

Delayed Primary Closure of Exomphalos Major in a Limited Resource Area

Nezar A. Abo Halawa^{1*}, Mohamed Yousef Batikhe²

¹Pediatric Surgery Unit, General Surgery Department, Qena Faculty of Medicine, South Valley University; ²Pediatric Surgery Unit, General Surgery Department, Sohag Faculty of Medicine, Sohag University

ABSTRACT

Background: An omphalocele is a congenital abdominal wall defect consisting of eviscerated abdominal contents within sac composed of a three-layered. However the objective of treatment is tissue closure, there is no agreement exists on the ideal treatment of giant omphalocele. The most popular two strategies now are staged surgical closure and delayed primary closure. Delayed primary closure is associated with more early full feeding, shorter hospital stay and a lower occurrence of sepsis. **Objective:** evaluate outcomes of delayed primary closure of exomphalos major in limited resource area using topical povidone-iodine. **Methods:** A prospective study was conducted in the pediatric surgery unit, South Valley university hospital and Sohag university hospital between Jun 2015 to December. A total of 17 neonates with omphalocele were managed by delayed non-operative by painting the sac with betadine and saline. **Results:** 70.1 % were diagnosed with associated anomalies mostly pulmonary hypoplasia, followed by cardiac anomalies,. There are two cases with prolonged hospital stay 89 & 125 days as they developed sepsis and persistent pneumonia. In addition, two patients were treated for line sepsis.. At present,7 patients have undergone delayed repair (primary fascial closure) at a median age of 12 months (range, 5-18 months), 4 remain with their original ventral hernia(one of them had progressively diminished in size and 2 has been lost to follow-up . Mean period for epithelization is 2.9 months (2.4- 4.1 months). We had seven cases (41.2%) were diagnosed prenatally. In two cases the sac burst, one during delivery and the other during the transport. **Conclusions:** Delayed primary closure of exomphalos major after repeated dressing by povidone-iodine is a safe and good option especially in our limited resource locality with restricted availability of silo and poor bad compliance patient. It enhances rapid epithelization with the advantage of twice then once weekly dressing. It decreases the handling of babies with diminished doctor and nursing asset usage. Also, it can be used even by unskilled parents without the nursing direction **Key words:** omphalocele, delayed primary closure, topical povidone-iodine

INTRODUCTION

An omphalocele is a congenital abdominal wall defect consisting of eviscerated abdominal contents within sac composed of a three-layered membrane of the peritoneum, Wharton's jelly, and amnion. It occurs in about 1 in 4000 to 6000 live births (1-4). There is remains no agreement with respect to the strict definition of "giant" omphalocele, it ranges from failure to close the defect primarily to the definitive size of defect and contents of the sac, however, it is commonly depicted as a defect more than 5 cm or those containing liver^(1,2 & 5)

However the objective of treatment is tissue closure, there is no agreement exists on the ideal

treatment of giant omphalocele. The most popular two strategies now are staged surgical closure and delayed primary closure⁽⁶⁾

Staged surgical closure requires the utilization of numerous operation preceding final fascial closure and incorporates silo construction, skin flaps, tissue expander placement, AlloDerm and utilization of interposition mesh.^(1,7-16) However, all previous maneuvers have been associated with more operations, expanded ventilator reliance, the hazardous of anesthesia, increased the risk of infection and postponed enteral feeding. All those disadvantages are very critical in these neonates which mostly have associated cardiopulmonary co-morbidities^(7,9,11,13,17-20)

Delayed primary closure including dressing with various topical therapy as povidone-iodine, silver nitrate, medicated Manuka honey and Acacia nilotica with enhancement granulation and epithelialization of the skin over the sac which was by followed interval repair of the defect^(1-3,18, 21-26). In contrast, delayed primary closure is associated with more early full feeding, shorter hospital stay and a lower occurrence of sepsis^(6, 8 & 10)

The aim of this study was to evaluate outcomes of delayed primary closure of exomphalos major in limited resource area using topical povidone-iodine

PATIENTS AND METHOD

A prospective study was conducted in the pediatric surgery unit, South Valley university hospital and Sohag university hospital between Jun 2015 to December 2018 after the approval

from the institutional ethical committee. A total of 17 neonates with omphalocele were managed by delayed non-operative by painting the sac with betadine and saline, informed consent was taken from the parents. Giant omphalocele was defined as omphalocele having defect more than 5 cm and sac containing liver (proven by abdominal ultrasonography).

