

Case Report

Massive Gastroschisis in Neonate: The Miracle of No Anesthesia Manual Ward Reduction

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Abstract

Purpose: We report a case of giant gastroschisis for which immediate progressive bowel and liver reduction was performed successfully.

Methods: We undertook this procedure on the conscious child without either general or local anesthesia. We performed analgesic sedation with a sugar solution given orally the bedside. The newborn was fasted with an intravenous infusion set at routine maintenance rates. He got routine oxygenation through a nasal cannula. Antibiotics for prophylactic care were given by an intravenous injection, with a cardio respiratory and thermal monitoring scope.

Results: It is a newborn of a 4th gesture, 4th part, 36-year-old mother who was well monitored during her pregnancy by four prenatal consultations and a vaginal delivery at 38 weeks and 3-days of gestation. Isolated giant gastroschisis was at birth on clinical examination. Birth weight is 2865 g. Normal vital signs were the results on admission. The female child is admitted in neonatology under oxygen, venous route, 10% glucose serum and protection of bowel loops by sterilized pad soaked with saline. We achieve complete reduction with pain control, without anesthesia, by using a preformed silicone bag within four days. Suites are simple. The patient left the hospital on day 10 of life.

Conclusion: The authors have opted for vigil reintegration of loops in order to increase the survival rate.

Keywords: Congenital-malformation; Gastroschisis; Minimally invasive surgery

Introduction

Gastroschisis is a severe birth anterior abdominal wall defect. There is a hole on the right side of the umbilical ring. This hole allows the intestine and sometimes other organs to come out of the belly from the peritoneum cavity and float around in the amniotic fluid during pregnancy. The condition occurs approximately between 1/2500 and 1/5000 births. It is not known to be associated with other organ anomalies or chromosome problems. Its cause is unknown, and antenatal diagnosis is the rule. Indirect signs through maternal blood screening done at 15 to 22 weeks can suggest the disease when resulting in high levels of AFP, estradiol, hCG, and inhibin A. The diagnosis confirmation is obtained with fetal ultrasound and even MRI showing a detailed picture of the inside of the womb. Gastroschisis can be simple or complicated. Simple gastroschisis consists of intact bowel loops with no breach, and the complex form consists of bowel loops with edema, necrosis, perforation, stenosis, or volvulus.

Antenatal treatment is still impossible, and surgery is needed soon after the baby is born. There are two types of procedures: primary one-step repair or staged fixation. Surgical treatment includes the reduction of herniated contents into the bowel cavity followed

by primary closure whenever possible or the staged repair if the abdominal cavity is small [1]. The first report of surgical intervention by manual closure with a fatal outcome was in 1878. Watkins reported the first successful primary closure of gastroschisis in 1943. Moor and Stokes recorded the use of the skin flap technique in 1953. In 1967, Schuster developed an advanced concept in surgical treatment using Teflon sheets sewn to the abdominal wall. However, this procedure involved the risk of bowel injury and infectious complications. Allen and Wren used Silastic instead of Teflon [2-5]. However, owing to various risks, primary closure remained the procedure of choice until 1980. After that, staged repair using silo became the preferred method because mortality was high with primary closure. Nevertheless, this procedure was associated with longer ICU stays and led to increased complication related to a late onset sepsis and increased time to initiate enteral nutrition. In 1998, Bianchi and Dickson performed bedside reduction and closure without anesthesia and found this to be associated with fewer complications and better survival [6].

Mortality is most common in our context due to high anesthetic contrarily to Western countries. This study aims to present the solution of immediate reduction at the bedside without anesthesia and through a massive, unusual case report.

Case Presentation

A 36-year-old woman (Gravida 4, Para 4, Abortus 0) was diagnosed with a low-risk pregnancy at a private hospital. She was fit and had a healthy body mass index. She did not smoke, was non-consanguineous along with her husband, and had no allergies. The index pregnancy showed regular ultrasound scans performed at 18, 26, 32, and 38 weeks of gestation. Those different investigations demonstrate normal fetal morphology. This mother went into labor spontaneously at 38 weeks 3 days of gestation. The maternal urine screen was negative, but there was meconium-stained amniotic fluid at delivery. A 39-week-

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female neonate was born vaginally without any dystocia encountered. At birth, the female weighed 2865 g and presented with a gastroschisis. The baby girl was in good condition and required no resuscitation. Her Apgar score was above 8. She was conscious and her vital signs were in normal range. The clinical examination showed a massive-sized bowel, colon, and liver evisceration through a defect superior to 6 cm. We noticed a segmental dilatation of the sigmoid colon, magma of small bowel wrapped up in a thin peritoneum membrane, and the left lobe of the liver (Figure 1).



