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## Comparative analysis of the prescription of drugs to patients with chronic prostatitis in health care institutions of different forms of property ownership

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### Abstract

Chronic prostatitis (CP) is one of the most common urological diseases in men. The problem of diagnosis and treatment of CP was and remains relevant. A comparative analysis of the prescribed drugs for outpatients with a diagnosis of CP in health care institutions of different forms of property ownership was conducted. The structure and features of drugs application in the studied health care institutions in the context of the main anatomical groups (according to the ATC-classification) and individual drugs were determined using the frequency, ABC and FMR analyzes. On the basis of the integrated ABC/FMR/VED-analysis the distribution of drugs according to their importance for the pharmacotherapy of CP, frequency of prescribing and price was conducted.

**Keywords:** Chronic prostatitis, drugs, application, expenses for pharmacotherapy, integrated ABC/FMR/VED-analysis

### Introduction

Chronic prostatitis (CP) is one of the most common urological diseases in men and represents a major social and psychological problem, as it leads to a significant decline in the quality of life of men <sup>[3,10]</sup>.

The problem of diagnostics and treatment of CP was and remains relevant. Despite the appearance of modern high-quality methods for detecting inflammatory pathogens, new high-level antibiotic drugs, the results of treatment of this disease are far from positive <sup>[3]</sup>. This is due to many factors. Among them: changes in the microbial content of CP, the appearance of resistant strains and polymicrobial associations, the complexity of their detection and treatment. In addition, CP is often accompanied by complications from other organs of the reproductive system, disorders of urination and chronic pain syndrome <sup>[10]</sup>.

### The aim of the study

Conduct a comparative analysis of the prescribed medicines for outpatients with CP diagnosis in health care institutions of different forms of property ownership.

### Materials and methods

Medication leaflets (ML) for outpatients from health care institutions of Ivano-Frankivsk – the private clinic of “Oxford Medical Center” (PC) and the municipal clinic “City Clinic No. 5” (MC).

### Methods used

- frequency analysis, which allows to conduct the distribution of the prescribed drugs and their groups on the frequency of use. With the help of this analysis it is possible to determine the list of drugs that are most often or vice versa rarely prescribed, as well as to conduct the distribution of drugs on the frequency of their prescribing within one group <sup>[5]</sup>;
- ABC-analysis, which provides an assessment of the structure of costs for medical supplies. Group A accounts for about 20% of all drugs, for which 70-80% of the funds are spent. Group B accounts 15-20% of drugs with a level of expenditure of 15-20%. Group C is 5-10% of the spent money and accounts for about 60% of all drugs <sup>[5]</sup>;
- FMR-analysis, the criterion of which is the frequency of drugs application, but not the cost-effectiveness indicator. According to this analysis drugs are divided into three

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groups. Group F the most often prescribed drugs, which represent relatively about 20-30% of the positions, which account 70-80% of the used drugs. Group M-less often prescribed drugs (20% and 5-10% relatively). Group R-rarely prescribed drugs (50-60% and 10-15% relatively) [4];

- VED-analysis, which divides drugs according to their classification into vital (V), essential (E) and desirable (D). In our case drugs included to the State Pharmacopoeia were divided according to the VED-analysis into vital (V) and desirable (D); the group of essential drugs (E) was not identified [1];
- ABC/FMR/VED-analysis, which is the integration of the above methods [4].

**Results and discussion**

It has been established that 4 urologists work in the PC and one in the MC, who follow the recommendations of the CP treatment and the clinical protocol for the provision of

medical care at the CP [6, 7, 8].

The analysis of ML of outpatient cards showed that most often from CP suffer men in the age group of 41-50 years (36.4% of applications to PC and 23.5% - to MC), in the second place-age category of 51-60 years (30.9% and 20.6% relatively), fewer patients with CP are men over the age of 60 (12.7% and 26.5% relatively), and even less patients with CP are in the age group of 20-30 years (10.9% and 17.6%, relatively), the least number of appeals to urologists with this disease is at the age of 31-40 years (9.1% and 11.8% relatively). It was established that CP was often accompanied by concomitant diseases: arterial hypertension (17.4% of all patients aged 51-60 years, 15.3% of men older than 60 years, 8.3% - in the age group of 41-50 years, and about 3% of young men under 40 years old); two men aged 41-50 years experienced diabetes mellitus; one patient aged 51-60 years and one patient over 60 years old had chronic hepatitis. The results of the analysis confirm (Table 1) that the CP is rapidly getting younger.

