Effectiveness of Dosage Forms with Flurenizide in Preventive Care and Treatment of Dangerous and Controlled Infectious Diseases

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Abstract: Creation of an efficient and safe medication is based on the knowledge of the world’s best achievements in medicine and pharmacy. Development of new original medications and dosage forms, study of their specific medicinal properties, application and advantages over well-known brands are important for achieving a high quality medical assistance. The innovative product—original Ukrainian substance Flurenizide served as the basis for new dosage forms (solid, semisolid and liquid) intended for preventive care and treatment of dangerous and controlled infectious diseases for human and veterinary medicine.

Key words: Flurenizide, antimicrobial, antiviral, antiseptic properties, dosage forms.

1. Introduction

Development and introduction of new efficient antimicrobial, antiviral and antiseptic medications into medical practice is a relevant task today. Variety of microorganisms, their ability to mutate and create forms which are resistant to existing chemotherapeutic medications urges us to seek new and more effective medications for prevention and treatment of infectious diseases. In the early 1990s at the Lviv State Medical Institute received an organic compound, patented under the name “Flurenizyd™, Pharmaceutical and Medicines that Are Used to People and Animal” [1].

Flurenizyd registered in the State Register of medicines Ukraine as a new drug in original Ukrainian anttybacterial and antimicrobial activity (registration No. P.10.00/02305 from 12.10.2000 p.) [2].

2. Materials and Methods (Information Search Scientific Literature)

A profound analysis of patent information of Ukrainian and foreign scientists showed that fluorine use in medicine and pharmacy is promising. There are effective substances among them which are suggested for preparing readymade dosage forms and those which have already been applied in production (Florenal, Amixin, etc.).

Research methods were microbiological, pharmacological, pharmaco-technological and clinical trials.

Flurenizyd, New Ukrainian drug, has a broad spectrum of antimicrobial activity, acting on mycobacterium Myc. tuberculosis H37Rv, Chlamydia trachomatis and other (Table 1).

In the experiment, Flurenizyd is effective in type and mutated forms of Mycobacterium tuberculosis. Controlling anttybacterial and drug activity was Isoniazid. Microbiological, pharmacological and clinical studies of some fluorenilidenhidrazydiv are described [3].

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Table 1  The spectrum of antimicrobial activity Flurenzudu in experiments in vitro [3].

<table>
<thead>
<tr>
<th>Microorganisms</th>
<th>Concentration (mg/mL)</th>
<th>Gram-positive coci</th>
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</thead>
<tbody>
<tr>
<td><strong>Staphylococcus aureus 201189</strong></td>
<td></td>
<td><strong>M. tuberculosis H37Rv</strong></td>
</tr>
<tr>
<td><strong>Staphylococcus album</strong></td>
<td>12.5–100.0</td>
<td>Strain, freshly-isolated of patients with pulmonary tuberculosis resistant to Ethionamidum</td>
</tr>
<tr>
<td><strong>Staphylococcus epidermidis</strong></td>
<td>6.5–100.0</td>
<td>Strain, freshly-isolated of patients with pulmonary tuberculosis resistant to Streptomycin</td>
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<tr>
<td></td>
<td></td>
<td>Strain, freshly-isolated of patients with pulmonary tuberculosis resistant to Kanamycin</td>
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<tr>
<td></td>
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<td>Strain, freshly-isolated of patients with pulmonary tuberculosis resistant to Isoniazid</td>
</tr>
<tr>
<td>Gram-positive bacillus wrong</td>
<td></td>
<td><strong>Strain No. 3421</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>with dual resistance (to Ethambutol and Streptomycin)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Ultra small bacteria H37Rv</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Ultra small mycobacteria [44]</strong></td>
</tr>
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<td></td>
<td></td>
<td><strong>Revertants of Mycobacterium Ultra small [44]</strong></td>
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<td></td>
<td></td>
<td><strong>Myc. Bovinus</strong></td>
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<tr>
<td></td>
<td></td>
<td>6.0–100.0</td>
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<tr>
<td></td>
<td></td>
<td>12.5–50.0</td>
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<td></td>
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<td>12.5–50.0</td>
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<tr>
<td></td>
<td></td>
<td>1.625</td>
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<tr>
<td></td>
<td></td>
<td>3.0–100.0</td>
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<tr>
<td></td>
<td></td>
<td>6.5</td>
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<td></td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>Gram-negative facultative anaerobic bacillus</td>
<td></td>
<td><strong>Klebsiella</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.5–100.0</td>
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<tr>
<td></td>
<td></td>
<td><strong>Proteus</strong></td>
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<tr>
<td></td>
<td></td>
<td>12.5–128.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Pseudomonas aeruginosa 2198 (1987)</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Shigella</strong></td>
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<tr>
<td></td>
<td></td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Escherichia coli</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.5–250.0</td>
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<tr>
<td></td>
<td></td>
<td><strong>Chlamydia trachomatis, LGV</strong></td>
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<tr>
<td></td>
<td></td>
<td>5.0 mg/embryo</td>
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<tr>
<td></td>
<td></td>
<td><strong>Mycoplasma hominis</strong></td>
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<td></td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Ureaplasma genitalium</strong></td>
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</table>

