



## FAST TRACK SURGERY IN TOTAL KNEE ARTHROPLASTY - A REVIEW.

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### ABSTRACT

The number of orthopedic surgeons who are convinced in the need for significant changes in planned total knee arthroplasty (TKA) is increasing slowly and steadily. A new approach to pain control has been developed over the past 10-15 years, and the introduction of techniques to reduce perioperative stress, and the use of minimally invasive surgical techniques can help limit postoperative complications and shorten recovery time. This type of optimization is regarded as *Fast-track Care* program, where improved healing process is particularly useful to comorbid patients.

**Keywords:** fast-track care, local infiltration analgesia, multi-modal approach, total knee arthroplasty

Joint arthroplasty is a surgical procedure, performed to reduce pain, improve function and correct deformation. Over the recent years TKA is applied to increasing number of patients [1, 2]. Due to population aging the degree of the arthrosis is aggravating, which means that the number of TKAs will grow significantly. The number of TKAs in the USA in 2008 was > 615 000. A number of authors noted an apparent increase in this procedure by nearly 134% for a period of only nine years [3, 4]. Generally, this intervention is performed mainly on elderly patients with limited activity, pain and radiographic evidence of arthrosis. [5] TKA could be applied to younger patients as a result of posttraumatic arthrosis [6, 7]. Usually patients planned to undergo such an operation are not in poor general condition, although there is comorbidity in some of them. However, the operation may be followed by a series of postoperative complications, as well as prolonged recovery time resulting in higher costs for hospitals [8].

The *Fast-track Care* program is a multi-modal approach for optimizing the perioperative outcome of patient care through a combination of organizational and clinical improvements. The important thing in this program is the individualized approach to each patient by organizing multidisciplinary team focused on the specific patient. In terms of terminology *Fast-track Care* overlaps with programs of fast, accelerated, etc. The focus is on improving the efficiency and quality of patient care. Its implementation begins with admitting the patient [9]. The collection of comprehensive information about the planned surgery [10] plays a very important role.

The *Fast-track Care* program involves various methods: epidural or regional anesthesia, minimally invasive

techniques, optimal pain control using a modified pain protocol and local infiltration analgesia [2, 11, 12]. All this makes the early onset of postoperative rehabilitation possible immediately after surgery [13, 14, 15]. The combination of those methods reduces the perioperative stress and prevents postoperative nausea and vomiting, which allows patient mobilization within the first six hours after the surgery. This shortens the length of hospital stay and the period required for full recovery [1, 3]. The debate on whether only selected patients should be covered by the program or everyone could join it are still in progress. It is argued whether psychological factors, preoperative pain and functional status depend on organizational or pathophysiologic reasons, related to surgical trauma and whether they determine the length of stay in hospital [8, 16, 17, 18].

A great number of difficulties had to be tackled in order to make the implementation of the *Fast-track Care* program possible:

1. Coordination between orthopedists and anesthesiologists must be optimized so that the spinal anesthesia wears off at the end of the surgical procedure in order to begin patient mobilization. Streamlining of intravenous infusions is necessary due to the rapid removal of urinary catheter [14, 19].

2. An improved protocol for postoperative pain relief is necessary, it should involve the smallest amounts of opiates possible, so postoperative nausea and vomiting are minimized, while sufficient quality pain relief is ensured. Local infiltration analgesia (LIA) is administered for additional pain reduction [20, 21].

3. Nurses and physiotherapists have to get used to the new method of working, e.g with the earlier mobilization; with the fact that the patient no longer has a urinary catheter or drainage and first and foremost with the specific approach to each individual patient [22].

