The efficacy of Decasan antiseptic agent in the multimodality treatment of patients with exacerbation of chronic cystitis

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The work presents the data on application of antiseptic agent in Decasan in the multimodality treatment of patients with exacerbation of chronic cystitis.

Key words: decamethoxin, Decasan, chronic cystitis.

Chronic cystitis is a chronic inflammatory process in the wall of the urinary bladder, the most frequent complication of acute diseases of the urinary bladder, urethra, kidneys and genitals both in males and in females. It is frequently diagnosed as concomitant disease in patients with diabetes mellitus, in various gynaecological diseases, in chronic diseases digestive tract, spinal cord and neuropathies [5, 14, 22]. Radiation cystitis is a frequent complication of radiation therapy. The conventional classification of cystitis differs non-complicated (catarrhal, erosive-desquamative and atrophic cystitis) and complicated forms of cystitis (ulcerative-necrotic, profuse bleeding up to tamponade, encrusted cystitis, secondary-corrugated urinary bladder and bladder fistulas) [3, 28, 29].

The most complete classification of cystitis was presented by A.V. Lyulko [14], which divided chronic cystitis into catarrhal, ulcerative, polypoid, cystic, emphysematous, eosinophilic, encrusted and necrotic forms depending on the patterns and the severity of morphological changes. The cystitis is considered chronic when two exacerbations occur within 6 months or three exacerbations occur within a year. The urologists most frequently deal with postoperative, radiation and catheter-associated types of chronic cystitis, related to the presence of resistant nosocomial and opportunistic microflora.

The main symptoms of cystitis include dysuria (frequent painful urges to urinate) and micro- or macrohaematuria, due to the pronounced inflammatory process of the wall of the urinary bladder.

Patients with chronic cystitis are frequently found to have impaired urodynamics, as well as weakened non-specific and specific immune defence, resulting in the formation of bacterial films within the folds of the mucous membrane of the urinary bladder [4, 24]. It is known that bacteria in the body exist in two forms: as microbial plankton (MP) and microbial biofilms (MBF). MPs floats freely in body fluids and are not bound to mucous membranes, it is able to contaminate the mucous membrane of the urinary bladder and cause generalized inflammatory process with classic presentation of acute cystitis. Planktonic bacteria are susceptible to antibacterial drugs; therefore acute cystitis is effectively managed by brief courses of antibiotics. In chronic cystitis the bacteria form an independent structured super-organism, balanced in terms of species composition of bacteria with functional division among its members, which are capable of passing genetic information. The microbial units that constitute MBF form a polymer shell (matrix), which consists of exopolysaccharides (90%), nucleic acids and proteins, occasionally fungi, which are tightly adhesive to the surface of the substrate. The bacteria organized into MBF are better adapted to antibiotic exposure than planktonic bacteria. Such bacteria are capable of withstanding antibiotic concentrations exceeding bactericidal concentrations for planktonic bacteria more than 100 times. The following factors explain super-resistance of organisms within MBF to antibiotics: ability to synthesize enzymes that destroy antibiotics; penetration of antibiotics inside MBF is slowed down due to the mucopolysaccharide 'shield' of the biofilm; deactivation (neutralisation) of a positively charged antibiotic by a negatively charged polymers of the matrix; conversion of bacteria to a state equivalent to anabiosis and delayed replication (the so called 'suspended animation'); narrowing of water canaliculi and, as a consequence, delay or suspension of antibiotic penetration into the deeper layers of MBF. All this leads to the fact that the antibiotic destroys only superficially located microbial units of MBF and MP. Therefore, under certain conditions, there is 'renaissance' of MBF using the reserve of the deeper layers of bacteria and there is a recurrence/exacerbation of inflammation in chronic cystitis [24].

Given the high prevalence of chronic cystitis, the presence of various factors, aggravating the inflammation in the wall of the urinary bladder, reduced immune reactivity against the background of persistence of resistant organisms, as well as the presence of concomitant disease, certain principles of treatment for chronic cystitis have to be observed [8, 9, 12, 13, 17, 21, 27]:

1. Antibacterial therapy taking into account the susceptibility of urine to antibacterial agents.

2. Immunotherapy.

3. Local treatments (urinary bladder instillations of antibiotics, analgesics, glucocorticoids, antiseptics, oils, coating agents, stimulants of regeneration and microcirculation in the wall of the urinary bladder, etc.).

