Case Report

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Use of composite mesh in gastroschisis: A unique approach

Vishesh K. Dikshit, Rahul K. Gupta, Abhaya R. Gupta, Paras R. Kothari, Ravikiran S. Kamble, Geeta A. Kekre, Prashant S. Patil

ABSTRACT

Gastroschisis is a congenital defect of the abdominal wall involving evisceration of abdominal contents. Initial surgical treatment of this condition depends on the size of the defect, size of the abdominal cavity and amount of bowel exposed. Various techniques described are primary closure, use of the skin flap and silo bag application, followed by fascial closure. Here we present a case wherein even after 7 days of silo bag application, fascial closure was not possible, and a composite mesh was used to cover the bowel until further repair could be attempted.

Key words: Composite mesh repair, delayed closure, gastroschisis

INTRODUCTION

Gastroschisis and omphalocele are the two most common congenital abdominal wall defefcts and are now frequently diagnosed antenatally by fetal ultrasound. The key surgical principles of management are closure of the defect, prevention of visceral injury and avoidance of abdominal compartment syndrome. Many options ranging from primary closure to staged procedures have been described but final outcome depends on the severity of associated abnormalities.

CASE REPORT

A new born male of 2.1 kg was referred from neonatal intensive care unit as a case of gastroschisis. The patient was a first born child of non-consanguineous marriage delivered via caesarean section due to meconium stained amniotic fluid. On examination, there was a 4 cm × 3 cm defect in the anterior abdominal wall just lateral to the umbilicus with bowel protruding out through it. The bowel loops visible were congested and oedematous. These were wrapped immediately in a sterile dry covering. A nasogastric tube and a perurethral catheter were inserted. A peripheral intravenous access was taken, and 10% dextrose was started after collecting samples for investigations. As soon as the patient was stabilised he was taken up for surgical correction of the defect.

Under general anaesthesia, an attempt was made to reduce the bowel to the abdominal cavity but as it was not possible, decision was taken to apply a "hand fashioned Silo Bag." A wide strip in double layer was cut out from a sterile Uro Bag and sutured to the edges of the defect [Figure 1]. This bag was closed in a cylindrical fashion and suspended from the overhead warmer. Daily reduction of the bowel into the abdominal cavity was done using cord clamps, which were advanced at 12 h intervals. The patient was regularly monitored for urine output, lower limb oedema, respiratory difficulty and signs of sepsis. It was noted that he was passing greenish stools 2-3 times daily.

Even after 7 days of continuous reduction, the bowel could not be completely returned to the abdominal cavity. Hence, the patient was taken up for re-exploration. Under anaesthesia after checking the intestines for associated anomalies they were reposited inside the abdomen but the defect was too large to be closed even after skin flaps were raised off the muscle layer. Hence, we decided to use a Sepramesh™ IP Composite mesh (BARD®) for closure [Figure 2]. The mesh was cut to the appropriate size and sutured to the muscle layer in an underlay fashion [Figure 3]. Skin could not be approximated over the mesh.

Department of Pediatric Surgery, Lokmanya Tilak Muncipal Medical College and Government Hospital, Sion, Mumbai, Maharashtra, India

Address for correspondence:
Dr. Vishesh K. Dikshit,
Ward 1A, Department of Pediatric Surgery, Lokmanya Tilak Muncipal Medical College and Government Hospital, Sion Hospital, Sion, Mumbai - 400 022, Maharashtra, India.
E-mail: kvisheshd@gmail.com

The patient was kept on saline gauze dressings, which were changed on a daily basis. As there were no signs of intestinal obstruction, feeding was started with gradual increments. Slowly the wound started contracting with skin growing in from all sides [Figure 4]. This was aided by plicating the mesh onto itself [Figure 5].

As there were no signs or symptoms of infection, antibiotics were stopped, and the child was maintained on breast feeds. The mesh was allowed to stay in the wound for 45 days after which he was taken up for closure. Under anaesthesia, the mesh was excised taking care not to injure the bowel. By this time the wound had contracted enough to let the muscle layer be closed easily with a good skin cover without any tension on the suture line or the need for any lateral release [Figures 6 and 7]. A glove drain was kept subcutaneously, which was removed after 5 days.

The patient was discharged on postoperative day 6 and is on regular follow-up with good wound healing [Figure 8].

