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COMPARATIVE STUDY OF THE EFFICACY AND SAFETY OF MOXIFLOXACIN AND LEVOFLOXACIN THERAPY IN THE MANAGEMENT OF COMMUNITY-ACQUIRED PNEUMONIA.

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ABSTRACT

Community-acquired pneumonia is an urgent problem that requires effective treatment. For effective treatment of pneumonia, it is necessary to choose the right fluoroquinolone, taking into account the sensitivity of the pathogen and the pharmacokinetic characteristics of the drug. In this case, it is necessary to take into account the pronounced side effects and limitations of the use of these drugs. An important step is to determine the dosage and duration of treatment. The effectiveness and safety of treatment of pneumonia with fluoroquinolones is manifested in clinical and laboratory parameters. This article reviews a comparative study of moxifloxacin with levofloxacin in the treatment of community-acquired pneumonia, and compares the effectiveness and safety of these drugs.

Key words

community-acquired pneumonia, fluoroquinolones, moxifloxacin, levofloxacin.

Introduction

Despite the increased availability of vaccines and urgent attention to infectious disease prevention, community-acquired pneumonia (CAP) is a common cause of morbidity and mortality worldwide. (1) The incidence is highest among the elderly, children under 5 years of age, and the disease often occurs in individuals with chronic diseases such as chronic obstructive disease, diabetes mellitus, and congestive heart failure. The most common etiological agent is Streptococcus pneumoniae, but the disease can also be caused by many other bacteria, atypical pathogens and viruses. Symptoms, which can range in severity from mild to life-threatening, include a productive or dry cough, pleuritic chest pain, shortness of breath, tachypnea, and tachycardia. Physical findings may include fever, as well as hypothermia, tachypnea, and accordion-like wheezing, which are pathognomonic symptoms.

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Clinicians must consider both individual and public health when addressing the many challenges faced in the treatment of community-acquired pneumonia, balancing the need for effective treatment with the safety and tolerability of the drugs chosen for use.

The emergence of a new generation of fluoroquinolones, moxifloxacin and levofloxacin, are powerful FDA-approved weapons against a variety of bacteria in the treatment of community-acquired pneumonia, but the burden caused by the continued prevalence of this disease on both patient well-being and health care systems is prompting health care providers to remain sensitive to the limitations of these treatments and the risks of resistance associated with their use.

Purpose of the study.

This randomized trial aims to compare two of the most recent and widely used fluoroquinolones for the treatment of community-acquired pneumonia, and to determine whether moxifloxacin is a safe treatment for this disease.

Materials and research methods

A total of 63 patients were included in the study. All patients had to meet the inclusion criteria and be eligible for inclusion in the study.

Diagnosis of CAP was based on the presence of a new pulmonary infiltrate detected on chest x-ray or progression of a pre-existing pulmonary shadow in combination with at least 2 of the following signs or symptoms: cough with production or change in sputum, temperature between 37°C and 38°C , auscultation findings consistent with pneumonia, and an increase in scores on any of the four items that make up the quality of life questionnaire (cough, sputum, chest pain, and shortness of breath).

Patients had to meet other general inclusion criteria, which were specifically defined by the CURB65 scale (2) - scoring 2-3 points, with moderate community-acquired pneumonia, receiving hospital treatment, requiring intravenous antibiotic therapy and not requiring mechanical ventilation, and informed consent of the patient to study. Before randomization, all patients required a chest x-ray on admission.

Strict monitoring of patients according to the SIRS and SOFA criteria, as well as patients who scored 1 and 2 points for outpatient treatment and 4-5 points for severe CAP on the CURB65 scale, and parallel infection with coronavirus infection. In addition, studies of patients who had a serious or critical life-threatening illness.

The study was designed as a randomized, double-blind trial (to avoid psychological bias), with two parallel groups and an observation period to evaluate the safety and tolerability of Levofloxacin and Moxifloxacin. Patients who were found to have an acute respiratory tract infection or a new infiltrate on hospital chest radiograph were screened for possible inclusion in the study. We began chest

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radiography within 24 hours of initial presentation and monitored the patient's symptoms for less than 14 days. We excluded patients with clinically severe conditions such as respiratory failure requiring mechanical ventilation. We used a computer-based stratified randomization schedule to allocate patients with a primary diagnosis of community-acquired pneumonia to treatment with moxifloxacin 400 mg once daily or levofloxacin 500 mg once daily. Neither patients nor investigators were aware of treatment assignments throughout the study. Clinical investigators who received study data were able to decipher treatment assignments if necessary. Emergency disclosure of patient prescriptions was permitted only in the event of a serious adverse event when knowledge of the treatment prescription was necessary for the medical management of the patient. The quality of food products and drugs was checked according to SanEpid surveillance

