ORIGINAL

Usage of the Medical Product Ketanov in the Maxillofacial Surgery

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SUMMARY

Pain is the psychophysiological condition of a person arising in as a result of the action of ultra-strong or destructive irritants causing organic or functional disturbances in the organism. The purpose of our research was to evaluate analgesic efficiency of the medicinal product ketanov (ketorolac tromethamine), produced by the firm "Ranbaxy" in patients with diseases of the maxillofacial region. We monitored 127 cases, which we divided into the following groups: Group I of 44 patients after performing dental surgery (extraction of tumors and tumor-like formations of jaws and soft tissues, plastic and reconstructive operations); Group II – 23 patients with mandibular fractures; Group III – 27 patients with inflammatory diseases of the soft tissues; Group IV – 19 patients with rhythmic diseases of the maxillofacial region (odontogenic neuralgia, post-traumatic and post-operative neuralgo-neuritis); Group V – 14 patients who have undergone the surgical phase of dental implantation. Ketanov (ketorolac tromethamine) is a highly effective analgesic and is recommended for use in the post-operative period after removal of tumors and tumor-like formations of the jaws and soft tissues of the face and neck, after plastic and reconstructive operations, in case of jaw fractures, purulent inflammatory processes, odontogenic neuralgia, postoperative and post-traumatic neuralgo-neuritis of peripheral branches of the trigeminal nerve, as well as after the surgical stage of dental implantation.

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Please cite this article as: Tymofieiev OO, Sokoliuk MA, Ripa VM, Havlytiuk DS, Kolisnichenko LA. Usage of the medical product Ketanov in the maxillofacial surgery. J Diagn Treat Oral Maxillofac Pathol 2021;5(9):106–10.

Paper received 05 September 2021
Accepted 24 September 2021
Available online 30 September 2021

https://doi.org/10.23999/j.dtomp.2021.9.4

INTRODUCTION

Pain is the psychophysiological condition of a person arising in as a result of the action of ultra-strong or destructive irritants causing organic or functional disturbances in the organism; is an integral function of the organism, which mobilizes a variety of functional systems to protect the organism from the effects of a harmful factor. Narrowly defined, pain is a subjective, oppressive sensation arising from the action of damaging factors on tissues that have pain receptors. The pain reaction is performed by the nervous system. The initial layer of pain is pain receptors (embedded in the skin, tissues and internal organs) that transmit their irritation through the nerve fibers into the central nervous system. The cerebral cortex processes the signals they receive into a painful sensation. Although, as stated earlier, pain is initially of a defensive nature, at the same time severe pain irritations can cause changes in the respiratory and cardiovascular systems, impair endocrine and immune functions, lead to depletion of the energy reserves of the organism and psyche or other changes in the organism which negatively affect the condition of the patient.[1–3]

The feature of the maxillofacial region is its abundant innervation; therefore, many illnesses in this area are accompanied by pronounced pain clinical symptoms, demanding adequate pain relief not only for treatment and intervention, but also for post-operative treatment.[4–13] Analgesics are medicinal agents that selectively weaken or relieve pain. Analgesics can be narcotic and non-narcotic, central and peripheral type of action.

Our long-term experience in dental and maxillofacial surgery shows the limited use in the clinic of narcotic analgesics (promedol, omnopon, etc.), which have side effects (depress respiration, cause nausea, vomiting, drug addiction). Therefore, over the years doctors have been searching for analgesics capable of optimally suppressing pain symptoms and not having the side-effects of opiates. In recent years our attention has been drawn to "Ketanov" (ketorolac tromethamine), produced by the Ranbaxy Laboratories Limited (Dewas, India).

Ketanov is a nonsteroidal non-narcotic analgesic that affects the cyclooxygenase pathway of arachidonic acid exchange by inhibiting the biosynthesis of prostaglandins that are mediators of pain sensitivity at the site of tissue damage.

Thus, it is considered, that ketanov reduce peripheral nocyceptic sensitivity, (ie, it's a peripheral analgesic).

Considering that this medication inhibits the biosynthesis of prostaglandins, which are also transmitters of inflammation, it should be noted that ketanov also has an anti-inflammatory effect.

This circumstance can be very advantageous for us, since in the etiology of many pain symptoms in diseases of the maxillofacial region inflammation is one of the leading factors.

The purpose of our research was to evaluate analgesic efficiency of the medicinal product ketanov (ketorolac tromethamine), produced by the firm "Ranbaxy" in patients with diseases of the maxillofacial region.

MATERIALS AND METHODS

We monitored 127 cases, which we divided into the following groups: Group I of 44 patients after performing dental surgery (extraction of tumors and tumor-like formations of jaws and soft tissues, plastic and reconstructive operations); Group II – 23 patients with mandibular fractures; Group III – 27 patients with inflammatory diseases of the soft tissues; Group IV – 19 patients with rhythmic diseases of the maxillofacial region (odontogenic neuralgia, post-traumatic and post-operative neuralgo-neuritis) ; Group V – 14 patients who have undergone the surgical phase of dental implantation.

