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Selected aspects of anesthesia for inguinal hernia repair sugery

Wybrane aspekty znieczulenia do operacji przepuklin pachwinowych

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Słowa kluczowe

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Summary

It is possible to perform inguinal hernia surgery by using a variety of anesthesia techniques. The choice of the method is conditioned by a pre-operative assessment of the patient's general condition. Regional techniques (spinal and epidural anesthesia) require special attention to the patient's anti-coagulation therapy or other coagulation disorders for other reasons, but they are the preferred method for inguinal hernia operations. General anesthesia for laparoscopic surgery is used in patients with contraindications for spinal anesthesia, because it is related to the systemic influence of anesthetics and the need for replacement ventilation; it is also preferred method for children, as it is ususally impossible to perform a central block due to the patient's lack of cooperation. Local anesthesia in combination with analgosedation is the technique used the least as it requires full cooperation with the patient. Effective treatment of postoperative pain can be achieved by combining pharmacotherapy with regional anesthetic techniques and local anesthesia, which allows patients to achieve greater satisfaction with the applied treatment, as well as reduces the risk of unfavorable course of the healing process.

Streszczenie

Przeprowadzenie operacji przepukliny pachwinowej możliwe jest dzięki wykorzystaniu różnorodnych technik znieczulenia. Wybór metody uwarunkowany jest przedoperacyjną oceną stanu ogólnego pacjenta. Techniki regionalne (znieczulenie podpajęczynówkowe i zewnątrzoponowe) wymagają zwrócenia szczególnej uwagi na stosowane przez pacjenta ewentualne leczenie przeciwkrzepliwe lub występujące z innych powodów zaburzenia krzepnięcia, jednak są metodą preferowaną przy operacjach przepukliny pachwinowej. Znieczulenie ogólne do operacji wykonywanych metodą laparoskopową stosowane jest u pacjentów z przeciwwskazaniami do znieczulenia przewodowego, gdyż wiąże się z ogólnoustrojowym wpływem anestetyków, a także koniecznością stosowania wentylacji zastępczej; jest również metodą z wyboru w przypadku dzieci, u których wykonanie blokady centralnej jest zazwyczaj niemożliwe ze względu na brak współpracy pacjenta. Znieczulenie miejscowe w połączeniu z analgosedacją to technika wykorzystywana najrzadziej i wymagająca pełnej współpracy z pacjentem. Efektywne leczenie bólu pooperacyjnego może być osiągnięte dzięki połączeniu farmakoterapii z technikami znieczulenia regionalnego i znieczuleniem miejscowym, co pozwala osiągnąć większą satysfakcję chorego z zastosowanego leczenia, jak również zmniejsza ryzyko niekorzystnego przebiegu procesu zdrowienia.

Conflict of interest
Konflikt interesów

None
Brak konfliktu interesów

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INTRODUCTION

The inguinal hernia repair surgery is one of the most frequently performed types of surgical procedures in general surgery departments around the world (1, 2). Inguinal hernia operations can be performed under general anesthesia, central blockades (spinal or epidural) as well as in sedation combined with local anesthesia (3). Decision which method of anaesthesia should be ised depends on proposed surgical technique as well as patient's condition. In reference to all these methods one can entail certain benefits, but also limitations and side effects, which is why it is extremely important to apply an individual approach and adapt the method that will bring the most benefits to the patient, with the lowest possible side effects.

In the postoperative procedure, particular emphasis should be placed on appropriate, adequate and effective analgesia, which allows to increase the satisfaction of the

patients in regard to the treatment, and also reduces the occurrence rate of the phenomenon of pain chronification.

REVIEW

Handling inguinal hernia operation with regional anaesthesia (spinal or epidural) is the preferred method because it helps to avoid systemic use of anesthetics and replacement ventilation, as well as is associated with lower intensity of postoperative pain and the lower need for analgesics (4).

Despite many benefits of spinal anesthesia, in the case of its use, special attention should be paid to the medicines in a long-term anticoagulant treatment (5). While performing central blockades, there is a risk of venipuncture, and in case of some preparations this may lead to subarachnoid hemorrhage – according to the recommendation of the Association of Anesthetists of Great Britain & Northern Ireland (AAGBI) 2011, spinal and epidural anesthesia are the most risky types of regional anesthesia with coexisting coagulation disorders. Depending on the drug being taken, as well as the clinical situation, a coagulation disrupting treatment should be discontinued or a bridging therapy using heparins should be considered.

Some of the most commonly prescribed coagulation-inhibiting medications are acetylsalicylic acid and non-steroidal anti-inflammatory drugs (NSAIDs), however, their discontinuation prior to performing central blocks is not required if they are the only preparation that inhibits coagulation. In the case of ADP receptor inhibitors, the time of discontinuation of the drug required before blocking varies from 5 (ticagrelor) through 7 (clopidogrel) to 10 days (ticlopidine). Vitamin K Antagonists (VKA) should be excluded from treatment for 2-3 days (acenocumarol) or 5 days (warfarin) before blocking, but the decisive factor is the INR measurement 24 hours before the planned surgery – only INR 1.4 or lower allows for the safe use of this type of anesthesia. New anticoagulants, dabigatran and rivaroxaban, should be taken 48 hours before the planned central block (6).