**Table 1:** Distribution of patients with CP by age

Clinic	Amount of patients	Age category, years				
		20-30	31-40	41-50	51-60	older 60
<b>Distribution of patients by age</b>						
PC	110	12	10	40	34	14
MC	34	6	4	8	7	9
Total	144	18	14	48	41	23
<b>Concomitant diseases</b>						
Arterial hypertension	63		4	12	25	22
Diabetes mellitus	2			2		
Chronic hepatitis	2				1	1
Total	67		4	14	26	23

The total number of prescriptions of drugs in 144 outpatient cards was 1137. The index of polypragmasia was high and on average it was 7 medicines per 1 ML. Urologists of the PC used 16 drugs under the international nonproprietary name (INN) or 44 medicines under the trade names (TN). In its turn, urologists of MC assigned in two times less drugs (8) under the INN in the form of 18 drugs under the TN. The prescribed drugs belong to 7 of the 14 anatomical groups according to the anatomical-therapeutic-chemical (ATC) classification: A-alimentary tract and metabolism (9.3% in PC and 5.6% in MC); G-genitourinary system and

reproductive hormones (46.5% and 55.5% relatively); J-antiinfectives for systemic use (25,6% and 27,7% relatively); M-musculoskeletal system (9.3% and 5.6% relatively), N-nervous system, V-various ATC structures (4.7% and 5.6% relatively) and R-respiratory system (antihistamines) -2.3% only in PC. The results of the analysis of ML allowed to establish (Table 2) that in the structure of the medicines prescribing the maximum proportion was occupied by drugs of the G group-genitourinary system and reproductive hormones.

**Table 2:** The structure of the prescribing of the main anatomical groups drugs

Indicators	PC	MC
Amount of outpatients cards	110	34
Amount of drugs (under the INN)	16	8
<b>Distribution of the prescribed drugs according to the anatomical groups</b>		
A-Alimentary tract and metabolism, %	9,3	5,6
G-Genitourinary system and reproductive hormones, %	46,5	55,5
J-Anti-infectives for systemic use, %	25,6	27,7
M-Musculoskeletal system, %	9,3	5,6
N-Nervous system, %	2,3	-
R-Respiratory system, %	2,3	-
V-Various ATC structures, %	4,7	5,6
Total	100	100

Treatment of CP is a very long process, which lasts up to three months. Therapeutic program consists of antibacterial treatment, restoration of circulatory disorders in a small pelvis

and microcirculation in the prostate, stabilization of the immune and hormonal systems (Table 3).

**Table 3:** Therapeutic program of CP

Component of program	Subgroup of drugs	Term of treatment
Antibacterial therapy	J01MA-Fluoroquinolones	10-14 days
Reducing the tone of smooth muscle, removing swelling	M01A-Anti-inflammatory and anti-rheumatic products, non-steroids	5-10 days
Improving of urodynamics	G04CA-Alpha-adrenoreceptors antagonists	1 month
Prevention of prostatitis, removing inflammation, edema of the prostate, reducing discomfort	G04CX-Other drugs used in benign prostatic hypertrophy G04BX-Other urologicals	1-3 months
Strengthening the body	A11-Vitamins	1 month

Antibacterial therapy is carried out using fluoroquinolones. PC prefers Levofloxacin, and MC – Abiflox. Among the non-steroidal anti-inflammatory drugs in both clinics most often Dicloberl is prescribed. Urologists in the PC generally prescribe 20 drugs of the subgroup G, and in MC-10 drugs. In the context of the G group the drugs of the subgroup G04CA (alpha-adrenoreceptors antagonists) are the drugs of choice for patients and are represented by 8 (40.0%) agents (Omnice, Omnice, Omix, Fokusin, Flosin, Tamsulostad, Tamsin Forte, Urorec) prescribed in PC and 1 (10%) agent (Omnice)-in MC.

For removing inflammation, edema of the prostate, reducing the discomfort drugs of the subgroup G04CX (other drugs used in benign prostatic hypertrophy) are used and are represented by 8 (40.0%) agents prescribed in PC and 6 (60.0%) - in MC. Six drugs are simultaneously prescribed in both clinics, namely Prostatilen amp. Prostatilen supp., Prostatamol Uno, Prostatplant, Prostatplant Forte, Prostatmed. Also drugs of the subgroup G04BX (other urologicals) are prescribed and are represented by 4 (20.0%) TN (Formen Combi, Pravenor, Phytprost supp., Vitaprost supp.) in PC

and 3 (30.0%) TN (Neoprost Forte, Phytprost supp., Vitaprost supp.) - In MC.

