ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

2017 • 2

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ

БАЯНДАМАЛАРЫ

ДОКЛАДЫ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

REPORTS

OF THE NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN

ЖУРНАЛ 1944 ЖЫЛДАН ШЫҒА БАСТАҒАН
ЖУРНАЛ ИЗДАЕТСЯ С 1944 г.
PUBLISHED SINCE 1944

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ
БАЯНДАМАЛАРЫ **2017 • 2**

«Қазақстан Республикасы Ұлттық ғылым академиясының баяндамалары»
ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы» Республикалық қоғамдық бірлестігі (Алматы қ.)
Қазақстан республикасының Мәдениет пен ақпарат министрлігінің Ақпарат және мұрағат комитетінде 01.06.2006 ж. берілген **№5540-Ж** мерзімдік басылым тіркеуіне қойылу туралы куәлік

Мерзімділігі: жылына 6 рет.
Тиражы: 2000 дана.

Редакцияның мекенжайы: 050010, Алматы қ., Шевченко көш., 28, 219 бөл., 220, тел.: 272-13-19, 272-13-18,
http://nauka-nanrk.kz. reports-science.kz

Типографияның мекенжайы: «Аруна» ЖК, Алматы қ., Муратбаева көш., 75.

ДОКЛАДЫ **2017• 2**
НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

Доклады Национальной академии наук Республики Казахстан»
ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

Собственник: Республиканское общественное объединение «Национальная академия наук Республики Казахстан» (г. Алматы)
Свидетельство о постановке на учет периодического печатного издания в Комитете информации и архивов Министерства культуры и информации Республики Казахстан **№5540-Ж**, выданное 01.06.2006 г.

Периодичность: 6 раз в год.
Тираж: 2000 экземпляров

Адрес редакции: 050010, г.Алматы, ул.Шевченко, 28, ком.218-220, тел. 272-13-19, 272-13-18
http://nauka-nanrk.kz. reports-science.kz

Адрес типографии: ИП «Аруна», г.Алматы, ул.Муратбаева, 75

REPORTS **2017 • 2**
OF NATIONAL ACADEMY OF SCIENCES OF THE
REPUBLIC OF KAZAKHSTAN

Reports of the National Academy of Sciences of the Republic of Kazakhstan.
ISSN 2224-5227
ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

Owner: RPA "National Academy of Sciences of the Republic of Kazakhstan" (Almaty)
The certificate of registration of a periodic printed publication in the Committee of Information and Archives of the Ministry of Culture and Information of the Republic of Kazakhstan N 5540-Ж, issued 01.06.2006

Periodicity: 6 times a year
Circulation: 2000 copies

Editorial address: 28, Shevchenko str., of.219-220, Almaty, 050010, tel. 272-13-19, 272-13-18,
http://nauka-nanrk.kz / reports-science.kz

Address of printing house: ST "Aruna", 75, Muratbayev str, Almaty

REPORTS OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
ISSN 2224-5227
Volume 2, Number 312 (2017), 60 – 66

UDC 616.858-08

V. K. Akhmetzhanov, Ch. S. Shashkin, R. Kaiyrzhanov

JSC «National centre for neurosurgery», Astana, Kazakhstan.
E-mail: Vadim.Akhmetzhanov@nmh.kz, Chingiz.Shashkin@nmh.kz, Rauan.Kaiyrzhanov@nmh.kz

PARKINSON'S DISEASE. STANDARDS FOR TREATMENT AND REHABILITATION OF PARKINSON'S DISEASE

Abstract. The main goal of Parkinson's disease (PD) therapy is to correct dopamine deficiency in the nigro-striatal system. Currently, there are six groups of drugs with anti-parkinsonian effect that have been used. The world standards of the medical treatment of PD are given in this article. The mechanisms of action of anti-parkinsonian drugs are also described. Levodopa and dopamine receptor agonists (DRAs) are the principal drugs that are prescribed with regards to the patient's age and severity of the disease. In spite of the fact that levodopa is "the gold standard" in the treatment of PD, its chronic administration cases the development of complications such as motor fluctuations and drug induced dyskinesia. The primary question to ask after the diagnosis of PD is when and how to start therapy, and what medication to prescribe. Specific treatment schemes in regards to the age of PD patients are also provided. Due to the progressive course of the disease and the complications of medical treatment, the management of the late stages of PD is complicated. The recommendations of the world experts on the medical management of the late stages of PD and complications of long-term levodopa administration are also given. Alternative treatment options are also provided. While some of them have been already used in medical practice of some countries, the rest of the alternative options have been only under undergoing experimental level. Non-medical treatment options of PD also include diet, physical exercise and psychological rehabilitaton. Recommendations for the management of PD patients can help clinicians to choose the right strategy in the effective treatment of PD patients.

