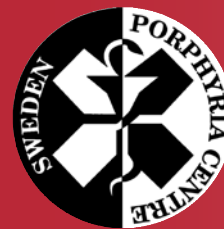

Patient's and Doctor's guide to medication in acute porphyria

CANADIAN PORPHYRIA FOUNDATION

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Canadian Porphyria Foundation Acknowledgements:

The Canadian Porphyria Foundation (CPF) extends a heart-felt thank you to **The Swedish Porphyria Association** who spearheaded the development of this booklet.

A very special thanks to the author, Dr. Stig Thunell, Sweden, who researched the effects of drugs and anaesthetics in the disease porphyria and produced this booklet titled, *“The Patient’s and Doctor’s Guide to Medication in the Acute Porphyrias”*.

The CPF thanks our friend, Gunilla Thunell, Executive Director of the Swedish Porphyria Association, whose generous help enabled the completion of the booklet.

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We wish to acknowledge Rita Gordon, BN, Neepawa, Manitoba for her exceptional assistance with the French translation and editing of this booklet.

Bernice Fulford Memorial Fund

In 1975, four of Bernice Fulford’s seven children were diagnosed with Hereditary Coproporphyrria. At that time, there was no porphyria medical information available anywhere to learn how to manage the disease or prevent acute life threatening attacks.

Bernice believed that a “Porphyria Safe and Unsafe Drug Guide” was of the utmost importance for preventing acute life threatening attacks.

To honour Bernice’s memory and life, her husband Ivan and family set up a memorial fund designating it for the updating, printing and distribution of current porphyria drug information.

This “Safe and Unsafe Drug Guide” has been funded in part by the Bernice Fulford Memorial Fund that was established at the time of her death in 1999.

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Canadian Porphyria Foundation Disclaimers

This guide to medications in acute porphyria has been reviewed for content and readability. The reviewers were not able to review the scientific content in its entirety, as they were not able to check the original source material due to its scope.

The CPF and the reviewers are not able to endorse the treatments whether by diet or by medication as given in this guide. They represent the opinion of the Swedish Porphyria Association and the Porphyria Centre Sweden.

Readers are strongly advised to consult their own physicians as to treatment options.

B.M. Gilfix
B. Schacter

Special Notes

1. Not all the drugs listed in this guide are available in Canada.
2. Paracematol is known in Canada as acetaminophen.
3. Cholesterol Lowering Drugs
Cholesterol lowering drugs are widely prescribed in Canada. Many of the cholesterol lowering drugs known as “statins” are unsafe being porphyrinogenic; the exception being rosuvastatin.
4. Antiepileptics
Many antiepileptic drugs are porphyrinogenic. The blood levels of many antiepileptics drugs can be measured (therapeutic drug monitoring). If it is necessary to use these drugs, the measurement of the blood levels of these drugs may aid the treating physician in determining the lowest drug concentration necessary to treat the condition and minimize the risk of inducing an acute porphyric attack.
5. Antivirals
Some antiviral agents including those used to treat HIV infections are porphyrinogenic. The blood levels of many drugs used to treat HIV infections can be measured (therapeutic drug monitoring). Therapeutic drug monitoring for drugs used to treat HIV is available in Quebec and British Columbia at the time of this writing. If it is necessary to use these drugs, the measurement of the blood levels of these drugs may aid the treating physician in determining the lowest drug concentration necessary to treat the condition and minimize the risk of inducing an acute porphyric attack.

DISCLAIMER

The classifications of the drugs in the following lists are based on a combination of clinical observations, previous drug lists, case reports in the literature and theoretical considerations made from the structure and metabolism of the substances.

Clinical observation, however, may in many cases be unreliable. Also, the biochemical and molecular-biologic models for the activation of the disease are incomplete. Therefore, despite the classifications having been made by aid of expertise, knowledge, and experience presently available, and with the help of specialists all over the world, it is not possible to take legal responsibility for the advice given.

