
UDC 615.12

E.V. Gorbacheva

The cost of treatment complications of drug allergy in children with acute intestinal infections

Far East state medical university, Khabarovsk

Summary. As a result of pharmacoeconomic analysis found that the greatest costs associated with the treatment of severe manifestations of allergic reactions to drugs. In the treatment of allergic reactions of moderate forms of economically viable single intramuscular injection of «Suprastin», then in children under one year application of the «Fenkarol», in children over the year – «Parlazin».

Key words: children, adverse drug reactions, drugs, pharmacoeconomic analysis.

Introduction. Questions of safety of medicines (drugs) are constantly in the focus of attention of many experts, since the growth of consumption of medicines in the world has a number of adverse health, social and economic consequences. Despite advances in the field of pharmacovigilance, there are certain difficulties associated with the state of the problem of drug safety, particularly in pediatric patients [1,8]. The pharmacological safety of the children require special attention, since the appointment of drugs first occurs in childhood, often in connection with acute infectious diseases in the structure of which one of the top belongs to an acute intestinal infection. Children are one group of people who most often have medical complications [7]. The structure of side effects (SE) drug leads in the incidence of allergic and play other immunological reactions [2,4,5,6].

In addition to physical and moral sufferings, which bring medical complications, SE pharmacotherapy leads to significant financial costs. Some countries spend on eliminating complications associated with the use of drugs, from 5,5 - 17 to 15-20% of their health care costs [3].

The purpose of this study was to evaluate the cost of treating complications of pharmacotherapy in the form of allergic reactions in children with acute intestinal infections.

Materials and methods. A retrospective analysis of 34 case histories of children in 2007, located at the hospital in the Municipal Children's Infectious Diseases Hospital «to them. A.K. Piotrovich» Khabarovsk, who experience allergic reactions (ARs) in the ongoing pharmacotherapy. Diagnosis of adverse reactions (NDP) was based on data from drug history, clinical manifestations and identification of causal relationships from the moment of drug use. In all cases the degree of certainty of causation «drug - the NDP», proposed by WHO can be estimated as «probable».

Used methods of pharmacoeconomic analysis «Analysis of cost minimization» and «Cost-effectiveness». Selling prices for drugs purchased by the hospital, are a distribution company JSC Protek refer to 2007.

The cost of drugs: 1 bottle of drops «Parlazin» (10 mg. in 1 ml - 10 ml) - 112 rub. 21 cop; 1 bottle of drops «Zirtek» (10 mg. in 1 ml - 10 ml) - 254 rub. 84 cop; 1 bottle of drops «Fenistil» (0,1% p-p 20 ml vial, 1 mg in 1 ml) - 106 rub. 74 cop; «Fenkarol» (tab. 0,025 grams. № 20) - 55 rub. 99 cop; «Supratin» (tab. 0,025 grams. № 20) - 55 rub. 51 cop; «Activated Carbon» (tab. 0,25 grams. № 10) - 1 rub. 07 cop; «Polysorb MP» (pack of 50 grams.) - 104 rub. 35 cop.

Results and discussion. The diagnosis of acute intestinal infection was verified on the basis of bacteriological methods in most cases identified by the representatives of opportunistic flora (*P. mirabilis*, *P. vulgaris*, *E. aerogenes*, *E. gergovia*, *E. cloacae*) and in rare cases, *S. enteritidis* and *S. flexneri* 2a.

The average age of the children was three years and amounted to $1,7 \pm 0,19$ years. When the distribution by sex reported prevalence of male 20 (58,8%) than girls, 14 (41,2%).

Assessment of the severity of clinical manifestations of AR in children held on the following criteria: the mild form - a child there were sporadic eruptions on the trunk and extremities in the form of small pink spotty rash, nor were there indications for allergy drugs. In the moderate form - the rash was profuse, maculopapular, by a sick person appointed by the H₁-histamine blockers. Severe form of AP was established in the diagnosis of a patient or a rash of toxic and allergic reactions, medication adjustment at the same time carried out in intensive care.

