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Respiratory Distress Indicative of a Right Bochdalek Hernia in a Central African Newborn

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Abstract

Congenital cupola diaphragmatic hernia (CDH) is a congenital embryopathy which is defined by the absence of development of all or part of a diaphragmatic cupola. We report a case of posterolateral diaphragmatic hernia called right Bochdalek hernia in a three-day-old newborn hospitalized in the neonatology department of the Center Hospitalier Universitaire Pédiatrique de Bangui (CHUPB) for respiratory discomfort, vomiting and fever. Unsuccessful treatment for neonatal staphylococcal infection diagnosis of diaphragmatic hernia was suggested and confirmed on day 18 of life by computed tomography and intraoperatively. The postoperative course was good.

Keywords

Bochdalek Hernia, Newborn, Bangui

1. Introduction

Bochdalek's hernia, one of the clinical forms of congenital diaphragmatic hernia (CDH), is the ascent of abdominal organs into the thoracic cavity through malformative posterolateral diaphragmatic defect called the foramen of Bochdalek [1] [2]. Diaphragmatic hernia results from the absence of closure of the pleuroperitoneal canal between nine and ten weeks of pregnancy [2]. The presence of abdominal organs in the thorax can lead to pulmonary hypoplasia, a reduction in the number of pulmonary vessels with pulmonary arterial hypertension (PAH). The diagnosis of CDH is generally made antenatally during an ultrasound and the planned management. Postnatally, semiology, misleading and varied, may or may not associate respiratory, digestive and sometimes infectious signs [1] [2]. It

is a rare pathology whose prognosis remains generally severe [2] [3]. We report a case of a right congenital diaphragmatic hernia in a Central African newborn revealed by respiratory distress.

2. Case Presentation

It was a newborn male, born on January 23th 2021, weighing 3100 g for 50 cm in height. His father, 28, and her mother, 24, were in apparent good health and not consanguineous. The follow-up of the pregnancy, made by midwives noted the existence of five prenatal consultations and no obstetric ultrasound. The serologies for toxoplasmosis, rubella and syphilis were all negative. A vaginal sample and a cytobacteriological examination of the urine done in the 2nd trimester of pregnancy had isolated an untreated staphylococcus aureus. The delivery was performed vaginally in a level II maternity ward. The newborn was hospitalized on D3 of life in the neonatology department of the Center Hospitalier Universitaire Pédiatrique de Bangui for respiratory discomfort, bilious vomiting, and thermal elevation noted.

At admission, the temperature was 38.5˚C, the respiratory rate at 76 cycles per minute, the heart rate at 172 beats per minute, the Silverman score at 5/10 and the oxygen saturation in ambient air at 80%. The thorax was symmetrical, there was cyanosis of the extremities, crackling rails predominant in the right pulmonary field and a decrease in the right basithoracic vesicular murmur. The chest ultrasound showed minimal right pleural effusion and the cardiac ultrasound was normal. Haemoglobin was 11 g/dL, platelets at 70,000/mm^3, white blood cells at 9000/mm^3, C-reactive protein at 105 mg/L, serum creatinine and blood ionogram were non-abnormality as well as two blood cultures. The hypothesis of a neonatal infection with pulmonary localization was retained and a probabilistic treatment of cefotaxime, ampicillin and gentalline relayed by vancomycin combined with general resuscitation measures and whole blood transfusion was instituted. At day 10 of hospitalization, a chest x-ray made in front of the accentuation of respiratory distress (**Figure 1** & **Figure 2**) showed hydro-aeric images

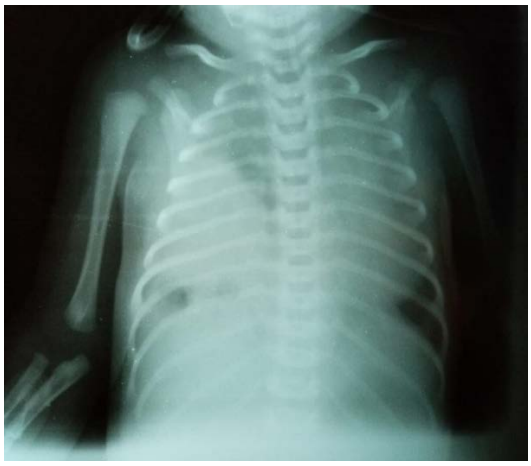

Figure 1. Picture of first chest X-ray.

