Brief Report

Omphalocele Management using Goal-oriented Classification in African Centre with Limited Resources

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Summary

In 2000–09, 96 children comprising 57 males and 39 females who were presented between 2 h and 1 week of birth with omphalocele were prospectively managed using goal-oriented classification at the University of Benin Teaching Hospital, Nigeria. All were born through spontaneous vaginal delivery, out of which 9 (9.4%) were preterm. Eighty-two (85.4%) mothers in villages with no supervised antenatal care/delivery and/or prenatal diagnosis presented their babies late. Thirty-three (34.4%) babies in group A, with defect size ≤4.5 cm and intact sac, were managed conservatively and had fascial closure after neonatal period, resulting in 32 (97%) survivors. Forty-two (43.8%) babies in group B, with defect size >4.5 cm and intact sac, were managed conservatively and had fascial closures for 9 months to 5 years, resulting in 40 (95.2%) survivors. Group C comprised of 21 (21.9%) babies with defect of any size/ruptured sac and who had immediate repair, resulting in two (9.5%) survivors owing to lack of facilities (p < 0.0001). Hospital delivery and provision of facilities are advocated.

Key words: omphalocele, goal-oriented classification, management, outcome, African centre.

Introduction

Omphalocele occurs due to failure of the four embryonic folds to meet in the midline and form umbilical ring before the 10th week of gestation, resulting in ventral abdominal wall defect of varying degrees [1, 2]. Clinical effects of the deformity and often associated anomalies lead to rapid deterioration in clinical parameters that require prompt and specialized management [1–5]. Although outcome has improved, the management remains challenging in developing countries especially in neonates owing to lack of facilities and infectious complications [1, 6–13]. Moreover, omphalocele is reported to be more common among the poor illiterate people residing in remote villages with poor means of transportation and poor access to organized antenatal care and delivery [10, 11]. Rare prenatal diagnosis, late presentation, unhygienic handling of the babies and hazardous transportation results in compromised clinical conditions, which require intensive care with poor treatment outcome [9–14].

This article reports outcome of goal-oriented classification, which determined management approaches, in an African centre with limited resources.

Patients and methods

This prospective study was undertaken in 2000–09 at the University of Benin Teaching Hospital, Nigeria. Following the approval from local ethics committee, all the babies who presented with omphalocele were included. The collated data included biodata, socioeconomic status of the parents, antenatal care/delivery, diagnosis, size of omphalocele, state of the sac, clinical state of the baby on arrival, complications, associated anomalies, goal-oriented classification/treatment approaches and the outcome. In addition to resuscitation and general assessment, the babies were classified and managed as follows:

(i) Group A: size of defect ≤4.5 cm ± syndrome with the sac intact managed conservatively and when necessary had fascial closure after the neonatal period.

(ii) Group B: size of defect >4.5 cm ± syndrome with the sac intact had initial conservative management and fascial closure when intraabdominal cavity was assessed as adequate.

(iii) Group C: any size of defect ± syndrome with ruptured sac had immediate fascial or improvised silo closure.
Conservative treatment involved 2 weeks hospitalization, use of broad spectrum antibiotics and alternate-day dressing with sofra-tulle gauze/follow-up at the outpatient clinic. Epitheliazation occurred between 1 and 2 months with a resultant ventral hernia, which allowed time for intraabdominal volume adequacy assessed monthly for fascial closure (Figs 1 and 2). Hernia repair was accomplished by fascial double breasting under general anaesthesia with diaphragmatic splinting observed as increased resistance to ventilation. Wound inspection/removal of sutures and discharge to follow-up were carried out on 7th and 10th postoperative days, respectively.

The data obtained were analysed using SPSS version 13 software package. Continuous data were expressed as mean±SD, whereas categorical data were analysed using the Chi-square test with a p-value ≤0.05 regarded as significant.

Results

In total, 96 children comprising 57 males and 39 females (ratio 1.4:1) aged between 2h and 1 week were managed, out of whom 17 (17.7%) were with associated anomalies. All were born through spontaneous vaginal delivery with nine (9.4%) of them born preterm. Eighty-two (85.4%) mothers resided in villages without supervised antenatal care and delivery, no prenatal diagnosis, had poor means of transportation and thus presented their babies late in compromised clinical conditions (p < 0.0001).

