

ANNOTATION

on the thesis of Zulkyya Abilova on the topic: "Pharmacotherapeutic substantiation of the use of analgesic drugs on farm animals" for the degree of Doctor of Philosophy (PhD) in the specialty 6D120100 - Veterinary medicine

Relevance of the topic. In modern society, increased attention has recently been paid to the welfare of animals, as well as the identification and relief of pain in farm animals. The media is increasingly critical of the welfare of productive animals, and consumers of livestock products are becoming aware of these issues.

Animal welfare is critical to ensuring product hygiene and quality. Terrestrial Animal Health Code (2019), Chapter 7.1 Introduction to Animal Welfare Guidelines. Article 7.1.1 (p. 365) states that "The state of welfare of an animal is recognized as good if it meets the following criteria: good health, comfortable conditions of detention, good nutritional status and safety. The animal should not be in a state of pain, fear, depression and should be able to show its natural behavior inherent in its physical and mental state. Moreover, animal welfare includes the following elements: disease prevention, proper veterinary care, shelter, housing management and satisfactory feeding, a safe and supportive environment, humane treatment, slaughter in appropriate conditions."

The legislation of Kazakhstan does not contain the principle of humane treatment of animals, the criterion of which is the welfare of animals and humans within the framework of generally accepted ethical values. Analysis of the legal framework, as well as the long-term practice of animal protection organizations, show that Kazakhstan's legislation on animals lacks both conceptual regulations at the legislative level and solution to certain important issues. Kazakhstan entered the WTO in 2015, accordingly, it is required to harmonize domestic legislation with EU legislation.

Despite the current level of development of medicine and veterinary medicine, the problem of finding ways to eliminate pain is far from a final solution. In agriculture, animals undergo painful procedures without anesthesia: castration of males, neutering of females, removal of horns and fangs, branding, and trimming of the tail. Pain - in fact, a protective reaction of the body - at a certain stage becomes the cause of the development of a whole cascade of pathological reactions. Unrestrained pain is one of the main factors that can lead to decompensation of the body and death.

At the moment, a large number of studies have been carried out in animals of various species on the negative effect of pain on convalescence and recovery after surgery. Therefore, the need to recognize pain in farm animals is still relevant in our time. Despite the achievements, pain relief remains one of the most important issues in modern veterinary medicine.

In this regard, the hypothesis of our research is that acute stress (pain, fear), inflammatory reactions, hematological and biochemical changes in the body of animals caused by veterinary painful procedures will be reduced by using analgesic drugs.

The purpose of the research

Study of the pharmacotherapeutic efficacy of the use of analgesic drugs in farm animals.

Research objectives:

1. Conduct monitoring and assessment of the state of pain relief during painful procedures carried out on farm animals in the Northern region of Kazakhstan;
2. Study the pharmacokinetic properties of the analgesic drug Metamizole Sodium on horses and goats;
3. Investigate the effect of surgical castration on the physiological state of calves with control of the stress marker level;
4. Develop and determine the pharmacotherapeutic efficacy of the local anesthesia protocol with 2% Lidocaine Hydrochloride Solution for surgical castration of bulls;
5. Assess the adequacy of the anesthesia protocol for surgical castration of stallions in stationary and field conditions.

Research materials

The work was carried out in the period from 2015 to 2020 at the Department of Veterinary Medicine and Immunobiological Laboratory of the Scientific Research Institute of Applied Biotechnology (SRIAB) of Akhmet Baitursynov Kostanay Regional University. Experimental and clinical studies on animals were carried out on the basis of the livestock enterprises of Kostanay region, LLP "Ak-Kuduk" of the Kostanay region, on the farm of milking goats of the IE "R. Buludov" of Zhitikara region, as well as at Large Animal Veterinary Clinic of Lithuanian University of Health Sciences (Kaunas, Republic of Lithuania), Dairy Goat Farm in Lublin (Poland). Pharmacokinetic studies of analgesic drugs were carried out in the Laboratory of Pharmacology and Toxicology of Veterinary School of the University of Pisa, Pisa, Italy.

The objects of the research are farm animals: horses (mares) at the age of 3–4 years in the amount of 12 heads and stallions at the age of 2.5–3 years - 12 heads, dairy goats of the Saanen breed at the age of 5–8 years - 6 heads, cattle: bull calves 75 heads of the Holstein-Friesian breed at the age of 3–3.5 months.

Subject of the research - the pharmacokinetic properties of Metamizole Sodium in the body of horses (mares) and dairy goats, the pharmacotherapeutic effects of the use of general and local anesthetics during the surgical castration of stallions and the pharmacotherapeutic effects of the local anesthetic of lidocaine hydrochloride during the castration of bulls were studied.

Behavioral and physiological responses and serum levels of the corticosteroid hormone cortisol were used as markers of the pharmacotherapeutic effect of general and local anesthesia during surgical castration of stallions and bulls.

To determine the physiological state of the animals, clinical, hematological, and biochemical studies were carried out.

In experimental studies, pharmacological drugs were used: Metamizole Sodium, Lidocaine Hydrochloride, Diazepam, Sevoflurane, Ketamine Hydrochloride, Xylazine and Epinephrine Hydrochloride.

