A case study reflecting on the physiotherapy input with a patient who received extracorporeal membrane oxygenation (ECMO) support following COVID-19.

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Abstract

The aim of this paper is to review and reflect on physiotherapy treatment for a patient with COVID – 19 who received ECMO support, from admission to discharge home.

Introduction

The COVID -19 pandemic presented a new range of challenges to clinicians across the world in caring for patients affected by a virus with what at the time was an unknown pathophysiology (1). In meeting this challenge physiotherapists utilised their knowledge and experience in treating patients with acute respiratory distress syndrome (ARDS) to provide the best possible care.

Methods

A case study design to provide a detailed review of the treatments used with the patient during their journey, including feedback from the patient. Table 1 outlines a timeline of key events during their patient journey. Figure 1 outlines the treatment modalities used with the patient both whilst they were sedated and awake

Results

Historically the Physiotherapy team within the ECMO centre have believed that chest physiotherapy would be mostly ineffective on patients with low lung volumes. However in this case study it was shown that with tidal volumes of between 30 – 100mls, expiratory vibrations with saline instillation and suctioning cleared more secretions then suctioning alone.

Effective and safe use of SOEOB and tilt-table built up-to standing with support whilst having ECMO in situ.

Despite the use of foot splinting whilst sedated we still faced challenges with contractures in calves which subsequently limited standing.

The use of PMV whilst ventilated allowed the wider MDT to provide effective support for the patients overall wellbeing. The use of PMV was timed with chaplaincy and psychology input, in addition to enabling two way communication during video and phone calls with the patient's wife, who at the time was unable to visit due to restrictions.

Patient feedback on the use of the PMV "To be able to communicate normally was wonderful, as you are locked into a world where no one understands you and it can be so frustrating to make people understand what you want".

Figure 1. Treatments used with the patient.

Whilst Sedated

Saline instillation and suctioning

Manual techniques (Percussion / expiratory vibrations)

Foot and hand splinting

Without Sedation

Sitting on the edge of the bed (SOEOB)

Tilt-table

Passy Muir Valve (PMV)

Suctioning in conjunction with flexible endoscopic evaluation of swallow (FEES) along side SALT

Mobility

Discussion

The patient was successfully weaned from the ECMO, ventilator and tracheostomy was de-cannulated; they were transferred back to their local hospital for ongoing rehab and were eventually discharged home.

This case study introduces a debate as to the effectiveness of manual techniques and suctioning with saline on patients with low lung volumes, as it appeared to be beneficial compared to suctioning alone.

The use of the PMV within the ventilator circuit enabled vocalisation much earlier during their admission which not only progressed their swallowing and cough strength rehabilitation but also significantly increased the amount of psychological support they were able to access.

Rehabilitation of VV-ECMO patients despite being logistically challenging is safe, feasible and effective and can include the use of a tilt-table with suitable planning in place

Conclusions

On reflection it seemed appropriate to utilise similar rehabilitation treatment options used in the management of ARDS patients on ECMO, despite the challenges associated with the complex logistical and safety factors when managing this patient group.

Table 1. Timeline of key events.

Timeline of events:
08/12/20 Diagnosed - positive SARS-CoV-2 Admission to District General Hospital
16/12/20 Initiated on CPAP
21/12/20 Invasive mechanical ventilation
26/12/20 Transferred to ECMO centre for VV-ECMO
02/01/21 Tracheostomy formed
22/01/21 Complication of upper GI bleed secondary to gastric polyps
08/03/21 De-cannulated from ECMO circuit
15/03/21 Tracheostomy decannulated
22/03/21 Stepped down to ward on HFNO
01/04/21 Repatriated to District General Hospital
16/06/21 Discharged home
Total duration 196 Days

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References

1. Kumar , M, Al Khodor, S. Pathophysiology and treatment strategies for COVID-19. Journal of Translational Medicine. 2020; 18(1).