Keywords: Parkinson's disease, levodopa, dopamine receptor agonists (DRAs), standards for treatment, rehabilitation.

Introduction. The best approach to the treatment and long-term rehabilitation of a patient with Parkinson's disease (PD) is a multidisciplinary team approach. A wide range of medical specialists should take part in daily treatment, which reflects the fact that PD is not just a violation of the motor sphere, and the symptoms of the disease are manifested in various other functional areas: the psyche, the cardiovascular system, the organs of the gastrointestinal tract and urinary system [1].

Conservative treatment of PD. This material provides an overview of the recommendations for pharmacological treatment of PD at different stages, developed by the European Federation of Neurological Societies and the European Section of the Society of Movement Disorders (EFNS/MDS-ES) [2].

There are two directions of treatment of motor disorders - neuroprotective and symptomatic therapies. Neuroprotective therapy is designed to slow the death of dopaminergic neurons, and thereby to inhibit the progression of the disease and restore degenerative neurons by compensating for known metabolic disorders. At present, there are no neuroprotective agents with proven efficacy.

Currently, PD therapy remains symptomatic. All antiparkinsonian drugs that neurologists use are usually attributed to this group. The main goal of PD therapy is to compensate for the deficiency of dopamine in the brain, which is achieved with the help of various drugs, among which the most important is levodopa, the precursor of dopamine, and also with the help of dopamine receptor agonists (ADRs), enzymes inhibitors of levodopa and dopamine metabolism, such as monoamine oxidase B (MAO-B) and catechol-O-methyltransferase (COMT). Drugs with a nedophamine mechanism of action are used: they are NMDA- receptor blockers (amantadines), anticholinergic drugs (cyclodol).

Levodopa and its medications. Medications of levodopa, being the precursors of endogenous dopamine, are still considered the gold standard in the effectiveness of PD treatment. It has the best symptomatic effect on the main motor symptoms. A large experience of the drug showed that PD therapy with levodopa is more effective than other drugs, in particular dopamine receptor agonists.

The effectiveness of levodopa approaches almost 95% with the reduction of motor disorders. It follows that a good response to levodopa is a diagnostic sign for confirming the PD diagnosis, and ineffectiveness of levodopa leads to the thought of finding other forms of Parkinson's syndrome, respectively [3].

In the first years of treatment with levodopa, which is prescribed 3-fold, motor disorders regress and remain stable within a day. The period of good drug control is called the "honeymoon" period. But after several years of levodopa administration in most patients, after the first three to five years, there are predictable complications of taking the drug in the form of excessive movements, which are called dyskinesias, and periods of fluctuations in motor activity, which are called motor fluctuations. And over time, these complications more and more bring suffering and dissatisfaction from treatment. The development of motor fluctuations is also explained by the steady progression of the disease.

Taking into account the period of pharmacological activity of the drug, levodopa is taken at least three times a day. Beginning with a minimally effective dose, with 50 mg of the drug. Weekly increasing by 50 mg, we are trying to get a therapeutic response. And at that dose of levodopa, at which the response in the form of good motor activity was received, we continue the drug intake [4].

The average therapeutic dose of levodopa medications is 300-600 mg per day, the frequency of reception during the day is 3 to 6 times.

If there is no effect on high doses of the drug, the diagnosis should be revised [5].

Dopamine receptor agonists (DRAs). The pharmacological principle of DRA medications is to stimulate DA-receptors, replacing the effect of dopamine. Therefore, they are used in the early stages of PD, and in the first years of DRA treatment, the effectiveness in controlling motor disorders and non-motor manifestations is the same as with levodopa. Important is the fact that DRA drugs reduce the risk of motor fluctuations and dyskinesias [6]. According to numerous studies with initial manifestations of PD (1-2 stages according to the Hoehn and Yahr scale), the quality of life in primary monotherapy with levodopa or a dopamine agonist is comparable.