4. The complete the *Fast-track Care* program requires the formation of a multidisciplinary team, which consists of an orthopedist, anesthesiologist, internist, nurses, a pharmacist and physiotherapist. In terms of logistics, the introduction of *Fast-track Care* program may turn out to be more complicated than expected. This working group has helped to overcome several important aspects. Pain relief protocol is changed so that patients would need the smallest possible dose of opioids. Preoperative medication with gabapentin oral (600 mg), extended-release paracetamol (2g) and celecoxib (200 mg) or todolac (200 mg) is essential. They are assigned to pa-

tients twice a day for 6 days, except gabapentin, where the daily dose is 300 mg plus 600 mg. Surgery is performed under local spinal anesthesia. Additional sedation with propofol (1-5 mg/kg) is administered if necessary. Cefuroxime (1.5 g) and tranexamic acid (1 g) are administered intravenously for 15 min. prior to incision. No drainage tube is used. Intraoperative local infiltration analgesia is routinely administered after the surgery [6]. Multimodal protocol for pain relief is intended to ensure the necessary pain relief in any patient with the least possible postoperative nausea and vomiting, in order to allow early mobilization [23]. The use of spinal anesthesia for a short period allows the patient to mobilize at an earlier stage and reduces perioperative stress.

The objective of using spinal anesthesia is analgesia during the surgery itself, as postoperative pain relief is ensured by local infiltration anesthesia and oral analgesics. [24] Local infiltration analgesia (LIA) was introduced by Kerr and Kohan in 2008; LIA is actually infiltration of a mixture of drugs (ropivacain, ketorolac and epinephrine) into the wound field. [3] They examined 325 patients with TKA and reported satisfactory postoperative analgesia allowing mobilization within 4 hours after the intervention, early discharge, and absence of serious complications or side effects [3]. These data prove that LIA may be used to support functional recovery and shorten hospital stay. The final result is that the patient is able to start doing exercises while still in the recovery room [25].

The patient should be instructed prior to operation with respect to the complex of exercises to be done in bed immediately after spinal anesthesia wears off [18, 26]. The mobilization is carried out by a physiotherapist within six hours after the surgery [18]. The rehabilitation process was initially aimed at all patients with TKA, while now the *Fast-track Care* program is applied strictly individually, specifically to each patient. The method of its implemen-

tation depends on the mental, social and somatic status of the patient [16, 27].

Preoperative communication with patients is essential in order to familiarize them with *Fast-track Care*. This is so because the idea of mobilization only hours after the surgery is difficult to be understood by patients unless they are properly informed. Standardized postoperative rehabilitation protocol includes weight bearing ambulation on assisting devices on the day of the operation. Further physical therapy is performed twice a day – transfer training and walking techniques. Each session with physiotherapist is complemented with information on general fitness training and advice on daily activities [16]. Improved clinical characteristics include intraoperative spinal anesthesia, local infiltration analgesia, planning volume replacement therapy and mini-invasive incisions. Postoperative activities are aimed at the prevention of deep vein thrombosis by venous compression and cooling starting 6-8 hours after surgery. When all those criteria are met patient is eligible to be discharged [20, 28, 29, 30, 31, 32].

## CONCLUSIONS

The *Fast-track Care* program in TKA with early discharge from hospital could be achieved in almost all patients. Thus achieving its goals regardless of the pre-operative functional characteristics of patients, although age has a limiting effect on the length of stay [6, 17, 21]. This type of optimization is possible only if a multidisciplinary approach, led by a special team is adopted. The first steps of the program have already been taken, but further improvement will require new clinical studies and evidence. In other words, *Fast-track Care* program in TKA is a very promising concept, taking into consideration the general social, psychic and somatic aspects of every patient. This approach is to be further optimized in future.

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### Acknowledgments:

No institutional finding or grants as well as technical assistance or contributions of this research has been obtained by the author.

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*Please cite this article as:* Kosev P, Sokolov T, Pavlova I, Valentinov B, Andonov J, Petrova N. Fast track surgery in total knee arthroplasty - A review. *J of IMAB.* 2015 Jul-Sep;21(3):837-839. DOI: <http://dx.doi.org/10.5272/jimab.2015213.837>

Received: 07/04/2015; Published online: 03/08/2015

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