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The way to use the list

For you as a patient

If you would like to know whether you can use a certain drug, you can find the drug in the alphabetical list, pages 17 - 31, or the list where the drugs are ordered according to medical use, pages 34 - 56. In both cases the pharmaceutical – not the commercial – names of the drugs are given. Different ways of printing and different symbols indicate whether they may be dangerous to use or not.

You should observe that there may be occasions when your doctor must prescribe a drug that is not considered to be safe in acute porphyria, because the medication is of greatest importance for you and no safe drug is available. In such a (rare) case the risk for a porphyric reaction is minimized by the aid of certain precautions, adapted to your personal sensitivity, pages 32 - 33.

For the doctor

Be careful and precise when prescribing a drug or selecting anaesthesia for a patient who is a carrier of one of the four forms of acute porphyria. Erroneous choice of medication is connected with imminent risk of initiating a porphyric attack, which may be extremely painful for the patient, possibly disabling and potentially lethal.

First hand choice is a drug classified as safe or probably safe in the drug lists, pages 17 - 31 and 34 - 56.

On strong or imperative indication drugs classified as unsafe should be considered, but only under the condition that no safer alternatives are at hand and presuming that preventive measures adapted to the porphyric susceptibility of the patient are undertaken, pages 32 - 33.

PREFATORY NOTE

The distressing experiences from the fate of porphyria patients hospitalized during the first four to five decades of the 20th century and treated with drugs, resulted for many years in an extremely restrictive attitude among the porphyria specialists when it came to recommendations regarding medication in the acute porphyrias. In 1977 professor Lennart Wetterberg in Stockholm, Sweden together with pharmacist AnnaLisa Mouchard (1914-2005) at the Swedish Porphyria Association (Riksföreningen mot Porfyriskjukdomar – RMP) published the first list of drugs to be avoided in acute porphyria. It was primarily intended to be used by patients for their protection against erroneous prescriptions of porphyrinogenic substances, but was soon – and still is – adopted for use by their doctors. Since then, updated editions of the list have been published every other year by RMP in collaboration with the specialists at Porphyria Centre Sweden. In 1995 drugs that could be recommended for use were also included in the register.

Previously, the strict advice to doctors has been to follow the recommendations in the list closely and under no circumstances whatsoever prescribe a drug classified as unsafe. Today this attitude is hardly defensible. Clinical experience as well as results from more than one enquiry among patients point to the fact that most carriers of acute porphyria tolerate most drugs most of the time, presuming that they are in a quiescent phase of their disorder. To abstain from a prescription badly needed by the patient on “better safe than sorry” grounds is to overrate the reliability of the list when it comes to accuracy in porphyrinogenicity prediction. It also may give rise to unnecessary and inhuman undertreatment.

On the other hand, drug prescription for porphyria patients is indeed not a question of complete liberalization. The carrier of acute porphyria should never without a due cause be exposed to a porphyrinogenic substance. The first choice shall always be a substance classified as safe to use, but in instances when no such drug is available and the indication for the prescription is urgent, potentially dangerous drugs must be considered, presuming that the risk is minimized by preventive measures.

The susceptibility to porphyrinogenic adverse reactions varies between carriers of acute porphyria, and also in one carrier over time. Safe prescription is therefore essentially a question of being able to make an accurate enough estimation of the degree of porphyrinogenicity of the substance to be prescribed and of the current vulnerability of the patient, and to be able to discern the combinations with a high risk for an acute porphyric crisis so that adequately adapted precautions may be used.

In this 2007 edition of *Drugs in Acute Porphyrias* we have increased the number of drugs classified. The list encompasses about one thousand substances presently included in the Swedish Pharmacopeia. It also contains a guide through the risk estimation process.

The practical and theoretical basis for the drug porphyrinogenicity classifications were discussed at the International Porphyria Congress in Prague, September 2003, where specialists from all parts of the world agreed to take part in this project with the aim to produce an evidence-based drug classification list. The present drug list represents the first attempt in that direction.

