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Medical treatment for vertigo

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Abstract. *Medical treatment for vertigo.* An overview of the medical treatment options currently available for vertigo in Belgium is given. There are three sections: drug treatment for acute unilateral vestibular loss, Ménière's disease and motion sickness. The pharmacological properties, contra-indications, side-effects and dosage are discussed for each drug.

Introduction

An overview of the medical treatment options currently available for vertigo in Belgium is given. The pharmacological properties, contra-indications, side-effects and dosage are discussed for each drug. For more detailed information we refer to textbooks on pharmacology.[1-3]

1. Acute unilateral vestibular loss

For acute unilateral vestibular loss, medical treatment is appropriate during the first days to reduce vertigo and secondary neurovegetative signs (Table 1). These drugs should not be continued too long since they may interfere with compensation processes.

Table 1

Drugs for acute unilateral vestibular loss

generic name	dosage
dimenhydrinate	rectal 120-240 mg oral 3×50-80 mg
meclozine	oral 3×25-50 mg
sulpiride	intramuscular 100-200 mg oral 2×50-100 mg
promethazine	intramuscular 50 mg oral 2×25 mg

1.1. *Antihistamines of the benzhydril group*

1.1.1. Dimenhydrinate

Pharmacological properties: Dimenhydrinate belongs to the ethanolamines and has an antihistamine (H1-antagonist) and anti-emetic effect. Maximum plasma levels are reached in 1-2 hours and its half-life is 6 hours. It works after 30 minutes, and the effects last for 8 hours.

Contra-indications: prostatic hypertrophy, glaucoma.

Side-effects: somnolence, in case of prolonged use accommodation problems, dry mouth, urine retention, confusion or excitation in elderly people. In rare cases, tremor and gastrointestinal complaints. Very rare cases of leucopenia, agranulocytosis.

Dosage: For an acute attack of Ménière's disease, suppositories 60-120 mg. For motion sickness, 50-80 mg 30 min before the trip. In prolonged treatment: 50-160 mg before each meal and before sleep.

1.1.2. Meclozine

Pharmacological properties: Meclozine is an H1-antihistamine and anti-emetic drug with a prolonged effect. It works 2 hours after oral intake and the effects last for 8 hours.

Contra-indications: prostatic hypertrophy, glaucoma.

Side-effects: drowsiness

Dosage: adults: 25-50 mg a day preferably before sleep or 1 hour before the trip. Maximum dose 100 mg a day. It is not available for rectal application.

Children: syrup 1 mg/ml, <2 years 4 mg, 2-5 years 6 mg, 5-10 years 12 mg, if necessary 2-3 times a day.

1.1. *Antihistamines of the phenothiazine group*

1.2.1. Sulpiride

Pharmacological properties: Sulpiride is a specific antagonist of the dopamine D2/D3 receptors and belongs to the class of the benzamides. Low doses (150-600 mg) enhance dopamine transmission. High doses block the D2/D3 receptors. After intramuscular injection, maximal plasma levels are reached after 15-30 min. After oral intake the drug works for 4-5 hours. The half-life is 7 hours.

Contra-indications: phaechromocytoma

Side-effects: extrapyramidal symptoms, neuroleptic malignant syndrome (loss of consciousness with evolution to stupor and coma), autonomic symptoms with hyperthermia, tachycardia, peripheral vasoconstriction, transient hyperprolactinaemia which disappears after discontinuing the treatment.

Dosage: during an acute attack of vertigo: intramuscular injection of 100-200 mg.

Prolonged oral treatment: 2×50 mg, maximum 2×100 mg a day.

1.2.2. Promethazine

Pharmacological properties: Promethazine is an H1-antihistamine with a strong anticholinergic effect. It works 2 hours after oral intake, and the effects last for 6-18 hours. A stronger and faster effect is achieved after intramuscular injection.

Contra-indications: prostatic hypertrophy, glaucoma.

Side-effects: pronounced sedation, dry mouth

Dosage: during an acute attack of vertigo: intramuscular injection of 50 mg. Oral treatment: 25 mg twice a day.

2. Ménière's disease

2.1. *Acute attack*

The same drugs can be given as for an acute unilateral vestibular loss.

2.2. Prophylactic treatment

2.2.1. Betahistine

Pharmacological properties: Betahistine is a strong H3-antagonist, facilitating histamine transmission, a weak H1- (calcium release) and H2- (production cAMP) agonist. In animal experiments betahistine has been found to enhance cerebral and cochlear blood supply and improve oxygenation of the inner ear, enhance central compensation and reduce nystagmus in humans, probably through an effect on the vestibular nucleii. There is clinical evidence for an effect in Ménière's disease and an enhancement of compensation after acute unilateral peripheral vestibular loss. Betahistine has a prophylactic effect on Ménière's disease, and there is a limited effect during an attack.

Indications: Ménière's disease and other recurrent vertigo attacks.

Side-effects: gastrointestinal disturbances. Precautions in case of phaeochromocytoma, peptic ulcer and asthma

Dosage: Starting at 3×16 mg a day, increase dose up to 3×32 mg. If the frequency of the attacks declines, the dose can be reduced to 3×6-8 mg a day. If the treatment is effective, it is advised to continue the treatment for at least 3 months before slowly reducing.

2.2.2. Diuretics

The most frequently used diuretics in Ménière's disease are:
hydrochlorothiazide, 25 mg a day
chlorthalidone, 50 mg a day
spironolactone, 50 mg a day
acetazolamide, 250 mg a day.