If the patient's thromboembolic risk is too great to stop VKA completely (e.g. in patients with an implanted artificial heart valve), a bridging therapy using heparins should be instituted (7). The most common are prophylactic doses of low molecular weight heparins (they do not require adjustment of dosages for APTT), in case of which we can safely perform spinal blocking 12 hours from the last dose administered (8).

The inguinal hernia operations performed by laparoscopy with intraperitoneal carbon dioxide insufflation are a strong indication for general anesthesia with tracheal intubation, as only this form of instrumental airway management ensures safety of respiratory function with increased intraabdominal pressure during this method of surgery. The operative techniques associated with the creation of extraperitoneal carbon dioxide insufflation, general anesthesia with the using of supraglottic methods of airway conduction may be considered.

Due to the systemic consequences of drugs and agents used to perform general anesthesia, this type of anesthesia for inguinal hernia repair using the laparoscopic method is only used in patients with contraindications for spinal anesthesia. The essential elements of the considerations of the impact of general anesthesia on the course of surgery with the using of laparoscopic methods are: protection of the conduction, systemic effects of extraperitoneal or intraperitoneal carbon dioxide insufflation, the use of skeletal muscle relaxants (9, 10).

The majority of studies regarding the assessment of airway patency control with tracheal intubation or laryngeal mask were performed in the pediatric population. In this group of patients due to the lack of cooperation in the field of performing spinal anesthesia, general anesthesia is much more common. Numerous researchers presented that there is no predominance of tracheal intubation over other supraglottic methods of management of the airways during general anesthesia in surgical procedures with the formation of extraperitoneal carbon dioxide insufflation. The authors also pointed out that the use of supraglottic methods limits the using of skeletal muscle relaxants (11, 12).

The method of laparoscopic inguinal hernia repair under general anesthesia in a patient with co-morbidities – in term of the cardiovascular and respiratory systems, is associated with the risk of carbon dioxide retention. In this aspect, it is important to perform preoperative cardiopulmonary function and to determine the compensation possibilities. In cases of significant respiratory failure in the course of lung diseases, especially obstructive pulmonary disease, the choice of regional methods or local anesthesia remains to be considered (8, 9). The possibility of laparoscopic hernia repair using the laparoscopic method under regional anesthesia with anterior abdominal wall blockade in patients with contraindications for general and spinal anesthesia due to cardiovascular diseases and obstructive pulmonary disease was described (13).

Donmez et al. demonstrated that the level of patient satisfaction was significantly higher using regional and spinal methods in relation to general anesthesia, as well as a better level of post-operative analgesia and a lower frequency of side effects were noted. In the surgical aspects, the muscle relaxation associated with the spinal block was adequate for the surgery (14). The results of many studies indicate the predominance of spinal anesthesia in relation to general anesthesia in the aspect of the postoperative period and the overall assessment of patient satisfaction (14, 15). Different results of the study were presented by Sunamak et al. which indicated that general anesthesia was significantly less frequently associated with episodes of headache and urinary retention (16).

The choice of the method of anesthesia for inguinal hernia surgery depends on the pre-operative assessment of the patient's general condition. According to data provided by Callesen, the frequency of local anesthesia for hernia operations varies from a few percent

in Sweden to 18% in Denmark, and the risk of conversion to general anesthesia is small and less than 1%. It should be emphasized that the use of the laparoscopic method has the dimension of a minimally invasive surgical technique, as well as the systemic consequences of patient state during anesthesia (17-19).

Another anaesthesia associated aspect of connected with inguinal hernia operations is perioperative analgesic treatment (20, 21). The latest guidelines for the management of post-operative pain pay particular attention to the application of the principles of multimodal analgesia and analgesia in advance. In addition, they suggest replacing parenteral pharmacotherapy with enteral therapy as soon as possible, as well as the rapid abandonment of opioids for non-opioid analgesics (with the control of the severity of the discomfort). In the case of inguinal hernia surgery, it is recommended to use analgesia in advance in the form of non-steroidal anti-inflammatory drugs (NSAIDs) orally – non-selective (diclofenac, ibuprofen, ketoprofen, dexketoprofen) or selective (nimesulide, meloxicam) in combination with intravenous dexamethasone, enteral form of gabapentin and an infusion or fractionated doses of i.v. lidocaine. The use of local techniques is important – when the operation is performed using a laparoscopic method, the site of the insertion of troacres shall be injected with local anesthetics, and in the case of the classic method – it's the blockade of the trapezius muscle of the loins with 15-20 ml of 0.2% bupivacaine or 0.375% ropivacaine. Moreover, the surgical site may be infiltrated with 30-40 ml of 0.25-0.5% of ropivacaine or up to 30 ml 0.25-0.5% of bupivacaine (22).

In the postoperative period, the use of paracetamol and/or metamizol in combination with NSAIDs (ketoprofen, dexketoprofen) and tramadol is recommended as basic analgesia. Strong opiates, such as morphine or oxycodone, should only be used as a rescue analgesia. Particular attention should be paid to the use of individual drugs according to their pharmacokinetics, ordered "per hour", not "on demand", because only this form allows adequate control of pain and reduces the risk of complications (22).

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