The Role of the Anesthesiologist in Fast-Track Surgery

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Surgical injury may be followed by pain, nausea and vomiting, ileus, stress-induced organ dysfunction (pulmonary, cerebral, cardiovascular), fatigue and catabolism, all of which may contribute to morbidity, need for hospitalization and delayed convalescence. Since the postoperative recovery process includes multiple pathogenic factors, an enhanced postoperative recovery program (the concept of fast-track surgery) requires a stepwise multimodal, evidence-based intervention. The concept was introduced a decade ago[1] and subsequently has been demonstrated to provide a powerful instrument to enhance recovery, reducing morbidity, hospital stay, and convalescence across several surgical procedures, ranging from simple day-case procedures to more complex procedures, such as colorectal surgery, aortic aneurisms, hip fracture surgery, etc.[2–4]

T1 In Table 1, some of the factors to be considered when organizing a fast-track surgical program are listed. Obviously, the fast-track methodology requires an interdisciplinary approach including the patient, the anesthesiologist, the surgeon and the surgical nurses, nutritional support, physiotherapy, etc. As seen in Table 1, the anesthesiologist plays a key role in several areas to secure a successful fast-track program.[2,3] The present paper is a short update on recent achievements of interest to the anesthesiologist when participating in multimodal rehabilitation programs, and where the reader is referred to a recent extensive review covering the literature up to 2007.[3] In Figure 1, F2 the basic principles of the fast-track methodology is shown, and the discussion will be focused on pre-, intra-, and postoperative factors of interest for the anesthesiologist.

Preoperatively

There has been an increased recent focus on pre- and early intraoperative optimization of fluid status, and where it is now well established in outpatient and short stay procedures that more than 1–1.5 l of crystalloids is required for an enhanced recovery.[3–5] Optimal fluid management should be structured on a procedure-specific basis, since each procedure may have different fluid dynamics.[6] In addition, the concept of goal-directed fluid therapy has proven valid across several major procedures[7,8] and is based on an individualized optimization of stroke volume, which is different from previous cardiovascular optimization regimens aiming at general well-defined goals, but not considering the large inter-individual variability in cardiovascular performance. Future studies on the goal-directed fluid management concept are required to outline indications and results in individual procedures and patient groups.

The classical concept of preoperative bowel clearance in major abdominal procedures has been questioned, and several randomized trials have shown it to be unnecessary or even shown to increase morbidity, especially in colorectal procedures.[9,10] The consequences are important for the anesthesiologist since preoperative bowel clearance may result in a variable degree of hypovolemia, thereby hindering optimal clinical judgment of fluid balance unless a goal-directed approach is utilized. Base on experimental studies, the concept of a preoperative carbohydrate load has been introduced.[11] Although the anti-catabolic effects are well-documented,[11] the overall clinical outcome effects in minor and major procedures need to be defined before general recommendations.[12–14]

Intraoperatively

The importance of temperature control, local regional and central neuraxial blockades, and monitored anesthesia care has been covered in detail.[3] Among the regional anesthetic/analgesic techniques, the intraoperative use of high-volume infiltration anesthesia regimens in hip and knee replacement has so far shown extremely promising results with improved and prolonged analgesia, allowing early mobilization and shortening hospital stay.[15,16] These techniques should receive further attention and be compared to the otherwise well-documented effective continuous peripheral nerve block techniques,[3] since the high-volume infiltration technique may be easier and less demanding on expertise. Furthermore, it may be combined with a continuous wound infusion analgesic technique.[17]

The effect of the amount of *intra*operative crystalloid combined with a fast-track methodology has been assessed in three recent blinded randomized trials in cholecystectomy, colonic surgery, and knee replacement,[18–20] confirming that >1 L Ringer lactate is required for optimizing perioperative pathophysiology and functional recovery in outpatient laparoscopic cholecystectomy,[18] while there may be little differences in functional recovery in knee replacement when receiving an amount between 2.5 and 5 L Ringer lactate.[19] In contrast, in colonic surgery[20] an intraoperative amount of 2 L Ringer lactate may have a

Table 1. Why is the Postoperative Patient in Hospital Today?

	Factors where anesthesiologists play a key role
Organ dysfunction ("surgical stress")	*
Hypothermia-induced organ dysfunction	*
Pain, nausea, vomiting and ileus	*
Organ dysfunction due to fluid excess/hypovolemia	*
Hypoxemia – sleep disturbances	*
Immobilization-induced organ dysfunction	†
Semi-starvation-induced organ dysfunction	†
Fatigue	
Traditional care principles (tubes, drains, catheters, monitoring, restrictions, etc.)	
Surgical complications	

* = yes.