4. Physical therapy in various forms (electrophoresis, laser therapy, electrical stimulation and others).

5. Treatment of concomitant disease (diabetes mellitus, prolapsed urinary bladder, urinary incontinence, benign prostatic hyperplasia, chronic urethritis and prostatitis and others).

Treatment of chronic cystitis is a major problem, since eliminating the pathogens organized into biofilms with traditional antibiotic therapy is virtually impossible. This is also due to damage, exerted by the bacterial films to the glycosaminoglycan (GAG) layer, which covers the surface of the transitional epithelium of the urinary bladder and the necessity to repair that damage in course of treatment [17, 22, 23]. This layer plays an essential role protecting the epithelial cells of the urinary bladder from toxic components of urine. In damaged GAG layer there is a direct contact of the components of urine with epithelial cells; under such conditions both bacterial adhesion and inflammatory processes in the wall of the urinary bladder are enhanced. The GAG layer may be damaged by the soluble virulence factors, produced by E. coli. The disrupted GAG layer can be restored using various methods of creating a coating layer, including application of heparin, oral pentosan polysulphate and hyaluronic acid [14, 17, 22, 23, 30–32].

It is recommended to use Uropol-S as an effective agent eliminating the defects of the GAG layer in the urinary bladder [17].

One study enrolled patients with failures of hydrodilation and administration of dimethylsulfoxide into the urinary bladder. It was estimated that in interstitial cystitis the surface of the mucous membrane lacks GAG layer, which is normally protecting it from the action of urine. The patients received Pentosan 50 mg orally 4

times a day or 150 mg orally 2 times a day for 4–8 weeks. In twenty of 24 patients there was decreased intensity of all symptoms (imperative urges, frequent urination and nocturia) by 80%; in 2 patients the intensity of the above symptoms decreased by 50–80%. The well-being of these patients continued to improve after completion of treatment. In 2 patients the treatment proved to be ineffective [23].

Instillations of various drugs into the urinary bladder are used along with antibacterial therapy [12–14, 17, 23]. The bullous, bullous-fibrinous and granular forms of cystitis are managed with instillations of silver-containing products with novocaine, Collargol in the dilution of 1:5000 and 1:1000 mixed at 1:1 ration with 0.5% solution of novocaine, in the total amount of 40–50 mL, as well as injection of dioxidine or Dimexide with novocaine. Instillations of 20 mL of 40% solution of Dimexide into the urinary bladder are performed once a day or every other day, a total of 10–15 instillations per course of treatment [14]. Intravesical instillations of the above drugs have been in use for a considerable time, but they have retained their efficacy as of today. In catarrhal and haemorrhagic forms of cystitis instillations of oil solutions are indicated (chloramphenicol emulsion, rosehip oil and sea buckthorn oil) [14]. In abacterial cystitis it is recommended to administer 0.1% solution of oxychlorosene into the urinary bladder [23].

Favourable results were obtained in intravenous administration of 20 000 IU of heparin in 1000 mL of 5% glucose solution for 4 days. Two courses of treatment with 4-day interruption are recommended. Heparin was also used locally as instillations into urinary bladder (20 000 IU of heparin in 2 mL of isotonic sodium chloride [normal saline]) [14].

Substantial improvement was noted already after the first 4-day course of daily intravenous infusions of 5000-10000 IU of heparin in 70% females with interstitial cystitis. The rest of the patients had decreased dysuria by the end of the second 4-day course of treatment, performed with an interruption of 4 days [22].

Instillations of hyaluronic acid in women with recurrent cystitis (40 mg in 50 mL of buffer solution) weekly for 4 weeks, then monthly for 4 months have proved to be effective, since none of the 40 women has had any recurrent infection of the urinary bladder within 5 months [25]. During 12.4 months of observation the number of recurrences had decreased 13 times, and their incidence had decreased 14.3 times. Instillations of hyaluronic acid into urinary bladder may serve as an alternative to antibiotics in chronic cystitis [17].

