

Adaptation and use of media in an innovative simulation-based clinician training programme

Melson, Eka; Chen, Wentin; Zhou, Dengyi; Ooi, Emma; Evans, Nia; Delson, Dwi; Davitadze, Meri; Kempegowda, Punith

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Adaptation and use of media in an innovative simulation-based clinician training programme

Eka Melson ^{1,2}, Wentin Chen,³ Dengyi Zhou,³ Emma Ooi,⁴ Nia Evans,⁵ Dwi Delson,⁶ Meri Davitadze,⁷ Punith Kempegowda²

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¹Ninewells Hospital, Dundee, UK

²Institute of Metabolism and Systems Research, University of Birmingham, Birmingham, UK

³College of Medical and Dental Sciences, University of Birmingham, Birmingham, UK

⁴RCSI & UCD Malaysia Campus, Georgetown, Pulau Pinang, Malaysia

⁵Royal Glamorgan Hospital, Llantrisant, UK

⁶University of Dundee, Dundee, UK

⁷Georgian-American Family Medicine Clinic "Medical House", Tbilisi, Georgia

Correspondence to

Dr Punith Kempegowda, University of Birmingham Institute of Metabolism and Systems Research, Birmingham B15 2TT, UK; p.kempegowda@bham.ac.uk

EM and WC are joint first authors.

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INTRODUCTION

The COVID-19 pandemic has disrupted medical education internationally. As a result, medical students and doctors in training have missed out on months of essential training and career progression. Thus, the use of media has evolved and expanded exponentially to deliver medical education remotely.¹

Hargis and Wilcox discussed the potential use of media in medical education to enhance the learning environment.² Different types of media possess unique characteristics and are feasible educational tools to promote learning. These include text documents, infographics, podcasts, videos, webinars and social media platforms.

In this letter, we share our experience of designing a teaching intervention incorporating different media. We also highlight the potential uses of other media based on our non-systematic review of the use of media in medical education.

Simulation via Instant Messaging—Birmingham Advance (SIMBA)

SIMBA is an innovative simulation-based learning intervention initially conceptualised for postgraduate medical education. SIMBA uses WhatsApp to facilitate real-time interaction between learners and moderators. Real-life clinical cases are selected and approved by specialist consultants. Anonymised patient data are used to create transcripts (online supplemental material 1), used by moderators to provide standardised responses and progress participants through case simulation. Moderators adopt the roles of a patient, senior clinician and individuals in the multidisciplinary team at different points during the simulation, which is initiated by prompting learners with the presenting issues of patients. Participants then elicit the patient history, physical examinations, investigations, propose diagnoses and appropriate management/follow-up plans. This is followed by a debrief session chaired by an expert in the specialty who highlights the key clinical aspects of each case and clarifies questions from participants. [Figure 1](#) summarises the SIMBA model and workflow. We have previously showed that SIMBA is effective in improving clinician confidence in managing various endocrine conditions evaluated using Kirkpatrick's model of training evaluation.³

TYPES OF MEDIA

Text

Text is effective when generalisation can increase analysis, critical thinking and content evaluation.⁴ PDF documents of current clinical guidelines have proved useful to summarise large amounts of information about diseases in SIMBA during the debrief sessions. This has helped to increase participant knowledge and confidence in managing cases.

Infographics and images

Infographics visually present information to greatly aid abstraction.⁵ In SIMBA, approaches to diagnostic and management pathways of pathologies were presented to learners as flowcharts to provide learners with a visual summary of this information. PowerPoint presentations were used to compile radiological images into slide shows that mimic real-life cross-sectional imaging views of MRI/CT scans. Additionally, PowerPoint presentations were also used during debrief sessions to boost learner engagement with experts in the field. To complement knowledge gained through SIMBA, we have developed an accompanying medical educational initiative, Concise Medical Information Cines (CoMICs), to provide an overview of various medical topics using illustrations and infographics compiled into bite-size videos. In addition to trainee doctors, some of these videos are also aimed at medical students, patients and the general public. These are uploaded weekly to our YouTube channel bit.ly/youtube_comics and openly accessible to the public.

