows all trainees in the team to have a first-hand experience previously confined to the assistant only. The large TV screen allows the surgeon to explain anatomy and surgical steps directly on the screen.

One of the trainees, Dr Tan Shu Yu, a third year trainee mentioned that the 3D technology provided her with better depth perception and less eye strain. A few of the

trainees loved the interactive learning session that were possible during the ophthalmic surgery using NGENUITY™ 3D Visualization System as they felt the teaching component during traditional microscopic surgery was lacking. Dr Khairul Abd Majid, a final year trainee commented that 3D visualization system was more ergonomic as all of the trainees in operating theater could lean back comfortably and learn the surgical skills from the surgeon by looking at the big TV screen.

On the other hand, a small number of trainees felt that 3D heads-up surgery had its disadvantages despite a better visualization system and a more comfortable learning environment. Dr Logesvaran, another final year trainee mentioned that each new technology had its own learning curve not only for the surgeons but also for the assistants as they needed to adapt themselves to wearing the 3D spectacles and viewing the surgery on a TV screen. To further improvise on this technology, Dr Atikah Asini, a second year trainee suggested to include touch screen functions on the 3D viewing system as an additional helpful feature.

3D Heads-up surgery from the perspective of surgeons

One advantage of the 3D technology to surgeons was purportedly a reduction in neck strain from being able to maintain a head up position during surgery. This was especially advantageous for long surgeries such as complex retina surgeries. Prof Dr Mae-Lynn liked the ability to increase the magnification on the big screen allowing fine details to be seen. She also liked the lower lighting settings which reduced phototoxicity and increased patient comfort that were possible with this system. One of the surgeons, Dr Yong Meng Hsien, an ophthalmologist at UKMMC, reported that the ability to change posture during surgery compared to the traditional method was an advantage of 3D surgery. He felt this reduced the strain on the neck and the back.

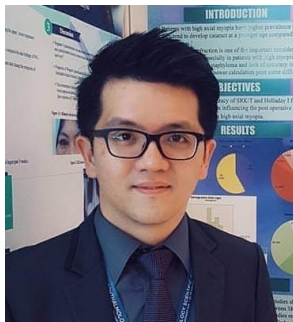
Adapting to visualization using a 3D technology seemed to be the biggest challenge to surgeons trying this technology for the first time. Dr Ainal Adlin Naffi, another ophthalmologist at UKMMC said that time was needed to practice the 3D technique which involved coordinating one's hands and different fields of view. Other than better colour adjustment settings, surgeons suggested to check distance between TV screen and

surgeon in order to achieve maximum optimization of focus and view. The recommended distance from surgeon to the TV screen is 1 meter for maximum depth perception and resolution. The placement of TV screen was very important for the surgeon to get the best angle of view during operations especially when a temporal approach was used in phacoemulsification which required some additional arrangement of the equipment in the theatre.

Conclusion

All in all, this demonstration of 3D viewing created quite a buzz in the Ophthalmology department at UKMMC and provided a much awaited new technology to be attempted. The ability for trainees to see what the surgeon sees easily makes this a popular choice for trainees. In general, opportunities to further explore this technology is exciting.

The authors declare no financial interest in the above described product.



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