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Omphalocele: Conservative Management Using a Natural Approach in a Resource-Limited Setting

—Series of Three Cases Observed at the La Bavière Specialised Paediatric Medical Centre, Haut-Uélé, Democratic Republic of the Congo

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Abstract

Introduction: Omphalocele is a congenital malformation characterized by the failure of the abdominal wall to close. It is presented as a hernia of varying size at the base of the navel. Omphalocele is a public health problem worldwide. It affects approximately 1 in 10,000 births, with an overall mortality rate estimated at between 10% and 65%. The objective of this study was to describe the clinical aspects and management of omphalocele at the La Bavière Pediatric Medical Center in Haut-Uélé (CMB). **Patients and Methods:** This descriptive case series, conducted at the La Bavière Health Pediatric Medical Center in Durba (DRC) between January 2024 and April 2025, reports on three newborns hospitalized for omphalocele. Clinical, therapeutic, and evolutionary data were collected from medical records and analyzed descriptively, in accordance with the ethical principles of the Declaration of Helsinki. **Results:** Three children were included, none diagnosed prenatally, and the patients' ages ranged from 3 to 7 days old. The newborns' weights ranged from 3 to 4 kg. It predominates in boys living in rural areas and disadvantaged families in 66.6% of cases. The types of omphalocele identified were type 2 (67%) and type 3 (33%). No patients had cardiac or other associated malformations. Fe-

ver was noted in 33.3% of cases, while omphalitis or local infection of the umbilical stump was present in 66.6% of cases. All patients were treated using a non-operative management: application of a compression dressing made from zinc oxide and Flammazine®, held in place with elastic bandages and adhesive tape, until complete epithelialization of the abdomen. Dehydration, malnutrition, and anemia were the main complications. The length of hospital stay ranged from 10 to 45 days. All patients progressed favorably without the need for surgery. The cure rate was 100%. All patients came from areas of artisanal and industrial mining, with heavy use of cyanide, mercury, and toxic products. **Conclusion:** Omphalocele is a global public health issue in both industrialized and developing countries. In the absence of associated malformations, local care using compression dressings with emollients offers good results in low-resource countries.

Keywords

Omphalocele, Management, Bavaria, Public Health, Non-Operative Management, DRC

1. Introduction

Omphalocele is a defect in the closure of the anterior abdominal wall, resulting in the protrusion of part of the abdominal contents, covered by a membrane consisting of deep peritoneum and superficial amnion. This congenital anomaly, which can be shocking for parents, requires the most relevant prenatal counseling possible, particularly regarding the frequent associated anomalies, ideally starting in the first trimester.

The estimated prevalence in the Paris region was 6.8 cases per 10,000 births between 2009 and 2013. During the same period, there was a 70% rate of medical termination of pregnancy (MTP) and a 2% rate of intrauterine fetal death (IUFD) (source: InVs). The incidence is higher in women over 35 or under 20. Affected newborns are more often boys [1].

In Africa, it varies between 1 in 2000 births and 1 in 11,000, with an estimated overall mortality rate of between 10% and 65% [2].

In the West, prenatal diagnosis of omphalocele is now usually made in the first trimester in more than 90% of cases [1]. This allows for planned delivery in hospitals equipped to care for these newborns in neonatal surgery and intensive care units. In these countries, it is currently considered a benign condition with a survival rate of 97% [3].

In developing countries, limited access to prenatal diagnosis and the scarcity of neonatal surgery services mean that this condition is often diagnosed after birth, with treatment most commonly provided in pediatric and pediatric surgery departments. Other malformations, especially cardiac malformations, are associated with omphaloceles in approximately 50% of cases and constitute a major prog-

nostic factor [4].

Less documented in our country, hence this study, which aimed to describe the clinical aspects and management of omphaloceles at the La Bavière Health Specialized Pediatric Medical Center in Haut-Uélé.

2. Patients and Methods

2.1. Study Design and Framework

This is a case series study with a documentary focus based on the clinical and therapeutic characteristics of three patients hospitalized for omphalocele. The study was conducted at the La Bavière Health Pediatric Medical Center in Durba, Haut Uélé, Democratic Republic of the Congo, over a period from January 2024 to April 2025. This hospital is a regional reference center for the treatment of congenital malformations and, above all, for health promotion, with a capacity of more than 100 beds, which justified the choice of this site as the study location.