Thirty-three (34.4%) babies were included in group A, 42 (43.8%) in group B and 21 (21.9%) in group C. All the babies in group C had inadequate intraabdominal volume and established sepsis. Digital abdominal cavity expansion and fascial closure was achieved in 6 (28.6%) babies, 13 (61.9%) required improvised silo closure, whereas 2 (9.5%) who died within 24 h were too ill for any surgical intervention.

Postoperative respiratory difficulty compounded by unavailable paediatric ventilator was a problem.

Babies in groups A and B did well with full epitheliazation within 2 months. Adequate intraabdominal volume allowing safe fascial closure was possible before 5 years.

Twelve (36.4%) children in group A required no repair as the resultant ventral hernias were very small. Two children with giant ventral hernia required postoperative ventilation support. Postoperative aspiration and intracardiac anomaly, respectively, resulted in the death of a child each. Survival was poorest among babies in group C, 2 (9.5%), compared with 32 (97%) and 40 (95.2%) in groups A and B, respectively, (p < 0.0001). Total mortality, 22 (22.9%), were due to sepsis and postoperative respiratory failure in 17 (17.1%) babies.

Discussion

Unsupervised pregnancies, rare prenatal diagnosis and vaginal delivery in locations with poor means of transportation posed challenges [4, 9–13]. This is unlike in developed countries where prenatal diagnosis and planned delivery with early surgical attention are feasible [15–17]. Unhygienic handling of babies, late referral and hazardous transportation contributed significantly to the compromised clinical conditions on arrival. Sepsis, hypoplastic intraabdominal volume, emergency surgeries and lack of facilities influenced the mortality [4, 10–12].

Although outcome of ruptured omphalocele was still poor, overall results were better using this approach compared with others [10–12]. Omphalocele with intact sac had excellent prognosis irrespective of the defect size as only 3 and 4.8% mortalities, respectively, were recorded among the babies in groups A and B. Majority of the ruptured omphalocele occurred during vaginal delivery but other authors did not record any difference between vaginal

Fig. 1. During sofra-tulle dressing of omphalocele in a full-term male baby at the age of 1 month in surgical outpatient clinic.

Fig. 2. Same boy in Fig. 1, now at age 9 months. Full epitheliazation occurred before age 2 months and fascial closure was successfully done at 9 months.
and Caesarean deliveries of such babies in their centers [1, 3, 15–18].

Immediate postoperative respiratory failure requiring ventilation support was recorded in many babies. This was similar to the experiences of other authors who emphasized availability of a pediatric ventilator for omphalocle repair [1, 19]. Other researchers [6–8, 20, 21] avoided early fascial closure and recommended the use of synthetic patches to minimize diaphragmatic splitting, which is responsible largely for compromised respiratory function. Active digital expansion of abdominal cavity to accommodate the viscera as an alternative to synthetic patch was performed [22]. Intraabdominal pressure monitoring as a guide to safe fascial closure was stressed by others [23, 24]. Indirect assessment through increased resistance to ventilation served as rough guide, which was misleading in some cases [10, 11, 13].

Outcome of dressing of intact sac was rewarding as in other studies [9, 21]. All the omphalocle epithelialized within 2 months without infectious complications, which were major problems in the ruptured group. This allowed time for preoperative volume assessment, screening for associated anomalies and planned repair of the resultant ventral hernia [13]. Moreover, some of the children with very small omphalocle did not eventually require repair of the resultant ventral hernia after epitheliazation because they were small and similar to congenital umbilical hernia that is very common and requires no repair unless there is complication in this subregion. However, postoperative aspiration and undiagnosed intracardiac anomaly influenced the death of two children following repair of the resultant giant ventral hernia as also reported by others [9, 13].

In conclusion, adoption of this goal-oriented classification, which determined management approaches that may be useful to practitioners in similar setting, gave encouraging results. Antenatal care/delivery in hospital and provision of facilities are advocated to improve outcome.

References