3. Calcium antagonists, nootropic drugs

3.1. *Cinnarizine, flunarizine*

Pharmacological properties: These are selective calcium entry blockers which belong to group IV of the calcium antagonists. They have also an antihistamine (H1) effect. They inhibit contractions of vascular smooth muscle cells. The cellular influx of calcium is blocked in a tissue selective way without an effect on blood pressure and heart rate. Microcirculation is improved by raising erythrocyte deformability and reducing blood viscosity. Cellular resistance to hypoxia is increased. These drugs inhibit the stimulation of the vestibular system, resulting in a reduction of nystagmus and other autonomic disturbances. Compensation after acute unilateral vestibular loss is stimulated, probably through the inhibition of the reaction on the normal side. Cinnarizine blocks the calcium influx of the endolymph to the vestibular sensory cells.

Maximum plasma levels of cinnarizine are reached 2-4 hours after intake. The half-life is

4 hours and terminal half-life is 16 days. The maximum effect is reached after 1-3 hours, and lasts 6-8 hours.

Maximum plasma levels of flunarizine are reached in 2-4 hours and a steady state is reached at 5-6 weeks. The mean terminal elimination half-life is 18 days.

Indications: Cinnarizine: migraine prophylaxis, cerebrovascular disturbances, vertigo of peripheral and central origin, tinnitus, peripheral circulatory disorders such as intermittent claudication, prophylaxis of motion sickness. Flunarizine: migraine prophylaxis, vertigo of peripheral and central origin. The treatment should be discontinued after 2 months in case of vertigo and after 6 months for migraine.

Contra-indications: Cinnarizine: recent cerebral haemorrhage and extrapyramidal symptoms.

Flunarizine: depressive illness and Parkinson's disease.

Side-effects: Cinnarizine: somnolence and gastrointestinal disturbances, usually transient. In rare cases extrapyramidal symptoms, weight gain, depressive feelings. Flunarizine: drowsiness and/or fatigue (20%), usually transient, and weight gain (11%). Gastrointestinal disturbances. During chronic treatment (>6 months) and in elderly people: depression, extrapyramidal symptoms, insomnia, anxiety, galactorrhoea, dry mouth, muscle ache, skin rash.

Dosage: Cinnarizine: in adults 3x75 mg a day, for motion sickness 3x25-50 mg a day, at least 1 hour before the trip. Flunarizine: 10 mg daily (at night) for patients younger than 65 years of age and 5 mg for those older than 65 years of age.

3.2. *Piracetam*

Pharmacological properties: Piracetam is a nootropic drug, a psychotropic substance, that enhances the function of the higher telencephalic cerebral functions, which play a role in cognitive processes such as learning ability, memory en consciousness. It is thought to restore and protect central neural transmission by influencing membrane phospholipides and through the activation of the turnover of second messengers. Piracetam enhances microcirculation through the inhibition of platelet aggregation and an increase in erythrocyte deformability. It is also thought to antagonise vasospasm. It may have a positive effect on vertigo of central origin, particularly in elderly people. After oral intake, the maximum plasma level is reached after 30 minutes, and the maximum level is reached in cerebrospinal fluid after 2-8 hours. The half-life is 4-5 hours in the blood and 6-8 hours in cerebrospinal fluid.

Indications: Positive effects have been described for: memory loss in elderly people, vertigo, diminished consciousness and concentration, sickle cell anaemia, chronic alcoholism, coma, cognitive disturbances, cortical myoclonus. This is a registered drug for vertigo of central origin.

Side-effects: These are thought to occur in fewer than 5% of patients. Agitation, irritability, anxiety, disturbance of sleep and gastrointestinal complaints have been described.

Dosage: 30-160 mg/kg/day in 2, 3 or 4 doses. For vertigo after cerebral trauma an initial dose of 9-12 g is proposed, followed by a maintenance dose of 2.4 g a day. For vertigo of central origin in elderly people an initial dose of 4.8 g a day is proposed, followed by a maintenance dose of 1.2-2.4 g/day.

3.3. *Co-dergocrine mesilate*

Pharmacological properties: Codergocrine mesilate blocks the adrenergic alpha receptors and stimulates the dopamine and serotonine receptors. A shortening of cerebral circulation time and a vasodilatatory effect on the precapillary sphincters has been observed. This is thought to lead to an improvement in impaired metabolic cerebral function. Codergocrine mesilate may result in some improvement in the impaired mental capacity in elderly people older than 60 years of age.

After oral intake, absorption is only 25%, due to the first-pass effect. Biological availability is only 5-12%. With the FAS (Facilitated Absorption System) form of the product, biological availability improves by one-third compared to the normal form. Codergocrine mesilate works for 3-24 hours.

Indications: Positive effects have been described in case of chronic cerebral insufficiency with improvement of the following parameters: mental alertness, confusion, memory, emotional balance, depression, anxiety, vertigo, somnolence.

Contra-indications: acute or chronic psychosis.

Side-effects: nausea, congestion of the nasal mucosa, orthostatic hypotension.

Dosage: 3 times 1.5 mg a day or one dose of 4.5 mg FAS a day before breakfast.

Table 2
Drugs for motion sickness

generic name	dosage
scopolamine	oral 0.3-0.6 mg transdermal 1.5 mg
dimenhydrinate	before the trip 50-100 mg max. 3x50-100 mg
promethazine	before the trip 25 mg max 2x25 mg
cinnarizine	before the trip 25-50 mg max 25-50 mg

4. Motion sickness

Scopolamine is the most effective monosubstance against motion sickness, but is no longer available due to the side-effects even after transdermal application: drowsiness, blurring of vision, dry mouth. The oral dose for adults is 0.3-0.6 mg with a maximum effect after 30-60 minutes lasting for 4 hours. After local application (patch) the maximum effect is reached after 6-8 hours, lasting for 72 hours.[4]

The dosage of the other drugs for motion sickness is given in Table 2.

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