Disorders of the umbilicus in infants and children: A consensus statement of the Canadian Association of Paediatric Surgeons

Embryologically, the umbilicus is a 'busy' place, being the exit site for the umbilical vessels and transmitting important structures related to the developing gastrointestinal and urinary tracts.

Abnormalities involving the umbilicus in babies and children are common, and are often a source of great anxiety for patients' families. The present consensus statement was developed as a resource for physicians caring for children, providing guidelines for the diagnosis, management and referral of umbilical conditions.

The consensus statement was obtained through the joint work of the members of the Educational Committee of the Canadian Association of Paediatric Surgeons, followed by invited, broad input from all of the association's membership via the association's Web site.

UMBILICAL HERNIA

Umbilical hernia is the most common umbilical disorder seen in infants and children. It is seen in over 10% of Caucasian babies and in a higher proportion of infants of African descent. Umbilical hernias are more common in premature babies and in those with trisomy 21 (1).

The hernia is usually identified during the first months of life following umbilical cord separation. It consists of a peritoneum-lined sac protruding through the umbilical ring – the opening in the deep fascia of the abdominal wall. Because of the prominence of the hernia, particularly when the baby cries or strains, it may be a cause of great concern to the parents and other caregivers.

Clinical features

Umbilical hernias are usually painless. Incarceration of the hernia is very uncommon.

Over time, the umbilical ring constricts spontaneously to obliterate the defect; during this time, the protrusion of the hernia may, in fact, increase. The size of the ring (defect) is more important than the size of the hernia sac for predicting the probability of spontaneous closure. The vast majority of hernias close spontaneously during the first three years of life, and most will close by six years of age.

Recommendations

Reassurance and observation are sufficient management approaches for the vast majority of patients. Unless the defect is large (larger than 1.5 cm), spontaneous closure can be anticipated; therefore, repair is deferred until the age of four to six years (2). Incarceration, although rare, warrants urgent surgical evaluation and repair.

Do not tape the hernia; it will not speed hernia resolution, but may cause significant skin breakdown.

UMBILICAL GRANULOMA

An umbilical granuloma, a small nodule of tissue measuring up to 1 cm, may become apparent following the separation of the umbilical cord.

Clinical features

The surface of an umbilical granuloma may be smooth or irregular, and is often pedunculated. It may be con-

Correspondence: Dr D Poenaru, Education Committee, Canadian Association of Paediatric Surgeons, Kingston General Hospital, 76 Stuart Street, Kingston, Ontario K7L 2V7. Telephone 613-549-6666 ext 3535, fax 613-548-2514, e-mail poenarud@kgh.kari.net

fused with umbilical polyps (vide infra or omphalomesenteric duct remnants).

Recommendations

Small granulomas may be treated adequately with applications of topical silver nitrate. Larger granulomas or those refractory to silver nitrate may require surgical resection.

HERNIA OF THE UMBILICAL CORD

Clinical features

A hernia of the umbilical cord presents as an umbilical defect with intestinal contents within the base of the umbilical cord. Despite its frequent unimpressive appearance, this 'hernia' is, in fact, a small omphalocele. If missed, this condition can lead to intestinal damage by a low-placed umbilical cord clamp.

Recommendations

Hernias of the umbilical cord are small omphaloceles and require prompt surgical closure that follows the principles of omphalocele treatment.

OMPHALOMESENTERIC (VITELLINE) DUCT REMNANTS

The omphalomesenteric duct connects the terminal ileum to the umbilicus in utero. The duct normally disappears completely, but a part or all of it may persist postnatally. The most common remnant is a Meckel's diverticulum, an out-pouching of the ileum that does not connect to the umbilicus (not discussed here). There are several other possible remnants of the omphalomesenteric duct (3).

Clinical features

Patent omphalomesenteric duct: The patent omphalomesenteric duct is a communication between the ileum and the umbilicus. It presents in the neonate with the drainage of enteric contents, often with a prolapse of the duct and adjacent ileum from the umbilicus. Probing of the lesion documents the patent lumen. The condition should be suspected in cases of delayed separation of the cord or persistent, large, umbilical granulomas with associated drainage.

Umbilical polyp: The umbilical polyp is a small remnant of intestinal or gastric mucosa in the umbilicus. It presents as a bright red nodule in the umbilical dimple and may mimic an umbilical granuloma.

Umbilical cyst: The umbilical cyst presents as a nodule deep to the umbilicus. It may be prone to infections.

Recommendations

All of the above lesions require prompt referral to a paediatric surgeon for surgical management.

URACHAL REMNANTS

The urachus is a structure that connects the dome of the bladder to the anterior abdominal wall at the level of the umbilicus (4). During earlier development, the urachus is a patent tube, but postnatally it is normally just a solid core of tissue (the median umbilical ligament). The failure of its lumen to obliterate may result in several pathological conditions. These conditions are analogous to the omphalomesenteric remnants described above.

Clinical features

Patent urachus: With a patent urachus, a complete communication between the bladder and umbilicus remains. Urine is noted to drain from the umbilicus.

Urachal sinus: The blind-end opening of the urachal sinus is noted at the umbilicus either incidentally or because of drainage.

Urachal cyst: A urachal cyst, a residual cyst without communication to the bladder or the umbilicus, is found inferior to the umbilicus along the midline of the abdominal wall. It usually presents as a tender, swollen mass secondary to infection.

Recommendations

Urachal anomalies require further investigation and management by a paediatric general surgeon or a paediatric urologist. Surgical excision is the treatment of choice.

NEONATAL OMPHALITIS

Neonatal umbilical infections are rare in developed countries, reflecting good neonatal care and asepsis. *Staphylococcus* and *Streptococcus* species, as well as Gram-negative and polymicrobial infections, predominate.

Clinical features

Neonatal umbilical infections may present as a purulent umbilical discharge or periumbilical cellulitis.

Recommendations

Omphalitis should be treated aggressively with parenteral antibiotics; this often is sufficient treatment. Omphalitis may, however, progress to necrotizing fasciitis, a rapidly progressing, life-threatening infection of the abdominal wall. Hence, a baby with omphalitis should be observed closely and referred promptly to a paediatric centre if there is evidence of progressive sepsis.

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