Dimethyl sulphoxide (DMSO, Dimexide) is an effective agent for the treatment of chronic cystitis; the agent possesses the ability to penetrate through biological membranes and exerts anti-inflammatory, analgesic, antiseptic and fibrinolytic effect. 30–50 mL of 50% DMSO solution, diluted with 0.5% solution of novocaine is introduced into the urinary bladder for 15–30 minutes. Instillation is performed 1–2 times a week for 4–8 weeks. Dioxidine may be added to increase the effect [17]. In order to reduce the risk of recurrence one group of patients received heparin intravesically at the dose of 10 000 IU every month after the course of DMSO therapy; the second group received DMSO alone. In the group of intravesical heparin the incidence of recurrences had decreased by 20% as compared to 52% in the group of DMSO monotherapy [12, 13]. Favourable results were obtained in intravesical administration of heparin in combination with hydrocortisone, oxybutynin and tolterodine [12, 13, 23].

Sometimes the symptoms of chronic cystitis are relieved by administration of 50% DMSO solution into the urinary bladder at 50 mL once in 2 weeks. The solution is allowed to remain in the urinary bladder for 15 minutes. According to the authors, using 0.4% solution of oxychlorosene is more effective. The urinary bladder is filled with the solution under the pressure of 10 cm H_2O. The treatment is performed under general anaesthesia. Prior cystography is mandatory, since vesico-ureteric reflux may be complicated by ureteral fibrosis [23].

Chlorpactin, a drug previously used for the treatment of tuberculosis, is administered intravesically in patients with prior failures of Dimexide treatment. Chlorpactin as a 0.4% solution was administered under the pressure 10 cm H_2O with an interruption of 1 month. The efficacy rate was from 50% to 72%. Using the BCG vaccine as a 6-week course has proved to be effective in 60% of cases; however, the results of the study were not statistically significant [12, 13].

The following drugs are used to restore the GAG layer of the urothelium:

1. Heparin, used as 10 000 IU in 10 mL of sterile water three times a week for 3 months. The efficacy rate of such treatment is over 50% [17, 23].

2. Pentosan polysulphate (PPS) is a glycoprotein, administered intravesically at 300 mg in 50 mL of normal saline solution two times a week for 3 months [17, 30–32].

3. Hyaluronic acid (Cystistat). A 56% improvement rate was reported in 4 weeks of treatment and 71% improvement rate was reported in 7 weeks [17, 25].

4. Chondroitin sulphate (Urospol-S) is also a drug used to restore GAG layer. It is administered intravesically as 40 mL of 0.2% solution. The following schedule is used: during the first 4 weeks 1 time a week, then 1 time a month for 12 months [17].

The therapy of choice in radiation cystitis is local instillation of 5–10% DMSO solution into the cavity of the urinary bladder. The favourable effect of Dimexide was confirmed in treatment of over 800 patients with radiation lesions of the urinary bladder [3].

As a rule, the treatment was started approximately in 3–4 weeks after biopsy of the wall of the urinary bladder with administration of cytodestructive drugs (Collargol or DMSO in a concentration not exceeding 10%) [21]. The authors have not employed the aggressive cytodestructive approach to the therapy of interstitial cystitis (using 30–50% DMSO solution or 1–2% solution of silver nitrate), recommended by other authors [12–14, 17, 23], because experience has shown that patient's discomfort exceeds the immediate and remote positive treatment outcomes. Ten procedures of cytodestructive therapy were followed by administration of the products, enhancing the synthesis of mucopolysaccharides by the cells of urothelium (heparin 40 000 units, as well as the agents that accelerate reparation processes in the epithelium of the urinary bladder [sequential administration of Gepon and Actovegin]) [21].

The authors give special attention at this stage of treatment [3, 21] to administration of Gepon, administered daily for 5–10 days at the dose of 0.002 g, previously dissolved in 10 mL of normal saline solution.

Gepon is a product developed jointly by British scientists and the employees of GNC the Institute of Immunology of FMBA (reg. No. 000015/04–2001). The product is a synthetic peptide, consisting of 14 amino acid residues with a molecular weight of 1818 Daltons, which exerts multi-directional immunomodulating and antiviral effect. The treatment of radiation cystitis was performed with instillations of 0.04% solution of Gepon into urinary bladder (the content of Gepon vial 0.002 g was dissolved prior to use in 5 mL of

sterile normal saline solution). During the first 10–12 days irrigations were performed twice a day with subsequent conversion to single instillations [3].