In all cases, The omphalocele and surrounding skin were first washed with saline. the sac was painted with povidone-iodine (5 % solution), then dressing was placed over the entire omphalocele defect, then two-layer pressure dressing was then folded over the omphalocele in the first 3 weeks { Fig.1} later on two-layer pressure dressing was folded over the omphalocele and the patient's trunk and back to give a moderate measure of circumferential pressure to the defect with the objective of setting up as well as keeping up abdominal area.



Fig. (1)

The level of compression was acclimated to prevent respiratory compromise or patient distress. Enteral feeding was started as soon as possible. Thyroid function test (T4 and TSH) was performed in all cases and was done after 2 weeks. During dressing a musty odor was noted. Dressings were at first changed two times per week and were diminished to week by week dependent on the size of the defect. Once dressing changes had decreased to once per week and the patient was medically stable, they were discharged. Wounds were carefully monitored for

infection in the outpatient setting. Dressing changes were performed in our outpatient clinic. When neoepithelialization was established, two-layered pressure dressing was continued until the time of surgical repair.

Thyroid function was repeated every month until the topical therapy was continued and at one month after stoppage of topical therapy. Data collected included sex, gestational age, birth weight, prenatal diagnosis, mode of delivery, associated anomalies, length of initial hospital stay, time of oral feeding, duration of mechanical

ventilation, early complications, the duration for epithelization and time of definitive surgical repair

RESULTS

A total of 17 infants with giant exomphalos were managed by delayed primary closure. The patient's demographics are summarized in Table 1.

Twelve patients (70.1%) were diagnosed with associated anomalies which include six with pulmonary hypoplasia, three with cardiac anomalies, one with ectopic kidney, one with

Talipes equanvarus, one with inguinal hernia and one with undescended testis. There are two cases with prolonged hospital stay 89 & 125 days as they developed sepsis and persistent pneumonia. In addition, two patients were treated for line sepsis. We have four deaths from severe cardiopulmonary anomalies. At present, 7 patients have undergone delayed repair (primary fascial closure) at a median age of 12 months (range, 5-18 months), 4 remain with their original ventral hernia (one of them had progressively diminished in size { Fig.2} and 2 has been lost to follow-up. The case which was operated at 5 months show recurrence



Fig. (2)

Table (1): Demographic and clinical data of the included patients:

| P.No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | Mean | SD |
|--------------------------|-----|------|-----|------|-----|------|------|------|-----|------|-----|------|------|-----|------|------|-----|--------|--------|
| Factor | | | | | | | | | | | | | | | | | | | |
| Sex | M | M | M | F | M | M | F | M | M | F | F | F | M | M | M | F | M | | |
| GA(wk) | 37 | 30 | 36 | 38 | 38 | 32 | 38 | 33 | 33 | 36 | 37 | 37 | 36 | 37 | 30 | 36 | 38 | 35.4 | 2.73 |
| WT(kg) | 300 | 170 | 300 | 290 | 280 | 180 | 290 | 210 | 220 | 250 | 280 | 260 | 250 | 30 | 170 | 300 | 290 | 2552.9 | 477.12 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00 | 0 | 0 | 0 | | |
| Pre.diag. | +ve | -ve | +ve | -ve | -ve | -ve | +ve | -ve | -ve | -ve | +ve | -ve | +ve | -ve | +ve | -ve | +ve | | |
| Or. feed. (days) | 3 | 4 | 8 | 3 | 6 | 7 | 4 | 5 | 5 | 3 | 8 | 3 | 6 | 4 | 5 | 4 | 4 | 4.9 | 1.65 |
| Postnatal days in NICU | 89 | 23 | 28 | 125 | 21 | 14 | 35 | 28 | 28 | 49 | 21 | 49 | 28 | 14 | 23 | 28 | 20 | 36.6 | 28.93 |
| Postnatal days intubated | 9 | 13 | 0 | 10 | 0 | 16 | 2 | 9 | 4 | 15 | 5 | 3 | 2 | 7 | 10 | 3 | 2 | 6.5 | 5.12 |
| Mo. to epith. | 2.8 | died | 2.5 | 2.7 | 2.4 | died | 3.1 | 4.1 | 3.2 | died | 3.8 | 2.3 | 2.6 | 2.8 | died | 2.7 | 2.7 | 2.9 | .53 |
| Mo.to surg. | 14 | | 5 | lost | 11 | | wait | Lost | 9 | | 15 | wait | wait | 14 | | Wait | 18 | 12 | 4.24 |

The table summarized patient demographic data. Abbreviations: P. No.: patient no, GA: gestational age, Wt: weight, Pre.diag.: prenatal diagnosis Or. feed. : oral feeding. Mo. to epith.: months to epithelization, Mo.to surg.: Months to surgery, wk: week, mo: month SD: standard deviation, Wait : wait for surgery Lost: lost to follow-up.

