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Case Report

Pocus as a tool to avoid diagnostic errors in covid-19 era

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ABSTRACT

X-ray flips and wrong labelling has been uncomfortably common, and often results in wrong side intervention. Wrong side surgery is indeed the most dramatic and visible form of human errors. Until the 1999 Institute of Medicine report 'To Err is Human', the medical fraternity was largely unaware of such preventable medical errors and near misses. We herein, describe a case where X-ray flip and mislabelling led to wrong side intervention in a COVID-19 ICU. Active errors in human performance are inevitable while practising medicine in the current COVID-19 pandemic where difficulties in performing comprehensive systemic examination with the protective gear on, long working hours, work stress, emotions, and fatigue interplay with the errors in technology and increase the chances of errors. We propose the use of point of care ultrasound (POCUS) in COVID-19 ICU's to aid in the diagnosis and management.

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1. Introduction

Wrong side surgeries are a common occurrence, but highly under-reported owing to the opprobrium in the field of medicine.¹ It's incidence is likely to increase in the COVID-19 era where operating with personal protective gear is the new normal. Though protective gear is inevitable, it is many a times taxing on the surgeon as it taints the decision making, overall performance and causes increased fatigue.² We herein, describe a case where an inverted chest radiograph and wrong labelling caused wrong side chest tube placement in a confirmed case of COVID-19.

2. Case Details

A confirmed case of COVID admitted in ICU developed sudden onset breathlessness and desaturation one day. A bedside digital chest radiograph (CXR) was obtained but the

CXR uploaded was a flipped one. There was pneumothorax on the anatomic left side. However, pneumothorax appeared to be on the right side in the chest radiograph (Figure 1A). The resident in charge performed a brief physical examination, but percussion and auscultation could not be made out with the PPE on. He placed a chest tube on the right side without much delay as the patient was desaturating and breathless. In view of persistent breathlessness, a repeat chest radiograph was obtained. The follow-up CXR showed expanded right lung with right ICD in situ, but pneumothorax on the left side this time (Figure 1B). A chest tube was placed on the left side, following which the patient improved clinically. The right chest tube was removed after confirming the absence of an air leak and a repeat chest radiograph was obtained (Figure 1C). There were no post-procedural complications. Pleural fluid cartridge based nucleic acid amplification test tested positive for Mycobacterium tuberculosis and she was started on antituberculous therapy.

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Written informed consent has been obtained from the patient and her attenders to publish the clinical case details and radiograph images without disclosing the patient identifiers.



Fig. 1: **A:** Flipped chest radiograph showing hydropneumothorax on the right side (which is the anatomic left side); **B:** Left sided hydropneumothorax is seen and right chest tube is in situ; **C:** Left hydropneumothorax is persistent and right side chest tube has been removed.

3. Discussion

The famous ‘Swiss cheese model’ sometimes called the ‘cumulative act effect’ propounded by James Reason has gained wide acceptance in the health system since its foundation.³ It says most accidents can be traced to one or more failure domains as lapses in one defence mechanism do not allow an accident to materialize since the other defences act as barriers to prevent an untoward event. In this case, the flipped chest radiograph, wrong labelling, the difficulty in performing a comprehensive respiratory system examination with the protective gear on, the COVID-19 pandemic by itself, and the halo of fear around it, all paved way to this accident. So how do you work your way out of this complicated situation? Here comes the saviour – point of care ultrasound (POCUS).

POCUS is the performance and interpretation of ultrasound at the bedside. POCUS was introduced in the late 1980’s following the development of compact, high-quality, portable ultrasound machines. The BLUE protocol and the FALLS protocol serve as testament to the fact that POCUS aids diagnosis and treatment of lung conditions.^{4,5} Advantages of POCUS include bedside evaluation, real-time use, safety, repeatability, less expensive, absence of ionizing radiations and instant results.⁶ It can replace the stethoscope in COVID settings, and possibly reduce the chances of PPE breach, exposure, and the nosocomial spread of the virus.⁷ It also brings down the need to transfer patients for radiological investigations, thereby reducing the risk of shifting intubated and critically ill patients. It also reduces exposure to health care personnel, reduces PPE wastage, and allows the staff that would have been required to assist shifting to engage in their other duties in the workplace. POCUS not only helps detect pneumothorax but also identifies pulmonary manifestations of COVID-19 such as sub-pleural consolidation and pulmonary edema.^{8,9} Sonographic features of pneumothorax include

absence of lung sliding, loss of comet tail artefacts and the lung point sign.⁸ It can also be used to rapidly assess the severity of the disease, track the history of the disease, prognostication, and monitor treatment response.¹⁰ Certain practical barriers faced while using POCUS are the high inter-observer variability as it is user dependant and inadequate training.¹¹ An experienced sonographer can perform a quick check within 5 minutes. Decontamination of equipment between patients and the use of individually packaged, single-use ultrasound gel are measures that keep a check on cross-contamination.¹²

Surgical time outs before any invasive procedure can also come handy to curb the errors in the complex practice of medicine in the COVID-19 era. Also, hospitals must have a standardized process for acquisition and labelling chest radiographs, to prevent x-ray flips and wrong labelling.

4. Conclusion

Quoting the words of Paul Bear Bryant, ‘when you make a mistake, there are only three things that you should do about it: admit it, learn from it and do not repeat it’ as some of the best lessons are learned from mistakes and failures. For the first time in the era of modern medicine, the entire world is facing the same threat. Time has come that the health care community rampantly use POCUS – the novel tool to aid the management of patients infected with novel coronavirus 2019. This is an attempt to emphasize the use of POCUS in the COVID-19 era, to learn from the error and the contributing factors; and not to blame the wrongdoer.

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6. Conflict of Interests

There are no conflicts of interests.

7. Source of Funding

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