2.2. Population and Selection Criteria

The cases included correspond to newborns admitted with a confirmed clinical diagnosis of omphalocele, *i.e.*, three cases during the period of our study. The inclusion criteria required a complete medical record, including demographic data, morphological characteristics of the malformation, therapeutic modalities, and hospital progress. Patients who were transferred without follow-up or whose records were incomplete were excluded in order to ensure the validity of the observations. Infants and newborns with other malformations not consisting of a diagnosis of omphalocele were also excluded.

Omphaloceles were grouped into three categories according to the anatomical or morphological classification, including Type I (minor or small omphalocele: containing only intestinal loops, generally < 5 cm), Type II (major or large omphalocele: containing the liver, sometimes the stomach and other viscera, ≥5 cm), and Type III (giant omphalocele with a large sac > 8 - 10 cm and massive exteriorization of the liver and digestive tract) [3] [4].

2.3. Variables and Data Collection

The variables studied included age, sex, geographical origin, size and contents of the omphalocele sac, the presence of associated anomalies, and surgical or conservative treatment modalities. Data were extracted from admission records, surgical reports, and nursing notes, then recorded in a standardized grid. Data collection was performed by a single investigator in order to limit transcription bias and ensure consistency of information.

2.4. Analysis and Presentation of Results

The analysis was based on descriptive methods, with calculation of frequencies, proportions, and measures of central tendency adapted to the small sample size.

The results are presented in the form of narrative descriptions detailing the evolution of each patient. This close, quantitative, and qualitative analysis highlights the similarities and differences between cases, while contextualizing local care practices.

2.5. Ethical Considerations and Limitations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki, with data anonymization and prior institutional authorization. Parental consent was sought for the use of information for scientific purposes. The main limitations are the small sample size and the absence of a comparison group, which limits the generalizability of the results.

However, this case series makes a relevant contribution to the regional literature on omphalocele and highlights the specific challenges of care in a resource-limited setting.

3. Results

In our series, three cases of omphaloceles were admitted to the neonatal unit of the La Baviere Durba Specialized Medical Center in Haut-Uélé, DR Congo.

It predominantly affects boys living in rural areas. Dehydration, malnutrition, and anemia are the main complications.

The patients' ages ranged from 3 to 7 days old. Most were from rural areas (66.6%) and disadvantaged families (66.3%). The newborns' weights ranged from 3 to 4 kg. The types of omphalocele identified were type 2 (67%) and type 3 (33%). No patients had cardiac or other associated malformations. Fever was noted in 33.3% of cases, while omphalitis or local infection of the umbilical stump was present in 66.6% of cases. All patients were treated using the non-operative management: application of a compression dressing combined with an antimicrobial agent until complete epithelialization of the abdomen. Treatment also included antibiotic prophylaxis with Cefotaxime (Claforan®), Metronidazole (Flagyl®), and Gentamicin. One patient developed anemia and received a transfusion on day 14.

The cure rate was 100%. Dressings were made from zinc oxide and Flammazine®, held in place with elastic bandages and adhesive tape. Rehydration was achieved using a 10% glucose solution and medical milk was administered. The length of hospital stay varied from 10 to 45 days.

The mothers' ages ranged from 15 to 35 years, including primiparous, pauciparous, and multiparous women. All patients came from areas of artisanal and industrial mining, with heavy use of cyanide, mercury, and toxic products such as chemical fertilizers. No deaths were recorded, and all patients progressed favorably without the need for surgery.

4. Discussion

4.1. Frequency

We received three cases of omphaloceles out of 35 cases of congenital malfor-

mations recorded over a 14-month period, which is a low frequency compared to the Malian series, which includes 72 cases over three years [2], or the Ivorian series, which includes 80 cases over nine years, and the Cameroonian series, which includes 10 cases over five years [5] [6].

Our study covers a small series, but it shows that unlike in countries where surgery is successful in cases of omphalocele, in our countries with limited resources and in the absence of associated malformations, the non-operative management of progressive compression dressing using sterile compresses and an antimicrobial such as flamazine is effective, held in place with Velpeau bandages and adhesive tape, it is often offers a safe, accessible, and beneficial solution compared to surgery with all its complications and high risk of death [6]-[9].

The high frequency of type I omphaloceles, 66% in our study, is similar to the Cameroonian series (60%), but too high compared to the series by Kanté *et al.*, who found 26% of type I omphaloceles, and the series by Kouamé *et al.*, who found 44% of the same type.

