UDC: 615.281.8:615.454.2:618.1

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**Antivirals: Today and the prospects of development in Ukraine.**

 *It was made a diligent examination of drugs for therapy of genital herpes (GH). It has been proved, that there is an insufficient quantity of domestic medicinal forms on pharmaceutical market of Ukraine. It is necessary to develop combined drugs with wide therapeutic spectrum for treatment of GH. The range of drugs, based on combination of synthetic and bioactive substances of plant origin should be extended.*

*Key words: antivirals, genital herpes, acyclovir, suppositories, infection, treatment.*

**Introduction.**

 Today, the therapy of virus infection is the most actual problem of medicine, because of occurrence this disease and severity of pharmacotherapy. Herpetic infection is the most widespread among all virus infections. Genital herpes (GH) is one of the most socially important problem in clinical practice of dermatovenereologist, obstetrician-gynecologists and urologists. The number of ill people with GH during last 10 years increased to 30 % [1]. More than 90 % of people in the world currently are infected by HSV (herpes simplex virus) and 20 % of them have various clinical implication of infection. Only 5 % of ill people have typical symptoms, but in 80 % of cases, infection hasn’t clinical implication.

 The main role in etiology of GH belongs to HSV 2, but pathogene could be either HSV 1 or combination of both types of HSV, which have from 50 to 100 % people [3]. More than 100 types of herpes virus are described now, from which only 8 types are clinically important. Currently, it is known about 450 pathogenic viruses for people.

 Main groups of viruses include: 170 respiratory viruses; 90 enteric viruses, about 100 arboviruses, pathogens of hepatitis, A, B, C, D, E, F, G; HIV-1, HIV-2, more than 100 viruses of papilloma, parvovirus, hantavirus, adenovirus. The infections, which connected with HSV 1 and HSV 2 are dominated. GH is characterized by polymorphism of clinical implications, recurrent chronicity, different complications, including inflammatory process of pelvic organs, abnormality of fertility, intrauterine infection of fetus and neonate [8, 10].

 The highest prevalence of GH is registered among people of 20-29 years old, second peak is in age 35-40 years. The zymosis depends on degree of infection and immune system.

 According to clinical finding, GH is divided into 4 types: first clinical episode of primary GH; first clinical episode in the presence GH; herpes recidivicus; atypical GH; asymptomic GH [4,5].

 The therapy of GH is not easy process because there are not any drugs, which could eliminate virus from the body completely. That’s why the main aim of the therapy is acceleration of epitheliazation’s processes reduction in number of relapses and increase of the disease-free survival.

 Currently, for therapy we can use antiviral therapy, immunotherapy and combination of these methods according to stage and severity of disease [7].

 The aim of this study is analysis of drug’s assortment, which used in antiviral therapy, to evaluate next optimization of drug’s providing.

**RESULTS AND DISCUSSION.**

General assortment of antivirals on Ukrainian pharmaceutical market is represented by 411 names. Annual volume of this group in Ukraine is about 300 mln. hrn [2, 9].

The list of antivirals of different dosage forms includes: 51,8 % of drugs with systemic effect (using for ARVI and herpes infection therapy); 40,4 % of immunomodulators; 7,8 % of drugs with local action (pic. 1).

Pic.1. Relation between antivirals, based on action.

Different dosage forms can be used for therapy of infection: tablets (49,8 %), powder (4,4 %), solutions for injections (285 %), ointments and creams (14,1 %), suppositories (3,2 %). (pic.2).

Pic.2*.* ***Relation between antivirals of different dosage forms***

 There is multivarious range of antivirals, which have efficiency clinically proven on the world’s markets. On the basis of features of application, the drugs can be divided in some groups:

* drugs for therapy DNA – containing viruses;
* drugs for therapy RNA – containing viruses;
* antivirals with action similar to antibiotics;
* interferon inducers;
* homeopathic drugs;
* immune adjuvants.

 By the chemical composition, antivirals are classified as: interferon and its products, nucleosides, lipids and its derivatives, adamontane and its derivative drugs of plant origin.