It is gratifying that a cooperative effort from the national porphyria centers in Sweden and Norway recently has resulted in a web-published drug list.

It is our hope that the new drug list will prove to function well and provide support for you who are carriers of acute porphyria, as well as for you in the health services responsible for the well being of porphyria patients. We also thank the large network of specialists who have taken part in the work and who will help to update and develop the list in the future.

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Porphyria Centre Sweden

FOR YOU AS A CARRIER OF ACUTE PORPHYRIA

The porphyrias

Porphyrias – inherited diseases

Porphyria is the common name for a group of seven metabolic disorders which affect the chain of processes that leads to formation of the red blood pigment, heme. The disorders occur in certain families where the predisposition for the illness generally is transmitted from one of the parents to some of the children, girls as well as boys. The risk for a child to inherit the predisposition from his or her parent is generally 50 %. The predisposition never jumps a generation, but since in most forms of porphyria, not all carriers will develop the illness, the disease does not necessarily become overt in every generation.

Skin porphyrias and acute porphyrias

There are two main groups of porphyria – the *skin porphyrias* and the *acute porphyrias*. Within each of the two groups there are subforms.

In the skin porphyrias, exposure to sun gives rise to skin fragility and vesicles or, in one form, almost instant burning pain.

In the acute porphyrias, the nervous system is affected in an attackwise manner, with a variety of symptoms including abdominal or other pain, muscle weakness and nervous manifestations: the *acute porphyric crisis*.

The acute porphyrias are:

Acute intermittent porphyria (AIP) the most common form, about one carrier in 10 000 persons, *variegate porphyria* (VP), *hereditary coproporphyria* (HCP), about 1-2 carriers in 100 000 persons and the exceedingly rare *ALAD-deficiency porphyria* (ALAD-P), one patient in 5-10 million persons.

Two of the acute porphyrias, VP and HCP, also present with skin hypersensitivity to sun.

The drug list concerns only carriers of acute porphyria

The drug lists and the advice forwarded in “*Patient’s and Doctor’s Guide to Medication in Acute Porphyria*” is only intended for use in the acute porphyrias, i.e. AIP, VP, HCP and ALAD-P.

The symptoms in acute porphyria

The manifestations of *acute porphyria* are variegated, coming from all parts of the nervous system. In some cases the symptoms are solitary, in others they appear in groups.

A sign that is almost invariably present is reddish or red-brown urine. Sometimes the urine sample is uncoloured when freshly voided but will take on a red tint if left standing in the daylight for half an hour or so. This is indeed a sign many carriers take advantage of when trying to decide whether current symptoms may be due to their porphyric condition or due to other causes.

Often the porphyric crisis is preceded by a period of stubborn obstipation. The attack generally starts with nausea, long-drawn vomiting and heart palpitation. Neuropsychiatric changes, typically fluctuating are common: extreme fatigue, irritability, restlessness, severe agitation, unquietness and insomnia, or personality changes, visual hallucinations, depression, apathy.

Abdominal pain is the most common symptom, almost always present and not seldom interpreted in the emergency ward as biliary colic, a renal stone or intestinal blockade. Backpain, gluteal pain and other muscle pain may be present. Numbness and impaired muscle strength starting in arms and legs occur, in a few cases progressing to temporary paralysis and breathing difficulties.

Less common symptoms are seizures, difficulties in urination and temporary blindness. Lowering of blood salt concentrations may be the reason for seizures or heart rhythm disturbances.

The porphyric crisis

After the condition is triggered the symptoms arrive within hours or a day. The attack may last from a few hours to days or weeks if left untreated. With treatment it usually subsides within 4-5 days. The symptoms may be so mild that they disappear after removal of the precipitating agent(s) and self medication (below), or so severe that they prompt hospital intensive unit care.