In addition, drugs that improve the immune system, accelerate the rehabilitation after illness and increase efficiency are used (Beresh Plus drops - in PC, Pantocrin - in MC).

According to the results of the conducted ABC-analysis it was established that the total cost of the medical support for the course of CP pharmacotherapy of 110 patients in the PC was 6 514.88 \$ and of 34 patients in the MC - 1 788.49 \$, in the conditions of almost the same for both healthcare institutions level of an average indicator - 59.23 \$ and 52.60 \$ relatively (the cost of drugs was calculated according to pharmbase.com.ua dated June 2018) [9].

In the PC group A included 18% of all drugs with about 79% of money spent on them; group B-20% of all drugs with 16 % of money spent; and group C-62% of all drugs with 5% of money spent [1]. In the MC group A included 39% of all drugs with about 73% of money spent on them; group B-22% of all drugs with 18% of money spent; and group C-39% of all drugs with 9% of money spent (Table 4).

**Table 4:** Results of ABC-analysis of drugs prescribed for the treatment of CP

Group	Amount of drugs				Money spent			
	PC		MC		PC		MC	
	abs.	%	abs.	%	abs.	%	abs.	%
A	8	18	7	39	134 511,24	79	34 167,19	73
B	9	20	4	22	27 024,65	16	8 351,36	18
C	27	62	7	39	9 023,88	5	4 304,17	9
Total:	44	100	18	100	170 559,77	100	46 822,72	100

FMR-analysis of the frequency of drugs prescribing in two health care institutions (Table 5) has shown that such TN as Water for injections, Dicloberl, Omnice, Prostatilen amp. belonged to the group F; Prostatamol Uno-to the group M; Vitaprost, Levofloxacin, Prostatplant Forte depending on the

health care institution belonged to the group F or M. To the groups F and R belonged 4 TN-Abiflox, Pantocrin, Prostatilen supp., Phytprost; to the groups M and R belonged 3 TN-Prostatplant, Ciprinol, Ciprofloxacin [1].

**Table 5:** Results of FMR-analysis of drugs prescribed in the investigated health care institutions

Drug TN	PC		MC		Drug TN	PC		MC	
	Amount	Group	Amount	Group		Amount	Group	Amount	Group
Abiflox	2	R	12	F	Pravenor	1	R		
Aevit	18	M			Prostalin	1	R		
Analgin	2	R			Prostatmed	2	R	7	M
Beresh Plus	43	F			Prostatamol Uno	31	M	10	M
Vitaprost	20	M	15	F	Prostatplant	26	M	4	R
Water for inj.	106	F	34	F	Prostatplant Forte	42	F	5	M
Dexalgin	1	R			Prostatilen amp.	106	F	34	F
Dicloberl	66	F	34	F	Prostatilen supp.	85	F	4	R
Diclofenac	39	F			Prostatophyt	1	R		
Duovit	39	F			Reumoxicam	1	R		
Levoflox	1	R			Suprastin	1	R		
Levofloxacin	68	F	8	M	Tavanic	1	R		

Leflocin	4	R			Tamsin Forte	1	R		
Lymphomyosot	1	R			Tamsulostad	3	R		
Sodium chloride	2	R			Urorec	1	R		
Neoprost Forte			8	M	Uroset	1	R		
Omix	1	R			Phytoprost	3	R	15	F
Omnice	75	F	34	F	Flosin	6	R		
Omnice ocas	5	R			Fokusin	18	M		
Ofloxacin	1	R			Formen Combi	1	R		
Ofloxin	2	R			Ceftriaxone	1	R		
Pantocrin	8	R	34	F	Ciprinol	13	M	4	R
Polymic			5	M	Ciprofloxacin	15	M	5	R

The data in Fig. 1 show that according to the formal VED-analysis in the PC less than half and in the MC the third part of the investigated drugs are included in the State Formula (SF) of Drugs [2] - that is they are vital (V). The rest of the investigated drugs are non-formular-that is they are desirable (D).

The treatment scheme of CP includes fluoroquinolones and

alpha-adrenoreceptors antagonists, which are formular drugs (45% and 33% in the PC and MC relatively). Also prescribing (up to 3 months) of Phyto medicines (preparations of *Prunus africana*, *Serenoa repens* and other herbal and animal products) and drugs to improve the functioning of the immune system, which are non-formular, is obligative (55% and 67% in the PC and MC relatively).

