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The umbilicus in gastroschisis: aesthetic considerations

Abstract Preservation of the umbilical cord attachment (UCA) in gastroschisis (GS) is still not routine practice. In a prospective series of 36 children with GS, it was always possible to preserve the UCA, even in those undergoing a temporary silo and delayed closure. Reconstruction by ‘umbilical cord capping’ left no additional scar and achieved a normal abdominal wall. Mild cellulitis in 3 infants resolved on antibiotics, and an initial umbilical weakness in 7 did not require additional surgery. We conclude that preservation of the UCA should be an integral part of surgical technique for all infants with GS. Reconstruction by ‘umbilical cord capping’ alone achieves an unscarred abdominal wall with an umbilicus of normal shape and position.

Key words Umbilicus • Gastroschisis • Aesthetics

Introduction

It is an accepted aspect of normal development for children and adolescents to wish to conform and not to be different from their peers. Indeed, the development of self-esteem is closely related to an acceptable body image and has a major impact during adolescence and later life in both sexes [1–3]. Abnormal or anomalous anatomy is perceived by children and parents as disfiguring, often creating anxiety and inhibiting normal activities involving exposure of the affected body part. In fact, most parents of children with gastroschisis (GS) ask whether their baby will have a ‘normal belly button’.

Preservation of the normal umbilical cord attachment (UCA) is superior to surgical techniques in achieving a normal umbilicus. We have attempted to evaluate the possibility of routinely preserving the normal UCA and to assess the role of ‘umbilical cord capping’ (UCC) in achieving an unscarred abdominal wall with a normally-shaped umbilicus at the normal site in children born with GS.

Fig. 1 Appearance of umbilicus 24 h after primary midgut reduction and abdominal closure by umbilical cord capping

Fig. 2 Appearance of umbilicus 24 h after delayed midgut reduction and umbilical reconstruction
Discussion

Since the majority of children with GS are expected to survive to live a normal life, consideration of quality of life and development of body image are particularly relevant to surgical planning. Reconstructive surgeons are well familiar with the distress caused by even minor congenital disfigurement such as prominent ears or facial skin tags, as well as an excess (digits, nipples) or absence (umbilicus) of natural anatomical features. Similarly, surgical scars, however acceptable to the surgeon, are often perceived as regrettable. Indeed, it is common and appropriate surgical practice to attempt to hide a neat scar within a natural anatomical crease. Although parents accept the absence of an umbilicus and an abdominal wall scar as a trade-off for neonatal survival, they often ask for surgical umbilicoplasty later in the child’s life.

Preservation of the UCA in GS is not a new concept [4, 6]; however, it is still not an integral part of surgical technique for GS [5]. The normal drying and shedding of the umbilical cord results in a more natural umbilicus than is achievable by any surgical umbilicoplasty. In a prospective series of 36 children over a 2-year period, it was possible to preserve the UCA in all circumstances, including those requiring a temporary silastic silo prior to delayed closure. A total of 29 children (21 primary closure and 8 silos) underwent conventional abdominal wall repair, apposing the edges of the defect transversely. This technique led to a neat but obvious surgical scar passing to the right of the umbilical cicatrix. The parents accepted the scar as ‘necessary’, but also expressed appreciation at the presence of a normal umbilicus to the left of the scar.

A reassessment of the anatomy of the abdominal wall in GS highlights the fact that there is no actual tissue deficit, but rather a widely stretched umbilical port to the right of a splayed UCA. Indeed, the right rectus abdominis muscle and its fascial sheath are complete, forming the right margin of the wide umbilical port. Such a concept also implies a potential for the widened umbilical port to undergo contraction and cicatrisation in the normal manner once the midgut has been reduced.

Seven children underwent closure of the widened umbilical port using the splayed base of the umbilical cord as a cap hinged to the left of the defect. The peritoneal edge of the cord was sutured circumferentially to the free edge of the fascial sheath. Natural cord drying and rapid initial contracture at the umbilical port resulted in a normal, unscarred abdominal wall with a ‘soft’ umbilicus in 7 infants. In retrospect, it would seem that this early umbilical weakness represented an as yet incomplete fascial contracture. Indeed, resolution occurred spontaneously over subsequent months, and none have required operative repair. Thus, the long-term appearance following repair by UCC alone was that of an otherwise unscarred abdomen with a normal umbilicus at its natural site.

It is interesting and perhaps significant that comparisons between parents of children with GS prompted them to question the necessity for an abdominal scar for the one child but not the other with the same condition.

We conclude by emphasising that it is always possible and, indeed, desirable to preserve the UCA towards a normal umbilicus following repair of GS. Furthermore, reconstruction of the widened umbilical port by UCC is achievable in a considerable proportion of children with GS.

Results

There were 2 late deaths related to complications of short-bowel syndrome. Three children who had primary reductions (2 with capping and 1 requiring a silo and delayed closure) developed mild periumbilical cellulitis that resolved with antibiotic therapy. Five children subsequently required a laparotomy for un repaired atresia, volvulus, anastomotic stricture, or bowel adhesions. Surgery was performed either through the previous transverse abdominal scar or through a Pfannenstiel incision.

The abdominal wall and umbilicus of infants reconstructed by UCC was of relatively normal appearance within 24 h of the procedure (Fig. 1). However, an umbilical weakness suggestive of a possible umbilical hernia was demonstrable in 7 infants some 10 days after cord shedding. At 2-year follow-up all had reduced in size spontaneously and none had required surgery. The abdomen was unscared except when a lateral extension incision had been used to facilitate midgut reduction.

Patients and methods

Thirty-six children (mean gestational age 37 weeks, mean birth weight 2,350 g) were treated for GS during 1993 and 1994. All patients were paralysed and ventilated at midgut reduction and abdominal wall reconstruction and then gradually weaned off the ventilator. Parenteral nutrition was routine until enteral alimentation was established over some 4–6 weeks. Antibiotics were given routinely for 5 days post-repair.

Primary midgut reduction was achieved in 28 infants. Twenty-one had umbilical repair by the conventional technique of layered fascial and skin closure, which always created a transverse scar of variable length running to the right of the UCA. The splayed UCA was retained at the left edge of the scar and was tubularised to give a normal, circular umbilical cord appearance.

Seven infants underwent abdominal wall reconstruction by UCC. In this procedure the umbilical cord, attached to the left of the defect, was used like a hinged bottle cap to close the lesion following reduction of the midgut. The splayed base of the umbilical cord lined by peritoneum was sutured circumferentially to the rim of the rectus abdominis fascial sheath (Fig. 1). No effort was made to reduce the size of the widened umbilical port. Whenever possible, midgut reduction was achieved without extending the umbilical port. Should a lateral release incision have been necessary to allow midgut reduction, this was then first repaired as far as the rim of the original umbilical port, which was then capped with the umbilical cord in the same way.

Delayed closure was necessary in 8 infants. A temporary silastic silo was sutured to the fascial rim of the defect, always retaining the UCA on the left. These infants were paralysed and ventilated for 4–7 days during the period of bowel reduction. At final surgical closure, umbilical reconstruction was carried out in 7 by transverse fascial and skin closure, positioning the UCA in the midline (Fig. 2), or by UCC in 1 infant. The cord was then left to shed naturally.

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