

# Can I improve postoperative outcome after abdominal surgery ?

S. LAUWICK, A. KABA, J. JORIS

Most of the textbooks of anesthesia do not devote any chapter to anesthesia for abdominal surgery. Whereas the choice of anesthetics has minimal impact on postoperative outcome of the patient scheduled for these procedures global perioperative anesthetic management however affects postoperative recovery, convalescence, or even morbidity. This presentation highlights practical measures susceptible of reducing postoperative complications and of shortening patient convalescence.

## MEASURES REDUCING THE INCIDENCE OF INFECTION

Tissue vasoconstriction and hypoxia alter immune function and facilitate septic complications. Hypothermia from anesthesia results in vasoconstriction and dysfunction of polymorphonuclear leucocytes, and slows wound healing. Prevention of intraoperative hypothermia decreases the risk of parietal infection.

Furthermore increasing tissular oxygen tension (PtisO<sub>2</sub>) reduces the risk of wound infection. Intraoperative administration of supplemental oxygen (FIO<sub>2</sub> = 0.8) increases PtisO<sub>2</sub> and subsequently results in a twofold reduction in wound infection. It should be noted that postoperative atelectasis is not increased by this high intraoperative FIO<sub>2</sub>.

Moderate hypercapnia also increases PtisO<sub>2</sub> as well as splanchnic PO<sub>2</sub>. Whether this measure allows to reduce the incidence of wound infection still needs to be demonstrated.

Finally preoperative nutrition, particularly when enriched in immunonutrients (omega-3 fatty acids, arginine), significantly reduces the incidence of postoperative infection and the length of hospital stay, not only in malnourished but also in non-malnourished patients.

## INCREASING OXYGEN DELIVERY IMPROVES POSTOPERATIVE OUTCOME

Increasing oxygen delivery (DO<sub>2</sub>) by supplemental oxygen not only reduces the incidence of

wound infection, but also the incidence of major postoperative complications.

Improved DO<sub>2</sub> can also be achieved by optimization of cardiac output. Increasing cardiac output by colloid infusion guided by esophageal doppler reduces postoperative morbidity, length of hospital stay, and postoperative ileus.

However liberal intravenous administration of crystalloid increases PtisO<sub>2</sub> but not PO<sub>2</sub> measured in the peri-anastomotic or intra-anastomotic colon. This may result from an increase in anastomotic colon edema compromising local vascularization. As a consequence the incidence of postoperative infection is not decreased by liberal intravenous administration of crystalloid. Rather a restrictive regimen of fluid administration during major abdominal surgery is associated with a reduction in postoperative complications and with shortening of postoperative ileus. On the contrary liberal fluid administration improves patient outcome after minor abdominal procedures, mainly using the laparoscopic approach.

Potential deleterious postoperative hypoxemia is thankfully avoided by supplemental oxygen and by prevention of fluid overload and of pulmonary edema. Perioperative epidural analgesia using local anesthetics and the laparoscopic approach are also helpful to reduce the incidence of postoperative pulmonary complications and hypoxemia.

## STRATEGIES TO PREVENT POSTOPERATIVE ILEUS

Postoperative ileus delays postoperative feeding, is associated with postoperative negative nitrogen balance and asthenia, and prolongs hospital stay and postoperative convalescence. Any treatment to shorten ileus is therefore welcome. Pathophysiology of postoperative ileus is multifactorial : visceral and parietal inhibitory reflexes, inflammation, sympathetic activation, and the use of perioperative opioid.

Postoperative epidural analgesia using local anesthetics blocks these inhibitory reflexes, reduces sympathetic activation, results in marked opioid

sparing effect, and subsequently reduces postoperative ileus significantly.

Continuous preperitoneal wound infiltration with local anesthetics also blocks inhibitory reflexes and reduces postoperative opioid requirements. Accordingly bowel function is improved.

The benefits of these analgesic techniques may be partially mediated by a systemic effect of local anesthetics. Indeed intravenous lidocaine which has anti-inflammatory effect, decreases opioid consumption, and has intrinsic intestinal prokinetic properties shortens postoperative ileus.

Nonsteroidal anti-inflammatory drugs speed the return of bowel function.

Finally intra- and postoperative restrictive administration of fluid is also associated with shortened ileus.

Because opioid-induced hyperalgesia results in greater postoperative opioid consumption, unwanted after abdominal surgery, strategies that limit intraoperative use of opioid (ketamine,

clonidine, locoregional techniques) may be beneficial for abdominal surgical procedures.

#### PREVENTION OF CHRONICISATION OF ACUTE PAIN

This issue will be addressed by the next speaker. The incidence of chronic pain after laparotomy ranges between 15 and 30%. Different strategies have been shown to prevent chronicisation of acute pain after laparotomy : intraoperative intravenous infusion of moderate dose of ketamine, intraoperative epidural analgesia, and spinal clonidine.

Whereas each of these measures alone has limited beneficial effect their combination allows postoperative acute rehabilitation and shortened hospital stay. The concept of a multimodal approach, introduced by Henrik Kehlet, is the key for the success of fast track pathways introduced after abdominal surgery.