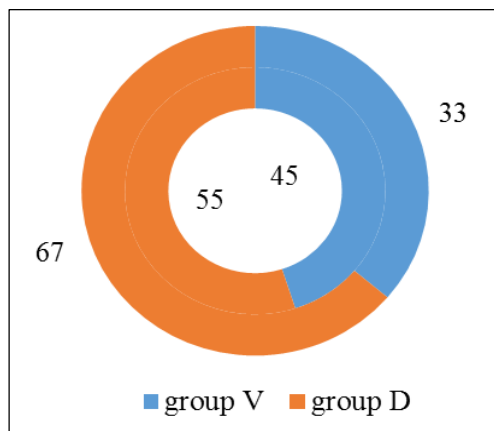


Fig 1: Results of the VED-analysis of the prescribed drugs (%): external circle-private clinic (PC), internal circle-municipal clinic (MC)

The obtained results of the matrix projection of the integrated ABC/FMR/VED-analysis indicate (Tables 6 and 7) that the most costly and commonly used in the PC among the formular drugs is Omnic caps., and among non-formular drugs are Prostatilen amp., Prostatilen supp., Prostaplant Forte caps., Beresh Plus drops. Dicloberl supp. and Levofloxacin tab. are close to them.

In its turn, in the MC the most costly and commonly used among formular drugs is also Omnic caps, and among non-

formular drugs are Prostatilen amp, Pantocrin extr, Prostaplant caps, Vitaprost supp, Phyto prost supp. Dicloberl supp. and Abiflox tab. are close to them.

According to the recommendations of the practical experience of urologists prescribing of formular and non-formular drugs is acceptable since CP treatment is long-lasting (from 1 to 3 months). The treatment of CP starts with formular drugs and continues with non-formular drugs (herbal and animal products, other drugs used in urology).

Table 6: Matrix projection of results of the integrated ABC/FMR/VED-analysis in the private clinic

2017		Group of drugs on the frequency of requesting					
		F	M	R	F	M	R
Group of drugs on the volume of commodity circulation	A	Omnice caps.	X	X	Prostatilen amp. Prostatilen supp. Prostaplant Forte caps. Beresh Plus drops	Prostamol Uno caps. Prostaplant caps. Viraprost supp.	X
	B	Dicloberl supp. Levofloxacin tab.	Fokusin caps. Ciprinol tab.	Leflocin tab. Omnice Ocas tab. Flosin caps.	Duovite caps.	X	Phyto prost supp.
	C	Diclofenac supp.	Ciprofloxacin tab.	Ofloxin tab. Abiflox tab. Tamsulostad caps. Tamsin Forte tab. Reumoxicam amp. Urosept supp. Omix caps.	Water for injections, amp.	Aevite caps.	Formen Combi caps. Analgin amp. Pantocrin extr. Tavanic tab. Sodium chloride sol. Prostatophyt tinc. Suprastin amp. Pravenor caps. Prostamed tab.

				Ceftriaxone pow. Levoflox tab. Ofloxacin tab.			Prostalin supp. Dexalgin amp. Urorec caps. Lymphomyosot drops
<b>V</b>				<b>D</b>			
<b>Group of drugs on the formal VED-analysis</b>							

**Table 7:** Matrix projection of results of the integrated ABC/FMR/VED-analysis in the municipal clinic

2017		Group of drugs on the frequency of requesting					
		F	M	R	F	M	R
Group of drugs on the volume of commodity circulation	A	Omnice caps.	X	X	Prostatilen amp. Vitaprost supp. Pantocrin extr. Phyto prost supp. Prostaplant caps.	Prostamol Uno caps.	X
	B	Dicloberl supp. Abiflox tab.	X	X	X	Neoprost Forte caps. Prostaplant Forte caps.	X
	C	X	Levofloxacin tab.	Ciprinol tab. Ciprofloxacin tab.	Water for injections, amp.	Prostamed tab. Polymic tab.	Prostatilen supp.
<b>V</b>				<b>D</b>			
<b>Group of drugs on the formal VED-analysis</b>							

### Conclusion

According to the analysis conducted at the Private Clinic "Oxford Medical Center" and the Municipal Clinic "City Clinic No. 5" in Ivano-Frankivsk it was found that men with the age of 41 - 50 years are most likely to become ill with CP. The structure and features of drugs application in the studied health care institutions in the context of the main anatomical groups (according to the ATC-classification) and individual drugs were determined using the frequency, ABC and FMR analyzes. On the basis of the integrated ABC/FMR/VED-analysis the distribution of drugs according to their importance for the pharmacotherapy of CP, frequency of prescribing and price was conducted. The results of the study can be used to optimize the medical supply of outpatients with CP in various health care institutions.

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