 Studying the range of drugs, which are registered on the 1st March 2014 it wasset, that needs in antivirals for patients are satisfied (see tab.1).

Tab.1.

Antivirals of systemic effect and local action for GH therapy on pharmaceutical market of Ukraine.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| № | Product name | Drug substance | Dosage form | Manufacturer, country |
| 1 | 2 | 3 | 4 | 5 |
| 1 | MEDOVIR | acyclovir | Powder for preparation of solution of injection  | Medochemie LTD, Cyprus |
| 2 | ACYCLOVIR-DARNITSA | acyclovir | Tablets | Darnitsa, Ukraine |
| 3 | ACYCLOVIR -PFARMEX | acyclovir | Tablets | "Pharmex Group", Ukraine |
| 4 | ACYCLOVIR -FARMAK | acyclovir | Tablets |  "Farmak", Ukraine |
| 5 | GERPEVIR® | acyclovir | Powder for preparation of solution of injection | "Kyivmedpreparat", Ukraine |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 |
| 6 | VIROLEX | acyclovir | Tablets | KRKA, Slovenia |
| 7 | VIROLEX  | acyclovir | Powder for preparation of solution of injection | KRKA, Slovenia |
| 8 | ACYCLOVIR STADA® | acyclovir | Tablets | Stada Arzneimittel AG, Germany |
| 9 | ACIVIR | acyclovir | Tablets | Unimax Laboratories, India Mepro Pharmaceuticals Pvt. Ltd.,India |
| 10 | BIOCYCLOVIR-BIOPHARMA  | acyclovir | Powder for preparation of solution of injection | "Biopharma", Ukraine |
| 11 | ACYCLOVIR | acyclovir | Tablets | JSC "Lekhim-Kharkiv", Ukraine |
| 12 | GEVIRAN | acyclovir | Tablets | "Polpharma", Poland |
| 13 | ACYCLOVIR -ASTRAPHARM  | acyclovir | Tablets | “Astrapharm”, Ukraine |
| 14 | ZOVIRAX™ | acyclovir | Tablets | GlaxoSmithKline, Great Britain |
| 15 | ZOVIRAX ™  | acyclovir | Lyophilizate for preparation of solution of injection | GlaxoSmithKline, Manufacturing, Italy |
| 16 | ACIC®  | acyclovir | Tablets | Salutaz Pharma GmbH, Germany, Sandoz Pharmaceuticals d.d |
| 17 | MEDOVIR | acyclovir | Tablets | Medochemie LTD, Cyprus |
| 18 | CYMEVENE | ganciclovir | Lyophilizate for preparation of solution of injection | F. Hoffmann-La Roche Ltd., Switzerland |
| 19 | FAMVIR® | famcyclovir | Tablets | Novartis Pharma, Spain |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** |
| 20 | VALACICLOVIR-KR | valacyclovir | Tablets | Chervona zirka, Ukraine |
| 21 | VALCIK | valacyclovir | Tablets | Pharmascience Inc., Canada |
| 22 | VALTROVIR | valacyclovir | Tablets | "Kyivmedpreparat", Ukraine |
| 23 | VALAVIR®  | valacyclovir | Tablets | "Farmak", Ukraine |
| 24 | VALTREX™  | valacyclovir | Tablets | "GlaxoSmithKline Pharmaceuticals S.A.", Spain |
|  |  |  |  |  |
| 25 | GERPEVAL  | valaciclovir | Tablets | "Phytopharm", Ukraine |
| 26 | ARPEFLU®  | umifenovir | Tablets | "Lekpharm" , Belorus |
| 27 | EREBRA® HIPORHAMIN EXTRACT | hiporhamin extract | Tablets | "Pharmcentre Vilar", Russia |
| 28 | KAGOCEL®  | kagocel | Tablets | "Niarmedic Plus", Russia |
| 30 | AMIZONUM ®  | amizonum ® (enisamium iodide) | Tablets | "Farmak", Ukraine |
| 31 | IMUSTAT | umifenovir | Tablets | "Darnitsa", Ukraine |
| 32 | NOVIRIN  | inosine pranobex | Tablets | "Kyiv vitamin plant", Ukraine |
| 33 | ISOPRINOSINE  | inosine pranobex | Tablets | Liaomedicamenta Technical Pharmaceutical Sociedad, Portugal, Pharmaceutical plant TEVA, Hungary |
| 34 | ACYCLOVIR-PHARMEX  | acyclovir | Cream | " Pharmex Group", Ukraine |
| 35 | GERPEVIR®  | acyclovir | Ointment | “Kyivmedpreparat”, Ukraine |
| 36 | ZOVIRAX® | acyclovir | Cream | Glaxo Operations UK Limited, Great Britain |
| 37 | ACICLOVIR-FARMAK | acyclovir | Cream | "Farmak", Ukraine  |
| 38 | ACICLOVIR-VISHFA  | acyclovir | Ointment | Pharmaceutical fabric, Jitomir, Ukraine |
| 39 | VIROLEX | acyclovir | Ointment | KRKA, Slovenia |
| 40 | AGERP | acyclovir | Ointment | Joint Ukrainian-spanish enterprise "Sperco Ukraine", Ukraine |
| 41 | ACIC® | acyclovir | Ointment | Salutaz Pharma GmbH, Germany, Sandoz Pharmaceuticals d.d |
| 42 | ACIVIR | acyclovir | Ointment | Temiz Medicare Limited, India Mepro Pharmaceuticals Pvt. Ltd., India |
| 43 | ACYCLOSTAD®  | acyclovir | Ointment | Stada Arzneimittel AG, Germany |
| 44 | PANAVIR®  | Panavir® | Suppositories | "Lanapharm", Russia |

