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Case Observation

BeneVision N Series' witness of a battle against neonatal asphyxia

issue 3

In Mindray's Case Observation section, you will find "comrades in arms" who encounter similar problems with you; hear different fresh diagnosis and treatment ideas and solutions; learn more comprehensive and intelligent monitoring methods and analysis methods; find more efficient and applicable clinical decision-making experience.

For critically ill newborns, blood oxygen saturation is one of the most important vital signs in NICU, and it is also the parameter, for which every NICU department requires the highest standard on monitors.

Case Introduction:

A female patient who was delivered at Week 32 of GA with a birth weight of 1.5 kg.

Disease Introduction:

Current Diagnosis:

Neonatal respiratory distress syndrome (NRDS), acute respiratory failure, pneumonia, shock, patent ductus arteriosus (PDA), patent foramen ovale (PFO).

Situations that occurred during the hospital transfer:

The patient was transferred from a lower-level hospital. Due to relatively severe infection, the patient was prone to secrete a large amount of sputum, and the airway was prone to be blocked. During the transfer, the patient required sputum suction every half an hour. The patient had relatively poor oxygenation, and oxygen supply must be depending on mechanical ventilation. Her oxygen saturation could be maintained at about 80 – 85% until she was transferred to a higher-level hospital for further treatment.

After being transferred to a higher-level hospital:

Continuous anti-infective therapy, fluid supportive therapy and mechanical ventilation were given in IMV mode, after trying to increase FiO_2 to 60%, the SpO_2 of the patient could be maintained at 90%.

[06:03 p.m.]

The SpO_2 of the patient suddenly **decreased to below 80%**. The doctor immediately checked the airway through laryngoscopy and found that the patient's airway and intubation tube were completely blocked due to continuous excessive sputum secretion, leading to asphyxia, and the patient was immediately subjected to endotracheal tube replacement and airway clearance therapy. (As shown in Figure 1)

Figure 1

[06:05 p.m.]

When the obstructed airway catheter is pulled out and replaced with the manual bag valve mask for temporary ventilation, the asphyxia

was not relieved, **and the SpO_2 and heart rate continued to decline**. When the SpO_2 dropped to about 60%, the doctor decided to complete the tracheal intubation first, and then clear the sputum around the airway as soon as possible after ensuring the normal ventilation status of the patient. (As shown in Figure2)

Figure 2

[06:07 p.m.]

During laryngoscopy-assisted tracheal intubation, the heart rate dropped to below 100 bpm, and the SpO_2 dropped to 44%. The patient was in a critical status. (As shown in Figure 3)

Figure 3

[06:08 p.m.]

The endotracheal intubation was rapidly completed, but the patient's heart rate and SpO2 were extremely low, and her condition was very critical. **The SpO_2 parameter on the monitor is consistent with the patient's status**. (As shown in Figure4)

Figure 4

[06:09 p.m.]

The doctor immediately started to perform cardiopulmonary resuscitation for rescue, in conjunction with manual bag valve mask for rapid ventilation. After 1 minute of cardiopulmonary resuscitation, the patient's heart began to show an upward trend. **The effectiveness of the cardiopulmonary resuscitation was measured by the continuously increasing blood oxygen value on the monitor.** (As shown in Figure5)

Figure 5

[06:10 p.m.]

The patient's heart rate returned to 138 bpm and **SpO_2 returned to 80%**, so this **rescue was considered as successful**.

After the patient's heart rate and SpO_2 steadily rose to the normal range, the airway was cleared after repeated sputum suction for 2 times, so that the patient's airway was kept patent and mechanical ventilation support

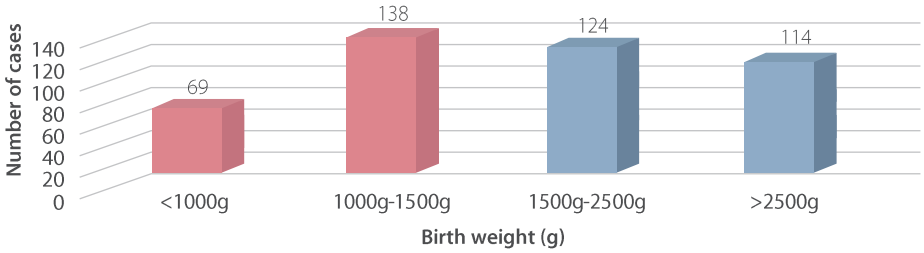
was continued to be provided, and her SpO_2 could eventually stabilize at more than 90%. (As shown in Figure 6)