Audio

Owing to the low cost, ease of production and general appeal, podcasting has become increasingly popular in recent times, with many medical organisations and societies now producing podcasts to deliver medical education.⁶ Although we have not implemented podcasts or audio files in SIMBA to date, we have identified their potential use in the future, such as cardiac or pulmonary recordings. This may help to make our simulation sessions more realistic and applicable to real-life clinical practice.

Video

Videos possess unique characteristics over other media and are a richer medium compared with text, infographics and audio as they offer moving visual pictures.⁴ Videos uploaded to video-sharing platforms, such as YouTube, have demonstrated rapid and international reach, thus vastly expanding their

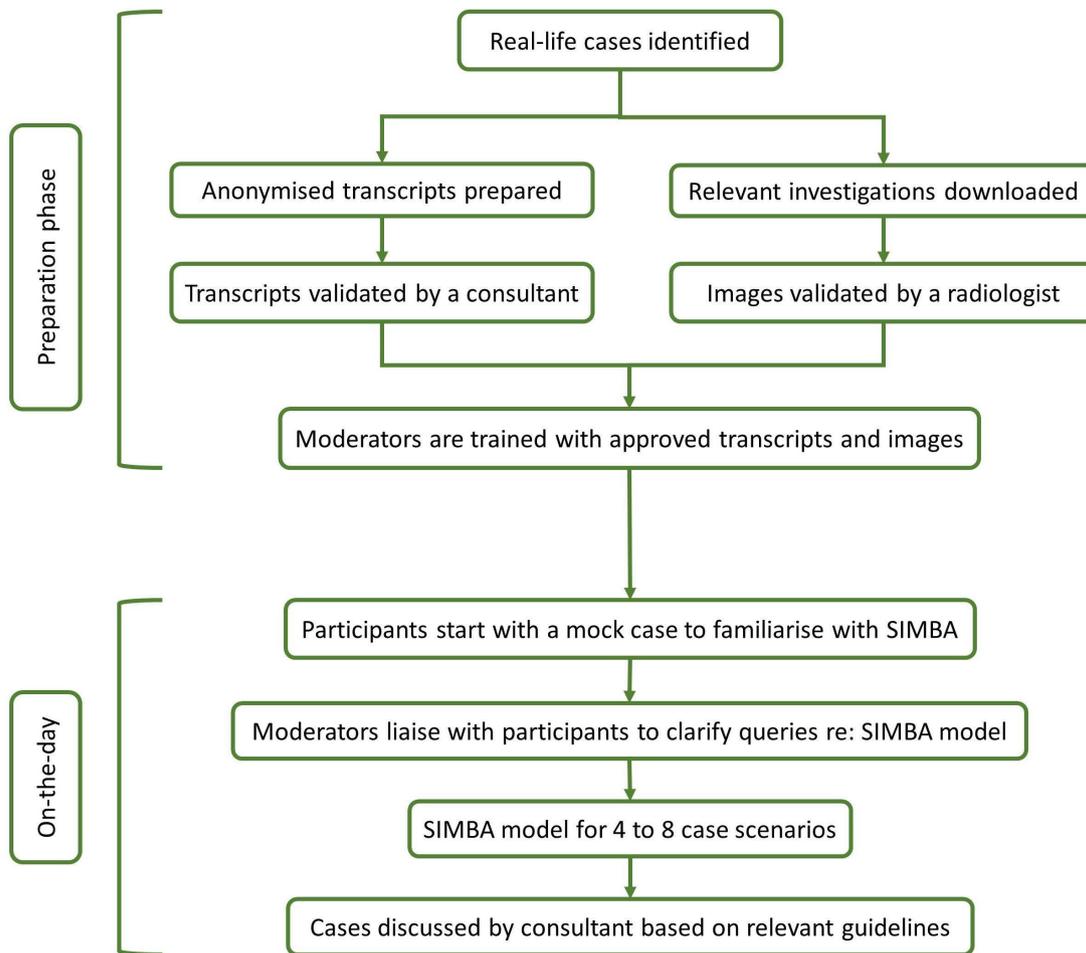


Figure 1 Preparations leading to a Simulation via Instant Messaging—Birmingham Advance (SIMBA) session.

impact within medical education.⁷ As SIMBA is a novel medical education training programme, we commence each session by showing an animated video example of participant–moderator interaction to familiarise participants with the SIMBA model (still images shown in online supplemental material 2). The debrief and expert discussion sessions are also recorded to enable participants to review and further consolidate learning at a later stage.