DRAs are divided into two groups - ergoline and non-ergoline derivatives. Drugs of the ergoline series include bromocriptine, lisuride, pergolide, etc. Non-ergoline derivatives include pramipexole (Mirapex), ropinirole (Requip, Ronirol) and pyribedil (Pronoran).

The initial DRA monotherapy allows to delay the appointment of levodopa for several years (up to 1-3 years). In the late stages of the disease DRA is combined with levodopa drugs, which allows to shorten the duration of periods of shutdown, as well as reduce the daily dose of levodopa by a third [5].

MAO-B inhibitors. The pharmacological action of MAO-B inhibitors at PD is that they "block" the metabolism of dopamine. Thus, the concentration of dopamine in the synaptic cleft and in the neurons of the black substance is increased, as a result of which the dopaminergic transmission increases. MAO-B inhibitors are inferior in effectiveness to levodopa and DRA medications, so they are used in the early stages of PD. Monotherapy with these drugs is possible. At the disposal of neurologists there are two medicines - rasagiline (Azilect) and selegiline (Jumex).

One of the latest drugs related to this class of antiparkinsonics is rasagiline (Azilect). Rasagiline is several times higher in its activity than selegiline. It is used once in the morning at a dose of 1 mg, which greatly facilitates the treatment. Several completed controlled randomized trials have shown that rasagiline in addition to the symptomatic effect may have a neuroprotective effect, especially in the initial stage of PD, as well as in the late stages in patients with motor fluctuations. This makes rasagiline one of the promising compounds for the PD treatment [7].

Amantadine. The antagonist of glutamate NMDA-receptors, amantadine, is effective in PD combination therapy. Amantadine can be used as an agent for treating people with early PD stages, but should not be a first-choice drug. The use of the drug in the late stages of PD can correct the late side effects of levodopa. Especially valuable is the property of amantadines to suppress the severity of levodopa-induced dyskinesias. The optimal dose of amantadine is 200-300 mg per day in 3 divided doses [8].

COMT inhibitors. The class of inhibitors of catechol-O-methyltransferase (COMT) is represented by two drugs: Tolcapone and Entacapone. The means of the first series is entacapone. It is used in patients with end-dose dyskinesia and reduces the duration of the "off" period by 1-1.5 hours per day.

COMT inhibitors do not have a direct anti-Parkinsonian effect and have been synthesized as a means to combat the complications of prolonged therapy with levodopa.

The drug has a positive effect on motor fluctuations, especially when the wear end of the dose. The combined form of levodopa, containing levodopa, carbidopa and entacapone, has the trade name (Stalevo), and is used to combat levodopa-induced fluctuations at PD.

Cholinolytics. Anticholinergic drugs or cholinolytics are the first group of drugs to be used to treat PD. Cyclodol is given to young patients without cognitive impairment having a tremor of rest. Anticholinergics have little effect on motor function, and are not used to treat motor disorders.

Cyclodol is prescribed as a first-choice drug because of limited efficacy and has the side effect of causing psychoneurological complications. In foreign clinical recommendations cholinolytics are preferable to use in the early stages of the disease, with predominantly trembling forms of the disease, in relatively young patients. Currently, long-term therapy with anticholinergics and taking these medications by elderly patients are not recommended. The recommended average daily dose for most drugs is 2-4 mg.

When to start treatment. ***General principles.*** The timing of the initiation of therapy at the PD diagnosis in international recommendations is not clearly regulated. When the symptoms of the disease begin to affect the patient's quality of life, this will be considered as an indication for initiating therapy. There is a recommendation for the preparation of symptomatic therapy at PD, from which you can begin treatment. Most schemes involve the choice of therapy for each patient individually. It depends on the characteristics of the drug (effectiveness, complications, safety, cost, etc.), on the patient (stage of the disease, age, expectation from treatment, concomitant diseases, socioeconomic status and financial well-being, etc.) and on external factors (availability of the drug on the market, features of the health system, etc.).