For the first time, high activity antityuberkulozen Flurenzudu on sensitive and resistant strains of MBT (Mycobacterium tuberculosis) confirmed at the Central Research Institute of the Ministry of Health Tuberculosis [4].

Enhanced microbiological research Flurenzudu also held at the Lviv Institute of Epidemiology and Health and is part of research topics: “Examine tuberculostatic effect was first synthesized drugs of fluorene and to develop schemes to their use for the treatment of tuberculosis”, No. state registration 0195U025270 and “develop new methods of diagnosis and treatment mycobacterioses”, No. state registration 0196U009405 [5-11].

3. Result and Discussion

Effective substance with a broad spectrum is Flurenzide, introduced into medical practice in Ukraine in 2000. We have developed an effective dosage forms (solid, soft, liquid) with Flurenzidom to prevent and treat infectious diseases.

3.1 Flurenzide Pills

The 0.05 g and 0.15 g Flurenzide pills have been designed by authors and standardized at Danylo Halystskyi Lviv National Medical University under the supervision of Doctor of Pharmacology, Professor L. I. Petrukh, tested and standardized regulations in enterprises [12-14].

These pills prescribed for treatment of all types of tuberculosis of grown-ups and children, latent silicotuberculosis; for treatment of urogenital chlamydiosis, ureaplasmosis and mycoplasmosis; chlamydia infection in chronic pyelonephritis patients; complex therapy of eczema and syphilis patients. The basis of Urogenital candles is Flurenzide in hard dosage form has been included into “National List of Main (Vital) Medications and Medical Products”
Table 2  Evaluation of the effectiveness of vaginal suppositories of 0.1 g Flurenizyd [32].

<table>
<thead>
<tr>
<th>Criteria of efficacy</th>
<th>Evaluation of efficacy</th>
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<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>High efficiency (1 point)</td>
<td>26</td>
</tr>
<tr>
<td>Moderate efficiency (2 points)</td>
<td>4</td>
</tr>
<tr>
<td>Low efficiency (3 points)</td>
<td>–</td>
</tr>
<tr>
<td>Lack of efficiency (4 points)</td>
<td>–</td>
</tr>
</tbody>
</table>

(Group J04A “Mycobacteria Affecting Products. Antituberculosis Medications”) [15, 16]. The features Flurenizydu use in tablet form for oral use, immediate and remote use efficiency of chemotherapy in adult patients with chronic, mostly destructive, pulmonary tuberculosis, including the release of drug-resistant mycobacteria. Reasonable new ways to treat pathologies using Flurenizydu based on consideration of the sensitivity of *Mycobacterium tuberculosis* drug activity and quantities antymikobakteriyonyi blood.

Proven efficiency in the use Flurenizydu kompleksniy himioterapiyi tuberculosis respiratory organs in pupils residing in contaminated territories radionuklidamy. The results of research work successfully used in antytuberkulozen health facilities [17-28].