Susceptibility varies

Only 20-30 % of the carriers of the predisposition for acute porphyria develop the disease. An exception is ALAD-P where symptoms usually appear eventually. Since the porphyric illness generally is triggered by environmental factors the obvious way to stay well is to avoid exposure to such agents.

The susceptibility to disease-triggering factors varies between carriers of the predisposition, and in one carrier from one occasion to another.

The risk that symptoms develop is low before puberty. In adolescence and later, women are more at risk than men, especially during the hormonal turbulence before menstruation, during the first weeks of pregnancy and in the lactating period after delivery. The peak risk is between 20 and 35 years of age, but after that it decreases with age. The risk never disappears completely, however.

How to stay well

In order to stay well, factors that are recognized as triggers of the porphyric disease are to be avoided. These factors include certain pharmaceutical drugs and anaesthetics (*drug list*), alcohol, organic solvents, physical or mental stress, fasting, and hormonal contraceptives.

When an attack is precipitated most often a combination of such agents have acted together. Current infection, and in women hormonal changes connected with the menstrual cycle or pregnancy, increase the susceptibility of the person to the risk factors. As prevention, carriers exposed to sensitizing or triggering factors should preferentially change over to a high carbohydrate diet (below).

Certain drugs can precipitate an acute attack

Often an acute porphyric attack is observed to have been precipitated on exposure to a pharmaceutical drug. On the other hand, a common experience is that the same drug in many other instances may have shown to be tolerated by other carriers, or the same person on another occasion. This circumstance is most probably a reflection of a fact that several factors in cooperation are needed to lower the disease triggering threshold to a degree to start the porphyric process.

The drug prescribed may act as the weight tipping a scale previously loaded with dangerous factors: recent alcohol intake, exposure to organic solvents in paints or cleaning agents, ongoing infection, other medication or anaesthesia, caloric deprivation in fasting or attempts at weight reduction, strenuous physical exercise and/or current stress, sleep deprivation or irregular food intake.

The drug lists below represent attempts at prediction of their power to start the porphyric process. Equally important in a risk estimate, however, is your current vulnerability to their porphyric effect. As a carrier of a predisposition for acute porphyria most factors determining your susceptibility rest in your own hands.

Treatment

The carbohydrate diet and the sugar-cure

Sugar has the ability to decrease the strain on the deficient enzyme in acute porphyria. Intake of carbohydrates in different forms can therefore be employed for counteracting activation of the porphyric condition. Carbohydrates are equally effective given as food or administered intravenously.

If you don't experience any problems with your porphyric condition, there is no need to give your diet any special thought. On the other hand, if you seem

to be sensitive to agents which activate the porphyric condition it may be advisable to adopt a high carbohydrate diet.

Should you suffer from diabetes or take an anticoagulant your doctor should be consulted before you change food habits.

Your normal daily intake of carbohydrate should be no less than 250 g. In order not to put on weight the amount of fat should instead be minimized.

Foodstuffs rich in carbohydrates and poor in fat are bread, flour, grain, cereals, pasta, potato, root vegetables, peas, beans, fruit and berries, dried fruit, jam, marmalade, honey, syrup, whey-cheese, low-fat milk, juice, fruit drink, lemonade and sweets (observe that chocolate and nuts are rich in fat).

An example of a suitable daily carbohydrate intake may be: 6 slices of bread (55 g carbohydrate), 4 tbs grain or flour (15 g), 4 potatoes (55 g), 300 g root vegetables and greens (25 g), 3 fruits (40 g), 4 decilitre low-fat milk (20 g), 2 tbs marmalade and jam (20 g), 4 lumps of sugar (10 g) – i.e. a total of 260 g carbohydrate.

