Managing a case of severe neonatal Mpox, the first in a Sri Lankan child

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Case report

A 15-day-old baby girl with fever and a generalized rash was admitted to the National Institute of Infectious Disease (NIID), Angoda, Sri Lanka. The rash had appeared when she was eight days old (Day 1 of illness) following a two-day prodrome of mild fever. Initially, a few vesicles were noted on the neck which disseminated widely affecting all body areas over the following days. With the appearance of the rash, the height of fever spikes increased.

Her parents were living in the United Arab Emirates (UAE) and were employed in the hospitality industry. The mother had arrived in Sri Lanka at 35 weeks of gestation. The father followed four weeks later. The baby had been delivered by normal vaginal delivery at term following an uneventful antenatal period. The birth weight was 3.2kg. As fever persisted, the baby was admitted on Day 8 of illness. Of note, the mother had a few similar lesions on her face and upper limbs which appeared on the day prior to the baby becoming unwell. The father reported a few lesions four weeks before, while in the UAE, which had healed completely by the time the baby was born.

On admission, the baby was febrile and had a generalized rash. Most of the lesions were vesicular with central umbilication and an erythematous halo. Some lesions were pustular (Figures 1 and 2). Mucosal involvement was also present with lesions affecting the lips and inside of the nose. She had discrete cervical, axillary, and inguinal lymph nodes (0.5cm x 0.5 cm).

The baby was tachypnoeic (respiratory rate 80-100/min) with intercostal and subcostal recession but maintained an oxygen saturation of 98% in air on presentation. The heart rate varied between 180-200/min. The baby was handled wearing full personal protective equipment (PPE). All peripheral pulses were palpable and the capillary refill time was normal. She was extremely irritable but was alert and was moving all four limbs. Anterior fontanelle was normal. Abdomen was not distended. There was no organomegaly. There were lesions around the anus but no oedema to suggest proctitis. Labia were extensively involved.

Figure 1: ***Initial presentation on day 8 of illness showing vesicular lesions with central umbilication and an erythematous halo***

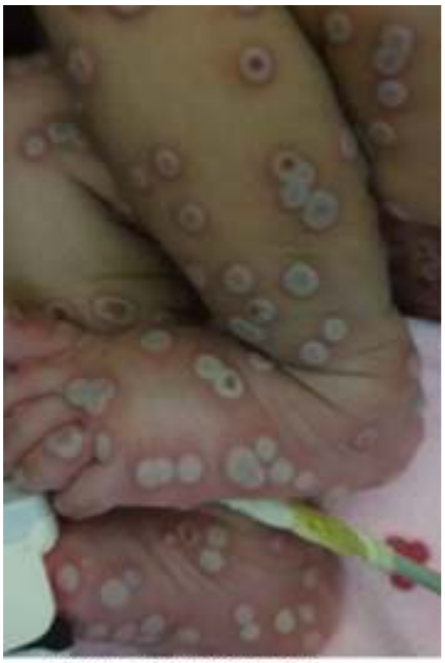

Figure 2: ***Pustular skin***

On admission, the white blood cell count was 29,000/cu mm (N 51.7%), haemoglobin 10.8g/dL, haematocrit 32.9% and platelet count 302,000/cu mm. C-reactive protein (CRP) was 74.7mg/L, aspartate transaminase 41 IU/L, alanine transaminase 35 IU/L, serum creatinine 36mg/dL, serum sodium 135 mmol/L and serum potassium 3.6 mmol/L. Chest x-ray showed bilateral changes suggestive of viral pneumonitis (Figure 3).

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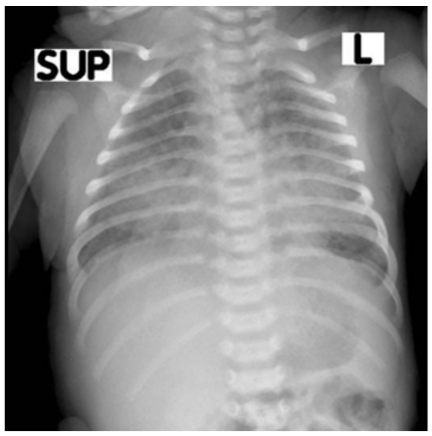

Figure 3: ***Chest x-ray showing viral pneumonitis***

During the course of the admission, the baby's work of breathing increased and the oxygen saturation dropped to 90%. As oxygen administration via nasal cannulae or high flow nasal cannulae was difficult due to lesions in the nose, delivery was via face mask.