† = important contribution to facilitate mobilization and oral nutrition.

potential risk of increasing morbidity and that probably about 2.5 to 3 L should be given to prevent hypovolemia.[20] Further procedure-specific studies on the optimal amount of crystalloid combined with the goal-directed approach[7,8] and the fast-track methodology are required, and also to evaluate the need for concomitant colloid administration. The role of the anesthesiologist to reduce nausea, vomiting, and paralytic ileus is well established.[2–4,21]

Postoperatively

Recent developments in multimodal, non-opioid analgesia to enhance recovery has been covered before.[3] There is an important need for the anesthesiologists to change their strategy when integrating optimized perioperative pain management into postoperative outcome studies.[22,23] Thus, most outcome studies in relation to analgesic techniques have not considered other aspects of perioperative care such as the fast-track methodology and thereby not utilizing the advantageous physiological effect of the different non-opioid pain regimens.[22,23] The time has therefore come for an optimized design of pain-outcome studies[23] as has been introduced in the published fast-track studies.[2–4]

Although the concept of multimodal analgesia was launched about 15 years ago[24] and subsequently confirmed in several studies,[3] there is a need for studies including *several* non-opioid analgesics. Thus, inclusion of gabapentanoids[25] and glucocorticoids[26] should be studied when combined with other non-opioid analgesics. Such studies, performed on a procedure-specific basis, should also include appropriate local anesthetic techniques, and where continuous wound infusion of local anesthetics[17] or IV local anesthetics[27,28] may be considered to provide improved analgesia, thereby to facilitate recovery in fast-track clinical pathways. The role of the anesthesiologist in this process is self-evident.

Organizational Issues

Although much evidence has been available from large consecutive cohort series or randomized trials on the results of a multimodal rehabilitation effort within the fast-track methodology,[2–4] widespread implementation into clinical practice has been relatively slow. Thus, several series have documented an apparent reluctance to implement the scientific evidence,[29–33] calling for an intensified multidisciplinary collaboration between anesthesiologists, surgeons, and surgical nurses. Although many factors are involved in the translation of documented scientific evidence to clinical practice,[34,35] the documented major improvements in outcome by the fast-track methodology hopefully will bring anesthesiologists and surgeons together to achieve these advantages.

Future Strategies for the Anesthesiologist to Enhance Fast-Track Surgery

The role of the anesthesiologist in perioperative medicine is well established and should expand outside the operating room into the surgical ward and also into the postdischarge period. Such strategies may include an increased use and investigation of multipharmacological modification of stress responses during and after surgery,[36–38] participation in postoperative rounds by anesthesiologists in certain high-risk patient populations, i.e., hip fracture,[39] participation in and leading the introduction and investigation of "outreach" services or early identification and treatment of postoperative organ dysfunction[40,41] and participation in multidisciplinary collaboration to identify patients at risk for persistent postsurgical pain and possibilities for early intervention.[42]

CONCLUSIONS

As is apparent from this short updated review on recent developments combined with a previous extensive review,[3] the anesthesiologist plays an increasingly important role in the process to enhance postoperative recovery and reducing morbidity. This especially applies to development and documentation of well-defined procedure-specific care programs within the fast-track methodology. Future advances in fast-track surgery will require a close interdisciplinary collaboration within anesthesia, pain management, surgery, and nursing care. The focus should go beyond the surgical procedure to expand to the surgical ward and the postdischarge period to implement and develop techniques to improve analgesia and limit organ dysfunctions. The major improvements in outcome documented in the fast-track surgical literature hopefully will stimulate this collaboration. In this process, interdisciplinary participation in scientific meetings and symposia will be helpful where anesthesiologists and surgeons are contributing on procedure-specific topics. The future is now to develop, establish, and implement the evidence.

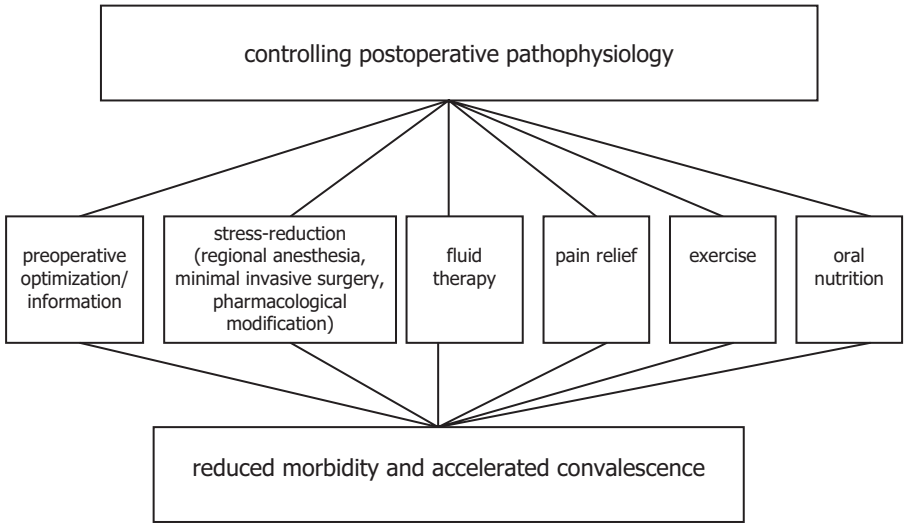

Figure 1. •••.

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