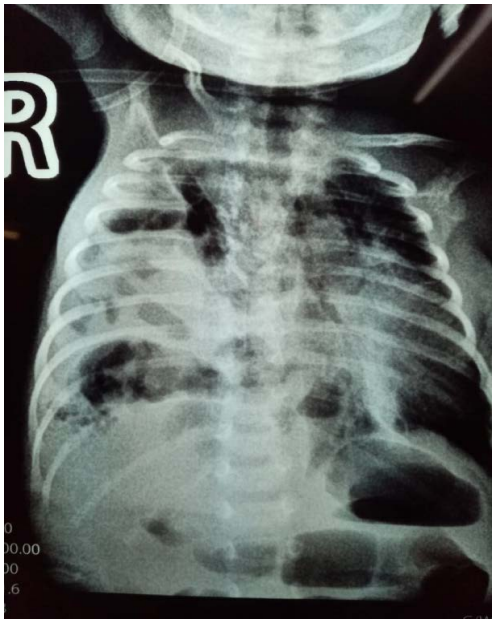

Figure 2. Picture of control chest X-ray.

with discharge of the heart and mediastinum on the left. The diagnosis of right diaphragmatic hernia was evoked and confirmed by a computed tomography (CT) scan made on Day 18 of life (**Figure 3**) showing hydro-aeric images of the right hemi thorax that communicated with the abdominal contents through a 20 mm retro hepatic orifice. After stabilization of the hemodynamic state, the newborn was operated on at Day 24 of life. He had a right Bochdalek hernia associated with poor intestinal rotation (**Figure 4**). The surgery consisted of the closure of the Bochdalek foramen and an anterograde appendectomy. The operative follow-up was good, the exit of the newborn was made at day 35 of life. It weighed 4000 kg for a height of 51 cm. He was reviewed 2 months after hospitalization in perfect health without digestive or respiratory disorders. We offered specialized and multidisciplinary care until adulthood. Information about possible complications of the pathology was given to the parents.

3. Discussion

Congenital diaphragmatic hernia is a rare pathology whose incidence varies between 1/3000 and 1/5000 live births [1] [2] [4] [5] [6]. It develops between the 6th and 8th week of embryogenesis, following the abnormal cessation of the development of the diaphragm in the posterolateral region resulting in the abnormal persistence of a diaphragmatic breach [2] [7]. Generally, the diaphragmatic breach is unilateral, with a predilection on the left in 80% to 90% of cases and posterolateral 85%, exceptionally bilateral [1] [4] [5] [8]. The right posterolateral location of bochdalek's hernia as found in this observation is a rare entity. We report the second Central African case of CDH, the first, published by GODY in 2021 was of left location [2] [6] [8]. CDH is more common in boys as in this observation and that of GODY [7] [9].