Monkeypox virus (MPXV) deoxyribonucleic acid (DNA) was detected from lesions of the mother and the baby by polymerase chain reaction (PCR). Clade classification facility was not available. Intravenous (IV) antibiotic cefotaxime was started but later changed over to meropenem on suspicion of septicaemia. IV immunoglobulin and convalescent serum from the father were started. Antivirals tecovirimat and cidofovir were not available in Sri Lanka. Breastfeeding was continued and daily baths were given.

The baby continued to have new lesions developing until Day 14 of illness. However, by this time the initial lesions were getting crusted (Figure 4).

While the fever spikes were continuing and tachycardia and tachypnoea were persistent, on Day 16 of illness, a cardiac murmur was heard with a palpable liver of 2 cm below the costal margin. Blood gas showed metabolic acidosis with high lactate levels (3.5mmol/L). Initial troponin I which was marginally high, gradually increased to 0.202 ng/ml (normal <0.016ng/ml). The chest x-ray showed cardiomegaly. On clinical suspicion of myocarditis, a 2D echocardiogram was done, a limited study by an adult Cardiologist using the ultrasound scan machine and this showed normal ejection fraction and no pulmonary hypertension and was concluded as possible acute myocarditis. We tried to do an electrocardiogram (ECG) but because of the extensive painful rash, this was not successful. Baby was transfused blood on two occasions, the lowest haemoglobin being 7.3 g/dL. Eye examination by an ophthalmologist showed a lesion on the eyelid but no corneal involvement and no uveitis.

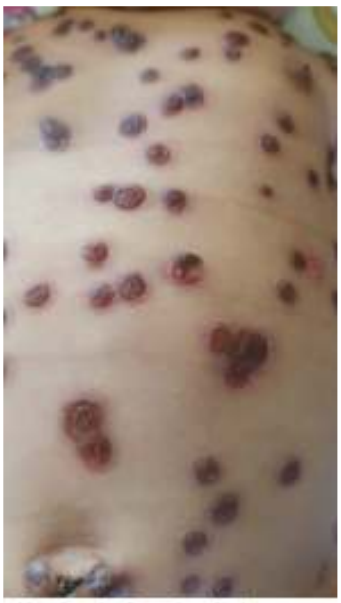

Figure 4: ***Crusting lesions***

On Day 21 of the illness, her condition deteriorated with rising CRP and high procalcitonin; chest x-ray and high-resolution computed tomography (HRCT) showed evidence of secondary bacterial pneumonia. SARS-CoV-2 and influenza PCR were negative. Antibiotics were changed to IV cefoperazone-sulbactam. At this stage, with the assistance of the World Health Organization (WHO) we had the opportunity to have a discussion with the clinical team at Imperial College Healthcare NHS Trust, who had the experience in managing the only reported case of neonate with Mpox so far[1]. This enabled us to enhance our knowledge and confidence in managing our patient.

On Day 23 of the illness our search for an antiviral was fruitful with the WHO sending a stock of oral tecovirimat for use of the baby. Oral tecovirimat 50mg twice a day was started immediately. On day 26 of illness the fever completely subsided (Figure 5).

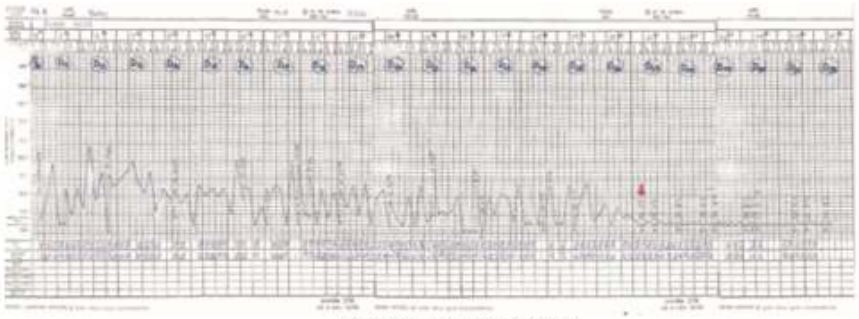

Figure 5: ***Temperature chart***

By Day 30 of the illness baby's general condition remarkably improved. All scabs except for a few had fallen and intact skin formed underneath (Figures 6 and 7)