It was found that the development of AR occurred in the first three days of the beginning of the use of drugs, namely, after $2,5 \pm 0,15$ days. Meanwhile, only 78,8% of patients with prescriptions can be considered rational. In other cases, the use of drugs, is recognized as not valid (21,2%), as it were patients who administered antibiotics for milder forms of intestinal infections or have used drugs that have age restrictions («Chloramphenicol»).

Among the drugs that most often lead to the development of the NDP, were antibiotics. The structure of the latter occupied a leading place cephalosporins and aminopenicillins, in rare cases - aminoglycosides, as well as «Chloramphenicol».

In the analysis of complications of drug therapy, found that in 2 (5,9%) of children registered with a mild form of AR, in 27 (79,4%) - middle-form, in 5 (14,7%) patients there was a severe form of AP, in the form of toxic-allergic reaction and rash on the introduction of «Cefotaxime» and «Cefazoline». The average duration of preservation of the NDP was $3,16 \pm 0,33$ days.

The choice of drugs for the relief of AR was based on clinical symptoms and the presence of drugs in the hospital. In milder forms of AR was sufficient to abolish the drug, which was connected with the development of drug allergy. If necessary, medical correction of AR revealed that the highest frequency used H₁-histamine blockers first generation («Suprastin», «Fenkarol»,

«Fenistil») - 58,5% of cases, other children have used drugs of second generation («Zirtek», «Parlazin»). In 26,6% of patients for the relief of urticaria, toxic-allergic reaction, briefly, during the 1-2-days used parenterally «Prednisone». The children in the development of severe forms of NDP held infusion therapy, which included a glucose-salt solutions.

Appointment of AR treatment scheme included the following: moderate form for recorded – «Suprastin» inside or «Fenkarol» or «Parlazin» or «Fenistil» or «Zirtek». In some cases, we used a combination of these drugs with adsorbents «Activated Carbon» or «Polysorb MP».

Given that the administration of these drugs «Parlazin», «Zirtek», «Fenistil» performance was the same, in order to calculate the cost of treatment, the method of pharmacoeconomic analysis «Analysis of cost minimization». The calculations proved to be the lowest cost of treating drug «Parlazin» (tabl. 1).

In cases where a child as a single agent used drugs «Fenkarol» and «Suprastin» found that the effectiveness of «Fenkarol» amounted to 75% efficiency «Suprastin» - 71%. For these drugs, the method of pharmacoeconomic analysis of the «Cost – effectiveness». Established that the cost-effectiveness ratio was lowest in «Fenkarol», so it is preferable to use (tabl. 2).

A combined therapy of H₁-histamine blockers + adsorbent («Activated Carbon» or «Polysorb MP») is not noted an increase in the effectiveness of therapy compared with monotherapy. Meanwhile, the use of combination therapy increased the cost of treatment.

After conducting pharmacoeconomic analysis «Analysis of cost minimization», revealed that the lowest cost of treatment was associated with combination therapy «Suprastin» + «Activated Carbon» (tabl. 3).

Of interest to calculate the cost of the treatment of severe allergic reactions. In this case, long-term use was within $4,5 \pm 1,38$ days. In this case, we used the following regimen: in the first two days of the manifestations of AR applied fluid therapy in the volume of 400 ml of 10% glucose and 0,9% sodium chloride solution was injected intramuscularly and «Prednisolone» - 2 times a day; simultaneously for three days intramuscularly administered solution «Suprastin» 2 times per day, with the subsequent transition to the 4 day for ingestion and also for all the days the patient received «Activated Carbon».

The value of drugs, including the cost of syringes and systems for drip, are shown in table 4.

Given the fact that during the 4 days of treatment using different drugs, the total cost of treating an allergic reaction severe was 148 rub. 92 cop. and costs more than ten times higher compared with the treatment of allergic reactions of moderate severity (tabl. 5).