Individual patients develop haemorrhagic cystitis after radiation therapy for cervical cancer or cancer of the urinary bladder, often accompanied by profuse bleeding. This complication is also observed in therapy with cyclophosphamide. Administration of 3.9% solution of formaldehyde into urinary bladder (prepared by a tenfold dilution of the standard 39% solution) is effective in the above condition. After filling the urinary bladder the catheter is clamped for 30 minutes, and then the urinary bladder is irrigated with 10% solution of ethanol. The procedure is repeated 1-2 more times every other day, as required [23, 26].

In failure of formaldehyde or silver nitrate therapy haemostasis can be achieved with continuous intravenous infusion of vasopressin. Selective embolisation of the internal iliac arteries can be performed with the same intent [5, 23].

The literature also contains results on intravesical administration of resiniferatoxin (RTX), botulinum toxin (BTA), oxybutynin in a dose of 10 mg, tea tree oil and puncture administration of ozone-oxygen mixture into perivesical fat with simultaneous intravesical instillation of Ozonide oils; however, further studies are required to validate the efficacy of the above treatments [12, 13, 21]. Thus, despite the variety of drugs, available for the treatment of chronic cystitis, none of them is completely effective.

Deliberate use of antibiotics has lead to emergence of chronic cystitis with resistant microflora in the mucous membrane of the urinary bladder, refractory to known techniques and antimicrobial drugs. Therefore chronic cystitis is viewed as a disease that requires deep clinical, specialized urological and immunological assessments and multi-modality treatment using contemporary techniques and pharmaceutical products. The available literature describes multiple new antiseptic products, including the domestically produced antiseptic agent Decasan, which began to be used for the treatment of purulent wounds in Surgery and other areas of Medicine; however, we have encountered no data on efficacy of the above drug in chronic cystitis [1, 2, 6, 7, 10, 11, 15, 16, 18–20].

The aim of the study was studying the efficacy of intravesical administration o the domestically produced antiseptic agent Decasan in patients with exacerbation of chronic uncomplicated bacterial cystitis.

MATERIALS AND METHODS.

The assessments included 32 patients with exacerbation of chronic cystitis (men and women) at the age of 57-86 years, which had intravesical administration of Decasan antiseptic (0.02% decamethoxin solution), Group 1. The mean age of subjects in Group 1 was 59.6 years; there were 10 males and 22 females. The solution of Decasan was introduced into the urinary bladder in varying concentrations depending on the type of cystitis.

Group 2 (25 patients) included patients with chronic cystitis, which were instilled solution of Furacilin into the urinary bladder. The mean age of subjects in this group was 58.4 years; there were 20 males and 5 females. Standard pharmacy solution of Furacilin, supplied as aqueous 0.02% solution (1:5000) was introduced into the urinary bladder or cavity of the urinary bladder was irrigated via epicystostomy drainage.

Control group (Group 3) consisted of 30 patients with chronic cystitis, which had no intravesical instillations whatsoever. The mean age was 56.4 years; there were 11 males and 19 females.

In Groups 1,2 and 3 antibacterial therapy was performed in accordance with microbiological assays of urinary culture and sensitivity; nitrofurans (Furagin or Furomag) were administered as mandatory therapy.

The patients with chronic cystitis were subject to clinical assessments; all patients had microbiological urinary assays before and after the course of treatment. Total bacterial count was determined, the species and the quantity of isolated strains, as well as their sensitivity to antibiotics.

The results of treatment were assessed by clinical parameters, the intensity of pain and dysuria, the laboratory findings of urinalysis, microbial contamination of urine, the number of sterile urine inoculations after treatment and the duration of treatment. Chronic cystitis was observed in various diseases: postsurgical cystitis, postradiation cystitis in urinary bladder tumours; cystitis in males with benign prostatic hyperplasia, complicated by acute or chronic urinary retention with drainage of urinary bladder with a urethral catheter or epicystostomy, as well as chronic cystitis in females, accompanied by urinary incontinence.

