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DELAYED PRIMARY CLOSURE OF GIANT OMPHALOCELE: GRADUAL CLOSED-REDUCTION FOLLOWED BY OPEN FASCIAL CLOSURE

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ABSTRACT

Objectives: To introduce the new technique of gradual closed-reduction followed by open fascial closure and to assess its clinical outcome in our setup.

Material and Methods: It was a prospective and descriptive study. It was conducted at the Department of Pediatric Surgery, Post Graduate Medical Institute, Lady Reading Hospital, Peshawar from January 2003 to December 2007. All patients with giant omphalocele (base-diameter more than 5 cm in width) including ruptured ones were first managed with conservative treatment using mercurochrome (0.5-1%) solution and were then admitted to the hospital after the age of 06 months. Small omphaloceles were excluded from the study. A thorough clinical examination and relevant investigations were performed in all patients.

Results: A total of 18 children with giant omphalocele were treated with this technique. There were 10 (55.55%) female and 8 (44.44%) male patients. Age ranged from 6-24 months. Hospital stay was from 12-15 days. No mortality was observed and no major complications (abdominal wound dehiscence, compromised venous return, respiratory discomfort or cyanosis) were seen. Mild wound infection (local erythema and / or purulent discharge) was seen in 3 (16.66%) patients, fever up to $102F^0$ in 9(50.00%) patients and mild respiratory embarrassment in 5 (27.77%) patients.

Conclusion: Delayed primary closure of giant omphalocele by this technique is a safe and effective way of treatment particularly in places where neonatal and pediatric ICU facilities are not available.

Key words: Omphalocele, Exomphalos, Giant omphalocele, Abdominal wall defect, Delayed primary closure.

INTRODUCTION

Giant omphalocele (Fig-1) is a congenital ventral abdominal wall defect characterized by a large (> 5cm diameter) opening with herniated abdominal organs, loss of abdominal cavity and other associated congenital anomalies[1,2]. Large omphalocele with associated congenital anomalies such as lung hypoplasia, major congenital heart disease or anomalies of the great vessels can be a challenging clinical problem[1,2,3]. A number of techniques have been mentioned in the literature to treat giant omphalocele including early primary closure, staged primary closure (Silo), Polytetraflourethyline (PTFE) mesh, absorbable mesh, skin flap, dural grafts, suspension technique, abdominal wall stretching, tissue expanders, human acellular dermis, vacuum assisted closure and conservative treatment with some escharotic agents, but none have proved to give promising and successful results in treating all children with giant omphalocele[2,3,4].

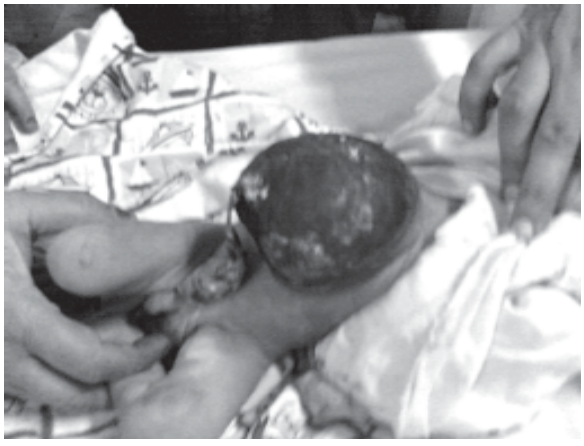

Fig.1: Giant Omphalocele

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Primary fascial closure is the only definitive treatment of patients with omphalocele, but management of giant omphalocele is a great surgical challenge in the neonatal period particularly when associated with other serious congenital anomalies[2,4,5]. An alternative approach of primary closure after gradual closed reduction of omphalocele by this new technique has been found to be a useful, safe and effective way of treatment in our setup where pediatric and neonatal intensive care facilities are yet to be developed.

MATERIAL AND METHODS

All patients with giant omphalocele (base-diameter more than 5 cm in width) including ruptured ones were first managed with conservative treatment using Mercurochrome (0.5-1%) solution (Fig-2). Patients with giant omphaloceles were admitted to the hospital after the age of 06 months. Patients with small omphaloceles were excluded which were repaired in the neonatal period or at the time of presentation. A thorough clinical examination was performed and baseline investigations including Hemoglobin (Hb%), HBsAntigen/Anti-HCV Anti bodies, Ultrasound abdomen were done in all patients and echocardiography, was done when needed.

Technique:

1. On the day of admission, the contents of omphalocele were reduced manually on the bedside without any form of anesthesia (Fig-3). This closed reduction was maintained by strapping the defect on the skin with the help of a zinc oxide adhesive tape (breadth "4) or any other non-allergenic adhesive tape available (Fig-4), without causing respiratory discomfort, for a period of 2-3 days.

2. After 2-3 days, under general anesthesia, the omphalocele contents were further reduced manually and strapping done in the same way without causing much discomfort and maintained for another 2-3 days. The patient was observed for any signs of cyanosis or respiratory discomfort in which case the strapping was immediately removed.

Fig. 2: Omphalocele, after treatment with mercurochrome solution.

Fig. 3: Omphalocele being reduced manually with out general anesthesia.

Fig. 4: Strapping of the defect with sticking plaster.

3. At this stage under general anesthesia all the contents were completely reduced manually and the defect was packed with gauze-piece of adequate size to fit in the defect and again strapping was done over it and the patient observed in the same way as mentioned already and strapping maintained for further 2-3 days.

