Techniques and Results of the Conservative Treatment of Giant Omphalocele with 2% Disodium Aqueous Eosin

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Abstract

Aim: Describe the techniques and results of the conservative treatment of giant omphalocele with aqueous eosin.

Material and Methods: It was a 15 years conservative treatment retrospective study of giant omphalocele with 2% disodium eosin aqueous. The technique consisted of the twice a day application of 2% eosin on the omphalocele bag (sterile solution for cutaneous application). The technique was taught to the mother to continue with the outpatient care. We studied the duration of hospitalization, the learning curve of the technique through the mother, the intercurrent complications, the complete epithelialization percentage and the mortality.

Results: A total number of 173 giant omphaloceles had a conservative treatment with 2% aqueous eosin. The average length of hospitalization was 21 ± 6 days. The learning curve of the application of the aqueous eosin on the bag omphalocele through the mother was 10 ± 3 days. Complications of treatment were 22% functional bowel obstruction and 18% infection of the omphalocele bag. The complete epithelialization of the omphalocele bag after the application of the 2% aqueous eosin was 68.5%. The mortality was observed in 25.5% of cases.

Conclusion: The giant omphalocele conservative treatment with aqueous eosin is a simple, efficient technique and a good alternative to surgery. The learning through the mother reduces the length of hospital stay.

Keywords: Aqueous eosin; Newborn; Omphalocele; Conservative treatment

Introduction

The surgical treatment of giant omphaloceles causes hemodynamic and respiratory complications, increasing their mortality rate. To reduce the morbidity and mortality of giant omphalocele surgical treatment, several conservative treatments are used [1-3]. The iodized polyvidone and mercurochrome have long been used for their ability to desiccate and epithelialize the bag but complications such as hypothyroidism and mercurial poisoning have been described. More recently, the use of VAC® (Vacuum Assisted Closure) Therapy® in the conservative treatment of giant omphalocele has been described [4]. In a previous study, we focused on the yet high mortality in surgical treatment of omphalocele due to a lack of technical capacity [5]. From this fact, over the last fifteen years, we give priority to the conservative treatment of giant omphalocele with 2% disodium aqueous eosin. The aim of this study was to describe the technique and results of the conservative treatment of giant omphalocele with 2% disodium aqueous eosin.

Material and Methods

It was a retrospective study over a period of 15 years (from January 1997 to December 2012) in the Pediatric Surgery Department of the University Hospital of Yopougon, Abidjan, Ivory Coast. All unruptured omphalocele were included, with a collar diameter greater than 4 cm, which had a conservative treatment with 2% disodium aqueous eosin.

Description of the conservative treatment technique with 2% disodium aqueous eosin

Omphalocele bag traction was performed in the early days to prevent her downfall and maceration in contact with the skin. The treatment consisted of a twice a day application of the 2% disodium aqueous eosin on the entire omphalocele translucent membrane. This application was continuing until the bag was completely desiccated and epithelialized. When intercurrent complications such as infection of the bag, were appearing, the treatment was of local health-care with a concentrated sodium hypochlorite solution (DAKIN COOPER STABILIZED®). Local care at the infected part was used twice a day with sterile gauze pads soaked in concentrated sodium hypochlorite solution until its complete disinfection. After this local disinfection, the twice a day application of aqueous eosin was continued until the complete epithelialization of the translucent membrane (Figure 1). All patients had a parenteral antibiotic prophylaxis with amoxicillin 50 mg/kg/24 in two intakes and Metronidazole 30 mg/kg/24 h in a single intake.

When patients had intercurrent bowel functional disorders, we set up an electrolytic hydro rehydration, a digestive rest, a gastric suction by siphoning and a urinary catheter. Energy inputs were provided by the solutes of 10% glucose serum. The resumption of normal bowel function was helped by the parenteral administration of trimebutine maleate (Debridat® PFIZER) and evacuator enemas with lauryl sulfaoacetate sodium (Microlax®) rectal solution for babies: Johnson & Johnson, Health Beauty, France). The gastrografin was used in 2 cases after failure of enema with Microlax®. During hospitalization, we were

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teaching to mother the application of the 2% aqueous eosin on the omphalocele bag under the supervision of nurses.

The discharge of the newborn was allowed when the mother had a good knowledge and good practice in the application technique of eosin and that the bag had started epithelializing. Other discharge authorization criteria were the absence of clinical signs and biological infection, stable vital signs, a regular bowel transit, a normal feeding and a regular weight gain. After discharge, newborns had an external follow-up once a week to control the good application of the eosin until complete epithelialization.

We examined

The number of giant omphalocele treated over the period and the annual frequency, the study of associated anomalies, the care period in hours, the duration of hospitalization in days, the duration of the learning curve through the mother expressed in days, the duration for complete epithelialization expressed in days. Complications (the infection of the bag, the detachment of the epithelialization plate, functional bowel disorders) have been identified. The number of omphalocele completely epithelialized was defined and expressed in percentage. The mortality throughout the treatment was defined.

Results

A total number of 173 unruptured omphaloceles was treated with the topical application of 2% disodium aqueous eosin over the study period. The annual rate was 11.53 ± 3 of giant omphaloceles. The giant Omphaloceles were the ones whose diameter was superior to 4 centimeters, also called "amniocele", the abdominal defect extends a varying distance supra-umbilical. Their bag contains small bowel, sometimes liver or heart [6].