Combination treatment of chronic cystitis using the antiseptic solution of Decasan was used in 32 patients. Prior to the onset of treatment the patients had pronounced lower abdominal and perineal pain, as well as cramps in urination or at the end of urination; the females had urinary incontinence. Female urge urinary incontinence was treated by Urotol, tolterodine hydrotartrate (Urotol by Zentiva Company) at 1 mg twice a day orally for one month. Urotol was used in patients of all three groups in micturition frequency over 7–8 times per day and more than 2–3 micturitions at night, as well as in pronounced lower urinary tract symptoms.

Thus, our therapeutic technique in chronic cystitis is a combination use of the following:

1. Intravesical instillations of Decasan antiseptic in various concentrations and with different exposure depending on the intensity of bladder inflammation in bacterial chronic cystitis.

2. Antibacterial therapy, conducted in accordance with the microbiological findings of urine cultures and the sensitivity of isolated microflora to chemotherapeutic agents.

3. Symptomatic therapy using desensitizing, antihistamine and analgesic agents, M-anticholinergics and drugs that reduce the tone of urinary tract (Urotol (Tolterodin) – tolterodine hydrotartrate; Oxybutynin – Driptan, Oxybutynin; Solifenacin – Vesicare etc.), as well as instillations of oils into the urinary bladder.

THE RESULTS OF STUDY AND DISCUSSION

The analysis of isolated urinary organisms in patients with chronic cystitis indicates that prior to treatment the patients had substantial urinary content of opportunistic bacteria, which have low sensitivity to commonly used antibiotics.

The urine of patients contained the following organisms: Staphylococci (Staphylococcus haemolyticus, Staphylococcus saprophyticus, Staphylococcus aureus) – 21.6%, Enterococci (Enterococcus faecalis, Enterococcus faecium) in 17% of cases and E. coli in 9.2% cases. In the remaining cases the urine was found to contain Klebsiella pneumoniae, Citrobacter freundii, Citrobacter diversus, Corinebacterium pseudodiphtheriae, Pseudomonas aeruginosa, Enterobacter aerogenes and Enterobacter cloacae. Haemolytic staphylococcus was found in 12.3% cases, saprophytic staphylococcus was found in 3.1% cases and Staphylococcus aureus was found in 6.2%

cases. Association of two microorganisms in a urinary culture was found in 20% cases of chronic cystitis. Staphylococci were the most susceptible to gentamicin (33.3%), ciprofloxacin (28.5%), vancomycin (28.5%), cefotaxime (23.8%), lincomycin (19.0%), erythromycin (14,2%) and oxacillin (9.5%). A noteworthy fact is isolation of a substantial number of strains of Enterococcus, which is the main symbiotic organism of human intestine. The most important peculiarity of Enterococci is their high resistance to antibiotics. Susceptible strains can be suppressed with ampicillin and vancomycin. The Enterococci that we have isolated were sensitive to vancomycin (14.2%), ampicillin (9.5%), gentamicin (4.7%), cefotaxime (4.7%), norfloxacin (4.7%), ciprofloxacin (4.7%) and streptomycin (4.7%). E. coli was sensitive to gentamicin (14.2%), amikacin (14.2%), cefotaxime (9.5%), norfloxacin (9.5%), ciprofloxacin (9.5%), cotrimoxazole (9.5%) and vancomycin (4.7%).

We have determined the optimal selection of antibiotics for the treatment of chronic cystitis in the patients assessed based on sensitivity of isolated microflora to antibiotics.

For Gram-positive flora (Staphylococci, Streptococci, Corynebacteria and Enterococci):

1. Fluoroquinolones (ciprofloxacin, ofloxacin, levofloxacin).

2. Aminoglycosides (gentamicin, amikacin).

3. Vancomycin.

4. III-IV generation cephalosporins (cefotaxime, ceftriaxone and cefipim).

5. Ampicillin + sulbactam.

For Gram-negative microflora (Enterobacteriaceae, Pseudomonas):

1. Aminoglycosides (gentamicin, amikacin).

2. III-IV generation cephalosporins (cefotaxime, ceftriaxone and cefipim).

3. Fluoroquinolones (ciprofloxacin, ofloxacin, levofloxacin).

4. Vancomycin.

In all cases of treatment for chronic cystitis we administered nitrofurans concomitant to antibiotics (Furagin or Furomag) in conventional doses; the only exceptions were patients with allergy to that group of drugs.