Recommendations for practitioners. In the treatment of acute AR should be guided by the severity of clinical manifestations. Need a «turn-based» assessment of a child with allergic nature of the NDP.

Thus, in mild forms - possible withdrawal of the drug, which caused complications and dynamic observation of patients. In the moderate form, in the presence of an itchy rash, especially on the face, neck - after the drug was shown a single intramuscular dose «Suprastin». In the future in terms of economy and efficiency, as shown by the calculations, depending on the child's age, in children 1 year of life - the use of «Fenkarol» in children older than one year – «Parlazin». If necessary, the sorption from the gut the allergen is advisable to use a combination of these drugs with «Activated Carbon». In severe forms of AP shows a fluid therapy, using a glucose-saline solution for two days, combination of drugs, «Prednisolone» + «Suprastin» + «Activated Carbon», but after the relief of acute manifestations, needs to be replaced «Suprastina», depending on age to «Fenkarol» or «Parlazin».

Conclusion: The analysis shows that the unjustified use of antibiotics in children contributes to risk for the NDP. In the moderate form of cost-effective use of AR «Suprastina», «Fenkarola», «Parlazinga» The largest costs are associated with the treatment of severe AR, which includes an infusion therapy, glucocorticoids, H₁-histamine blockers and adsorbents.

References:

1. Belousov Y.B., Gratsianskaya A.N., Zyryanov S.K. Safety of medicines in children: the European system of pharmacovigilance in pediatrics // Farmateka. – 2006. – № 2. – P.75-78.
2. Vertkin A.L. The effectiveness of emergency treatment of acute drug allergy in prehospital and hospital // Doctor in charge. – 2008. – № 4. – P.15-36.
3. Gerasimov V.B., Lukyanov S.V., Babahin A.A. and other. Side effects of drugs // Remedium. – 2005. – № 1-2. – P.32-36.
4. Summary Report of Federal Monitoring Centre for Drug Safety (FC MBLS) Roszdravnadzor's report for 2009. // Privacy medicines and pharmacovigilance. - 2011. - № 1. - P.30-45.
5. Murzich A.V., Golubev M.A., Kruchinin A.D. Drug allergies //South-Russian medical journal. – 2000. – № 2-3. – P.1-10.
6. Novikov D.K. Medical immunology: a tutorial /DK Novikov. - Mn.: Vysh.shk., 2005. – 301s.
7. Ovchinnikova E.A. The role of monitoring drug safety in dealing with their management // Good Clinical Practice. – 2003. – № 4. – P.88-95.

8. Kilbridge P.M., Campbell U.C., Cozart H.B. et al. Automated Surveillance for Adverse Drug Events at a Community Hospital and an Academic Medical Center // J Amer. Med. Inform. Assoc. – 2006. – Vol.13. – P.372-377.

Table 1

Costs of H₁-histamine blockers for the treatment of allergic reactions-moderate

Drug	Dosages regimen	Cost package	Price of 1 are suitable treatments	Cost of treatment
«Parlazin» 10 mg in 1 ml, 10 ml	5 drops 2 times a day	112 rub. 21 cop.	5 rub. 61 cop.	16 rub. 83 cop.
«Zirtek» 10 mg in 1 ml, 10 ml	5 drops 2 times a day	254 rub. 84 cop.	12 rub. 74 cop.	38 rub. 23 cop.
«Fenistil» 1 mg in 1 ml, 20 ml	10 drops 3 times a day	106 rub. 74 cop.	8 rub. 01 cop.	24 rub. 03 cop.