Figure 1: Baby on day one of birth.

The general physical review of the organs' system and cardiac check-up by the pediatrician found no associated congenital malformation. The abdominal circumference measured was up to 21 cm. The patient was transferred to the neonate unit and placed on an open heating incubator. Different organs that moved out of the belly became covered with warm saline-soaked gauze. Initial stabilization needed fluid serum glucose 10% set at routine maintenance rates and antibiotics given intravenously. We emptied the colon using a rectal probe.

Bowel assessment revealed loops wrapped in a peritoneum membrane that produced a dense magma of the gut. The gastroschisis was reduced gradually under all aseptic precautions and followed a meticulous magma release loop by loop. We performed all this under close monitoring of temperature, respiratory rate, heart rhythms, and oxygen saturation. Figures 2 and 3 shows the newborn at days one and three of manual ward reduction.

On day 4 of the manual Silo procedure, we successfully achieved liver reintegration into the abdomen without pain. Mild abdominal tenderness persisted, but there were no alarming vital signs (Figure 4). Meconium was evacuated spontaneously within the fifth day. It allowed progressive oral feeding with breast milk. The abdomen was initially on repletion, tender, and firm. It got softened within the following five days. The soft tissue was closed under local anesthesia on day 10 of the procedure (Figure 5). The patient left the hospital three days later, and the stitches were removed a week after. The child exhibited normal physical and neurological development, and had a successful follow-up (Figure 6). After 18 months of follow-up there are still no complications and no need for abdominoplasty.

Discussion

Clinical feature

Gastroschisis and omphalocele are common congenital defects,

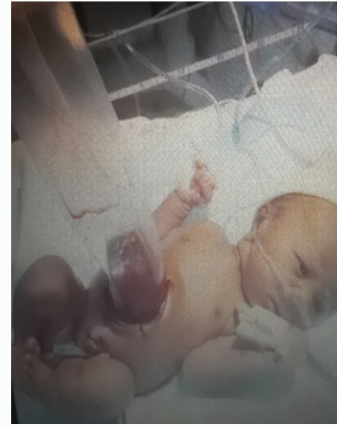


Figure 2: Neonate on silo day 1 of the procedure: only liver remained in the bag.

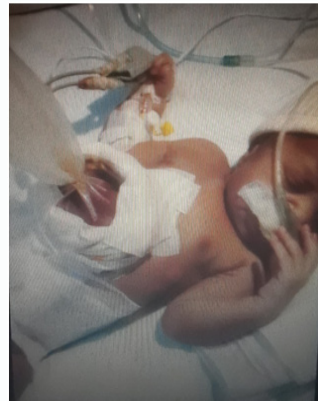


Figure 3: Baby on silo day 3 of the procedure.



Figure 4: Baby on day 4 of the procedure.

in the abdominal anterior wall. Omphalocele is more likely to be associated with other anomalies compared to gastroschisis because it occurs very early in embryonic development. During the fourth week of intrauterine development, the sides of the body or folds come together in the middle to form the front of the fetal abdominal wall. If this fusion is incomplete, it can result in a hole through which the internal organs can protrude from the abdomen, usually to the right of the belly button. The treatment for newborns with gastroschisis depends on factors such as the number of protruding organs, the size of the abdominal cavity, the age at which the condition is detected,



Figure 5: Soft tissue closed on day 10 of the procedure.



Figure 6: Long term follows up (3-month-old baby).

and any associated anomalies. Detecting the condition before birth allows the transfer of patients to specialized hospitals, which can lead to earlier treatment, reduce the need for ventilation, and fewer complications. It's important to treat this condition as soon as possible to prevent loss of heat and water from the exposed bowel. Early treatment also reduces the risk of bowel swelling, tissue death, and infections [7]. Kimble et al. [8] and Rattan et al. [9] recommend prenatal diagnosis for early treatment, and to prevent complications.