Initial stage of treatment. Treatment begins with the use of one drug from the group of anti-Parkinsons. If there is no regression of symptoms during the application of the drug within a month after reaching the optimal dose or it is poorly tolerated, it should be replaced by either a drug of the same group or a drug of another pharmacological group. The effectiveness of the drug and its dose means not complete elimination of symptoms, and the task of therapy is to strive for a significant improvement in motor functions, allowing the patient to maintain domestic and professional activity. When there are severe motor disorders and the appearance of instability (stage III according to Hoehn and Yarh), it is necessary to prescribe levodopa medications.

Features of treatment schemes for PD patients depending on age. Conditionally, the schemes for initiating treatment are divided for patients younger than 50 years old, 50-70 years old and older than 70 years old. Patients of the first group (up to 50 years old), when the motor disorders are not yet expressed and there are no cognitive impairments, can be prescribed the following drugs: MAO-B inhibitor-rasagiline (Azilect), dopamine receptor agonist - pramipexole (Mirapex), pyribedil (Pronoran). First, they start with monotherapy, then these drugs are combined together, reaching the maximum tolerated dose to provide control to reduce motor disorders. Further, as the disease progresses, levodopa is added in the minimum dose (level A).

Patients of the second age group (50-70 years old), if the motor defect is moderate, are necessary to start treatment with one of the dopamine receptor agonists (pramipexole), bringing the drug to the maximum doses. It is possible a combination with the drugs of other groups: MAO-B (rasagiline), amantadine or anticholinergic (rest tremor). Further, the agent containing levodopa is added at the lowest effective dose (200-400 mg/day).

If a motor defect is expressed in the patient, and there are also cognitive impairments, treatment is started with levodopa preparations at the dose of 200-400 mg/day. Subsequently, to improve control of motor impairment, add: a dopamine receptor agonist, MAO-B inhibitor.

For the third age group (over 70 years old), treatment should begin with drugs of levodopa. And according to the above standards, medications from other groups are added.

Features of drug therapy at late PD stages, and complications caused by prolonged therapy with levodopa medications. With long-term use of levodopa drugs, dyskinesias and motor fluctuations

("on-off") occur. The effect of levodopa decreases with time, repeated administration of the drug acts in a fragmentary manner, which leads to the above listed complications.

In the classification of dyskinesias there are three main types:

- "peak dose dyskinesia" (dyskinesia of period of inclusion, dyskinesia on-period). "Peak dose dyskinesia" is one of the frequent versions of medicinal dyskinesia at PD.
- Two-phase dyskinesia, occurs at the beginning and at the end of the action of levodopa.
- "end of dose dystonia" (the dystonia of the "off-period") appears after the end of the action of levodopa.

Recommendations for the treatment of motor complications at PD

Peak dose dyskinesias:

1. Reduce the dose of levodopa and increase the frequency of admission. Increase the number of dopamine agonist receptions (level of evidence C).
2. Cancel or reduce the dose of MAO-B or COMT inhibitors.
3. Amantadine in the dose of 200-400 mg/day (level of evidence A).
4. Atypical antipsychotics of clozapine or quetiapine (evidence level C).
5. Subcutaneous administration of apomorphine will reduce the dose of levodopa (level of evidence C).
6. Enteral administration of levodopa (level of evidence C).

To overcome "peak dose dyskinesia", the reduction of a single dose is considered the most reliable. In order to avoid the growth of hypokinesia, it is necessary to keep the daily dose at the same level. Thus, the fractional reception of small doses is one of the simplest ways to prevent fluctuations and dyskinesias.

Two-phase dyskinesia:

1. Two-phase dyskinesia is difficult to treat.
2. Increased dose and frequency of taking levodopa (risk of peak dose dyskinesia).
3. Admission of higher and less frequent doses.
4. Apomorphine and enteral administration of levodopa (level of evidence C).

"Off-period" and morning dystonia:

1. Additional doses of levodopa or dopamine agonists overnight.

For all types of medicinal dyskinesias, amantadine is effective as a corrector, in the case of dyskinesia, the end-effect of a single dose of levodopa and biphasic dyskinesia is a three-component drug of levodopa/carbidopa/entacapone (Stalevo medication).