In order to achieve this goal, in addition to investigating patients' complaints, we (before and after the introduction of ketanov) examined certain clinical and laboratory indicators: painfulness during palpation of the postoperative wound or places of pathological lesions; examination of the injection area; frequency of paroxysmal pain; body temperature; determination of oxygen saturation, pulse rate and respiration rate per minute; blood pressure; total blood test (red blood cells, total leukocytes count, hemoglobin, blood clotting time); biochemical test of the blood (total protein, glucose, bilirubin, urea, electrolyte); urine test; for an objective evaluation of the analgesic effect, tenzoalgometry was conducted and the reaction rates of nerve endings in the area of the pathological hearth were recorded on the equipment-program complex for the electropuncture diagnosis. They determined the side effects of the medication.

RESULTS AND DISCUSSION

Among the 44 patients (first group of observation) to whom ketanov was used for the treatment of post-operative pain, the distribution of the subjects were distributed as follows: 28 patients underwent surgery for the surgery of tumor-like formations and tumors of the jaw bones (excision biopsy, tumor enucleation, jaw resection); 9 – subtotal and total parotidectomies; 7 – plastic operations (bone plastics, removal of wrinkles of the face and neck, rhinoplasty).

The post-operative pain in these patients consists of pain in the area of postoperative wound, headache, malaise, weakness, anxiety. Tissue injury as a result of the surgery (tissue dissection and displacement, tumor removal, etc.) activates the flow of nerve impulses entering the central nervous system from skin and muscle receptors (afferentation).

As a result of persistent reflex spasm, muscles in the postoperative wound area become painful. The pain in the wound is almost constant until the wound is fully healed.

Patients in this group was administered 10-20 mg of the Ketanov intramuscularly or orally within 8 hours (3 times a day) during the first 24 hours of treatment, 10-20 mg orally after 12 hours (2 times a day) during the second and third days, and 10 mg in tablets twice a day during the fourth and fifth days. Only in the case of jaw resection and bone-plastic operations in the first two days after the operation of the ketanov was administered intramuscularly 30 mg after 8 hours (the daily dose did not exceed 90 mg), in the third and fourth days – 20 mg tablets in 12 hours, and from 5th to 7th days – 10 mg (in tablets) in 12 hours. In patients with such interventions, post-operative pain is usually moderate or severe, accompanied by headache, weakness, malaise, anxiety and depression. Approximately 30-40 minutes after the first (earlier described) administered intramuscularly doses of Ketanov, the pain weakens and stops.

In order to avoid post-operative pain, we recommend the first injection of ketanov to be done approximately 2 hours after the patient's extubation or 1 hour after the operation if it was administered under local potentiated anesthesia.

According to our observations, these patients are given adequate, stable and long-term analgesia under such ketanov management schemes. Since ketanov has an anti-inflammatory effect associated with inhibition of prostaglandin synthesis, we did not prescribe other anti-inflammatory medications in the postoperative period. The increase in blood oxygenation (saturation) trends regarding use of the ketanov indicated positive effects on respiration and hemodynamics. Side effects like drowsiness, increased sweating and nausea were observed by us in 3 patients (7%). In all these patients, such symptoms appeared on the 2nd day of the intramuscular injections of high doses (30 mg) of the ketanov. The side effects disappeared when the dosage of the drug was reduced.

The second group of patients (23 persons) included persons with fractures of the jaws. All of these patients had a fracture line within the tooth row and there has been in injury of the mandible nerve (contusion, sprain, incomplete rupture). After repositioning and fixing jaw fragments with dental metal splinting and intermaxillary rubber thrust one of the main clinical symptoms was the persisted pain in the injured jaw and surrounding soft tissues (all of the subjects had hemorrhages in the soft tissues around the fracture). The second group of patients was assigned to the complex of therapeutic measures as an analgesic, according to the following pattern: in the first two days – 10-20 mg orally or intramuscularly in 8 hours (3 times per day), from 3th to 7th days – 10 mg per day after 12 hours (2 times per day). Already in 30-45 minutes after the first dose of the medication, there was a significant decrease and then a cessation of the pain response that appeared in the form of low-intense pain arising only from palpation of tissue at the site of the injury. Patients got restored normal sleep; taking liquid food did not cause pain. We haven't seen any side effects on this group of patients. The tenzoalgometry was provided in order to assess the intensity of pain reactions, and the electrophysiological indicators of the mandibular branch of the triple nerve at the mental point in the course of treatment were studied. All indicators showed a decrease in pain response in patients during the period of application of ketanov. During treatment there was an increase in oxygen saturation of blood and improvement of hemodynamics, as well as normalization of other clinical-laboratory indicators.

