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IN SITU SIMULATION OF ADVANCED AIRWAY MANAGEMENT IN MICROCEPHALIC PRIMORDIAL DWARFISM: TESTING A NEW SYSTEM

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Introduction: Microcephalic primordial dwarfism is the rarest and most severe form of dwarfism [1]. The associated craniofacial abnormality means patients are difficult to bag mask ventilate and intubate. A patient with primordial dwarfism is transitioning from Alder Hey paediatric hospital to our hospital. The patient requires frequent intubations which were achieved using an asleep, spontaneously breathing fibreoptic technique. This differs vastly from our usual practice in adults. We have developed a standard operating procedure (SOP) for anaesthetising and intubating this patient in our hospital. We are using in situ simulation to test our SOP and improve our system.

Methods: We provided four x 1-hour high fidelity simulations in our emergency theatre for four different multidisciplinary teams, each comprising six members. We designed a scenario that mirrored the patient's clinical presentation in an emergency, utilising an interactive paediatric mannequin and an actor as the parent. Each team was required to manage the patient and parent according to the SOP. We noted the behaviours of the teams and how they used the SOP. The simulation was followed by a debrief focusing on human factors.

Results: Twenty-four candidates participated. Pre-simulation, only 1 candidate (4%) felt confident in using the techniques specified in the new SOP, increasing to 14 candidates (58%) post simulation. We identified the following areas for improvement and have revised the SOP accordingly:

- Make the SOP flowchart role based.
- Modify the SOP to include a "situation report" at 5-minute intervals.
- Make the anaesthetic plan clearer by using headings and coloured highlights.

Discussions in the debrief also identified latent factors in the wider hospital system which we are working to address. These included:

- Would staff on ward areas be skilled enough to recognise an early deterioration in the patient and refer to anaesthetics promptly?
- Would ward areas have adequate paediatric equipment?
- How would an intubation in a non-theatre environment be managed?

Discussion: In situ simulation has been used to test and improve our SOP and enhance the confidence of our staff. We identified and have started to rectify latent factors within our hospital system. We now plan to:

- Use low-fidelity simulation with a 3D printout of the patient's head to teach the SOP to the wider team.
- Repeat the high-fidelity simulation to ensure that our system is robust.
- Develop and test an SOP for a non-theatre intubation plan.

Ethics statement: Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant ethical approval was granted.

REFERENCES

1. Walking with Giants Foundation. About Microcephalic Primordial Dwarfism [Internet]. Liverpool (UK): Walking with Giants Foundation; 2008 [updated 2019, cited 2024 Apr 21]. Available from: <https://www.walkingwithgiants.org/about-mpd/>.