If you currently are, or expect to be, exposed to factors which threaten to activate porphyria, you may get protection by increasing the carbohydrate intake over the basal level. It is a good idea to do this, for example, if you have to start on a medication connected with risk for porphyric side effects (see page 33), if you are going to have an operation or local anaesthesia, if you suffer from infection, if you are in a period with stress, irregular meals and insufficient sleep, or if you enter a menstrual period notoriously connected with problems from the porphyric condition.

In such cases the ordinary high-carbohydrate diet may be supplemented by intake of pure sugar, e.g. in the form of a few lumps of sugar every other hour and some further glasses of fruit drink or lemonade daily. One vial of a concentrated sugar solution from the pharmacy (e.g. *Nutrical*) can be added.

Because of the risk for weight gain, additions of pure sugar to the basal carbohydrate diet should not be prolonged. Frequent oral rinsing is necessary in order to protect decay of the teeth.

In case you currently experience porphyric symptoms, a daily carbohydrate intake of about 500 g should be attempted. In the hospital the sugar most often is given as intravenous infusion of a 1-2 litre salt-containing glucose solution. At home you can supplement the ordinary high-carbohydrate diet with a sugar-cure consisting of 4-5 lumps of sugar every hour and intake of glucose tablets, sweets, honey, syrup, lemonade and fruit-drink. A powerful addition is intake of a concentrated sugar solution available at the pharmacy (e.g. *Nutrical*), 2 vials

daily. If the porphyric symptoms are severe hospital help should be sought.

The cure should not be tried for more than 3-4 days. Otherwise the daily caloric intake may be so high that weight reduction later will be necessary, which in itself carries a risk for porphyric activation. In order to avoid damage to the teeth, frequent oral rinsing should be undertaken.

There may be situations when your doctor must prescribe a possibly dangerous drug because you are in need of it and no safe alternative is available.

Keep in mind then:

- that you should try to eliminate other possible triggering factors
- that the chances are good that all will go well
- that the risk is further lessened if you increase your intake of carbohydrates

Contact your doctor or hospital if your urine should turn reddish or red-brown in an unusual way, or if porphyric symptoms develop.

Self-medication in less severe symptoms

Try to determine whether your urine has turned red or red-brown. If that is the case your symptoms probably are due to porphyria. Try to figure out what can have started the symptoms. If you just recently have begun a new medication and there is a possibility that this has been the triggering event, stop taking it after consulting the prescribing doctor. Take a sugar cure, i.e. a diet with frequent regular meals with a high carbohydrate content supplied with extra sugar. Avoid stress and see to it that you get sufficient and undisturbed rest.

Hospital care in severe attacks

Hospital care should be sought without delay if self-medication is insufficient, or if there are symptoms such as intolerable pain, progressive limb numbness or reduction in muscular strength, severe distress or other mental symptoms, seizures, irregular heart action, breathing difficulties.

In the ward you will immediately receive an infusion of glucose in a salt solution, i.e. intensive carbohydrate administration directly into the blood. If that does not give relief a drip of Normosang[®] or Panhematin[®] is started. These fluid pharmaceuticals have about the same mechanism of action as sugar, but are considerably more potent and expensive.

Pain-relieving drugs that are safe, and safe medication for nausea are given as needed. High blood pressure, heart palpitations, unrest, insomnia and depression will be treated with safe drugs.

If your salt balance is disordered, a sodium chloride or magnesium sulphate solution will be administered as infusion into the blood, or fluid restriction prescribed, dependent on the reason for the disturbance.

While in the hospital, heart rate and blood pressure are monitored, as are blood salt balance and urinary excretion of PBG, the substance contributing to the red colour of your urine. The reasons are that the heart rate and urinary PBG concentration are used as indicators for the rate of regress of the attack and that there is a need to detect and treat, without delay, deficiencies in sodium and magnesium salts in the blood.

Your condition makes you entitled to the best form of nursing care including encouragement and ideally a private darkened room with peace and quiet allowing undisturbed rest and sleep.