The optimal mode of delivery of prenatally diagnosed gastroschisis has been the subject of several observational studies, systematic reviews, and meta-analyses [10-16]. The mode of delivery was not significantly associated with overall mortality, Necrotizing enterocolitis, secondary repair, sepsis, short gut syndrome, time until full enteral feeding, or length of stay in the hospital. In one study [10], cesarean section was identified as an independent risk factor for the development of respiratory distress at birth. Therefore, it is generally not recommended to opt for a planned cesarean section without the usual obstetric indications [17].

In our study, we observed a case of isolated massive gastroschisis with evisceration of the liver, colon, and bowel. It appeared impossible to reduce the condition without anesthesia. Due to the size of the case, we believe that birth by Caesarean section would be safer than vaginal delivery to avoid potential accidents. However, the

fact that a normal and safe delivery was achieved in such a severe case of gastroschisis could be attributed to the mother's high parity. Additionally, early management, digestive decompression, aggressive fluid and temperature regulation in the NICU environment, and the administration of broad-spectrum antibiotics can help reduce the risk of sepsis and preoperative complications.

Surgical procedure

The surgical goals for treating gastroschisis include reducing the herniated organs into the abdominal cavity without causing harm to the bowel or creating excessive pressure, and closing the hole in the abdominal wall. The type and timing of the surgery depend on the condition of the exposed bowel, the size of the hernia, the baby's gestational age, weight, and any other health issues [18]. Surgical closure options include primary reduction with immediate sutured or suture less closure, as well as a gradual visceral reduction followed by delayed sutured or suture less closure.

Although staged repair with a preformed silo is the preferred method at various institutes, it does have potential side effects such as ischemic complications, dislodgement, bowel twisting, prolonged ileus, the need for more surgery, and difficulties with final closure [9]. Patrick, from his part at Seattle Children's Hospital, would prefer primary closure as the procedure of choice because it avoids paralysis and requires minimal sedation leading to shorter hospital stays [8]. Furthermore, patients managed with staged repair took significantly longer to reach full feeds, and there was a trend of starting feeds later [7]. Following a primary closure, « Abdominal compartment » syndrome can be a severe and potentially life-threatening complication. It is remarkable by respiratory compromise associated, or not, with lower limb, renal, and intestinal ischemia. Intra-gastric or intra-vesical pressures superior to 20 mmHg, or central venous pressure superior to 4 mmHg have been shown to correlate with decreased perfusion to the kidneys and bowel, and potential risk of compartment syndrome [19,20]. Peak aspiratory pressures of less than 25 cm H₂O on the ventilator after closure also indicate a low risk for abdominal compartment syndrome [21].

In 1998, Bianchi and Dickson published a series of 14 cases where they performed bedside reduction. Out Of these, 12 cases survived without anesthesia. They used an umbilical cord sutured to the rectus sheath to cover the defect and concluded that minimally invasive management of gastroschisis is safe [3]. In the index study system, the procedure was performed without anesthesia and was secure in all cases. Kimble et al. [8] reported the enormous series of 35 infants and were able to perform ward reduction without anesthesia and ventilation in 29 infants.

The prognosis for primary closure in our practice is a vast concern, as neonatal anesthesia conditions are often associated with high mortality rates. We believe that in such cases, a conscious reintegration of the bowel combined with a preformed « silo bag » is a safe and minimally invasive procedure with more favorable outcomes. However, in this case of significant abdominal-visceral disproportion, attempting to accomplish a « too tight » closure is likely not advisable. Our approach of completely releasing the herniated wrapped bowel, using the herniated liver as a protective canopy, and the decision to perform a vigil Silo staged reintegration, were crucial to the success. We hope that this case report will prompt consideration of the « conscious silo procedure » as a solution to reverse the current trend of very high case fatality for gastroschisis in our context. It also reinforces

our idea that a prospective large study over several years will enable us to set our selection criteria.

Conclusion

Gastroschisis management remains a constant cause of concern in Senegalese pediatric surgery practice. Appropriate management of such cases requires close collaboration to achieve good outcomes. Postoperative mortality is most common in our country due to the high risks of sepsis and neonatal anesthesia, contrary to Western countries. Early presentation favors manual ward vigil reintegration and primary closure procedure on bedside with no need for ventilator support. From this giant case, the authors suggest vigil Silo reduction in selected patients as the solution to reverse the current trend of high mortality for gastroschisis in Sub-Saharan countries.

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