

CLINICAL STUDY

Do we really apply fast-track surgery?

Zonca P¹, Stigler J², Maly T³, Neoral C³, Hajek M², Stiglerova S²*Department of Surgery, City Hospital, Ostrava, The Czech Republic. pavel.zonca@hotmail.co.uk***Abstract:** *Aim:* The aim of this study is to show the current view on fast-track programs optimizing the perioperative care.*Methods:* Authors searched Medline databases and identified current trials regarding all factors of fast-track programs. They analyzed these trials and identified the most important principles of fast-track programs based on trial analysis.*Results:* The most important principles are consistent in all individual trials. Most of authors recommend 10–12 issues. All authors emphasize early mobilization of patients after surgery and early introduction of peroral nutrition. Fast-track programs shorten the duration of hospitalisation and decrease morbidity.*Conclusion:* The perioperative care is characterized by a range of trussing traditions. Fast-track surgery optimizes the perioperative care. It is a safe method according to the trials. The implementation of single fast-track surgery factors is very slow (Tab. 2, Ref. 49). Full Text (Free, PDF) www.bmj.sk.

Key words: fast-track program, perioperative care, surgery.

The application of minimal invasive techniques and advanced anesthetic techniques has changed the surgical specialties. The trends require the best treatment effects that minimize the risks of patients. There is an effort to reduce the stress response. In the past many operations required hospitalization; however now it is feasible to perform out-patient interventions or in-patient interventions with short hospitalization and short recovery. The fast track technique sometimes referred to as ERAS (Enhanced Recovery after Surgery) has been introduced in the context of a better understanding of perioperative patophysiological processes. This technique with the application of sophisticated processes reduces the perioperative organ dysfunction. It is applied before the surgery, during the perioperative period, and after the surgery. Its imminent part resides in aggressive postoperative rehabilitation including early peroral nutrition. This technique involves an up-to-date approach to common principles of perioperative care such as the usage of drains, monitoring, etc. In general, the fast track principle shortens the duration of hospitalization and recovery and lowers morbidity connected with pulmonary, cardiac, thrombotic, and infectious complications (1).

This technique was successfully introduced at a number of hospitals in Scandinavia, USA, and Great Britain. It was established in Germany as well. It is commonly used in all surgical

specialties including general surgery, thoracosurgery, cardio-surgery, urology, gynecology, and others.

The authors pose a question whether fast-track surgery is really applied as common practice in our hospitals.

Method

The authors made the following entries into the electronic browser of Medline database: fast, fast track, rehabilitation, early ambulation, enhanced, and recovery. The articles were searched with no language limitation.

Hundreds of articles regarding fast-track surgery were identified. Only 6 articles were identified in Czech or Slovak journals (2–7). Other articles by Czech authors were published abroad (8–10).

Fast track – current view

The pioneer of multimodal fast-track program in Europe is Prof. Kehlet. Fast-track surgery includes many factors, which were identified in a systemic review by Wind in 2006 (11). Wind summarized 17 factors according to single studies. They are shown in the following table (Tab. 1). These factors were identified in randomized trials or in metaanalysis.

These 17 factors participating in multimodal fast-track surgery differ in individual studies, however all authors highlighted the facts of accelerated mobilization and early postoperative peroral nutrition. Prof. Kehlet summarized 15 factors. Other 2 factors were added to these 15 factors: perioperative application of high O₂ concentration, and application of probiotics before surgery. Most of authors recommend 9–12 of all these above mentioned factors.

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Tab. 1. Fast-Track Factors by Wind.

Fast-track factors (Wind)
Pre-operative education of patient
Without the use of ortograde bowel preparation before surgery
Without premedication
Application of probiotics before surgery
Prevention of fasting before surgery
Application of glucose solution 2 hours before surgery
Regional anesthesia, short-term anesthetics
Adequate fluid volume in peri-operative period
Short incisions (miniinvasive access, transversal incisions)
Prevention of preoperative hypothermia
Application of high O ₂ concentration perioperative
Nonopioid analgesia
Without routine drain usage and without nasogastric tube
Early urocatether removing
Prokinetics
Early post-operative per oral nutrition
Mobilization

Pre-operative education of patient

The patient's pre-operative education about perioperative care and advantages of fast-track surgery is essential. It is necessary to decrease the patient's fear of anesthesia. The patient's active cooperation and interest are essential conditions for successful application of fast-track surgery.

Bowel preparation before surgery

Preoperative mechanical bowel preparation is considered an effective tool in leak prevention and a factor decreasing the infection complications in patients with colorectal surgery. This dogma is based only on observation and experts' opinion. According to randomized trials there is no evidence that the patients benefit from mechanical bowel preparation. On the contrary, there is evidence that preoperative bowel preparation increases the risk of anastomotic leak. The dogma of the necessity of preoperative bowel preparation in colorectal surgery should be reconsidered (12).

Premedication

Some authors including Basse showed the possibility of skipping the premedication. It is possible to skip the premedication as long as the patient is well informed (13). Most of authors keep administering the premedication.

Symbiotics before surgery

The application of probiotics before the surgery improves the postoperative convalescence and shortens the postoperative ileus. The probiotics stabilize the bacterial bowel flora and decrease the bacterial translocation (14, 15).