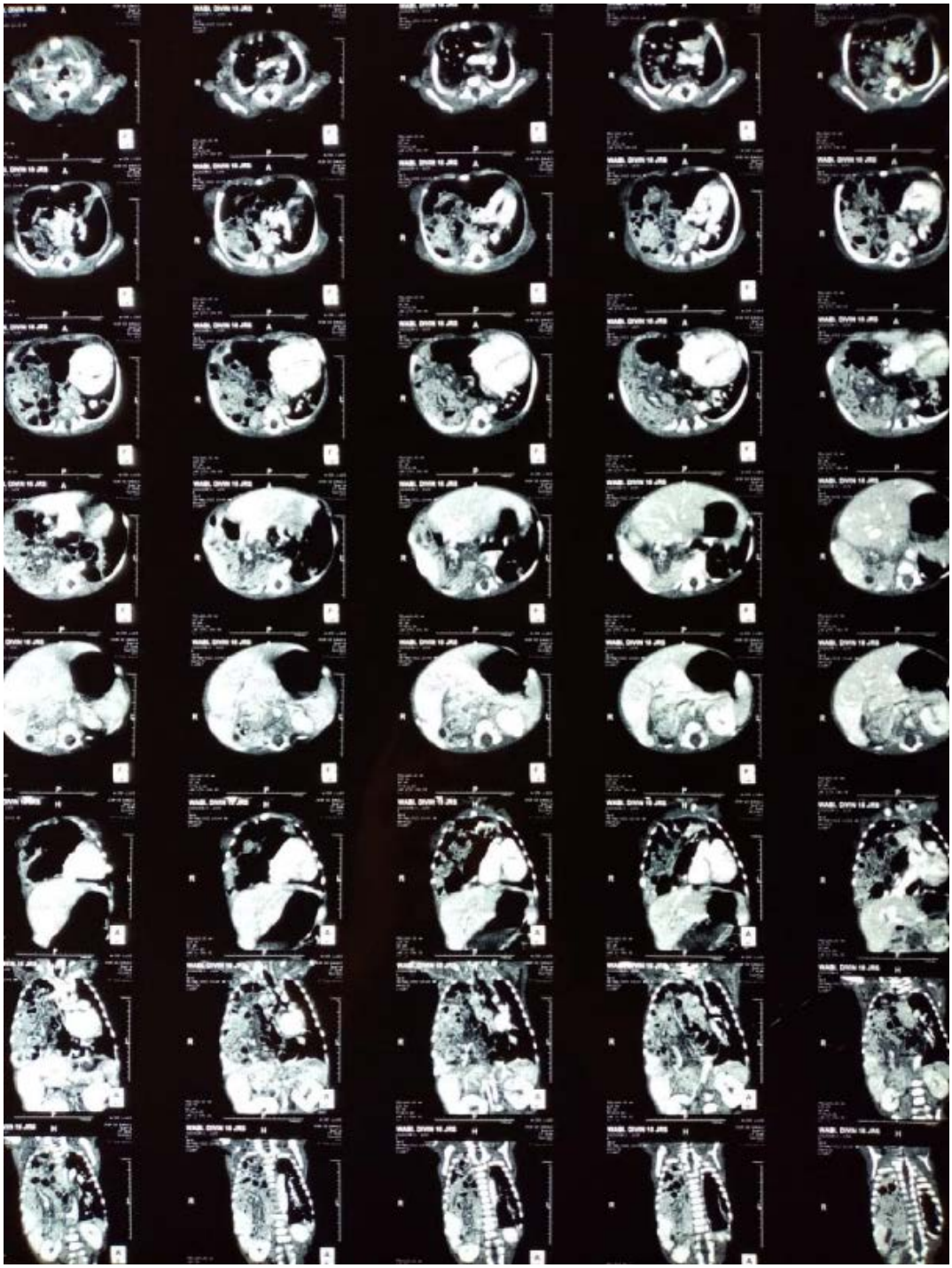

Figure 3. Picture of computed tomography of the newborn.

Antenatal diagnosis of hernia of the diaphragmatic cupolas is currently possible thanks to ultrasound before the 22nd week of amenorrhea in front of the highlighting of herniated organs in the chest, often associated with a deviation of the heart and hydraminios. Fetal MRI assesses the degree of pulmonary hypoplasia. Ultrasound not performed in this case during pregnancy means that at this stage the diagnosis was not possible.

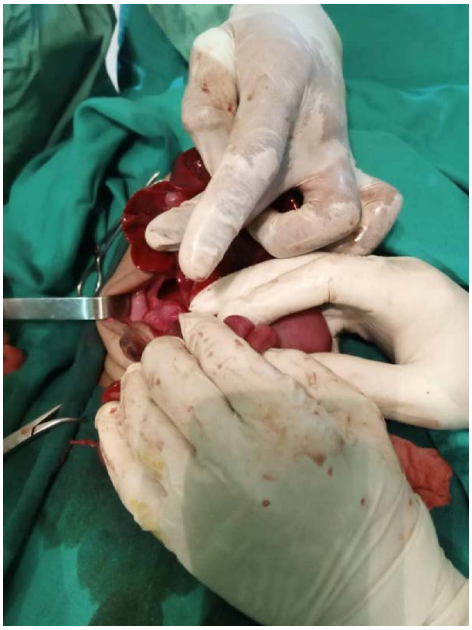

Figure 4. Figure of the newborn in intra-operative.

After birth, CDH exhibits clinical disparity and the mechanism of delayed clinical expression is poorly understood. It would be the obstruction of the diaphragmatic hernial orifice by the abdominal organs such as: the liver or the spleen which would condition the time of appearance of the signs [10] [11] But, it is known that in 5% to 25% of cases, congenital diaphragmatic hernia is revealed in the neonatal period and in the majority of cases during childhood and rarely in adulthood [12] [13]. In the early neonatal period, the diagnosis of CDH can be made in front of the triad: respiratory distress as in this observation, deviation of heart noises and a flat abdomen, see in front of a picture of acute asphyxiation [8] [13]. Chest X-ray better thoraco-abdominal, confirms the diagnosis by showing the digestive hydro-aeric images in the chest. Which were unfairly considered in this observation as infectious pulmonary images, justifying anti-staphylococcal antibiotic therapy. In the late neonatal period, digestive manifestations are usually in the foreground [8] [10] [11]. At this time, the diagnosis may be later when it comes to minor forms whose symptoms are respiratory and digestive difficulties (gastroesophageal reflux). In these cases, the systematic chest x-ray is the presumptive examination and the computed tomography allows the diagnosis to be made in case of radiographic doubt [1] [8] [10] [14]. CDH is isolated in more than half of cases and in about 40% of cases, there are associated malformations such as: heart disease, cleft lip and palate, abnormalities of the nervous, renal or bone system and or chromosomal abnormalities. We noted an association with an intestinal rotational anomaly with appendix to the left intraoperatively as reported by Hmadouch *et al.* [1].

The objectives of neonatal care are to reduce immediate mortality, essentially related to a failure to adapt to ectopic life, but also to put in place, from birth, measures to prevent morbidity in the long term.

Surgical treatment, one of the main therapeutic weapons [1] [2] [8] [14], consisted in this case in the reduction and closure of the Bochdalek foramen on the 24th day of life. An anterograde appendectomy was associated with it as well as general resuscitation measures.

The course of CDH depends on the clinical form and associated malformations. But, some congenital diaphragmatic hernias even isolated are serious and responsible for death in the first hours of life, and others compatible with normal life after surgical treatment [15]. The evolution of this newborn was favorable to his exit at Day 35 of life and 3 months of outpatient follow-up.

4. Conclusion

Bochdalek's hernia is a rare birth defect. Its clinical polymorphism explains the possibility of misdiagnosis. Its antenatal diagnosis is possible. In post-natal, respiratory and digestive symptoms helped by chest X-rays make it possible to evoke the diagnosis which is confirmed by the CT scan.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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