The data given are evident of low sensitivity of isolated isolated organisms to antibiotics; the presence of resistant strains creates certain difficulties in the treatment of chronic cystitis. Therefore, we set a goal of improving treatment outcomes in patients with chronic cystitis. To solve this problem, we applied the method of treatment based on instillations of Decasan antiseptic (manufactured by Yuria-Pharm Ltd.) into the urinary bladder in a certain concentration and with a certain exposure of the urinary bladder. Decasan (Decasanum) 1,10-Decamethylene-bis (N, N-dimethyl-mentoxycarbonylmethyl)-ammonium dichloride. Colourless transparent liquid; 1 mL of solution contains 0.2 mg of decamethoxin.

The pharmacological action

Decasan is a fungicidal, prostocidal, virucidal and antimicrobial agent. The mechanism of action of Decasan is based on its ability to disrupt cellular membrane (CM) permeability of target cells by binding with lipid structures in the area of their phosphatidic groups. Due to the changed CM permeability, intracellular homeostasis is impaired with subsequent lysis of cells. The selective action of Decasan is manifested as lack of effect in CM of human cells.

Bactericidal action of Decasan was studied and confirmed in a majority of Gram-positive and Gram-negative organisms. The latter include Staphylococci, Streptococci, Corynebacterium diphtheriae and Pseudomonas aeruginosa, capsuled bacteria and others. The fungicidal action of Decasan has been been reported for epidermophytosis, Trichophyton, yeastlike fungi, erythrasma, yeasts and some moldlike fungi (Penicillium and Aspergillus). Decasan manifests anti-protozoal activity against Giardia and Trichomonas. No viruses resistant to the drug have been found.

In course of treatment Decasan increases the sensitivity of microorganisms to antibiotics and exerts its activity in treatment-resistant strains. Intact mucous membranes and skin impede the absorption of the drug. No notable concentrations of Decasan were found in blood.

Pharmacokinetics

The product is virtually not absorbed by mucous membranes, intact skin and wound surface.

Decasan-related precautions: long-term administration does not produce any toxic action. Warming the drug to 38 °C prior to use enhances its efficacy.

Our method of using the solution of Decasan antiseptic.

The treatment of chronic uncomplicated cystitis was performed by instillations of Decasan solution into the urinary bladder. The product was pre-diluted by 1:5 sterile normal saline solution (the first working instillation solution of Decasan, WISD-1). Previously prepared solution in the amount of 20–40 mL was introduced into the urinary bladder with a sterile urethral catheter with the exposure in the urinary bladder for 30–60 minutes once a day. 3–7 instillations of the working solution of Decasan were used per one course of treatment. In pronounced pain and dysuria 20 mL of 0.5% novocaine solution was added to WISD-1 during instillations; the number of instillations was increased to 10. In complicated bullous or bullous-necrotic chronic cystitis 5-10 mL of sea buckthorn oil was introduced into the cavity of the urinary bladder after administration of WISD-1 and 20 mL of 0.5% novocaine solution. Concomitant to WISD-1 instillations into the urinary bladder, all patients received antibacterial drugs in accordance with the findings of culture and sensitivity assays.

Whenever epicystostomy drain was in place in patients with benign prostatic hyperplasia or with tumours of the urinary bladder, irrigation of the cavity of the urinary bladder through epicystostomy was performed daily using the solution of Decasan in a dilution of 1:5 (WISD-1). In cases of purulent lesions of the wall of the urinary bladder irrigation was started during the first days by undiluted 0.02% solution of Decasan; subsequently, as the cavity of the urinary bladder has cleared of the purulent contents, the irrigation was made with WISD-1.

