Original Article

Access this article online
Website: www.afrjpaedsurg.org
DOI: 10.4103/0189-6725.132825
Quick Response Code:

Outcomes of conservative treatment of giant omphaloceles with dissodic 2% aqueous eosin: 15 years' experience

B. D. Kouame, T. H. Odehouri Koudou, J. B. Yaokreh, M. Sounkere, S. Tembely, K. G. S. Yapo, R. Boka, M. Koffi, A. G. Dieth, O. Ouattara, A. da Silva, R. Dick

ABSTRACT

Background: The surgical management of giant omphalocele is a surgical challenge with high mortality and morbidity in our country due to the absence of neonatal resuscitation. This study evaluates conservative management of giant omphalocele with dissodic 2% aqueous eosin. **Materials and Methods:** In the period from January 1997 to December 2012, giant omphaloceles were treated with dissodic 2% aqueous eosin. The procedure consisted of twice a day application of dissodic 2% aqueous eosin (sterile solution for topical application) on the omphalocele sac. The procedure was taught to the mother to continue at home with an outpatient follow-up to assess epithelialization. We studied the duration of the hospital stay, the learning curve of the procedure by the mother, the complications, the duration and the percentage of complete epithelialization and the mortality. **Results:** A total of 173 giant omphaloceles had a conservative treatment with dissodic 2% aqueous eosin. The average hospital stay was 21 ± 6 days. The learning curve by the mother of the procedure was 10 ± 3 days. Complications of treatment were intestinal functional occlusion 22% and omphalocele sac infection 18%. The complete epithelialization of the omphaloceles sac after application of dissodic 2% aqueous eosin was 68.5%. Mortality was observed in 25.5%. **Conclusion:** Conservative treatment of giant omphaloceles by dissodic 2% aqueous eosin is a simple, efficient and a good alternative to surgery. The mother can easily learn its procedure which reduces the duration of hospital stay.

Key words: Conservative treatment, dissodic aqueous eosin, new-born, omphalocele

Department of General Pediatric Surgery, Teaching Hospital of Yopougon, BP 632 Abidjan, Côte d'Ivoire

Address for correspondence:
Prof. B. D. Kouame,
21 BP 209 Abidjan 21, Ivory Coast.
E-mail: kouadb@yahoo.fr

INTRODUCTION

Surgical treatment of the giant omphaloceles leads to several haemodynamic and respiratory complications which increase their mortality. To reduce the morbidity and the mortality of the surgical management of the giant omphalocele, conservative's treatments with antiseptic solutions were carried out.[1-3] Povidone iodine and merbromin have been used during several years due to their capacity to promote escharification and epithelialization of the omphalocele sac. However due to complications such as transient hypothyroidism with povidone iodine or mercury poising with merbromin, there was the cessation of their use for conservative treatment.[1-4]

More recently, the use of Vacuum Assisted Closure (VAC®) Therapy™ (Laboratory Kinetic concepts. Inc Medical (KCI): Chily-Mazarin) in the conservative treatment of giant omphalocele has been described.[4] In a previous study, we focused on the high mortality of surgical treatment of omphalocele in our area due to the inadequacy of our technical platform.[5] Therefore, over the past 15 years, we prefer the conservative treatment of giant omphalocele by application of dissodic 2% aqueous eosin.

The aim of this study was to describe the procedure and the results of conservative treatment of giant omphalocele with dissodic 2% aqueous eosin.

MATERIALS AND METHODS

We performed a retrospective study of the giant omphalocele which underwent conservative treatment with dissodic 2% aqueous eosin from January 1997 to December 2012 in the Paediatric Surgery Department of the University Hospital of Yopougon, Abidjan Cote d'Ivoire. The treatment consisted of twice-daily application of dissodic 2% aqueous eosin on the sac of the omphalocele. Eosin aqueous is an adjunctive treatment of diseases of the primitive bacterial or

may become secondarily infected, including diaper dermatitis. Referred to dye-dryer, very weak antiseptic. The vial of 100 ml of aqueous eosin costs 3 dollars and is sufficient for a month of conservative treatment. This application was continued until the drying and complete epithelialization of the sac. The infection of the sac was treated with topical treatment with sodium hypochlorite concentrated solution (Dakin Cooper Stabilized®, COOPER Cooperation Pharmaceutique Française, Lucien-Auvert, Melun), until its complete disinfection. After local disinfection, the twice a day application of dissodic 2% aqueous eosin was continued [Figure 1].

All the patients had antibiotic prophylaxis with parenteral administration of amoxicillin (50 mg/kg/24 h) and metronidazole (30 mg/kg/24 h). When the patients had functional bowel disorders, we set up a hydro-electrolytic rehydration, a digestive rest, gastric suction and slurping a urinary catheter. Energy inputs were provided by glucose infusion. The exoneration was helped by the parenteral administration of trimebutine maleate (Debridat® Pfizer, laboratory Pfizer, France) and enemas spillways with sodium lauryl (Microlax® baby rectal solution: Johnson & Johnson Health Beauty, France). Gastrografin have been used in two cases after failure of enema with Microlax®. During hospitalisation, the nurses teach the mothers, the conservative treatment procedure.