Social media

Social media facilitates rapid knowledge sharing with the ability to reach an international audience and can be viewed as an extensive open-access resource in medical education.⁶ Social media platforms offer an informal learning environment, which fosters engagement and a real-time dialogue that traditional means of communication lack.⁸ Facilitating SIMBA simulation via WhatsApp greatly enhances interaction and engagement in comparison to traditional forms of teaching.³ The ubiquity of WhatsApp has made SIMBA widely accessible, with international interest and participation.³ Additionally, Twitter (@SIMBAsimulation) and Facebook are used to advertise SIMBA sessions and attract international health professionals to participate.

Video conferencing and webinars

Live and prerecorded webinars are online seminars broadcasted through the internet.⁹ As an example of a synchronous tool, live webinars are regarded as the most advanced form of computer-mediated communication, which facilitate live interaction, active

participation and instant feedback. This requires more resources but has the potential to provide the richest learning experience and greatly enhance audience engagement.¹⁰ The COVID-19 pandemic has escalated the popularity of video-conferencing platforms to facilitate education, including Microsoft Teams and Zoom. As our response and solution to the global disruption of medical training in the wake of the COVID-19 pandemic, we expanded SIMBA internationally by using Zoom, as opposed to our previous face-to-face sessions in conference halls.

DISCUSSION AND CONCLUSION

The deliberate application of different forms of media has enabled us to adapt SIMBA during the challenging times of COVID-19. Where existing simulation models have proved costly, SIMBA is an effective model on improving learners' confidence in managing endocrine cases. We have since expanded SIMBA to other specialties including gastroenterology, hepatology, acute medicine, nephrology and general surgery. SIMBA has also been applied to undergraduate medical education, which has shown early success. Further evaluations are needed to assess for effectiveness of SIMBA in other specialties and areas of medical education. In the future, SIMBA could supplement in-person training days and promote ease of access to high-quality medical education internationally.

This letter highlights the importance of appropriate use of media in medical education with the aim of creating an optimal learning experience, using SIMBA as an example. Considering the ongoing disruption of the COVID-19 pandemic to medical

education, educators should consider implementing various forms of media to enhance teaching and facilitate a more blended learning approach. With further research and thoughtful application, different types of media will have immense implications for the current and future delivery of medical education.

Contributors EM and WC were the joint first authors having contributed equally to all aspects of the letter. DZ and EO contributed to the literature search conducted as part of the project. NE and DD created and deliver Concise Medical Information Cines. PK supervised the delivery of all aspects of Simulation via Instant Messaging—Birmingham Advance. EM conceptualised the idea of the paper. MD and PK critically reviewed the paper. The final version has been reviewed and approved by all the named authors.

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ORCID iD

Eka Melson <http://orcid.org/0000-0003-0685-4819>

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Case 4

Instruction to moderators: If information asked by participants is not available in the transcript, please copy the following

The information you requested is not available.

Please liaise with your senior moderator if any doubts at any point of the simulation

Instruction to moderators: once instructed to start case 4, copy this image and wait for participant's reply



Simulation via Instant Messaging-
Birmingham Advance

Please assess the patient as you would interact in a real-life clinic. Please request as much information about the patient as you like. However, please bear in mind you have **25 minutes** to complete all of the following in each case:

1. History
2. Physical Examination
3. Investigations (forms will be provided)
4. Your diagnosis and proposed management plan to the MDT
5. Post-op follow-up plan (if indicated)

You will receive instructions as you go through the cases. Please feel free to ask the moderators if any doubts at anytime throughout the case.

You have about **25 minutes** to complete the simulation, please type **"ready"** when you are ready to start.

Instruction to moderators After participants are ready, copy the presenting complaint below

Presenting complaint

A 58-year-old woman presents to your clinic with visual problems.

Please assess this patient in your clinic and request any information you will need in your assessment.

History of presenting complaint

For the past 8 months, I've noticed that my vision is getting worse. I'm finding it increasingly harder to focus at work and read on the computer and this has not helped with reading glasses. I've also been

IF NEEDED:

The information you requested is not available

having difficulty seeing cars approaching in the opposite direction. Alongside this, I've been having headaches which I think are related to eye strain and I've been feeling very tired. Over the past 4 months, I've gained four stone in weight.