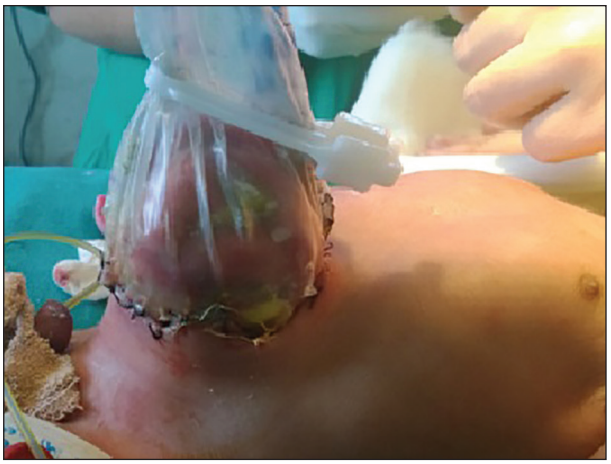

Figure 1: Silo Bag application

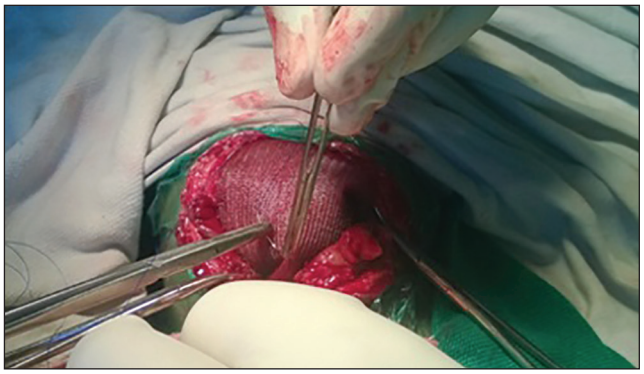

Figure 3: Underlaying of composite mesh

DISCUSSION

Gastroschisis is a congenital defect of the abdominal wall involving evisceration of abdominal contents. The incidence of gastroschisis is approximately 1 per 4000 live births[1] and is rarely associated with other congenital anomalies. Gastroschisis, formally thought to be a variant of omphalocele, was first described in the 1940s. It was not recognised as having a different embryologic origin for almost 20 years after the first reported case. Until the 1970s, survival of infants with gastroschisis was relatively poor.[2] With increasing technology, mortality has been reduced, and survival is an expected outcome. Infants with gastroschisis present the health care team with numerous challenges from delivery to post discharge.

Intestinal anomalies associated with gastroschisis are malrotation, midgut volvulus and atresia (most common).[2-5] Presence of atresia doubles the mortality rate and complicates the closure techniques and postoperative course.[3]

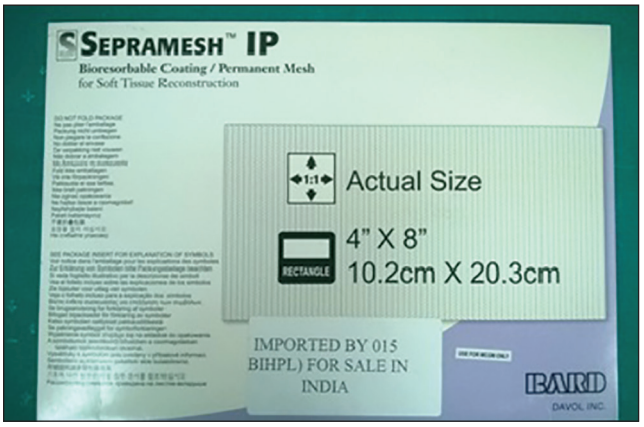

Figure 2: Sepramesh™ IP Composite mesh (BARD®)

