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Surgical Responses in NB

The endocrine and metabolic response to surgical stress in newborns (NB) is characterized by catabolic metabolism. An initial elevation in cathecolamines, cortisol and endorphins upon stimulation by noxious stimuli occurs; a defense mechanism of the organism to mobilize stored energy reserves, form new ones and start cellular catabolism. Cortisol circadian responsiveness during the first week of life is diminished, due to inmaturation of the adrenal gland. Cortisol is responsible for protein breakdown, release of gluconeogenic aminoacids from muscle, and fat lipolysis with release of fatty acids. Glucagon secretion is increased. Plasma insulin increase is a reflex to the hyperglycemic effect, although a resistance to its anabolic function is present. During surgical stress NB release glucose, fatty acids, ketone bodies, and amino acids; necessary to meet body energy needs in time of increase metabolic demands. Early postoperative parenteral nutrition can result in significant rate of weight gain due to solid tissue and water accumulation. Factors correlating with a prolonged catabolic response during surgery are: the degree of neuroendocrinological maturation, duration of operation, amount of blood loss, type of surgical procedure, extent of surgical trauma, and associated conditions (hypothermia, prematurity, etc.). They could be detrimental due to the NB limited reserves of nutrients, the high metabolic demands impose by growth, organ maturation and adaptation after birth. Anesthetics such as halothane and fentanyl can suppress such response in NB.

Physiology of Pneumoperitoneum

A potential working space during video-laparoscopic abdominal procedures in adults and children is established with the help of a carbon dioxide pneumoperitoneum. Insufflation by either an open or closed (Veress needle) technique will cause an increase in intrabdominal pressure (IAP). Studies during abdominal wall defects closure has shown that the rise in IAP may cause decrease venous return, decrease renal perfusion, low splanchnic flow, and increased airway pressures. The cardiac afterload will increase, an effect magnified by hypovolemia. CO2 is absorbed into the bloodstream transperitoneally causing hypercapnia and acidosis, an effect controlled by

increasing minute ventilation by the anesthesiologist. High risk children where this effect can be potentiate further are those with pre-existent cardio-respiratory conditions causing increase dead space, decrease pulmonary compliance and increase pulmonary artery pressure and resistance. Hypotension during the establishment of the pneumoperitoneum could be the result of vascular injury, arrhythmia, too much CO2, impending heart failure, gas embolism or pneumothorax.

Laparoscopic Splenectomy

Laparoscopic splenectomy is another safe and technically feasible video-endoscopic procedures in children. Indications are usually hematological disorders such as ITP, spherocytosis, and Hodgkin's staging. Technical considerations of the procedure are based on anatomical facts such as the variability in the splenic blood supply, the ligaments anchoring the organ and the size of the diseased spleen. Generally the avascular splenophrenic and colic ligaments are cauterized, the short gastric and hilar vessels are individually ligated with metallic clips or staplers (Endo-GIA), and the spleen is placed in a plastic bag and fracture until it is removed through the navel. Advantages of the procedure are: improved exposure, decreased pain, improved pulmonary function, shortened hospitalization, more rapid return to normal activities and excellent cosmetic appearance. Disadvantages are longer operating time, higher costs and the need to open 5-20% of cases due to uncontrolled hemorrhage.

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