During the postoperative period in patients with benign prostatic hyperplasia we performed round-the-clock, continuous irrigation of the cavity of the bladder and post-adenomectomy prostatic bed with solution of Decasan in the dilution of 1:7 (the second working instillation solution of Decasan, WISD-2) during one week post-surgery. Further, after removal of the system for round-the-clock washing, the cavity of the bladder and post-adenomectomy prostatic bed were postoperatively irrigated with WISD-1 during dressing change one or two times a day for 7-14 days.

The results of bacteriological urinary assays before and after treatment are given in the table.

After administration of Decasan solution in half the cases urine cultures have proved to be sterile; whereas in patients after administration of Furacilin solution and in patients without instillations

sterile cultures were obtained in 24% and 20% cases, respectively. After administration of Decasan solution microorganisms were identified in the urine in concentrations not exceeding 10^2–10^3 units/mL, which corresponds to good treatment outcomes; detection of a small number of microorganisms may have occurred due to microbial contamination at the time of urine specimen collection. When sterile urethral catheter was used to obtain urine specimens, the number of post-treatment sterile urine cultures was greater. Changes in organisms isolated from patients' urine after Decasan application have to be noted, which requires further out-patient follow-up and remote microbiological urinary assays - in 6-12 months after treatment completion.

Bacterial content of urine before and after treatment (average numbers), units/mL

Group	n	Before treatment	After treatment	Sterile after treatment, %
1	32	32.5×10^4	2.0×10^2	50
2	25	34.5×10^4	10.3×10^2	24
3	30	33.6×10^4	10.0×10^2	20

No complications were observed in treatment with Decasan solution, with the exception of genital pruritus in two women (6.2%), which was relieved by decreasing the concentration of instillation solutions, administration of desensitizing agents and intravesical administration of sea buckthorn oil into the urinary bladder at the dose of 5-1- mL.

Clinical efficacy was assessed by such data, as the disappearance of pain and cramps during urination, decreased frequency of micturition to 5-6 per day, normalisation of urinalysis findings and absence of disease recurrence within 6 months. In Group 1 recurrence of the disease had occurred in 3 patients (9.3%), in Group 2 it had occurred in 8 patients (32%) and in Group 3 it had occurred in 8 patients (26%). Therefore, it should be emphasized that application of the combination therapeutic technique in chronic uncomplicated bacterial cystitis using Decasan instillations of the urinary bladder have proved to effective in 90.7% cases; instillations of Furacilin were effective in 68% cases and no local treatment was effective in 74 % cases.

It is also necessary to note that the cost of treatment with solution of Decasan, a 0.02% solution of decamethoxin (in the dilution of 1:5 or 1:7) is 2 times cheaper than application of standard aqueous pharmacy 0.02% (1:5000) solution of Furacilin.

Also, using instillations of Decasan in the treatment of chronic bacterial cystitis allowed decreased amounts of antibiotics administered in the patient, which also reduced treatment-related financial expenditures of the patients and minimized the occurrence of dysbacteriosis in the patients.

CONCLUSIONS

1. The 0.02% solution of decamethoxin (Decasan) is an effective local antiseptic (for instillations into the urinary bladder), exerting pronounced clinical effect in patients with chronic bacterial cystitis.

2. Decasan is favourably tolerated by patients in the dilutions of 1:5 and 1:7 and does not cause adverse reactions in instillations into the urinary bladder. The efficacy of treatment of uncomplicated chronic bacterial cystitis using Decasan solution was 90.7%.

3. In multi-modality treatment of chronic bacterial cystitis of various origins Decasan allows decreasing the quantity and the doses of antibacterial drugs, which has a positive impact on clinical and economical outcomes of treatment.

4. Decasan is recommended for medical use for instillations in patients with chronic cystitis of various origins.

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The efficacy of Decasan antiseptic agent in the multimodality treatment of patients with exacerbation of chronic cystitis

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The work provides data concerning the application of Decasan antiseptic within multimodality treatment of patients with exacerbations of chronic cystitis.

Key words: decamethoxin, Decasan, chronic cystitis.

Efficacy of antiseptic Dekasan in complex treatment of patients with exacerbation of chronic cistitis

(AUTHOR'S ENGLISH ABSTRACT)

The paper presents data on the use solution Dekasan antisepsis in treatment of patients with exacerbation of chronic cystitis.

Key words: decametoxine, Dekasan, chronic cystitis.