Table 2

Calculation of the «Cost – effectiveness»

Drug	Dosages regimen	Of treatment cost	Effectiveness	Ratio «Cost-effectiveness»
«Fenkarol» 25 mg № 20	for 5 mg (1/5 tablets) 3 times a day	5 rub. 03 cop.	75 %	6,71
«Suprastin» 25mg. № 20	for 5 mg (1/5 tablets) 3 times a day	4 rub. 99 cop.	71 %	7,03

Table 3

Cost of combination therapy in the treatment of allergic reactions-moderate

Drug	Dosages regimen	Room 1 are suitable treatment	Cost of treatment
«Zirtek» + «Activated Carbon»	5 drops 2 times a day + 1 tab. 3 times a day	13 rub. 06 cop.	39 rub. 19 cop.
«Fenistil» + «Activated Carbon»	10 drops 3 times a day + 1 tab. 3 times a day	8 rub. 33 cop.	24 rub. 99 cop.
«Parlazin» + «Activated Carbon»	5 drops 2 times a day + 1 tab. 3 times a day	5 rub. 93 cop.	17 rub. 79 cop.
«Fenkarol» + «Polysorb MP»	5 mg (1/5 tablets) 3 times a day + 1 gr. on day	3 rub. 76 cop.	11 rub. 28 cop.

«Fenkarol» + «Activated Carbon»	5 mg (1/5 tablets) 3 times a day+ 1 tab. 3 times a day	1 rub. 99 cop.	5 rub. 97 cop.
«Suprastin» + «Activated Carbon»	5 mg (1/5 tablets) 3 times a day+ 1 tab. 3 times a day	1 rub. 98 cop.	5 rub. 94 cop.

Table 4

Cost of drugs and medical supplies

Drugs and medical products value	Cost of packing	Mode of
Glucose solution 10% - 200 ml	18 rub. 47 cop.	200 ml of 1 per day, intravenous drip solution
Sodium chloride 0,9% - 200 ml	19 rub. 88 cop.	200 ml of 1 per day, intravenous drip solution
«Prednisolone» 25 mg. - 1 ml, № 50	362 rub. 70 cop.	25 mg 2 times a day, intramuscularly
«Suprastin» 2% - 1 ml, №5	86 rub. 12 cop.	0,2 ml 2 times per day, intramuscularly
«Suprastin» 25 mg. №20	55 rub. 51 cop.	5 mg (1/5 tablets) 3 times a day
«Activated Carbon» 0,25 gr. №10	1 rub. 07 cop.	1 table. 4 times a day
System for infusion	4 rub. 70 cop.	1 time per day
Syringe, 2 ml	98 cop.	2-4 times per day

Table 5

The cost of treating an allergic reaction severe form

Drugs and medical products value	cost 1-day treatment	cost 2-day treatment	cost 3-day treatment	cost 4-day treatment
Glucose solution 10% - 200 ml	18 rub. 47 cop.	18 rub. 47 cop.	-	-
Sodium chloride 0,9% - 200 ml	19 rub. 88 cop.	19 rub. 88 cop.	-	-
«Prednisolone» 25 mg. - 1 ml, № 50	14 rub. 50 cop.	14 rub. 50 cop.	-	-
«Suprastin» 2% - 1 ml, №5	6 rub. 89 cop.	6 rub. 89 cop.	6 rub. 89 cop.	-
«Suprastin» 25 mg. №20	-	-	-	1 rub. 67 cop.
«Activated Carbon» 0,25 gr. №10	42 cop.	42 cop.	42 cop.	42 cop.
System for infusion	4 rub. 70 cop.	4 rub. 70 cop.	-	-
Syringe, 2 ml	3 rub. 92 cop.	3 rub. 92 cop.	1 rub. 96 cop.	-
Total:	68 rub. 78 cop.	68 rub. 78 cop.	9 rub. 27 cop.	2 rub. 09 cop.

Author: Gorbacheva E. V., MD, PhD, Associate Professor of Pharmacology and Clinical Pharmacology, State Medical DVGMU, 680000 Khabarovsk, Pushkin Street, 37 -1101, t.89242166387, e-mail: doktor_elena@mail.ru