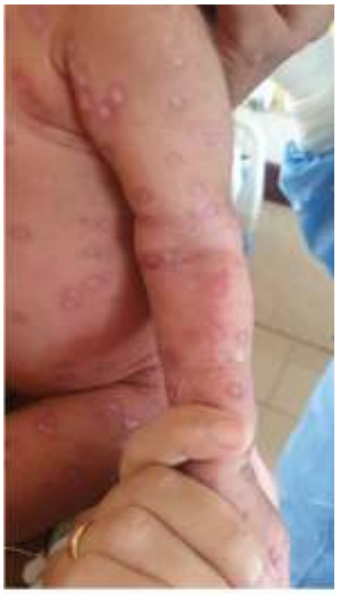

Figure 6: *Healed lesions*

After assessing home conditions, the baby was discharged on Day 30 of illness on home isolation. After discharge, we followed up the patient with video calls and by a physical review in two weeks at the hospital. The baby was noted to be in good health.

Figure 7: *Healed lesions*

Discussion

Mpox (formerly known as monkeypox) has historically been thought to be a zoonotic disease found in rainforest areas of West and Central Africa. The disease is caused by the *Monkeypox virus (MPXV)*, a double stranded DNA virus belonging to orthopoxviruses that are closely related to variola. The virus was first isolated in cynomolgus monkeys kept for research at the Serum Institute in Copenhagen Denmark in 1958[2]. The first reported human case of Mpox was in a 9-month-old child in the Democratic Republic of Congo in 1970[2]. Human to human transmission occurs through direct contact with infectious skin or mucocutaneous lesions and respiratory droplets.

From the end of smallpox vaccination in 1980 following the eradication of smallpox disease, Mpox steadily emerged and developed a niche in Central and Western Africa. In May 2022, a multi-country outbreak of Mpox emerged and the Director General of the WHO declared the outbreak a public health emergency of international concern (PHEIC) on 23rd July 2022. Globally, since the beginning of the outbreak, close to 90,000 cases and 156 deaths have been reported to WHO from 114 countries through August 2023. Sustained decline in the incidence along with no changes in demographics affected, severity and clinical manifestations, led WHO to declare Mpox is no longer a public health emergency of international concern on 11/05/2023.

Mpox among neonates is rare. However, when a baby presents with fever and a rash, Mpox should be considered in the differential diagnosis. Infants are at a higher risk of developing severe disease[1]. Our baby's disease course was complicated with pneumonitis, secondary bacterial pneumonia, myocarditis and anaemia. Only a few patients with Mpox induced myocarditis have been reported[3]. Low haematocrit is common in adults with Mpox[4]. Physiological decline and sepsis in addition to Mpox would have contributed to anaemia in our baby. The only neonate reported (according to the literature search up to 2023 June) had developed pneumonitis requiring ventilation[1]. Therefore, clinicians should be vigilant about possible complications.

Management of babies with Mpox in resource limited countries like Sri Lanka can be challenging. When the WHO declared the disease as a PHEIC, Sri Lanka should have been prepared for a possible outbreak. In this instance the virus was probably imported from the United Arab Emirates (UAE) via father who had the disease before arriving in Sri Lanka. Mother acquired the disease from father and transmitted to the baby perinatally. With globalization, it is important to be aware of the risk of importation of unusual infections that are not endemic in the country.

Currently, there is insufficient data to demonstrate the efficacy of tecovirimat for Mpox disease in humans[4]. Cessation of fever within two days of starting tecovirimat could be a coincidence and may have been due to treatment of secondary bacterial infection. The natural history of Mpox is such that fever could continue up to four weeks and in particular for this baby tecovirimat was started late in the illness when the lesions were starting to crust over. Attending to supportive care such as nutrition, fluid management keeping in mind the insensible losses, pain control and wound care are important in the management of patients with Mpox disease. However, for severe disease, antivirals and antibiotics for secondary bacterial infection may be needed. In the absence of antivirals, we resorted to alternative treatments including intravenous immunoglobulin and convalescent serum from the father. We did not have facilities to check Mpox antibodies. Studies have shown that antibodies elicited directly by infection are able to neutralize the Mpox virus[5]. The grandmother who was vaccinated against smallpox in childhood did not develop the disease even though she cared for both the baby and the mother without adhering to any protective measures. This is perhaps indicative of possible protection the smallpox vaccine may provide against Mpox.

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