4. Under general anesthesia strapping and gauze-piece were removed and the fascial defect was surgically exposed. Tension free fascial closure was performed using Vicryl of No.1 size. Redundant skin was excised and wound was closed and drained with a corrugated drain and antiseptic dressing with gauze was performed. The stomach was aspirated with nasogastric tube of adequate size. Intra Venous (I/V) fluids and I/V antibiotics were administered for 2-3 days and the

patient kept in the general ward without the help of Intensive care unit (ICU) or ventilatory support.

Any complication in the course was recorded.

RESULTS

Eighteen patients with central giant omphalocele were treated with this technique. There were 10 females and 8 males. Age ranged from 6-24 months with mean age of 18.44 months (Table 1). All of them were initially treated conservatively using mercurochrome solution topically applied over the lesion. Five (27.77%) of the 18 children had ruptured omphalocele in the neonatal period who were treated by sac or skin closure at the time of presentation followed by topical escharotics and later on by the new technique described in the study. None of the patients died after inclusion in the study and no major complication was observed. Mild wound infection was noted in three patients. Respiratory embarrassment was seen in 5 (27.77%) patients and fever from 100-102F° was observed in 10 (55.55%) patients persisting for 5 days (Table 2). There was no patient with wound disruption and none of the patients needed ventilatory support or Total Parenteral Nutrition(TPN). Abdominal distension and vomiting was seen in 2 (11.11%) patients. No incisional hernia has been reported up till now. 5 (27.77%) of the patients had some associated anomalies such as cardiac anomaly in 2 (11,11%) patients, malrotation in 1(5.55%) patient, club foot in 1 (5.55%) patient and vesical exstrophy in 1 (5.55%) patient. Hospital stay was from 10 to 15 days.

Table 1: Age and Sex Distribution

Age	Sex		Total
	Male	Female	
06-12 months	05(27.77%)	04(22.22%)	09(50%)
12-24 months	03(16.66%)	06(33.33%)	09 (50%)
Grand Total	08(44.44%)	10(55.55%)	18(100%)

Table 2: Post-operative complications

Complications	Number of patients and %ages
Respiratory Distress	05 (27.77%)
Wound Infection	03 (16.66%)
Fever	10 (55.55%)
Vomiting	02 (11.11%)

DISCUSSION

Large omphaloceles containing liver with associated congenital anomalies can be a challenging clinical problem[1]. A number of methods have been described for the initial management of big or giant omphalocele in the neonatal period[1,2]. Despite all efforts in improving the management of neonates with big exomphalos or omphalocele, there is not a single method which could be the sole definite treatment for these patients[2,3]. The advent of neonatal ICU care and TPN with high frequency oscillation facilities are the measures which can improve the survival of these patients particularly when associated with lung hypoplasia and congenital heart disease[1,2,4]. Despite all these supportive measures, primary fascial closure of big omphalocele in the neonatal period is still a big challenge for paediatric surgeons[5,6]. Various workers advocate stabilizing the high risk patients and then repair of the defect without jeopardizing the life of the patient supported by the use of total parenteral nutrition[4,5,6,7]. This could be achieved in the developed countries where the neonatal ICU facilities are available. But in most of the developing countries where these facilities are not available, the management of such patients after birth is still a great problem[7,8].

We had 18 patients all of whom treated initially with escharotic agents (Mercurochrome 0.5-1% solution) out of which 5 were of ruptured omphaloceles were treated by sac closure first and then the application of escharotic agent till the epithelialisation of the covering sac. We adopted this protocol for the obvious reason of not having the neonatal intensive care facilities in the department or hospital. Before adopting this technique almost 100% mortality was seen in patients with giant omphaloceles who were treated with primary fascial closure. This was the only method available at that time as none of the techniques such as silo stage closure, biodegradable sheet, PTFE sheet etc were available. Besides these could not be practiced in our setup with meager facilities. We observed dramatic improvement in the survival of these patients with this procedure. There was no operative mortality of delayed primary closure in this series (18 patients). One of the patients in this series did not need surgery. He was followed up for 18 months and was not included in this study.

Other complications in the form of wound infection, wound disruption, cardio- respiratory embarrassment, vomiting and fever were not seen in the majority of the patients. Three patients developed mild wound infection which got better with local treatment. One patient developed abdominal distension and vomiting, which were controlled with naso-gastric suction. All of these patients were kept in the general ward of paediatric surgery without the help of ventilatory support or ICU facilities. These

observations are very encouraging when compared to those of other observers which are very high[6,9,10,11]. Hospital stay was from 10-15 days which is very short as compared to other studies which is in the range of 80-100 days collectively of multiple procedures[7,12,13]. It is encouraging that the results in terms of mortality and morbidity are more favorable as well as the hospital stay is short for complete surgical treatment in this cohort of patients who are managed in centers of a developing country without the help of ICU and TPN. The objective of definitive management, through surgery, but without the involvement of ICU, TPN and delayed surgery so that the patient can safely withstand the risks of anaesthesia, can not be achieved by following the studies mentioned above[14,15,16] but the same objectives have been achieved by us in our instant study.

Primary closure of the defect is the only definitive treatment for giant omphalocele without jeopardizing the life of the patient, with low rate of complications and short hospital stay. The outcome of treatment of such patients in our setup is favorable and even much better than the results shown in the world literature[15-18]. Although it is a study of small series of patients, but the results are encouraging, therefore, we suggest that this method of treatment is a safe and effective alternate way of management of giant omphalocele in children.

CONCLUSION

Conservative treatment followed by closed reduction and delayed primary closure of giant omphalocele is a safe & effective way of treatment in places where neonatal and pediatric ICU facilities are not available.

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