Research methods

Questionnaires, clinical, hematological, biochemical, enzyme immunoassay and pharmacokinetic studies.

Provisions for Defense

1. Monitoring and evaluation of information on pain relief during painful procedures performed on animals in the Northern region of Kazakhstan.
2. Pharmacokinetic profiles of molecules of the analgesic drug Metamizole Sodium in the bodies of horses and goats.
3. Development and application of a protocol for effective and safe anesthetic protection of bulls during surgical castration.
4. Concentration of Cortisol in blood serum as a marker of painful stress during surgical castration.
5. Adequacy of the anesthesia protocol for surgical castration of stallions.

Scientific novelty

For the first time, monitoring of painful procedures on animals in agricultural formations in the Northern region of Kazakhstan was carried out. For this purpose, a questionnaire has been developed for the first time and a website has been created in the electronic system of the Internet. The assessment of the state of relief of pain sensations in animals during surgical interventions was carried out. The effect of Sodium Metamizole on the pharmacokinetic parameters of horses and goats was studied.

The effectiveness of the protocol of local conduction and infiltration anesthesia for surgical castration of bulls was substantiated: 2% Lidocaine Hydrochloride solution at a dose of 2 mg / kg with preliminary sedation with 0.5% Diazepam Solution, intramuscularly at a dose of 0.2 mg / kg.

Protocols of combined anesthesia with premedication for castration of stallions in various conditions were applied.

The practical value of the work

The obtained research results are important for their use in scientific activities, for the practical relief of pain syndromes of various origins in animals with analgesic drugs. Research results will expand the use of analgesic drugs for pain relief in animals.

The research results are used by scientists of the Laboratory of Chemical Pharmacology of the Veterinary School of the University of Pisa (Italy) in the study of the pharmacokinetic properties of analgesic drugs.

The developed protocol of local anesthesia for surgical castration of bulls has been introduced into the veterinary practice of the farms of LLP "Ak-Kuduk" in Kostanay district of Kostanay region.

The combined anesthesia protocol for the castration of stallions has been introduced and used in the practice of the Large Animal Veterinary Clinic of Lithuanian University of Health Sciences (Kaunas, Lithuania).

Anesthesia protocols can be used by practicing veterinarians for a variety of surgical and therapeutic procedures on animals.

The results of the study were introduced into the educational process when giving lectures and conducting laboratory and practical classes in the relevant

sections of operative surgery and veterinary pharmacology for students of veterinary specialties of A. Baitursynov KRU.

Based on the research results, the following have been developed and implemented:

- Practical recommendations "Methods of Anesthesia of Farm Animals During Surgical Castration";
- The act of integration the research results into the clinic of large animals of the Lithuanian University of Health Sciences;
- The act of integration the research results into the LLP "Ak-Kuduk" of the Kostanay region;
- The act of integration the research results PF "Seidakhmetov E.S." Kostanay region;
- Questionnaire for collecting information on the use of painkillers by farm animals in 3 languages.

Connection of work with research programs

Research was carried out within the framework of the scientific and technical project "Study of Real and Potential Sources of Pain in Different Species of Animals and the Development of a Strategy for the Use of Analgesics", grant funding of the Ministry of Education and Science of the Republic of Kazakhstan for 2015-2017 under the budget program 217 "Development of Science", subprogram 102 "Financing of Scientific Research", project registration number No. 0115PK01586.

Approbation of work. The research results were reported at scientific conferences:

- LVII International Scientific and Practical Conference "Achievements of Science for the Agro-industrial Complex", Troitsk, RF (February 2018). – p. 7-12;
- International scientific and practical conference "Baitursynov Readings" "Digitalization of Kazakhstan: IT technologies in science, production and education", Kostanay, part 2 (April 2018). - p. 83-88;
- International Scientific and Practical Conference "Baitursynov Readings". The versatility of the Great Steppe: spiritual rebirth, knowledge and innovation ", Kostanay, part 1 (April 2019). - p. 130-133;
- meetings of the Academic Council (2018-2021);
- Interdepartmental meeting of A. Baitursynov KRU (2021).

Publication of research results

4 works were published on the topic of the thesis, 3 of which were published in publications recommended by Committee for Quality Assurance in Education and Science of RK, a multidisciplinary scientific journal "3i-Intelligence, Idea, Innovation", as well as 1 article in a foreign edition of the "Journal of Veterinary Pharmacology and Therapeutics" (United Kingdom), included in the Scopus database, with percentile for General Veterinary Medicine - 83 and for pharmacology - 40. CiteScore equal to 2.6.

Personal contribution of the author. On the topic of the thesis, the author independently conducted a search and analysis of foreign and domestic literary sources. The applicant took a direct part in all stages of experimental studies on

animals on the use of analgesic drugs: pharmacokinetic studies in horses and goats, development and research of the effectiveness of anesthesia protocol in stallions during castration in stationary and field conditions, during castration of bulls protocol of local anesthesia. The applicant solved problems, analyzed and summarized the results, developed practical recommendations and manuscript formatting.

The volume and structure of the thesis. The thesis is presented on 121 pages of computer text and consists of Introduction, Main part and Conclusion. The text of the thesis is illustrated with 26 figures, 16 tables, 5 formulas and 12 applications. The list of used sources consists of 230 items.