The warning card and other assurances

- In all health care contacts bring your personal warning card (if you have one) and "*Patient's and Doctor's Guide to Medication in Acute Porphyrias*".

- If the pharmacy has a general authority (such as in Sweden) to exchange one prescription for a cheaper one with equal curing effect, ask your prescribing doctor to note on the prescription that such an exchange is not allowed in your case, since the drugs may not be exchangeable with regard to porphyric effects.

- If hospitalized, ensure that your ward patient-chart is marked in a way that it informs the personnel – day and night staff – that you are a carrier of a predisposition for acute porphyria, and that certain restrictions regarding medication, anaesthesia and fasting must be observed.

Specific information and advice

Local anaesthesia

Bupivacaine is recommended. This local anaesthetic is long acting, which may be a draw-back, but it is a drug with only positive results for use in the acute porphyrias.

Articaine is a relatively new local anaesthetic and still untried in acute porphyria, but from a theoretical standpoint seems to be well suited for use in these conditions. The other local anaesthetics are unsafe to use dependent on the dose administered.

Anaesthesia of the skin and mucous membranes can probably be made by any local anaesthetic available, provided that large areas are not covered.

Hormonal contraceptives

Contraceptives based on hormones have started many acute attacks of porphyria. The modern low-dose preparations may be less dangerous but definitely not safe. Consider other techniques for contraception if you are a carrier for acute porphyria.

Please remember that there is no totally safe alternative. If you nevertheless want to choose this form for contraception there is great need for close control during the first two months.

You must be observant of symptoms that point to activation of the disorder – red or red-brown urine appearing, unexplained irritability, unrest or insomnia, severe constipation, abdominal pains, numbness, or decreased muscular strength in hands or feet.

Your urinary excretion of PBG should be monitored, an increase in the amount being a signal for activation of the porphyric condition. Some carriers normally exhibit increased urinary PBG concentration also under conditions when the disorder is not noticeably activated. It is therefore important that a baseline is determined before the start of medication, so that a finding of an abnormally high PBG-concentration can be correctly interpreted.

As a carrier of acute porphyria taking contraceptive pills you must be extra careful with other agents that lower your threshold for triggering an acute attack. That means among other things avoidance of alcohol, weight reduction by fasting, stress, irregular meals and insufficient sleep.

Hormone replacement therapy

The general experience is that hormone replacement after menopause by aid of skin adhesive or local treatment with salve is safe in acute porphyria. The hormone treatment needed to prevent uncontrolled growth of the mucous membrane in the womb is, however, connected with a considerable risk. Local vaginal hormone treatment may be less dangerous.

Vitamins and minerals

The vitamin and mineral preparations for sale in the pharmacies are generally safe to use, as long as they do not contain other constituents than those on the label.

Foods

There are no reports that any food has precipitated the illness in a carrier of acute porphyria. Still, on theoretical grounds a few may be suspected to increase the porphyric susceptibility in a carrier. These are *liquorice, cabbage, cauliflower, turnip, broccoli, kohlrabi, cole, brussels sprouts, grapefruit, olive oil, garlic, grapes, red wine, peanuts*, and – of course – *alcohol*. (*St John's Wort* extracts are especially unsuitable).

Herbal remedies

Better avoid. There are herbaceous extracts that are strong activators of the acute porphyria. Such a one is preparations containing St John's Wort.

Vaccinations and travel prophylaxis

Vaccinations and gammaglobulin are safe in acute porphyrias.

X-ray investigation

The substances used as contrast media in X-ray investigations do not give any porphyric adverse effects, nor the radiation received.

The fasting period necessary for some X-ray investigations, e.g. of the intestines, is however unfortunate in acute porphyrias. To prevent the harmful caloric deprivation, glucose can be administered during the fasting period.

Concomitant diseases and health controls

A high blood pressure is not unusual in acute porphyria, especially in carriers who previously have experienced porphyric symptoms. If this applies to you, regular blood pressure checks are indicated, as well as tests of kidney function, which may have been affected by elevated blood pressure.

