Development of a novel training model for diagnosing parapneumonic and malignant effusions and practising performing US guided chest drains in paediatrics

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Abstract

Introduction

The insertion of a chest drain is an essential procedure that not only improves quality of life by relieving extreme dyspnea and cough secondary to pleural effusion but also can be a life-saving procedure. In pediatric patients, indications include parapneumonic and malignant pleural effusion and empyema. Needle misplacement is one of the major causes of complications in chest drains. Some common complications include puncturing of nearby organs such as the lungs and causing a pneumothorax or a blood vessel. Guidance using US is employed to increase the accuracy of needle placement. Hence, it significantly decreases the risk of complications. Therefore, the British Thoracic Society guidelines recommend US guidance in the management of pleural infections in paediatrics. Despite this, there remains a high incidence of preventable complications and mortality during and after chest drain insertion. Current commercial training models can be prohibitively expensive, often costing thousands of pounds and failing to represent anatomy as seen through ultrasound accurately.

Objectives

Development of a cost-effective, non-animal, user-friendly training model that is durable and easily reproducible.

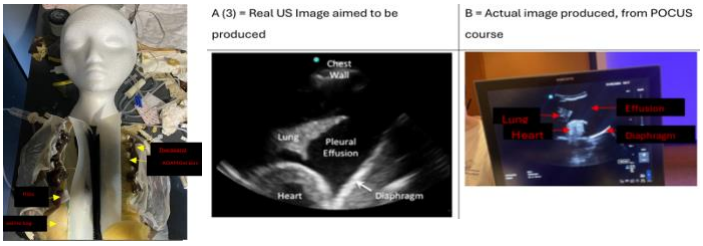
Methods

The model cost £36.4 and was built using standard household items. The demographic for the measurements was of an average 4-year-old child. 5-point Likert scale questionnaires were used before and after participants used the model at 2 designated drop-in sessions at Royal Sussex County Hospital where relevant cohort was invited and at a Point of Care Ultrasound (POCUS) course where participants were taught how to perform the procedure by a consultant.

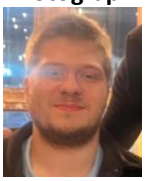
Results

16 participants provided feedback by engaging with the model. Analysis of the pre- and post-procedure questionnaires showed a statistically significant increase in participants' understanding and confidence. 90% of participants rated it as equal to or better than the commercial alternatives, and all participants agreed it could be used as a training aid for inexperienced trainees and improve outcomes within their trust.

Images



Photograph



Biography

Eren is a 4th year medical student at Brighton and Sussex Medical School, with an interest in radiology, anaesthetics, medical education and simulation in healthcare. He is enthusiastic about development of training models that are cost-effective, re-usable and reproducible. As part of ADAMGel group, he helped produce thoracentesis and paracentesis models and helped run POCUS courses in UHSx and ESHT by maintaining and teaching using the models

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