Prevention of fasting before the surgery and application of glucose solution 2 hours before the surgery

There is evidence that preoperative fasting decreases glycogen reserves and induces postoperative insulin resistance. This resistance type is similar to untreated DM, type 2. The output of

energy during surgery can be compared with the energetic output of sportsmen during high sport performance. Every sportsman has to renew his sugar reserves. It is possible to reduce the postoperative insulin resistance by preoperative peroral or intravenous sugar application (16, 17, 18, 19). The glucose application 2 hours before the surgery increases the glycogen reserves as well as reduces the stress reaction, fasting reduction, discomfort and exhaustion. Already in the past it was proved that an application of 400ml of clear fluid did not increase the risk of aspiration during the intubation. The passing of clear fluid through the stomach lasts less than 90 minutes (20, 21)

Anesthesia optimization

The introduction of short-term volatile anesthetics with fast start, short-acting opiates (remefentanil etc.), and short-acting muscle relaxants into the market has shortened the period of convalescence after anesthesia (22). There is an effort to decrease the stress response, the fact of which was proved in smaller operations. It was not proved in extensive surgeries. Regional anesthetic techniques bring about one more advantage, namely the reduction of endocrinological and metabolic responses after surgeries. Metaanalysis of randomized trials evaluated regional anesthesia in patients after surgeries performed on the lower half of body and proved to lower morbidity by 30 % when compared to general anesthesia (23). This effect was not proved in major thoracic and abdominal surgeries (24).

Adequate fluid volume

The fluid excess increases cardiopulmonary morbidity and prolongs the postoperative ileus. The results of some trials show that adequate and non excessive fluid application leads to a 50% decrease in common complications. The adequate fluid substitution depends on the extent of surgery, preoperative preparation and other factors (25, 26). Peri- and intraoperative normovolemia are an essential condition for good postoperative results. It is also important to emphasize that it is not the restriction of fluid volume that increases the morbidity. The fluid restriction was supported by some authors. It is important to individually optimize the fluid volume (27).

Short incision, mini-invasive surgery

The classic access for many abdominal operations is the middle-line laparotomy. The recent studies show that this approach is connected with greater postoperative pain, difficult wound healing, and more pulmonary complications when compared to horizontal incisions. There is a higher incidence of hernias as well. The mini-invasive access or transversal incisions are preferred (28). The mini-invasive access is connected with better immunological response and better recovery (29).

Hypothermia prevention

The maintenance of intraoperative normothermia is very important. Hypothermia has an impact on coagulation and leukocytes function. Normothermia decreases the intraoperative blood loss, postoperative cardiac morbidity, catabolism, as well

as surgical infections (30). Kurz showed a significant reduction in wound infection in colorectal surgery owing to the maintenance of intraoperative normothermia (31).

The application of high O₂ concentration in perioperative period

Additional oxygen supply has a positive effect on wound healing and decreases the wound infection. O₂ supply decreases the postoperative nausea and vomiting as well as decreases the incidence of cardiac complications (32).

Non-opioid analgesia, adequate postoperative analgesia

The postoperative pain is very often treated inadequately. The quality of management of postoperative pain is essential for the optimal mobilization and oral nutrition. The multimodal analgesia including NSAID and other drugs is important (33). The epidural and spinal analgesia significantly contributes to the success of multimodal rehabilitation. PCA is very important as well (34).

No routine use of drain and nasogastric tube

The drains after elective surgery as cholecystectomy, colorectal resection, thyroidectomy, radical hysterectomy or pancreatic resection offer only a very small benefit according to the randomized trials (35). The drains have their role after mastectomy, where they prevent from seroma formation. The drains hinder the mobilization and represent a psychological barrier. They should be utilized only selectively and not in a routine way.

Early uro catheter removing

The catheterization of urinary bladder is not recommended after the colorectal surgery excluding the low part of rectum for longer than 24 hours. The catheterization after the surgery in the low part of rectum can be indicated for 3 or 4 days.

Prokinetics, nausea treatment, vomitus, and postoperative ileus treatment

The ability of normal oral diet after the surgery is essential. Postoperative nausea, vomiting, and ileus should be reduced. The combination of antiemetics is beneficial. The propriety analgesia, early mobilization, mini-invasive operative access, and other techniques decrease the postoperative nausea as well and contribute to early restoration of bowel kinetics. The principles for rational prophylaxis of nausea are based on systematic reviews. 5-HT₃ receptor antagonists, droperidol, and dexametason are effective. Metoclopramide seems to be ineffective (36)

Early postoperative peroral nutrition

Early postoperative nutrition is essential for patient's self-sufficiency. Early postoperative peroral nutrition reduces infection complications and decreases the length of hospitalization without increasing the risk of anastomosis dehiscence according to the metaanalysis performed by Lewis in 2001. The early peroral nutrition abbreviates also the length of postoperative ileus (37).

Early mobilization

The postoperative rest in bed is undesirable. It leads to the increase in muscle loss, decreases the strength, compromises pulmonary function and tissue oxygenation, leads to venostasis and thrombembolism. It contributes to postoperative ileus and increases infection complications (38).