The new-born was exited, when the mother had a good knowledge and good practice in the application of the dissodic 2% aqueous eosin and the omphalocele sac had an early epithelialization without infection, vital signs stable, regular bowel movements, normal diet and taking regular weight. Conservative treatment was continued at home by the mother with external follow-up.

We studied the number of giant omphalocele treated over the period and the annual frequency, the associated abnormalities, the duration of hospital stay, the length of the learning curve the mother and the duration for complete epithelialization. We also studied the complications (infection of the sac, bowel functional disorders), the percentage of omphalocele completely epithelialized and the mortality rate.

RESULTS

A total of 173 giant omphaloceles was treated with topical application of dissodic 2% aqueous eosin over the study period. The annual rate was 11.53 ± 3 giant omphaloceles.

The associated abnormalities were, Beckwith-Wiedemann syndrome observed in 15 cases (8.6%). Eight cases had major abnormalities of Beckwith-Wiedemann syndrome associating omphalocele, macroglossia [Figure 2] and macrosomia and seven cases with minor anomalies, neonatal hypoglycaemia. Genitourinary abnormalities were observed in five cases (2.8%), three hypospadias and unilateral cryptorchidism in two cases. The echocardiography revealed seven cardiac malformations, four inter atrial communications and three inter ventricular communications. One case of anorectal malformation (0.5%) was observed. The average time of care was 28 h with a range of 3-144 h. The average hospital stay was 21 ± 6 days.

The learning curve of the topical application of dissodic 2% aqueous eosin by the mother was 10 ± 3 days. The average time to complete epithelialization was 70 ± 7 days. The complications observed during the conservative treatment were, bowel functional disorders in 38 cases (22%), infection of the sac in 31 cases (18%). Complete epithelialization of the omphalocele sac was observed in 118 cases (68.5%) [Figure 3]. The mortality



Figure 1: Omphalocele with application of dissodic 2% aqueous eosin



Figure 2: Macroglossia



Figure 3: Epithelialization of the omphalocele bag by application of dissodic 2% aqueous eosin

rate during treatment was 44 omphaloceles (25.5%). The death causes were sepsis and multi-visceral failure due to functional intestinal occlusion.

DISCUSSION

The conservative treatment with dissodic 2% aqueous eosin ensures epithelialization over third of unruptured omphalocele. The dissodic 2% aqueous eosin is a sterile topical solution whose active ingredient is disodium eosin. We describe for the 1st time, its use in the conservative treatment of giant omphalocele. We use this conservative treatment for over 10 years with satisfactory outcome. The local application of dissodic 2% aqueous eosin promotes progressive epithelialization of the omphalocele sac. This is a simple procedure that the mother can easily learn. During the hospital stay, the mother has a training of topical application of the dissodic 2% aqueous eosin. The mother learns the application procedure in 10 days which allows the mother to continue the care at home. The learning period was very long because it is often, mothers who have not been educated. Furthermore, because it must learn wearing gloves, sterile compress opening packages and know the used of sodium hypochlorite concentrated solution for infections of the bag. The follow-up of the epithelialization could be externally, thus reducing the length of hospital stay. The main complications of the use of dissodic 2% aqueous eosin are infections of the bag and bowel functional disorders. Local infection of the bag involved a detachment part between the omphalocele ring and the omphalocele's bag already epithelialized, due to difference in texture of these two parts. Epithelialized part is soft while non-epithelialized part is rigid. It is in most cases successfully treated with local application of sodium hypochlorite. Bowel functional disorder arises because of the intestinal inflammation due to omphalocele bag infection which leads to functional occlusion. Abnormalities of the contents such as malrotations and volvulus can exacerbate these functional occlusions. Bowel functional disorders are more difficult to treat. They realise a true bowel obstruction which treatment generally requires digestive exclusion, digestive aspiration, antibiotics and transit regulator. In the absence of clinical improvement with this protocol, we did a cleansing enema with gastrografin.

The conservative treatment of omphalocele, using healing agents such as merbromin, alcohol has been proposed since 1899 by Ahlfeld.[6] Other antiseptic such as povidone iodine has long been used.[2,3] Various complications have been attributed to these antiseptics. The mercurial and alcohol intoxications have been described.[2,3] Povidone iodine has long been used effectively in the conservative treatment of giant omphalocele. Although some teams attribute to the use of povidone-iodine, hypothyroidism, others feel that its use does not disrupt thyroid function.[1]

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. Furthermore, aqueous eosin does not cause complications observed with polyvidon and merbromin.