Gender does not appear to be a risk factor. Several studies [10], including ours, found more boys than girls (two boys and one girl). This male predominance is also found in the literature [11]. However, there is still no consensus regarding this male predominance. Girls outnumbered boys in an American study [12].

4.2. Admission Delays

The clustering of omphalocele cases in mining areas is a noteworthy finding that raises concern about environmental teratogens. Artisanal mining in regions such as Nord-Kivu frequently involves exposure to heavy metals (lead, cadmium, arsenic, mercury) and cyanide, which are well-documented for their teratogenic potential. These substances can cross the placenta, disrupt embryonic development, and have been associated with congenital malformations, including abdominal wall defects, in both human and animal studies [13]-[15]. Chronic maternal exposure through contaminated water, food, or inhalation of dust may therefore contribute to the occurrence of omphalocele in these communities, highlighting the need for environmental health surveillance and targeted epidemiological studies.

In addition to environmental risks, delays in neonatal admission remain a major determinant of poor outcomes. While in developed countries newborns with omphalocele are admitted immediately after birth [16] [17], our study observed delays ranging from 3 to 7 days, longer than those reported by Bankole (2 days) [18], Kouamé *et al.* (24 hours) [19], and Malagasy (24 hours) [20]. Such delays increase the risk of complications such as infection and rupture of the sac [21] [22]. Contributing factors include scarcity of neonatal services, long distances with impassable roads, and lack of medical transport. Training staff in peripheral health centers to stabilize neonates prior to transfer could improve survival rates, especially in resource-limited and environmentally hostile settings such as mining zones.

4.3. Distribution of Patients According to Maternal Age

According to the literature, the risk of malformation appears from the age of 30, but especially after the age of 35 [8]. The highest risk is between the ages of 35 and 40 [4] [9] [23]-[25]. Chromosomal abnormalities in children of older mothers are common [23]. The age of mothers in our series ranged from 15 to 35 years, which is consistent with Hamisu's 2005 retrospective study in the US covering the period from 1983 to 1999, which found that 89% of mothers of 1010 children with omphalocele were young and 11% were older [7] [8].

4.4. Mode of Delivery

The rate of vaginal delivery in our series (66.7%) is similar to that in Tunisia and Côte d'Ivoire [25]-[28]. This contrasts with developed countries, where there is a high rate of cesarean sections, which is thought to be related to the development of prenatal diagnosis, which raises the possibility of obstetric indications [21]. In our setting, some deliveries take place in remote health centers without a doctor to make a clinical diagnosis of omphalocele.

4.5. Prognosis and Progression

When there are no visceral malformations, patients with omphalocele are more likely to survive than those with associated visceral malformations [26]. This is equivalent to our case, where all patients survived, with a 100% recovery rate, unlike other African series where mortality is 20% to 30% [19] [22] [23]. This mortality rate remains high for a benign condition compared to Western series, which are increasingly treated surgically with survival rates between 97% and 100% [11] [29] [30].

The absence of associated congenital malformations in our study or their low frequency in other African studies (11 cases of associated malformations for Kouamé *et al.* in a series of 80 omphaloceles) may be linked to the limitations of our cardiac examination methods, both antenatally and immediately postnatally [11] [27] [30].

However, the frequency of these associated malformations means that they must be investigated, given their importance in the prognosis for the treatment of omphalocele [4] [17].

The same applies to prenatal diagnosis, which was not performed in our patients, even though this diagnosis is increasingly recommended and introduced in Africa, with 10% of antenatal diagnoses in an Ivorian series [27] [30]. In our context, the majority of pregnant women do not receive ideal care. Ultrasound scans are not performed, or are performed by poorly qualified staff. However, the value of this examination is well established in the prognosis of omphaloceles and the search for associated malformations. This practice makes it possible to plan for the mother-to-be to give birth in a suitable healthcare facility, thereby reducing infectious complications in particular [31].

5. Conclusion

Omphaloceles are a global public health problem in both industrialized and developing countries. In the absence of associated malformations, local care using compressive dressings with emollients offers good results in low-resource countries. Pediatrics Bavaria has had good experience with this approach as a non-invasive approach, well adapted to resource-limited settings in developing countries, such as the Democratic Republic of the Congo.

Conflicts of Interest

The authors declare no conflict of interest in relation to the conduct of this study.

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