



PEDIATRIC SURGERY Update © **Vol. 35 No. 06 DECEMBER 2010**

Pneumatosis Cystoides Intestinalis

Pneumatosis cystoides intestinalis (PCI) is a condition characterized by formation of multiple gas-filled cysts located within the wall (subserosa or submucosa) of the gastrointestinal tract. They pneumatosis can be located in any point of the GI tract. In neonates, PCI is associated with necrotizing enterocolitis. Infant and older children can develop PCI associated with immunosuppression (bone marrow transplant or chemotherapy), collagen vascular disease, aganglionosis, colonoscopy, steroid therapy, bacterial infection with *Clostridium* species, viral infection with rotavirus and cytomegalovirus, short bowel syndrome, bowel obstruction, and congenital heart disease. Following a mechanical (increase intraluminal pressure), bacterial (producing gas) and biochemical (high partial pressure of hydrogen) theory of origin of the pneumatosis, the exact mechanism is still unknown. Clinical presentation includes abdominal distension, bloody diarrhea, bilious vomits, lethargy and hypotension. Management consists of aggressive fluid therapy, frequent clinical and radiological examinations, systemic antibiotics, bowel rest and nutritional support. Worrisome CT findings include thickening of bowel wall, free fluid and periintestinal stranding. Surgery is indicated if the child develops progressive deterioration, free air, metabolic acidosis, severe hemorrhage, obstruction or signs of peritoneal irritation.

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Cells of Cajal

The interstitial cell of Cajal (ICC) are the smooth muscle pacemakers cells of spontaneous motility in the gut. The ICC network is widely distributed within the submucosal, intramuscular and intermuscular (between the circular and longitudinal

muscles) layers of the gut wall. ICC serves as electrical pacemakers, provides pathways for the active propagation of slow waves, are mediators of enteric motor neurotransmission and play a role in afferent neural signaling. This motor neurotransmission occurs through specialized synapses that exist between enteric nerve terminals and ICC. Digestive motility consists of non-propulsive mixing (segmental) and propulsive (peristalsis) movement. Electron microscopy and immunochemistry have demonstrated reduced number, density and structural abnormalities in the ICC of gut motility conditions such as achalasia, gastroesophageal reflux, gastroparesis, infantile pyloric stenosis, segmental dilatation of the intestine, chronic intestinal pseudo-obstruction, Hirschsprung's disease, neuronal intestinal dysplasia, internal anal sphincter achalasia and slow transit constipation. Gastrointestinal stromal tumors originate from the ICC. In the gut musculature, ICC and mast cells are the only cells that have prominent c-kit expression. c-Kit is a transmembrane protein kinase which has as ligand stem cell factor and is involved in cell development in a variety of cell lineages.

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Postoperative Ileus

Ileus refers to any obstruction of the intestine. Postoperative ileus occurs after a major surgical procedure and is an important cause of postoperative discomfort and prolonged hospital stay. Operations that involve large incision, extensive bowel manipulation and peritoneal irritatives such as blood and pus more commonly results in postop ileus. Ileus is characterized by lack of coordinated and reduced peristalsis. The patients complain of cramping, abdominal pain and nausea. No test confirms or excludes the diagnosis of ileus. Ileus that fail to resolved after the fifth postop day might be caused by an associated abscess, anastomotic leak, inflammation, intussusception or early adhesion. Ileus is resolving when the patient passes flatus or a bowel movement. Ileus resolves when the patient tolerates oral feeding without significant abdominal symptoms. After surgery the small bowel recovers first, the stomach next and the colon last within a period of 3-5 days. Sympathetic nerve activity due to peritoneal irritation reduces

acetylcholine release and inhibits bowel motility. Traditional treatment includes bowel rest and NG suction. Novel approach includes early enteral feeding, minimal to none NG suction, chewing gum (sham feeding), thoracic epidural catheter, ketorolac, intraoperative steroids and use of laparoscopy.

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