Past medical history and surgical history

1. Asthma
2. Allergic rhinitis

Medications

1. Cetirizine
2. Salbutamol inhaler
3. Beclomethasone inhaler

Allergies

Animal dander, pollen. NKDA

Family history

None

Social history

I work in administration. I do not drink or smoke.

Instructions to moderators: After the participants have asked all the information above please copy the following:

You have now completed history taking. What examinations would you like to perform for this patient?

Examinations: Ensure to give **only** the requested section for examinations

Observations: Unremarkable

Systemic examination: Cardiovascular and respiratory examination was unremarkable.

Specialty specific examination: Right homonymous hemianopia field defect.

IF NEEDED:

The information you requested is not available

Instruction to moderators After the participants have asked all the information above please send them the blood form and copy the following.

Please follow the link provided, tick all the relevant investigations you need for the case, and *text the moderator after you have submitted the form.*

https://docs.google.com/forms/d/e/1FAIpQLSePS9P2Vjg2SdR88EQPhOxmCur_MayCmdak_Y2mTjn2-rBdA/viewform?usp=sf_link

Results will be provided.

Instructions to moderators: send all the investigations as images from below **after you have confirmed that they submitted the investigations form.**

Blood tests		
Investigation	Result	Reference Range
IGF-1 (Insulin-like growth factor-1)	15.5	5.9-22.7 nm/L
FSH (Follicle-stimulating hormone)	10.5	25.8-134.8 IU/L
LH (Luteinising hormone)	1.8	7.7-58.5 IU/L
Prolactin	426	100-500 mU/L
TSH (Thyroid stimulating hormone)	1.07	0.40-4.90 mIU/L
FT4 (free thyroxine)	9.4	9.0-19.0 pmol/L

Instructions to moderators: If the participant asks for a **short Synacthen test**, please copy the following:

Short Synacthen test (SST)			
Offset	Time	Cortisol	Cortisol reference range
0 minutes	12.35	126	
30 minutes	13.05	535	Optimal response >450 nmol/L

Instructions to moderators: If the participant asks for imaging, please send the following:

Pituitary MRI

A calcified suprasellar lesion in keeping with a diagnosis of craniopharyngioma. Solid and cystic components noted.

Optic chiasm compression is present and worse on the left side. There is a marginal distortion of the third ventricle noted on the right. No hydrocephalus.

The pituitary gland is uninvolved and is normal.

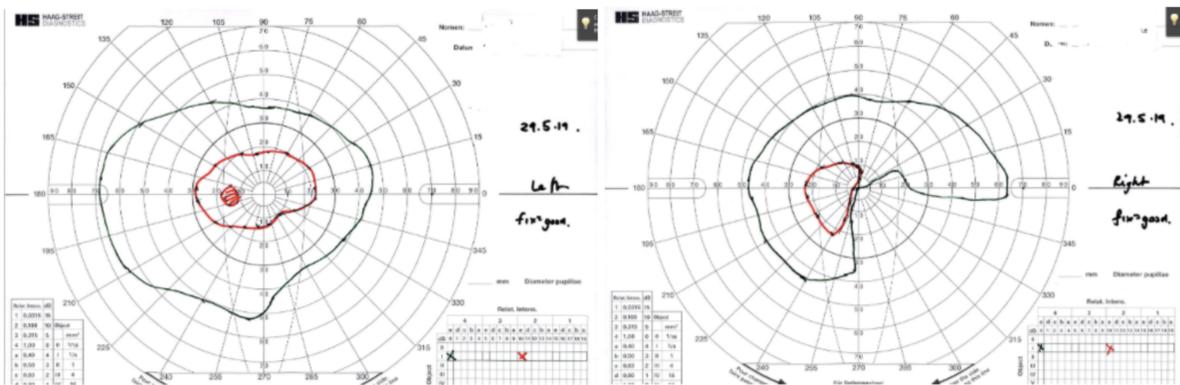
IF NEEDED:

The information you requested is not available

Instructions to moderators: If the participant asks for a **neuro-ophthalmology review**, please copy the following:

Neuro-ophthalmology review

- On examination, her visual acuity was right eye 6/9.5 and left eye 6/24.
- With pinhole, there was no improvement in the right eye and in the left eye acuity was 6/20.
- No relative afferent pupillary defect however pupil reactions were slow.
- Ishihara colour vision plates were right eye 12/13 and left eye 3/13.
- Dilated examination which showed slight pallor of the temporal neuroretinal rim in the left eye.
- Examination of ocular motility and cranial nerve V were unremarkable
- Visual field testing shows inferior right incongruous quadrantanopia with the right eye field defect being worse than the left.
- Optical coherence tomography of the retinal nerve was within normal limits
- The ganglion cell layer showed some mild thinning in the right eye versus the left.
- ***Assessment: Pupils and colour vision may correspond to chiasmal compression and/or left optic nerve involvement. The visual field pattern is in keeping with left optic tract involvement.***



Instructions to moderators: After the participants have asked all the information above, please copy the following:

You have now gathered all the available information for this case.

Please reply to the following:

- state the diagnosis and its rationale
- propose management and follow-up plan

Instructions to moderators: After the participants have answered above please copy the following:

MDT outcome

This patient was diagnosed with a suprasellar/intraventricular lesion with a solid and cystic component in keeping with craniopharyngioma. The lesion was causing chiasmal compression and visual

IF NEEDED:

The information you requested is not available

compromise. Following the MDT discussion, this patient was referred to neurosurgery for a surgical resection via an endoscopic endonasal approach.

One month later

The patient underwent an expanded endonasal endoscopic resection of the suprasellar lesion which was later confirmed to be a WHO grade 1 adamantinomatous craniopharyngioma. Pituitary MRI was satisfactory and showed gross total resection of the craniopharyngioma. Five days later, repair of a cerebrospinal fluid (CSF) fistula was required using adipose tissue taken from the patient's right thigh. Since this repair, the patient has experienced no further CSF leaks and has been mobilising independently. The post-operative pituitary MRI has shown total debulking of the tumour which will be monitored with repeat pituitary MRI scans. The patient has also experienced a subjective improvement in vision which will be reviewed regularly by ophthalmology.

6 weeks after surgery

Blood tests		
Investigation	Result	Reference Range
IGF-1 (Insulin-like growth factor-1)	13.3	5.9-22.7 nm/L
FSH (Follicle-stimulating hormone)	0.3	25.8-134.8 IU/L
LH (Luteinising hormone)	<0.1	7.7-58.5 IU/L
Prolactin	86	100-500 mU/L
TSH (Thyroid stimulating hormone)	0.66	0.40-4.90 mIU/L
FT4 (free thyroxine)	<5.4	9.0-19.0 pmol/L

Short Synacthen test (SST)

Offset	Time	Cortisol	Cortisol reference range
0 minutes	14.15	<28	
30 minutes	14.45	76	Optimal response >450 nmol/L

Please interpret these results and state how you would proceed

Instructions to moderators: After the participants have answered above, please copy the following:

The results of these post-operative tests show secondary hypothyroidism and cortisol deficiency. This patient should continue taking Hydrocortisone (15 mg in the morning and 5 mg in the afternoon) which was prescribed post-operatively and should commence on Levothyroxine 50 mcg.

Four months later

This patient has returned to see you in the clinic for follow up. They have been unwell with depression, weight gain of nearly 15 kg, joint pains and nocturia. They now use a stick to mobilise.

How would you proceed?

IF NEEDED:

The information you requested is not available

Instructions to moderators: After the participants have answered above, please copy the following:

This patient's symptoms are likely to be due to hypothalamic dysfunction which is common in patients with craniopharyngioma, however, since some symptoms could be due to pituitary dysfunction tests were repeated including, thyroid function tests, electrolytes, glucose and urine and serum osmolalities.

Her electrolytes, glucose and osmolalities were all satisfactory, however, thyroid function tests show her thyroid hormone replacement is still not optimal free thyroxine (6.5 pmol/L).

This would explain a number of the patient's complaints including depression, tiredness, weight gain. Her levothyroxine dose was increased to 100 mcg daily with further monitoring of free thyroxine arranged.