More recently, zinc sulfadiazine cream have been successfully used in the treatment of giant omphalocele. [7] The use of VAC therapy has been advocated for the treatment of giant omphalocele. The VAC therapy was previously used for the treatment of chronic wounds by creating negative pressure at the wound which promotes granulation tissue.[4,8]

Despite the progress in anaesthesia and neonatal resuscitation, surgical treatment of giant omphalocele led to serious complications incurred in the post-operative mortality.[5,9-12] The main post-operative complications are sepsis, respiratory failure and haemodynamic instability.[5,13,14] Omphalocele mortality ranges from 8% to 33% depending on whether minor or major forms.[15] The mortality rate in our study was 25.5%. These deaths were caused by the omphalocele sac infection which leads to intestinal functional occlusions. Mortality remains high; these new-borns die for septic shock, hypovolemic shock and respiratory distress. We do not have a neonatal resuscitation department. They have functional occlusion for which an exclusion digestive and parenteral nutrition and

prolonged antibiotic therapy are indicated. However we cannot currently carried total parenteral nutrition currently in our service. Prolonged digestive exclusion leads to hydro electrolytic disorders cause of the death. Total parenteral nutrition is not practiced in our department. Reduction of mortality of conservative treatment requires a good neonatal anaesthesia, resuscitation and total parenteral nutrition. We believe in some cases of occlusions observed during conservative treatment, there are anomalies of the content which require surgical treatment.

When complete epithelialization is achieved, the children are followed until the age of 2 years and then large umbilical hernia is surgically treated before verticalization.

CONCLUSION

The local application of dissodic 2% aqueous eosin on giant omphalocele promotes epithelialization of the sac. It is a simple conservative treatment, practical which can easily be taught to the mother to reduce the hospital stay. Functional intestinal occlusions caused by the omphalocele sac infection remains the main and serious complications.

REFERENCES

1. Whitehouse JS, Gourlay DM, Masonbrink AR, Aiken JJ, Calkins CM, Sato TT, *et al*. Conservative management of giant omphalocele with topical povidone-iodine and its effect on thyroid function. J Pediatr Surg 2010;45:1192-7.
2. Tran DA, Truong QD, Nguyen MT. Topical application of povidone-iodine solution (Betadine) in the management of giant omphaloceles. Dermatology 2006;212 Suppl 1:88-90.
3. Festen C, Severijnen RS, vd Staak FH. Nonsurgical (conservative) treatment of giant omphalocele. A report of 10 cases. Clin Pediatr (Phila) 1987;26:35-9.
4. Binet A, Gelas T, Jochault-Ritz S, Noizet O, Bory JP, Lefebvre F, *et al*. VAC® therapy a therapeutic alternative in giant omphalocele treatment: A multicenter study. J Plast Reconstr Aesthet Surg 2013;66:e373-5.
5. Kouamé BD, Dick RK, Ouattara O, Traoré A, Gouli JC, Dieth AG, *et al*. Therapeutic approaches for omphalocele in developing countries: Experience of Central University Hospital of Yopougon, Abidjan, Côte d'Ivoire. Bull Soc Pathol Exot 2003;96:302-5.
6. Gough DC, Auldist AW. Giant exomphalos – Conservative or operative treatment? Arch Dis Child 1979;54:441-4.
7. Ein SH, Langer JC. Delayed management of giant omphalocele using silver sulfadiazine cream: An 18-year experience. J Pediatr Surg 2012;47:494-500.
8. Kilbride KE, Cooney DR, Custer MD. Vacuum-assisted closure: A new method for treating patients with giant omphalocele. J Pediatr Surg 2006;41:212-5.
9. Lee SL, Beyer TD, Kim SS, Waldhausen JH, Healey PJ, Sawin RS, *et al*. Initial nonoperative management and delayed closure for treatment of giant omphaloceles. J Pediatr Surg 2006;41:1846-9.
10. Askarpour S, Ostadian N, Javaherizadeh H, Chabi S. Omphalocele, gastroschisis: Epidemiology, survival, and mortality in Imam Khomeini hospital, Ahvaz-Iran. Pol Przegl Chir 2012;84:82-5.
11. Ammouche C, Moog R, Lacreuse I, Gomes C, Kauffmann I, Becmeur F. Liver torsion leading to death in a 16-month-old infant treated neonatally for an omphalocele. Arch Pediatr 2012;19:260-3.
12. Abdur-Rahman LO, Abdulrasheed NA, Adeniran JO. Challenges and outcomes of management of anterior abdominal wall defects in a Nigerian tertiary hospital. Afr J Paediatr Surg 2011;8:159-63.
13. Mitanchez D, Walter-Nicolet E, Humblot A, Rousseau V, Revillon Y, Hubert P. Neonatal care in patients with giant ompholocele: Arduous management but favorable outcomes. J Pediatr Surg 2010;45:1727-33.
14. Vachharajani AJ, Rao R, Keswani S, Mathur AM. Outcomes of exomphalos: An institutional experience. Pediatr Surg Int 2009;25:139-44.
15. Tsakayannis DE, Zurakowski D, Lillehei CW. Respiratory insufficiency at birth: A predictor of mortality for infants with omphalocele. J Pediatr Surg 1996;31:1088-90.

Cite this article as: Kouame BD, Odehouri Koudou TH, Yaokreh JB, Sounkere M, Tembely S, Yapo K, *et al.* Outcomes of conservative treatment of giant omphaloceles with dissodic 2% aqueous eosin: 15 years' experience. Afr J Paediatr Surg 2014;11:170-3.

Source of Support: Nil. **Conflict of Interest:** None declared.