In carriers who have experienced attacks of acute porphyria the risk for development of liver tumour is increased, at least in the Scandinavian countries. These persons should after the age of 50, preferentially at least once a year, be monitored for development of this condition.

Drugs you can use and drugs you should avoid

General advice

– especially important if the medicine is not considered fully safe in acute porphyrias.

If you are a carrier of acute porphyria there are drugs which can trigger the porphyric condition and should thus be avoided if possible. The lists below can be used to identify drugs that may be dangerous to take and to find safer alternatives.

When porphyric symptoms develop after intake of a drug, most often probably more than one porphyria activating agent has been operative.

You are extra vulnerable to the dangerous drug if you are currently leading a life with stress, irregular meals and sleep deprivation, if you harbour an infection, or if you are on unsuitable medicines.

As a woman you may be more susceptible during the week before menstruation, the first months of pregnancy and in the period following delivery, or if you are on hormonal contraceptive or estrogen treatment.

As a carrier of acute porphyria you should avoid alcohol and the use of solvents for cleaning or painting. This advice is even more important at the start of a new medication or before anaesthesia. There is some evidence pointing to smoking as a factor that can increase the sensitivity to other porphyria precipitating agents.

With some exceptions (certain antiepileptics and a few other drugs), before puberty there is less risk for porphyric side effects of a drug.

Thus, follow the advice summarized below if you need to start on a new medicine which is not considered to be fully safe, or if you are going to have an operation, or dental or other treatment under anaesthesia. This is especially important if you have previously experienced porphyric symptoms or if you often, or on and off, notice that your urine is reddish or red-brown.

- 1 Eat regular and sufficient meals
- 2 Avoid fasting
- 3 Avoid stress
- 4 See to it that you get regular and enough sleep
- 5 Avoid strenuous exercise
- 6 Avoid alcohol
- 7 Avoid exposure to solvents, e.g. in connection with painting or cleaning
- 8 For the time being stop taking nature-cure medicines
- 9 Have any current infection treated

The way to read the drug list

The drugs are listed in alphabetical order according to their *pharmaceutical names*. Their *trade names* may differ from country to country, and are thus not included in the list. Those to avoid are marked out with black warning triangles. Drugs within brackets are contentious, i.e. we are uncertain whether they may be dangerous or not. Drugs that are probably safe to use are written in black text:

Black text

Safe, or probably safe drug. First hand choice. No need for preventive measures.

(Black text)

Insufficient data for good classification. Only to be used where no safe, or probably safe alternative is at hand. If taken, observe warning signs such as the urine turning red or porphyric symptoms developing. If you are susceptible to porphyric side effects, colour of urine or urinary PBG excretion should be observed for a few days after start of medication (page 33).

Black text ▲

Probably unsafe drug. Only to be used if there are strong reasons and no safer alternative is at hand. If used, safety precautions adapted to your personal susceptibility are to be undertaken (page 33).

Black text ▲▲

Dangerous drug. Used only on urgent indication where no safer alternative exists. If used, safety precautions adapted to your personal susceptibility are to be undertaken (page 33).

Alphabetical list**A**

The code referring to ATC register (pages 34 - 56)