Instructions to moderators: Please send as a separate message right after the previous text

The simulation has ended. Many thanks and we will discuss the case shortly

IF NEEDED:

The information you requested is not available

MODERATOR

Simulation via Instant Messaging-
Birmingham Advance

Please assess the patient as you would interact in a real-life clinic. Please request as much information about the patient as you like. However, please bear in mind you have **25 minutes** to complete all of the following in each case:

1. History
2. Physical Examination
3. Investigations (forms will be provided)
4. Your diagnosis and proposed management plan to the MDT
5. Post-op follow-up plan (if indicated)

You will receive instructions as you go through the cases. Please feel free to ask the moderators if any doubts at anytime throughout the case. You have about **25 minutes** to complete the simulation, please type **"ready"** when you are ready to start.

PARTICIPANT

Thank you. I am ready.

MODERATOR

30-year-old woman referred to the endocrine clinic by her dentist who noted facial changes over the last 4 years.
Please assess this patient in your endocrine clinic and request for any information you will need in your assessment.

PARTICIPANT

Good morning. I am Dr. Kempegowda. One of the endocrine doctors. How can I help you today?

PARTICIPANT

Is there any significant family history?

MODERATOR

No.

PARTICIPANT

What do you do for a living?

MODERATOR

The information you requested is not available - either because it was normal or not relevant to the case.

MODERATOR

You have gathered all the information that is required in the history. What examination would you like to perform for this patient?

PARTICIPANT

Okay. Thank you. Does the patient have any visual changes? BMI? BP? I would also like to perform a systemic examination as well.

MODERATOR

Enlargement of her jaw.
Anterior open bite.
BMI: 22.95
BP normal.
All other examinations are normal (CVD, cranial nerves - visual fields).

MODERATOR

Investigations	Results	Reference range
Calcium	2.65 mmol/L	2.10-2.60
Albumin	54 g/L	34-51
Total protein	84 g/L	60-80
ALP	71 U/L	35-105
Cortisol	99 nmol/L	Cortisol ref range 06:00-10:00: 172-497 nmol/L
Oestradiol	163 pmol/L	Fol: 98-571 Mid cycle: 176-1153 Lut: 122-1094
FSH	8.2 IU/L	Fol: 3.5-12.5 Lut: 1.7-7.7
LH	7.7 IU/L	Fol: 2.4-12.6 Luteal: 1-11.4
Prolactin	232 mU/L	100-500
17OH P	1.1 nmol/L	
Androstenedione	3.8 nmol/L	
Testosterone	0.7 nmol/L	< 1.9
SHBG	46.3 nmol/L	26.1-110.0
GH	2.42 ug/L	
IGF-1	41.9 nmol/l	9.5-32.0
TSH	1.87 mIU/L	0.4-4.5
FT4	20.2 pmol/L	10.0-22.0

PARTICIPANT

Thank you. There is an increase IGF-1 indicating acromegaly. I would like to confirm this by requesting a oral glucose tolerance test, please?

MODERATOR

OGTT results as below.

Minutes	Blood glucose (mmol/L)	Growth Hormone (nmol/L)
0	4.3	6.0
30	5.4	1.8
60	4.8	0.9
90	4.9	0.5
120	3.9	0.4

MODERATOR



MRI

Please summarise the MRI findings.

PARTICIPANT

Large pituitary tumour on the right with pressure on chiasm.

MODERATOR

You now have all the information required to make a diagnosis for this patient.

PARTICIPANT

Features suggestive of acromegaly with raised IGF-1 levels.
With normal OGTT and MRI showing adenoma.
Likely to suggest surgery if there are compression effects.

MODERATOR

Please write to the MDT:

- Summary of your case.
- State the diagnosis (and its rationale).
- propose management plan

MODERATOR

MDT

Newly diagnosed acromegaly. GP/self-referral with acromegalic features.

Pituitary adenoma.

Size: 18mm x 15mm x 14mm

Location: Predominantly right.

Consistency: Cystic

Cavernous sinus involvement: KNOSP grade 1 on the right

Optic chiasm involvement: None

Normal residual pituitary

MDT outcome: Surgery

MODERATOR

Operation note:

This procedure (trans-sphenoidal) was completed successfully 6 weeks after her initial presentation.

MODERATOR

Please outline your post-op management plan until discharge and long-term follow-up for this patient.

PARTICIPANT

Okay, thank you. I would like to monitor IGF-1 and osmolalities post-operatively, and repeat MRI in 3 months to look for any residual disease.

MODERATOR

The simulation has ended. Many thanks and the case will be discussed shortly.