The study examined 63 hospitalized patients at the multidisciplinary clinic of the Tashkent Medical Academy during the study period. In the study, the main group (received moxifloxacin) consisted of 30 patients (17 men and 13 women; aged 49-55 years), and the control group (received levofloxacin) consisted of 33 patients (18 men, 15 women; aged 50-56 years). None of the participants received an excess dose of study drugs that were not officially recorded in the medical record. Men comprised approximately 56 percent of the total patient population in the moxifloxacin and levofloxacin treatment groups, with a mean age of 49–56 years.

Clinical examination included physical examination, vital signs, chest auscultation, chest imaging, and laboratory tests. Of these, vital signs were measured repeatedly and the most abnormal result was taken before drug administration. Auscultation of the chest was performed, but interpretation of its results was not mandatory. Thoracic imaging included chest radiography in 2 views. And during a laboratory study, it was necessary to do a general blood test with a differential diagnosis and platelet count, but the interpretation of its results was not mandatory. All of this was performed in order to establish the most accurate diagnosis of CAP offered by current diagnostic technologies and to ensure that the subject's disease required antibiotic treatment according to the definition of CAP used in the study, which is an acute infection of the patient's lung parenchyma. who has clinical signs of CAP and one of the following: new or increased cough, purulent sputum, or fever, and auscultatory findings consistent with pneumonia.

Drug	IV infusion	Orally taken tablets
Moxifloxacin	Days 1-2-3 400 mg	Days 4-5 400 mg
Levofloxacin	Days 1-2-3-4-5	Days 6-7

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	500 mg	500 mg

Table. Drug doses

Results and discussion

	Moxifloxacin	**Levofloxacin**	**Initial results before moxifloxacin and levofloxacin therapy**
Temperature	36,7-37,0 °C	37,2-37,3 °C	37,7-38,2 °C
Cough	2	3	4
Heart Rate	78-80	82-86	98-105
Blood Pressure	110-120	110-120	90-110
Saturation	97-98	95-96	90-92
Improvement of general condition of the patient	On the 3rd - 4th days of the therapy	On the 5 th - 7th days of the therapy	

Table 1. Assessment of the patients' condition before and after drug therapy.

Side effects	**Moxifloxacin**	**Levofloxacin**
Nausea	+	++
Diarrhea	+	++
Headache	very rarely	comparatively more often
ALT and AST	moderate transient elevation	moderate transient elevation
Prolongation of the QT interval	In 1 patient	In 3 patients
Atrial fibrilation	not observed	In 1 patient
Tendinitis	not observed	In 2 patients
Phototoxicity	not observed	not observed
Peripheral neuropathy	not observed	not observed

Table 2. Side effects of the drugs.

Community-acquired pneumonia was relatively more severe in men. (3)

The study showed that both antibiotics - moxifloxacin and levofloxacin - were effective in the treatment of community-acquired pneumonia. (4) Both groups of patients receiving these antibiotics had a high percentage of recovery and a decrease in inflammatory parameters. However, as we see from the results of the above tables, when comparing the effectiveness, patients receiving moxifloxacin showed a significant improvement in clinical symptoms and laboratory parameters compared with patients receiving levofloxacin in the fight against pathogens of community-acquired pneumonia. Most patients receiving moxifloxacin were completely cured of pneumonia on days 3-4 of intravenous infusion (5), while in the group receiving levofloxacin, patients recovered on days 5-7 of intravenous and then oral antibiotic therapy and a few cases of relapse of the disease were observed.

Moxifloxacin also turned out to be safer in terms of undesirable effects; in the group receiving levofloxacin, undesirable reactions such as nausea, diarrhea, and headaches were observed relatively more often.

Conclusions

The broader spectrum of action and good tolerability of moxifloxacin make it an attractive choice for initial and subsequent antibiotic therapy for CAP, including in patients with infection caused by highly resistant pneumococci to levofloxacin.

Considering treatment costs and potential loss of income during illness, based on pharmacoeconomic considerations, moxifloxacin therapy leading to early hospital discharge may save costs compared with levofloxacin therapy. (6)

Targeted and judicious use of new fluoroquinolones will minimize the emergence of bacterial resistance across the class and maintain the effectiveness of the class.(7)

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