The morphological abnormalities were associated with

The Beckwith-Wiedemann syndrome was observed in 15 cases (8.6%). Eight cases with major abnormalities of the Beckwith-Wiedemann syndrome combining omphalocele, macrosomia and organomegaly, and 7 cases with minor neonatal hypoglycemia abnormalities. Genitourinary abnormalities were observed in 5 cases (2.8%), it was hypospadias in one case and unilateral cryptorchidism in 2 cases. The echocardiography revealed 7 abnormalities with 4 inter auricular communications (IAC) and 3 inter ventricular communications (IVC).

One case of anal imperforation (0.5%)

The average time of care was 28 hours with 3 hours to 144 hours extremes.

The average hospital stay was 21 ± 6 days.

The learning curve of the topical application technique of 2% aqueous eosin through the mother was 10±3 days.

The average duration for the complete epithelialization was 70 ± 7 days.

Major intercurrent complications observed were, functional bowel disorders in 38 cases and infection of the bag in 31 cases. Bag infections occurred during the treatment in most cases in the second week, at the beginning of epithelialization and the bag drying. Bag infections were treated before discharge of the patient.

The complete epithelialization of the bag was observed in 118 cases (68.5%) (Figure 2)

In 10 cases of functional occlusion, surgery was performed with operative reduction of the omphalocele. The mortality, during treatment period, concerned 44 omphaloceles (25.5%). The causes of the death were functional intestinal occlusion in 15 cases, septic shock in 11 cases, cardio–vascular collapses in 7 cases and unknown in 11 cases.

Discussion

The conservative treatment with 2% aqueous eosin ensures an epithelialization of over one third of unruptured omphaloceles. The 2% disodium aqueous eosin is a sterile topical solution for skin application whose active ingredient is disodium eosin. We describe for the first time, its use in the conservative treatment of giant omphaloceles. We use this conservative treatment for over ten years with satisfactory results. The eosin disodium topical application ensures a progressive epithelialization of the omphalocele bag. This is a simple technique that the mother can easily learn. The learning curve of the application technique over a period of about ten days allows the mother to continue with the topical care at home. The continuity of topical care can be non-resident, thus giving way to early discharge.

Major intercurrent complications of this technique continue to be the infection of the bag and functional bowel disorders. The infection of the bag is in the form of a detachment of the desiccating bag and of the collar part already covered with a cutaneous envelope. The infected part is in most cases successfully treated with local care using sodium hypochlorite.

The aqueous eosin is cheapest and available in all countries. The conservative treatment with aqueous eosin except its ease of use, is its modest cost, is its accessibility which allows using it in any situations.
Functional bowel disorders are more difficult to treat. They carry a true bowel obstruction for which the treatment generally requires a digestive exclusion, a digestive aspiration, an antibiotics and a digestive transit regulator. In the absence of clinical improvement with this treatment regimen, we perform an evacuating enema with gastrografin. The omphalocele conservative treatment, using healing agents such as mercuriochrome and alcohol have been proposed since 1899 [7].

Other antiseptic such as iodised polyvidone has long been used [2,3]. Various complications have been attributed to these antiseptic. The mercurial and alcohol poisoning have been described along with Mercurochrome and alcohol. Iodised polyvidone has long been used effectively in the conservative treatment of giant omphaloceles. While some teams charge the use of iodised polyvidone with hypothyroidism, others consider that its use does not disrupt thyroid function [1]. More recently, some teams have successfully used zinc sulfadiazine cream in the waiting treatment of giant omphaloceles. The use of VAC therapy has been recommended for the waiting treatment of giant omphaloceles [8]. This is a technique used for the treatment of chronic wounds by creating negative pressure to the wound and it promotes formation of granulation tissue [4,9].

Despite advances in anesthesia and neonatal resuscitation, the omphalocele surgical treatment causes serious complications incurred in the postoperative mortality [5,10-13]. The main complications implicated in the postoperative mortality are: sepsis, respiratory failure and hemodynamic instability [5,13,15]. The omphalocele mortality rate varies according to studies, from 8% to 33% depending on minor or major forms [16].

Conservative treatment with aqueous eosin can be used in the giant omphalocele with respiratory distress syndrome, hemodynamic instability due to the intra-abdominal pressure. Primitive reintegration of large omphalocele often leads to immediate postoperative death by cardiovascular failure or a long neonatal resuscitation [14]. Primitive surgery can also leads to serious post operative complications as liver ischemic necrosis, small bowel necrosis with long hospital stay. Conservative treatment is a very good alternative in these cases with hemodynamic instability.

The mortality in our study involved one in four newborns. These deaths occur as consequences of the bag sepsis which cause extended intestinal disorders. These functional bowel disorders are real functional occlusions by paralytic ileus due to inflammatory symptoms associated with the infection. In these neonates, the extended digestive exclusion leads to hydro-electrolyt and nutritional disorders, cause of death; the parenteral nutrition is not yet applied in our unit. We have not studied correlation between functional bowel disorders and the size of the omphalocele. The anomalies of contents such malrotations and volvulus may also contribute to the elevated rate of functional bowel disorders in the conservative treatment [6]. When the epithelialization is complete, children are followed until the age of two. We offer a cure for large residual umbilical hernia before the integral verticalization of the child to prevent growth disorders of the lumbar spine.

**Conclusion**

The topical application of 2% aqueous eosin on giant omphaloceles promotes epithelialization of the bag. It is a simple conservative technique, practical, easy for child's mother to learn. It helps reduce the length of time spent in hospital. Functional intestinal obstruction remains the main complication that strikes the mortality rate of this conservative technique.

**References**


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