Motor fluctuations:

1. Correction of the dose of levodopa: increasing the frequency of dose intake up to 4-6 times can reduce the manifestations of "exhaustion".
2. Addition of MAO-B inhibitors.
3. Addition of dopamine agonists.
4. Levodopa CR: can reduce "wear" (level of evidence C) and morning akinesia.
5. Addition of amantadine or anticholinergics.

Severe motor fluctuations:

1. Subcutaneous administration of apomorphine (level of evidence A) or pump (level of evidence C).
2. Enteral administration of levodopa/carbidopa (level of evidence C).

Unpredictable "on-off" periods:

1. Subcutaneous administration of apomorphine (level of evidence A).

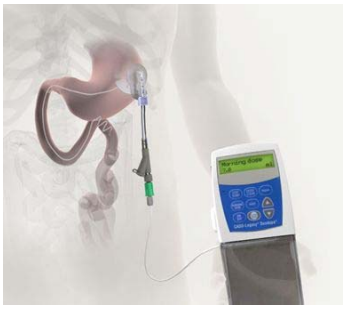
Alternative therapies. The therapy of late PD stages presents serious difficulties. As it was already noted, after several years of treatment, in the certain proportion of patients, the symptoms are no longer adequately controlled solely by oral therapy. For such patients, there are currently six advanced treatments that can improve symptoms and quality of life:

1) Introduction of levodopa into the duodenum using a portable pump;
2) Subcutaneous infusion of apomorphine using a portable pump (syringe-pen);
3) Gene therapy;
4) Growth factor (GDNF);
5) Cell therapy;
6) Deep brain stimulation (DBS).

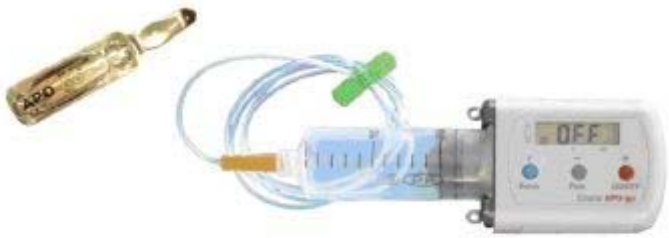
Duodenal administration of levodopa (Duodopa medication). The intake of various tableted forms of levodopa does not allow to ensure stable absorption in the small intestine and a stable concentration of the drug in the blood plasma. In connection with this, a method of constant duodenal administration of levodopa was proposed.

The essence of the method is that they install a portable infusion pump, feeding the gel through a special small tube into the upper part of the small intestine. By the duodenal administration of levodopa gel, a constant concentration of levodopa in the blood plasma is created, which avoids dyskinesias and "on-off" periods. Disadvantages of the method: a complex technical installation and the need for constant maintenance and high cost of the device.

Duodenal administration of levodopa is currently available in Europe, Australia, Israel, the Middle East, South Korea, Taiwan; The drug is at the registration stage in the USA and Japan.



Subcutaneous administration of apomorphine. Apomorphine is a nonspecific dopamine agonist. The drug is injected with a pen injector device to stop the off phase. The effect manifests itself in a few minutes and lasts about an hour. Apomorphine "APO-go" is applied in the form of pen injector and pump system. Therapy is easy to apply to patients. In patients with gross motor fluctuations, a dosing device has been developed to stimulate dopamine receptors, which continuously injects apomorphine subcutaneously. This is a modified insulin pump with a certain rate of drug administration during the day.



Gene therapy. In addition to reducing the level of dopamine at PD, glutamic acid activity is reduced, which is responsible for suppressing excessive neuronal activity characteristic at BP. Studies on gene therapy have not yet been completed. One of the works devoted to the gene PD therapy was that injections of genetic material (the glutamic acid decarboxylase gene) were made into the subthalamic nucleus, the area of the brain responsible for the regulation of movements. Cells of the subtalamic nucleus could synthesize glutamic acid, and recovery occurred in the imbalance of the exciting and inhibitory signals in the neurons that are responsible for the movement.

Growth factor (GDNF). Glial Neurotrophic Factor GDNF (glial cell line-derived neurotrophic factor), polypeptide that regulates the work of the nervous system, has a neuroprotective effect, and also contributes to the stability of dopaminergic cells of the brain. In the experiment, GDNF was injected into the PD patient in the striatum, where dopamine comes from the black substance. As a result of the tests, motor symptoms decreased in patients, and PET confirmed partial restoration of dopamine in the striatum and black substance. GDNF-therapy may become a new treatment for PD patients.