In 27 patients with abscesses of soft tissues of the maxillofacial region and neck (third observation group), ketanov was also included in a comprehensive anti-inflammatory treatment. The

drug was administered orally by 20 mg 3 times a day (in the first 48 hours) and 10 mg 2 times a day (3-7 days). The first dose of the drug we recommend to use in 1 hour after starting the intervention to open the abscess. The persistent analgesic effect occurred about one hour after the oral application of ketanov and was held for 7-8 hours. All clinical and laboratory indicators in the course of treatment of patients indicated an improvement in cardiovascular, respiratory and other systems. Patients' complaints about pain in the post-operative area were almost entirely absent. Moderate pain when the patients tried to open the mouth (during the first 2-3 days) was retained only in those patients whose inflammatory process involved muscles that move the mandible. On the 4th day after the operation, the use of mechanotherapy in these patients no longer caused pain sensation. In this group of patients, we haven't seen any side reactions from ketanov activity. In four patients (15%) of this group in the first two days after the operation we observed an increase in sweating, that we associate not with the use of the medication, but with an increase in the temperature reaction of the organism as a result of the presence of a purulent-inflammatory process.

The fourth observation group (19 persons) was represented by patients with odontogenic neuralgia (7 persons), postoperative (5 persons) and post-traumatic (7 persons) neuralgo-neuritis of the second and third branches of the trigeminal nerve. Considering that the main difference between neuropathic pain and other types of pain is the absence of permanent, nociceptic stimulation, we have only included in our group patients with peripheral form of the disease.

It should be recalled that in such nerve lesions, the onset of acute piercing or burning pain has a moderate and pronounced intensity, the duration of the pain attack was from few minutes to an hour. Episodes of paroxysmal pain ranged from 4 to 12 times a day. The duration of the disease was from 1 to 6 months. In this group of patients, ketanov was prescribed according to the following pattern: in the first two days – 20 mg (in moderate pain) and 30 mg (in severe pain) in the internal muscle after 8 hours (3 times a day), in the third to fourth day – ketanov was administered orally at a dose of 10 to 20 mg after 8 hours (3 times a day), during the 5th-7th day of treatment – orally at a dose of 10-20 mg after 12 hours (2 times per day), in the following days maintenance therapy with the lower dose of the medication (5-10 mg after 12 hours) was used for 5-6 days.

Our observations have shown that the use of ketanov in the indicated previously dosages within just a couple days of taking it significantly reduces the intensity of pain reaction and reduces (by two times) the number of pain attacks. In the following days, the pain reaction became blurred and the number of paroxysmal pain decreased.

The data of the survey of patients were confirmed by clinical-laboratory indicators and electrophysiological examination of peripheral branches of the trigeminal nerve. The side effects were only in the early days of the use of ketanov in the form of drowsiness, nausea, dizziness and pain at the injection site. Such reactions have been observed in 5 patients (26%) and only at a dose of 30 mg (3 times a day). When the dosage was reduced, the side effects were not recorded. In almost all patients with peripheral neuropathic pain, we have managed to eliminate pain clinical symptoms of the disease. Only one patient has had about three weeks of treatment, which we attribute to late detection and elimination of the odontogenic source of neuralgia.

The fifth observation group (14 persons) included patients undergoing a surgical phase of dental implantation. Generally, patients with such surgical interventions in the post-operative period have dull ache lasting up to 3-4 days. One hour after the completion of the dental implantation, we prescribed the ketanov at 10 mg (orally) after 12 hours for 3 days. All the patients that got ketanov have no post-operative pain. We didn't see any side effects in these patients. In the course of examination of these patients there was an increase of oxygen saturation of blood, improvement of hemodynamics and normalization of all clinical-laboratory indicators.

CONCLUSIONS

Ketanov (ketorolac tromethamine) has a pronounced and prolonged analgesic effect. His effects on blood oxygenation and hemodynamics, as well as his anti-inflammatory effects, have been noted. Ketanov is a highly effective analgesic and is recommended for use in the post-operative period after removal of tumors and tumor-like formations of the jaws and soft tissues of the face and neck, after plastic and reconstructive operations, in case of jaw fractures, purulent inflammatory processes,

odontogenic neuralgia, postoperative and post-traumatic neuralgo-neuritis of peripheral branches of the trigeminal nerve, as well as after the surgical stage of dental implantation.

AUTHOR CONTRIBUTION

Conceptualization: Tymofieiev OO. Data and interpretation acquisition: Tymofieiev OO, Sokoliuk M, Ripa VM, Havlytiuk D, Kolisnichenko LA. Drafting of the manuscript: Sokoliuk M. Critical revision of the manuscript: Tymofieiev OO. Approval of the final version of the manuscript: all authors.

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