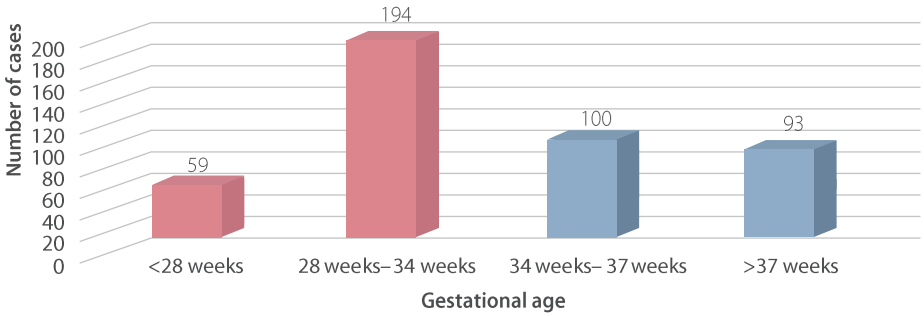
Figure 6

Mindray's Neonatal Patient Monitor ensures stable and continuous output of SpO_2 performance in monitoring neonates, which provides an important reference for clinical medical care and treatment, and protects every precious and weak life.

Extended Reading:

In terms of monitor, Mindray has 30 years of experience in the research of parameter SpO_2, covering neonates, infants and adults, and its accuracy is widely trusted. In 2017, Mindray initiated the clinical validation of blood oxygen monitoring for critically ill newborns, which has been successively carried out in 15 hospitals (80% A-level hospitals), and a total of 446 cases of critically ill newborns were finally included in the study. The distribution of the cases is as follows (the red bar graph – the distribution of critically ill neonatal patients):





Dimensional distribution	Distribution details	Total number of cases collected
Respiratory disease, wet lung of newborns, aspiration syndrome, infectious pneumonia, bronchopulmonary dysplasia, respiratory failure, pulmonary hemorrhage, periodic breathing, apnea, and asphyxia		214
Circulatory system diseases	Patent ductus arteriosus of newborns; shock and hypotension, and congenital heart disease	28
Nervous system diseases	Hypoxic ischemic encephalopathy, neonatal intracranial hemorrhage, neonatal seizures and epilepsy	10
Other diseases	Cyanosis, cold extremities, jaundice, sepsis, etc.	245

Dimensional distribution	Distribution details	Total number of cases collected
Ventilator	Non-invasive ventilation, invasive ventilation	183
Other equipment	Blue light therapy device, mild hypothermia therapy device, sputum suction machine, nasal feeding tube, EEG monitoring, extracorporeal circulation system and other equipment	270
Rescue equipment	Defibrillator; resuscitator	21
Unexpected events	Treatment of neonatal abnormalities, rescue, etc.	8
Daily care	Feeding, changing sheets, changing diapers, wiping the body, turning over and moving, patting, stroking the chest, cleaning the nasal cavity and mouth, carrying and soothing the baby, changing the position of the probe, etc.;	Scenarios recorded in detail during the process
	Dressing change, gastric tube change, sputum suction, enema, anal injection (relaxing the bowels), injection, nebulization, phototherapy, and oxygen therapy	
Examinations	Blood pressure measurement, blood glucose measurement, auscultation, bronchofiberscopy, blood gas measurement, X-ray, ultrasound examination, biochemistry test, and body temperature measurement	

Mindray's neonatal blood oxygen parameter monitoring can meet complex clinical scenarios and strict requirements under the conditions of low gestational age, very low birth weight, different diseases, and simultaneous use of multiple treatment equipment and medical procedures, and continuously maintain accurate and stable output values to protect every beat of life together with doctors and nurses.

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P/N: ENG-Case Observation-210285X6P-20220218

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