It should be mentioned, that the range of existing antiherpes drugs during last years increased significantly, but the most effective are acyclovir, valacyclovir, pencyclovir, gancyclovir, famcyclovir [6, 11].

According to this data, the number of dosage form with local action is insignificant. That’s why, the development of new combined antiviral in suppositories, used for gynecology is the most prospective direction.

**Conclusion.**

1. Analysis of data of antiviral medicines, which are registered in Ukraine, shows that medicines of systemic action consist 51,5 % of all.
2. Analysis of market proves, that foreign medicines dominated between all registered drugs on Ukrainian pharmaceutical market
3. Development and introduction of new domestic antiviral remedies in forms of suppositories is perspective direction of pharmaceutical sector.

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УДК: 615.281.8:615.454.2:618.1

**ПРОТИВІРУСНІ ПРЕПАРАТИ: СТАН ТА ПЕРСПЕКТИВИ СТВОРЕННЯ В УКРАЇНІ.**

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Проведено вивчення асортименту лікарських препаратів для лікування генітального герпесу (ГГ). Доведено, що на фармацевтичному ринку України недостатньо вітчизняних лікарських форм. Для лікування ГГ необхідно розробляти комбіновані лікарські препарати із широким спектром терапевтичної дії. Слід розширяти номенклатуру лікарських засобів на основі комбінації синтетичної сировини та біологічно активних речовин рослинного походження.

*Ключові слова: противірусні препарати, генітальний герпес, ацикловір, супозиторії, інфекція, лікування.*

**УДК:** 615.281.8:615.454.2:618.1

**ПРОТИВОВИРУСНЫЕ ПРЕПАРАТЫ: СОСТОЯНИЕ И ПЕРСПЕКТИВЫ СОЗДАНИЯ В УКРАИНЕ.**

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Проведено изучение ассортимента лекарственных препаратов для лечения генитального герпеса (ГГ). Доказано, что на фармацевтическом ринке Украины недостаточно отечественных лекарственных форм. Для лечения ГГ необходимо разрабатывать комбинированныеі лекарственные препараты с широким спектром терапевтического действия. Следует расширять номенклатуру лекарственных средств на основе комбинации синтетического сырья и биологически активных веществ растительного происхождения.

*Ключевые слова: противовирусные препараты, генитальный герпес, ацикловир, суппозитории,* *инфекция, лечение.*

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Надішла до редакції

13.06.2014