Cell therapy. PD treatment with stem cells is not carried out in our country, in other countries this type of therapy is actively studied, clinical experiments are conducted, both with mesenchymal stem cells

and with dopamine cells of the fetus. It should be considered that at PD, stem cells will eventually become one of the important therapeutic factors.

Non-drug therapies:

1. Diet. Weight loss is noted in half of patients suffering from PD. Maintenance of a certain dietary regime at PD is necessary, since the intake of levodopa medications into the small intestine will be slowed down by the presence of food in the stomach and the effect of the drugs will decrease. Therefore, it is necessary to take the medicine for half an hour before meals or two hours after eating so that they can safely go through the body to the small intestine. It is also recommended to limit the admission of protein food in the evening.

Patients with constipation are indicated a diet with a high content of dietary fiber. Food ration should include cereal products, vegetables and fruits, and reduce foods high in protein (protein makes it difficult to absorb levodopa).

2. Physiotherapy methods of treatment. Physiotherapy methods are used to reduce muscle tone, pain syndrome, to improve tissue nutrition. One of the modern methods of restorative treatment is transcranial magnetic stimulation of the cerebral cortex by an alternating magnetic field. The procedure is able to significantly reduce the manifestations of bradykinesia and improve mood.

3. Physical activity (exercise therapy). Physical activity is one of the methods of PD treatment. It is necessary to maintain the previous level of motor activity, to which the patient is accustomed. Useful exercises at PD - dosed walking, gymnastic exercises, using light dumbbells, expander, visiting the pool, exercising on a stationary bike. Gymnastics classes will reduce the intensity of tremors, help to learn relaxation techniques (relaxation of stressed muscles), overcome hypodynamia, improve posture, gait, coordination, prevent the occurrence of such complications as motor fluctuations.

Psychological rehabilitation. An extremely important aspect of social and psychological rehabilitation is the holding of schools for patients and their relatives. In the conduct of the training a neurologist, an exercise physiologist, a physiotherapist, a psychotherapist should participate [9].

Conclusion. One of the important steps in improving the quality of care for patients with PD and other motor disorders was the opening of the cabinet for motor disorders in JSC "National center of neurosurgery". Patients with PD are offered multidisciplinary medical rehabilitation to reduce motor and non-motor disorders. In the rehabilitation program there are neurologists, psychologists, speech therapists, exercise physiologists, the training of patients with PD and their relatives for care, therapeutic gymnastics, daily activities and nutrition. As the disease progresses, neurosurgeons of the vascular and functional neurosurgery departmnet provide consulting assistance to select patients for surgical treatment.

REFERENCES

[1] Akhmetzhanov V, Shashkin Ch, Djamantayeva B (2016) Parkinson Disease. Pathophysiology of the extrapyramidal system. The modern view to cause and pathogenesis of parkinsonism [Bolezn' Parkinsona. Patofiziologija jekstrapiramidnoj sistemy. Sovremennye predstavlenija o prichinah vozniknovenija i patogeneze parkinsonizma] Journal Neurosurgery and Neurology of Kazakhstan, 2(43):44-51 (in Russian).

[2] Ferreira JJ, Katzenschlager R, Bloem BR. (2013) Summary of the recommendations of the EFNS/MDS-ES review on therapeutic management of Parkinson's disease, European Journal of Neurology, 20(1):5-15. DOI: 10.1111/j.1468-1331.2012.03866.x.

[3] Levin OS (2011) Levodopa and levodopa phobia, Neuro News: psychoneurology and neuropsychiatry, 2/1 (in Russian).

[4] Levin OS (2006) On the rational use of levodopa in Parkinson's disease [O racional'nom primenenii levodopy pri bolezni Parkinsona], Severe patient (in Russian).

[5] Illarioshkin SN (2004) Key principles of Parkinson's disease treatment [Osnovnye principy terapii bolezni Parkinsona], Russian Medical Journal, 12(10):604-608.