3.2. Suppositories

Suppositories with Flurenizyde farmakotechnologichno developed and put into production and medical practice [3, 29-36]. Efficiency Flurenizydom suppositories of 0.1 g (for women) and Flurenizydu pills of 0.15 g (for men) are proved in the case of infectious and inflammatory diseases and akusherstvi hinekolyi and urology [37-50].

Flurenizide positively decreases the level of free-radical acidification and activates fermentative link of antioxidant protection system, quickly eases the morphological picture of inflammatory process in endometrium and has a positive impact on the ultrastructure of endometrial stroma. We have proved the expediency of including Flurenizide into preventive care for pyoinflammatory complication of C-sections in obstetric patients who live in territories with insignificant radiation pollution. The preparation boasts of its high effectiveness in treatment of urogenital chlamydiosis with immune modulating effect and no side effects.

The perception of the body of vaginal suppositories of 0.1 g Flurenizyd based on subjective symptoms and objective clinical data evaluated by expert researchers as “very good” at 100.0% of cases.

Adverse reactions during clinical trials Flurenizydu were found. ELISA results obtained after treatment Flurenizydom indicate chlamydia eradication of the pathogen in 86.6% of patients [32].

Noted Flurenizyd positive synergistic effect on other organs and body systems. Comprehensive treatment using Flurenizydu pills of 0.15 g and vaginal candles to 0.1 g results in the correction of humoral, cellular immunity and nonspecific resistance microorganism. The drug helps restore reproductive health and can be used in the departments of women’s clinics, gynecological and maternity departments, centers of reproductive health of the family [32].

Found that Flurenizydu use in treatment of reactive arthritis, combined with chronic urogenital chlamydiosis is effective, positive impact on the course of joint syndrome, the results of clinical and laboratory parameters. Flurenizydom antyhlamidiynyy has a pronounced effect significantly reduces the number of patients diagnosed with DNA (deoxyribonucleic acid) Chl. trachomatis IgG antibody titer and the IgA and to Chl. trachomatis after treatment [37, 42].

3.3. Soft Pharmaceutical Form

1% Flurenizide eye ointment, recommended for treatment of burns and bacterial diseases of
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Experiments show that in complex eye burns therapy it decreases the duration of epithelization and increases acuity of vision, has an antibacterial, anti-inflammatory and healing effect, decreases the level of complications.

Designed improved, pathogenetic complex method of treatment of eczema, which is parallel to conduct comprehensive baseline therapy provides patients also modern purpose imunotroponho the domestic drug Flurenizyd [55].

3.4. Flumexide and Flupestal

Flurenizide served as the basis for new liquid medications Flumexide and 1% antiseptic solution Flupestal for treatment of infectious diseases.

Flumexide (2% hydrodimexide suspension) combines antibacterial properties of Flurenizide with pharmacological effects of dimexide. Flumexide affects staphylococcus, streptococcus, e.coli, causing cleaning and healing of wounds in case of proinflammatory skin diseases (epidermis and derma). Flumeksyd improves wound healing process in patients with recurrent malignant tumors of the skin, reduces inflammation and promotes the appearance of granulation in the wound and the formation of biological dressings. The drug is recommended for use in surgery [56, 57].

A new liquid dosage form 1% Flupestal is a medication for local antisepsis and treatment of puss and inflammatory processes in surgery, dentistry—for complex treatment for acute and chronic alveolitis, in otolaryngology, rheumatology—for treatment of joint syndrome in reactive chlamydia-associated arthritis patients. Flupestal has antimicrobial, anti-inflammatory, immune modulating and antioxidant effect, without causing allergy and irritation. 1% Flupestal was tested in veterinary practice for treatment of otodectosis—damage to outer ear caused by acari bites [58-63].

4. Conclusions

Flurenizide is an important biomolecule with properties which are optimal for having required pharmacological effect—antimicrobial (antituberculosis, antichlamydia), immune modulating, antioxidant, antiradical, hepatoprotective, anti-inflammatory etc.

Described new dosage forms (solid, soft and liquid), exhibit higher clinical effect. They are intended for the prevention and treatment of hazardous and controlled infectious diseases in medicine and veterinary medicine.

Use Flurenizydu in various dosage forms expand the range of drugs antiviral, antimicrobial and antiseptic action needs to humane and veterinary medicine.

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