All infants were evaluated and topical application of 5 % povidone-iodine followed the application of two-layer pressure dressing was initiated on the first day of life. Mean period for epithelization is 2.9 months (2.4- 4.1 months). We had seven cases (41.2%) were diagnosed prenatally. In two cases the sac burst, one during delivery and the other during the transport, in this cases, a repair was done by 4- 0 Vicryl suture. In spite of the fact that the sac was dainty and friable, the suture line stayed unblemished permitting application of the dressing. Also in one case, the sac was ruptured during the dressing and was repaired with suture { Fig.3} All patients had a normal thyroid function test at presentation and later on after initiation of treatment.

Consecutive images of one patient are presented in{ Fig.4}



Fig. (3)



Fig. (4)

DISCUSSION

We demonstrated previously that delayed primary closure of exomphalos major is safe^(6,8&10). In this study, we have further demonstrated the efficacy of delayed primary closure of exomphalos major after repeated dressing by povidone-iodine in our locality where the other options of treatment is limited. Twelve patients (70.1%) of our patients had multiple anomalies, nearly as noted by similar studies^(1,3&22). Pulmonary hypoplasia was present in the majority of our patients, cardiac anomalies are the second most common anomalies. Four infants died in this series. All needed mechanical ventilation for their respiratory affection, and there was extremely difficult for these neonates to tolerate any surgery for exomphalos. Median time to initiation of enteral feeds was 4.9 days which nearly similar to other studies^(1&2), but also less than other studies of staged surgical closure^(16,27&28). This result emphasizes the advantage of early enteral feeding in our maneuver. Complete epithelialization was occurred after an average of 2.9 months which nearly similar to other studies^(3&18). In our study, we prefer topical povidone-iodine for many reasons. first, it is proved that povidone-iodine has a simplicity of utilization, improved epithelization without granulation and wide antimicrobial properties⁽³⁾. In addition topical povidone-iodine has the very important advantage as regard to ease of access to the required dressing supplies at our institution, staff experience and familiarity with materials. Also, povidone-iodine was viewed as simpler to oversee by parents, encouraging the progress to home care^(2,3&6).

The most striking remarkable result to emerge from the data is that we had 41.2% of cases in this series diagnosed prenatally, also we have two cases with rupture sac during delivery and during the transport. The reasons for this result are the vast majority of the neonates have a place with remote fringe zones with insufficiently prepared health centers, also these neonates are exposed to unsafety techniques during the time of high-risk delivery and transport to referral centers. So pre-birth screening quality should be improved in our settings with the goal that these cases can be referred in utero to the tertiary centers for better management. Also, we need to increase the

efficiency and training of obstetricians and radiologists regarding prenatal diagnosis.

In our protocol, we change the dressing twice weekly in the first three weeks then once weekly after that. This protocol diminishes hospital resource utilization, also decrease the incidence of infection, and allow early discharge of neonates from NICUs for dressing once weekly in our outpatient clinic. Also, the incidence of sac rupture was decreased as a result of longer dressing wear time. The results from this series certainly support delayed primary closure of exomphalos major with topical povidone-iodine has benefits of shorter mechanical ventilation and a shorter time to enteral feeding, which in our series was 6.5 and 5 days respectively. The compressive effect from the circumferential flexible dressing is an additional advantage of our strategy. Early gentle pressure can encourage a safe and steady reduction of omphalocele to an almost normative abdominal shape, on the other hand, the external compression facilitate shortening of the non-operative period before closure of abdominal wall

The only case in which surgery was performed at the age of five months had a recurrence, so we accept that there is no hurry to the early repair of ventral hernia especially with a wide defect

Limitations of our study include lack of the cost-effective nature of our maneuver, also further need to compare with other material used in topical management of exomphalos

This study has important implications for public health policy in our locality as it gives a chance for communication with obstetricians regarding the diagnosis of cases an ideal method of dealing with exomphalos major and transport of neonates. Also, increase the experience of our nurses and paramedical staff as regard to dealing with these cases

CONCLUSION

Delayed primary closure of exomphalos major after repeated dressing by povidone-iodine is a safe and good option especially in our limited resource locality with restricted availability of silo and poor bad compliance patient. It enhances rapid epithelization with the advantage of twice then once weekly dressing. It decreases the handling of babies with diminished doctor and

nursing asset usage. Also, it can be used even by unskilled parents without the nursing direction

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