Regional anesthesia, mini-invasive surgery, and pharmacological intervention are the basic tools of stress response. Neuronal blocks reduce endocrinological and metabolic activation and sympathetic stimulation. There is no relevant effect on inflammatory response (39). Minimal invasive surgical techniques reduce the postoperative pain and inflammatory responses; however have only a very small influence on endocrinological and metabolic responses (40, 41). Other possibilities in addition to the above mentioned factors are under investigation. New possibilities can possibly lead to a decrease in stress response.

The influence of pharmacological intervention after an application of glucocorticoid and B-blockers has been studied. It seems that B-blockers can reduce cardiac morbidity as well as reduce catabolism (42, 43).

There are no distinct conclusions that anabolic drugs (anabolic steroids, insulin, and growth factor) are beneficial for patients' catabolism (44).

The organ functions in patients should be optimized before any surgery. It involves cardiac diseases, chronic pulmonary obstruction, DM, and other diseases.

It is emphasized that alcohol abstinence and smoking cessation can possibly decrease the metabolic response as well.

Aims – measured parameters

The authors applying the fast track surgery monitored the duration of hospitalization after surgeries, the amount of readmissions, morbidity, and mortality. It is important to follow up the clinical parameters including bowel function after the surgery, pulmonary function, pain level, exhaustion, and quality of life.

Discussion

The primary aim of fast-track program is not to shorten the hospitalization time, but improve the patients' recovery after surgery and to reduce their morbidity. The fast-track program is based on scientific and clinical research. Its value is in a better and more effective health care.

The results of systemic review showed that fast-track programs offer faster recovery after the surgery, reduction of morbidity, and reduction of hospitalization's length.

The fast-track programs are applied in all surgical specialties in a wide range from general surgery to cardiac surgery, orthopedic surgery, urology, and other branches.

The principles contributing to fast-track surgery were identified more than 10 years ago but their practical introduction into daily practice is not claimed in all its aspects. The traditional, firmly fixed approach hinders this new approach.

Tab. 2. Result of the European study of perioperative care in colorectal surgery in 2004.

Bowel preparation	86 % (UK) – 95 % (G)
Nasogastric tube	55–95 % (Day 3: 40–70 %)
Fluid on 2nd postoperative day	10 % (Day 4: 50 %)
Firm diet	10% (Day 5: 25–50 %)
Discharge from hospital	11.2 (I); 11.7 (F); 12.2 (UK); 14.2 (G)

Williamson, Büchler a Kehlet presented their European study of perioperative care in colorectal surgery in 2004. This trial was performed in 243 hospitals with 850 patients and lasted for 2 weeks (45). It showed how uneasy it is to enforce the principles of fast track verified in the trials into practice. The results are shown in the following table (Tab. 2).

A very alarming fact is that many patients have inadequate nutritional support in hospital. About 47 % of malnourished patients have adequate therapeutic plans, but only 25 % of these patients have adequate therapy (46).

Some of the fast track principles become a part of modern conception of the traditional approach. On the other hand, fast-track surgery is used in many hospitals performing e.g. elective colorectal surgery as a standard method (47).

The multimodal perioperative programs reduce morbidity, primary and total length of hospitalization as mentioned above. They decrease the non-surgical morbidity. The most likely mechanism is the improvement of postoperative insulin resistance, decrease in metabolic and immunological dysfunctions owing to all applied factors of multimodal rehabilitation. Many authors verified the influence on IL-6 and TNF alfa and cell-mediated immunity (T-helper cell count, CD4/CD8 ratio). The increased risk of anastomotic dehiscence was not verified in studies dedicated to colorectal surgery (48).

For success in accelerated fast-track program it is essential to be well organized. Good cooperation between surgeons, anesthesiologists, physiotherapists, nurses and above all the patients is necessary. All factors leading to the acceleration of patient's recovery should be involved.

It is important to check whether the patient is being discharged under conditions equal to those of patients who had not undergone the application of fast track principles. The patient should be on a firm diet, mobile, and adequate analgesia should be provided. The bowel restoration should be present.

The trial results show 3 important factors:

- 1) Fast-track protocol can be applied in patients with significant comorbidities.
- 2) Fast-track protocol allows fast convalescence and shortens the length of hospitalization.
- 3) The adverse events connected with acceleration of postoperative care are not observed (49).

Other current multicentric prospective randomized trials aimed at confirming or excluding the width of applicability of this program are in process.

Conclusion

The current standardised form of individual operations and perioperative approach has taken many years to develop. The approach to individual operations has been handed down from one generation of surgeons to another. This practice has been firmly based. The implementation of new principles despite their verification in randomized trials is very slow.

It is possible that in the future the “rehabilitation care units” will be available. These “rehabilitation care units” will provide pain relief, mobilization, and nutrition care. It is possible as well that even more effective methods of reducing the perioperative stress will be available. Currently it is verified that fast-track principles shorten the duration of hospitalizations and reduce the morbidity. Many future operations will be performed as out-patient procedures or in-patient interventions with short hospitalizations. It will improve the quality and rationalize the health care.

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