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Successful Treatment of Acute Respiratory Distress Syndrome with Extracorporeal Membrane Oxygenation in a Leptospirosis Patient: A Case Report

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Abstract **Case Report**

Leptospirosis is an infectious condition with a wide clinical spectrum that can present with mild symptoms to severe life threatening situations. Amongst this spectrum, Acute Pulmonary Distress and Haemorrhage can manifest, which poses a challenging dilemma in the management of these patients. Inadequate ventilatory strategies can lead to high mortality within this group of patients. Early detection, prompt treatment, with good interdepartmental communication and good team work are essential. We present a case of a 28-year-old young male who presented in the acute setting with respiratory distress, and pulmonary haemorrhage which was successfully treated with venovenous extra corporeal membrane oxygenation.

Keywords: Acute Respiratory, Extracorporeal Membrane, Leptospirosis Patient.

INTRODUCTION

Leptospirosis is an infectious disease caused by pathogenic spirochete bacteria of the genus leptospira that are transmitted directly or indirectly from animals to human [7]. Human leptospirosis results from direct or indirect contact with contaminated urine, water or soil from infected animals and mostly occurs in tropical countries. According to WHO, based on current available reports, incidences range from approximately 0.1–1 per 100,000 per year in temperate climates to 10–100 per 100,000 in the humid tropics. In Malaysia, data from 2004 - 2015 showed a steady increase in cases for 10 years before reaching its peak at 2014 with 7806 cases and 92 deaths. In 2015, number of cases dropped to 5370 cases with only 30 deaths reported. Between the year 2004 until July 2015, the incidence rate in Malaysia was the highest in 2015 with 30.2 per 100, 000 population. During the same period, the mortality rate was the highest at 0.31 per 100, 000 population in 2014 nationwide [1].

CASE REPORT

A 28 year old gentleman who was previously fit and well came to casualty complaining of fever for 3 days with nausea and vomiting. He had just traveled back to the city from his countryside hoemtown where he has a history of travelling into the jungle and crossing rivers daily. A physical examination revealed high body temperature (39.8ºC), rapid heart rate and rapid breathing was observed. Laboratory investigation revealed leucocytosis with transaminits. Initial diagnosis was Thyphoid fever. Patient was then admitted to the ward in which he subsequently developed respiratory distress and hemoptysis. Patient desaturated and severely hypotensive with systolic pressures dropping down 86mmHg. Fluid resuscitation was commenced and 2 pints of blood was transfused along with 1 cycle of DIVC regime. He was intubated and transferred to the ICU. IV Rocephine was given as coverage. Despite these treatments, his respiratory condition deteriorated; an x-ray showed bilateral lower zone diffuse patchy consolidation (Figure 1). Impression at this time was Severe Leptospirosis with Pulmonary Haemorrhage. Transesophageal Echocardiography showed Good Biventricular Function and Bedside Bronchoscopy revealed that the Left Bronchus was normal, however the right bronchus mucosa was diffusely inflamed with haemorrhagic spots. Despite optimal medical treatment, the patient

developed a life threatening condition with septic shock and severe acute respiratory failure. He was referred to us by the respiratory physician for Extracorporeal Membrane Oxygenator (ECMO). Our ECMO team decided to initiate Veno-venous ECMO (V-V ECMO) and patient was transferred to the Cardiac ICU. Cannulation was performed via the right femoral vein with 25-French drainage cannulae for access and via the right internal jugular vein with 23-French cannulae for return. The ECMO run lasted for 10 days and was successfully terminated.

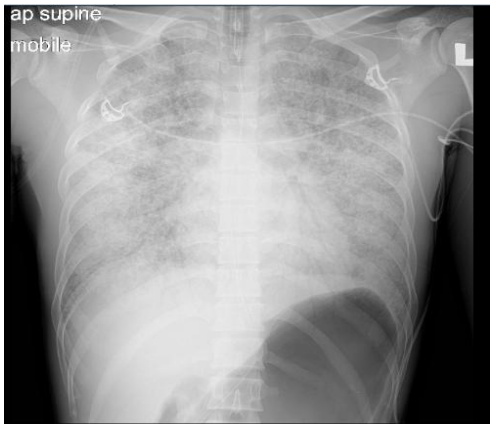

Fig-1: Anterior-Posterior Chest X-Ray at day 1 of admission. There is bilateral diffuse patchy infiltrates. A typical feature of Acute Respiratory Distress Syndrome

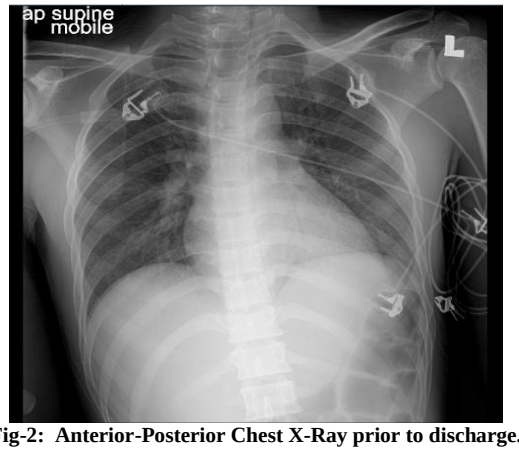

Fig-2: Anterior-Posterior Chest X-Ray prior to discharge. ECMO was successfully terminated after 10 days and 7 days later patient was discharged

DISCUSSION

Leptospirosis patients who developed Acute Respiratory Distress Syndrome (ARDS), requiring Mechanical ventilation, had a high mortality rate of up to 51% [1]. In certain reports, the role of ECMO in ARDS has been controversial, due to conflicting data on its effect on survival compared with conventional ventilator management. However there have been multiple case reports such as by Umei and Ichiba in Japan, Pardinas et al., Liao et al. and Cantwell et al. in which showing that ECMO institution in these patient lead to their survival. In Malaysia however, there have been no reports of this treatment being undertaken. This is partly due to the fact that ECMO remains a novel and expensive form of treatment. It's mostly available only in subspecialised cardiac centres, where there is presence of highly skilled and trained personnel, such as surgeons, anaesthetist and perfusionists, to help manage and troubleshoot the ECMO circuit. Classic manifestations of leptospirosis are due to its pathophysiologic mechanism, in which a bacterial glycoprotein acts as endotoxin and perforates cell membranes [2]. These can affect multiple organ systems, and severe disease can display a wide variety of signs and symptoms. Amongst others are hepatitis, acute kidney injury, acute respiratory distress syndrome (ARDS), and pulmonary hemorrhage, which presents in up to 3.7% of cases [2]. Vandroux et al. reported in the largest case series known so far in treatment of patients with ECMO for Leptospirosis, with a total number of 8 patients shows that mortality appears to be lower than that on other ECMO indications and that leptospirosis is a good indication for ECMO because respiratory failure is profound, but not durable, and leptospirosis doesn't lead to pulmonary fibrosis [3]. However, this study was monocentric and retrospective in nature.

CONCLUSION

We describe a case of Leptospirosis complicated with Acute Respiratory Distress Syndrome and Pulmonary Hemorrhage successfully managed with Veno-venous ECMO. The ECMO run was uncomplicated and patient made a full recovery and was discharged within 20 days of admission.

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