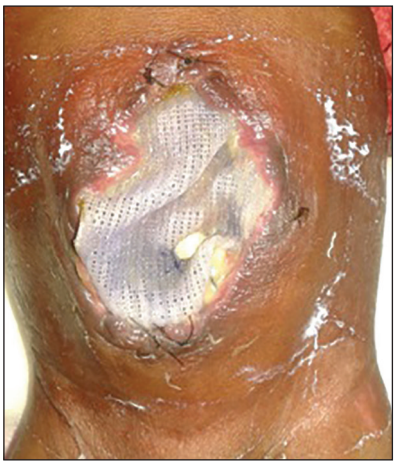

Figure 4: Wound contracting by ingrowing of skin from all sides

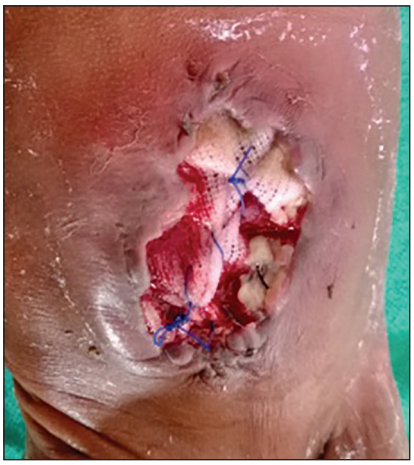

Figure 5: Plication of the mesh

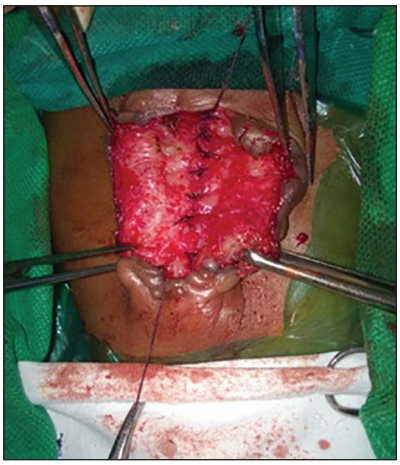

Figure 6: Closure of the muscle layer

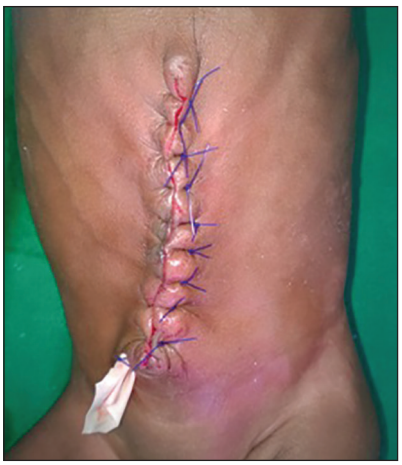

Figure 7: Closure of the skin

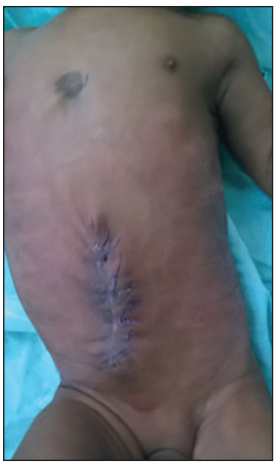

Figure 8: Postoperative day 6

Mode of delivery of antenatally diagnosed cases remains debated between caesarean section and vaginal delivery as no difference in the outcome has been found between the two.[6,7] As soon as the baby is born it should be wrapped in a sterile and dry covering, preferably a steri-drape to conserve body heat and moisture, which are readily lost from the exposed bowel. A nasogastric tube should be inserted to decompress the stomach, and the baby should be nursed in the right lateral position to avoid pull on the mesentery. Peripheral access should be taken, and fluids started before taking the baby up for surgical reduction.[8] Surgical options are:

1. Primary reduction with operative closure of the fascia.
2. Silo placement, serial reductions, and delayed fascial closure.
3. Primary or delayed reduction without fascial closure.[8]

In our case, as complete reposition was not possible, a Silo Bag fashioned out of Uro Bag was used and left in place for a week with twice daily reductions.

Eviscerated contents usually take 7-14 days to reduce completely, but the risk of infection and sepsis increases with each passing day. In our case, the bowel returned to the abdominal cavity by day 7, but the residual defect was too big to be closed without tension. Hence, a composite dual mesh was used. Use of nonabsorbable mesh for fascial closure has also been discussed by Christison-Lagay *et al*.[8]

The mesh used in our case was Sepramesh™ IP Composite mesh (BARD®), which is co-knitted using polypropylene (PP) and polyglycolic acid (PGA) fibres to result in a two-sided mesh with a PP surface and a PGA surface. The mesh is coated on the PGA surface with a bioresorbable, chemically modified sodium hyaluronate, carboxymethylcellulose and polyethylene glycol-based hydrogel. The fascial side of the mesh allows a prompt fibroblastic response through the interstices of the mesh, encouraging complete tissue ingrowth, similar to PP mesh alone. The visceral side of the mesh is a bioresorbable coating, separating the mesh from underlying tissue and organ surfaces to minimise

tissue attachment to the mesh. Shortly after placement, the biopolymer coating becomes a hydrated gel that is resorbed from the site in <30 days.

Patients of gastroschisis usually need prolonged total parenteral nutrition due to intestinal hypomotility and oral feeding needs to be started very slowly. Survival is generally good as there very few associated congenital anomalies in contrast to omphalocele and majority of patients achieve normal growth and development after an initial catch-up period in early childhood.[9]

CONCLUSION

Use of composite mesh in gastroschisis repair is a unique approach and gave commendable results in our case with easy wound closure and no long-term complications.

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