

ANAESTHESIA IN SECONDARY TREATMENT OF BURN INJURIES

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The task of anesthesiologist in burns' dressing is to remove pain during burns' management. Extensive burns, covering over 15 % of TBS, demand dressing changes every 48 hours and sometimes more often, which depends on wound secretions. High number of anesthetics is administered to the same patient in a short period of time. Which anesthesia technique we chose in our Center depends of the patient's condition, burns wound evaluation and available anesthetics. *Acta Medica Medianae 2005;45(2):65-66.*

Key words: *burns, burn pain, burn wound dressings, anesthetic techniques*

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Introduction

Burn pain causes physical damage, but patients may also suffer emotional and psychological problems that begin at the emergency scene and could last for long time and can hardly be predicted by the burn injury depth. The agent having acted causes tissue destruction and nerve endings are damaged causing intense pain (1). Continuous nerve stimulations result in peripheral and central amplifications of painful stimulations and in chronic painful syndrome development, which is difficult to prevent.

The pain coming from damaged nerve endings, on C and A fibers of polymodal skin receptors exposed to numerous released inflammatory mediators such as sub-stance A, histamin and bradikinin, causes their continuous irritation (2). Edematous, necrotic and potentially infected tissue of the burn is characterized by increased sensitivity to pain, especially during cleansing and contacts with various surfaces. Increased sensitivity of peripheral receptors and their continuous stimulation lead to primary and secondary hyperalgesia. Pain coming from the burn is increased by the central mechanism of pain amplification from the adjacent regions.

Central sensitivity is a result of neuron stimulation of dorsal and ventral horns of spinal cord, known as widely dynamically positioned neurons. Continuous stimulation of these neurons eliminates the MG channel block on NMDA receptors (N-methyl-D-aspartate) that is excitatory amino-acid receptors, allowing glutamate to activate NMDA receptor and achieve the spinal

hypersensitivity effect and peripheral entry amplification. Therefore, for each widely dynamically positioned neuron, the receptor area enlarges. Secondary hyperalgesia area shows increased sensitivity to mechanical stimuli and does not increase sensitivity to thermal stimuli. Abnormal pain sensations increase as burns heal. The importance of spinal cord in burn pain - secondary hyperalgesia - is confirmed by NMDA antagonists' efficacy such as Ketalar and morphine preparations (3).

Anaesthesiological treatment

The most important aim of burn injuries' treatment is to achieve skin grafting over the uninfected burn injury until it accomplishes good esthetic and functional result in patients, without pain and discomfort. To achieve this goal, we need time and the wound needs to be cleansed and dressed depending on the extent of the burnt surface area, location and depth.

During the dressing of the burn injuries, the pain can be relieved by different anesthesia techniques, often combined.

In premedications period, Midazolam with 0,5 mg of Atropin i.m. is usually administered.

Sometimes, analgosedation is sufficient to remove the pain and discomfort during the dressing and is applied in patients with minor unhealed surfaces, which often occurs at the end of treatment. In the past times, Ketalar in combination with Midazol, with or without oxygen mask, was used a lot (4).

The most applied anesthesia technique is total intravenous anesthesia (TIVA), Propofol and Fentanyl (5). As for analgesics, besides Fentanyl, Rapifen and Trodon are used (6,7,8). This technique has been used in most wounds' dressings. Sometimes, O₂ 4 l/min has been added to the mask with or without N₂O 4 l/min. A year ago, we started to use inhalation anesthetic Sevoran (9) with patient's spontaneous breathing. Inhalation

anesthetic combined with oxygen/nitrous oxide is applied on a mask that firmly stands on a face. In the last few months, laryngeal masks were used (number 3,4,5), and airway is safe even during patient's position changing.

During the treatment itself, it is necessary to make incisions or partial necrectomies (wound debridement) and this is an additional burden to both a patient and an anesthesiologist. In such a case, analgesics are administered and volatile anesthetic concentration is increased. Good intra-operative hemodynamic stability must be associated with excellent postoperative analgesia.

Anesthesia in wound dressing is a very dynamic one; it requires follow-up of the patient and full cooperation with surgery team. As for monitoring in the operation room, electro-cardiography is used. Pulse oximetry is often impossible to use because of burnt parts on fingers and toes. As for AT bandage, there is often no place for positioning. A great number of burn injuries' dressings during a treatment is a challenge for an anesthesiologist. Initially, a patient can be clas-

sified as ASA I, but during the treatment he can be classified as ASA II, III, IV (11). Sometimes, dressing is done in patients with ASA V. Anesthesia techniques change and are adjusted to a patient. The amount of anesthetics needed for treatment also varies.

In recently published studies, we can find more and more guidelines for prevention of pain, especially in dressing procedures. Pain treatment in burn injuries and a great number of anesthetics can in time develop a paradox sensor hypersensitivity (12). It is explained by tolerance development to opioids and β 2-antagonists. As a consequence to this hypothesis, highly efficient analgesics can make less tolerance and give better results in patients whose pain system is sensitized. Out of this comes a tip that in patients with tolerance to opioids, NMDA-receptor antagonists should be administered, because they block both paradoxical pain and opioid tolerance (9,10).

It would be beneficial to introduce a protocol for systematic pain treatment of burn injuries in Intensive Care Units.

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ANESTEZIJA KOD SEKUNDARNIH OBRADA OPEKOTINSKE RANE

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Zadatak anesteziologa kod previjanja opekotina je da ukloni bol prilikom obrade opekotinske rane. Ekstenzivne opekotine, preko 15% totalne površine tela, zahtevaju previjanja na 48 sati a nekad u zavisnosti od seceniranja rane i erodiranja krvnih sudova i češće. To dovodi do velikog broja anestezija kod jednog bolesnika u kratkom vremenskom roku. U našim uslovima izbor vrste anestezije zavisi od stanja bolesnika, hirurški praćene obrade opekotinske rane i dostupnosti anestetika. *Acta Medica Medianae* 2005;45(2):65-66.

Ključne reči: opekotine, bol kod opekotina, sekundarna obrada opekotinske rane, tehnike anestezije