[6] Levin OS, Fedorova NV, Smolentsova IG (2000) The use of dopamine receptor agonists in the treatment of Parkinson's disease. Diagnosis and treatment of extrapyramidal disorders [Primenenie agonistov dofaminovyh receptorov v lechenii bolezni Parkinsona. Diagnostika I lechenie extrapiramidnyh zabolevanii] (in Russian).

[7] Levin OS, Boiko AN, Ivanov AK (2010) The efficacy of Rasagiline (Azilect) in patients with advanced stage of Parkinson's disease with motor fluctuations according to the AZIMUT study [Jeffektivnost' razagilina (azilekta) u bol'nyh s razvernutoj stadiej bolezni Parkinsona s motornymi fluktuacijami po dannym issledovanija AZIMUT], Journal of neurology and psychiatry named after SS. Korsakov, 110(11):42-47 (in Russian).

[8] Illarioshkin SN (2004) Therapy of Parkinsonism: Opportunities and Prospects [Terapiya parkinsonizma: vozmojnosti i perspektivy], Diseases of the nervous system, 4 (in Russian).

[9] Kostenko EV, Manevich TM, Petrova LV (2014) Integrated rehabilitation for patients with Parkinson's disease [Kompleksnaja reabilitacija pacientov s bolezn'ju Parkinsona], Journal of General Medicine, 1 (in Russian).

В. К. Ахметжанов, Ч. С. Шашкин, Р. Б. Кайыржанов

«Ұлттық нейрохирургия орталығы» АҚ, Астана, Қазақстан

ПАРКИНСОН АУРУЫ. ПАРКИНСОН АУРУЫНЫҢ ЕМДЕУ СТАНДАРТТАРЫ МЕН РЕАБИЛИТАЦИЯСЫ

Аннотация. Паркинсон ауруын (ПА) емдеудегі негізгі мақсат нигростриарлық жүйедегі дофамин тапшылығын толтыру болып табылады. Қазіргі таңда антипаркинсондық әсері бар алты дәрілік зат қолданылады. Бұл мақалада ПА дәрімен емдеудің халықаралық стандарттары берілген. Паркинсонизмге қарсы дәрі-дәрмектердің фармакологиялық ықпал ету механизмдері талқыланған. Негізгі дәрілік заттар болып науқас адамның жасы мен ауру ауырлық дәрежесін ескере отырып тағайындалатын леводопа мен дофамин рецепторларының агонисттері (ДРА) болып табылады. Леводопа ПА емдеудегі алтын стандарт болғанына қарамастан, дәрінің ұзақ уақыт тағайындалуы қимылдық флуктуация мен дәрілік дискинезияға алып келеді. ПА анықтағаннан кейін қойылатын ең бірінші сұрақ ол емді қашан, қалай және қандай дәрі-дәрмектен бастау. Науқас адамдардың жасына қарай емдеу схемалары берілген. Аурудың үдемелі дамуы мен дәрі-дәрмек қабылдаудың кері әсері салдарларынан ПА кеш кезеңдерін емдеу қиын болып табылады. Халықаралық эксперттердің ПА кеш кезеңдері мен леводопа препараттарының ұзақ уақыт қабылдау салдарынан болған асқынуларды дәрі-дәрмекпен емдеу нұсқаулықтары берілген. Альтернативті дәрілік емес емдеу тәселдері де келтірілген. Олардың кейбіреуі кей елдердің тәжірибесінде қолданыста болса, басқалары ғылыми эксперимент өткізу кезеңінде. ПА дәрілік емес емдеу тәсілдеріне сонымен қоса диета, емдік физикалық жаттығу мен психологиялық реабилитация кіреді. ПА бар науқас адамдарды жүргізу бойынша нұсқаулық, практикалық дәрігерлерге науқас адамдарға әсерлі көмек көрсету жолында дұрыс стратегия таңдауға көмектеседі.

Түйін сөздер: Паркинсон ауруы, леводопа, дофамин рецепторларының агонисттері (ДРА), емдеу стандарттары, оңалту.

В. К. Ахметжанов, Ч. С. Шашкин, Р. Б. Кайыржанов

АО «Национальный центр нейрохирургии», Астана, Казахстан

БОЛЕЗНЬ ПАРКИНСОНА. СТАНДАРТЫ ЛЕЧЕНИЯ И РЕАБИЛИТАЦИИ ПРИ БОЛЕЗНИ ПАРКИНСОНА

Аннотация. Основной целью терапии болезни Паркинсона (БП) является коррекция дефицита дофамина в нигростриарной системе. В настоящее время применяются шесть групп препаратов с антипаркинсоническим действием. В статье даются международные стандарты медикаментозного лечения БП. Приведены механизмы фармакологического действия антипаркинсонических препаратов. Основные препараты это леводопа и агонисты дофаминовых рецепторов (АДР), которые назначают с учетом возраста пациента и тяжести заболевания. Несмотря на то, что препараты леводопы являются «золотым стандартом» терапии, их длительное использование ведет к развитию осложнений в виде моторных флуктуаций и лекарственных дискинезий. Первый вопрос после постановки диагноза БП – когда и как начинать лечение и с каких препаратов. Приводятся данные об особенностях схем лечения больных с БП в зависимости от возраста. В связи с появлением осложнением от приема препаратов, а также продолжающего прогрессирования заболевания, терапия поздних стадий БП представляет серьезные трудности. Представлены рекомендации международных экспертов по лекарственной терапии поздних стадий БП и осложнений, вызванных длительной терапией препаратами леводопы. Приведены альтернативные не медикаментозные методы лечения БП. Некоторые уже используются в практике отдельных стран, другие проходят стадии научных исследований. Нелекарственные методы лечения при БП включают в себя также диету, лечебную физкультуру, психологическую реабилитацию. Рекомендации по ведению пациентов с БП помогут практикующим врачам выбрать правильную стратегию терапии для оказания эффективной помощи пациенту.

Ключевые слова: болезнь Паркинсона, леводопа, агонисты дофаминовых рецепторов (АДР), стандарты лечения, реабилитация.

CONTENT

Publication Ethics and Publication Malpractice
in the journals of the National Academy of Sciences of the Republic of Kazakhstan

For information on Ethics in publishing and Ethical guidelines for journal publication see http://www.elsevier.com/publishingethics and http://www.elsevier.com/journal-authors/ethics.

Submission of an article to the National Academy of Sciences of the Republic of Kazakhstan implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see http://www.elsevier.com/postingpolicy), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. In particular, translations into English of papers already published in another language are not accepted.

No other forms of scientific misconduct are allowed, such as plagiarism, falsification, fraudulent data, incorrect interpretation of other works, incorrect citations, etc. The National Academy of Sciences of the Republic of Kazakhstan follows the Code of Conduct of the Committee on Publication Ethics (COPE), and follows the COPE Flowcharts for Resolving Cases of Suspected Misconduct (http://publicationethics.org/files/u2/New_Code.pdf). To verify originality, your article may be checked by the originality detection service Cross Check http://www.elsevier.com/editors/plagdetect.

The authors are obliged to participate in peer review process and be ready to provide corrections, clarifications, retractions and apologies when needed. All authors of a paper should have significantly contributed to the research.

The reviewers should provide objective judgments and should point out relevant published works which are not yet cited. Reviewed articles should be treated confidentially. The reviewers will be chosen in such a way that there is no conflict of interests with respect to the research, the authors and/or the research funders.

The editors have complete responsibility and authority to reject or accept a paper, and they will only accept a paper when reasonably certain. They will preserve anonymity of reviewers and promote publication of corrections, clarifications, retractions and apologies when needed. The acceptance of a paper automatically implies the copyright transfer to the National Academy of sciences of the Republic of Kazakhstan.

The Editorial Board of the National Academy of sciences of the Republic of Kazakhstan will monitor and safeguard publishing ethics.

Правила оформления статьи для публикации в журнале смотреть на сайте:

www:nauka-nanrk.kz

ISSN 2518-1483 (Online), ISSN 2224-5227 (Print)

http://www.reports-science.kz/index.php/ru/

Редакторы *М. С. Ахметова, Д. С. Аленов, Т.А. Апендиев*
Верстка на компьютере *А.М. Кульгинбаевой*

Подписано в печать 15.04.2017.
Формат 60x881/8. Бумага офсетная. Печать – ризограф.
5,25 п.л. Тираж 2000. Заказ 2.