A		ambenonium	N07A A30
abacavir	J05A F06	amido trioizinic acid	V08A A01
abciximab	B01A C13	amifostine	V03A F05
acamprosate	N07B B03	amikacin	J01G B06
acarbose	A10B F01	amiloride	C03D B01
(aceclofenac)	M01AB16	amino acids	V06D D00
acetylsalicylic acid	B01A C06	amino acids + lipids +	
acetylsalicylic acid +		+ glucose + electrolytes /	
+ sulphur	D11AC08	/see combinations	B05B A10
acetylsalicylic acid +		amino acids and minerals	V06C A00
+ caffeine	N02B A51	amino acids or amino	
acetylsalicylic acid	N02B A01	acid + electrolytes	B05B A01
acetylcysteine	R05C B01	aminohippuric acid	V04C H30
acetylsalicylic acid	D02A F00	aminophylline ▲	R03D A05
acyclovir	D06B B06	amiodarone ▲	C01B D01
acyclovir	J05A B01	amitriptyline ▲	N06A A09
acyclovir	S01A D03	amlodipine ▲	C08C A01
(acitretine)	D05B B02	ammonium chloride	B05X A04
(acrivastine)	R06A X18	(ammonium chloride +	
adapalene	D10A D03	diphenhydramine)	R05C A10
adenosine	C01E B10	(ammonium chloride +	
adefovir dipivoxil	J05A F08	quillaia extract)	R05C A10
alanyl glutamine	B05X B02	amorolfine	D01A E16
albumin	B05A A01	amoxicillin	J01C A04
alclomethasone	D07A B10	amoxicillin + betalactamase	
alemtuzumab	L01X C04	inhibitor	J01C R02
alendronic acid	M05BA04	amphotericin	A01AB04
alfa calcidol	A11C C03	amphotericin B	J02A A01
alfentanil	N01A H02	ampicillin	J01C A01
(alfuzocin)	G04C A01	ampicillin	J01C A01
alginic acid	A02E A01	ampicillin with enzyme	
alimemazine	R06A D01	inhibitor	J01C R02
allergene extract	V01A A00	amprenavir ▲	J05A E05
allopurinol	M04AA01	amrinone /inamrinone/	C01C E01
almotriptan	N02C C05	anakinra	L04A A14
alprazolam	N05B A12	(anastrozole)	L02B G03
alprostadil	C01E A01	anti-D (rh)	
alprostadil	G04B E01	immunoglobulin	J06B B01
alteplase	B01A D02	antihemophilic factor A	B02B D02
altretamine ▲	L01X X03	antihemophilic factor B	B02B D04
aluminium-, calcium-		antithymocyte	
and magnesium salts	A02A D01	immunglobulin /rabbit/	L04AA04

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A-C

antithrombin III	B01A B02	betamethasone	H02A B01
apomorphine	G04B E07	betamethasone	S02B A07
apraclonidine	S01E A03	betamethasone + ASA	D07X C01
aprepitant ▲	A04A D12	(betaxolol)	C07A B05
aprotinin	B02A B01	betaxolol	S01E D02
ascorbic acid	A01A B11	bezafibrate	C10A B02
ascorbic acid	A11G A01	bibrocathol	S01A X05
ascorbic acid + calcium	A11G B01	(bicalutamide)	L02B B03
asparaginase	L01X X02	bifonazole	D01A C10
atenolol	C07A B03	(biperiden)	N04A A02
atorvastatin ▲	C10A A05	bisacodyl	A06A B02
atosiban	G02C X01	bisacodyl	A06A G02
atovaquone	P01A X06	bisoprolol	C07A B07
atracurium	M03A C04	bleomycin	L01D C01
atropine	A03B A01	bosentan ▲	C02K X01
atropine	S01F A01	botulinum toxin	M03A X01
(auranofin)	M01C B03	brimonidine	S01E A05
azathioprine ▲	L04A X01	brinzolamide	S01E C04
azelaic acid	D10A X03	bromhexine	R05C B02
azelastine	R01A C03	bromhexine + ephedrine	R05C B10
(azelastine)	S01G X07	bromocriptine ▲	G02C B01
azithromycin	J01F A10	bromocriptine ▲	N04B C01
aztreonam	J01D F01	budesonide	A07E A06
B		budesonide	R01A D05
bacampicillin	J01C A06	budesonide	R03B A02
baclofen	M03B X01	budesonide + formoterol	R03A K07
balsalazide	A07E C04	bumetanide	C03C A02
bambuterol	R03C C12	bupivacaine + epinephrine	N01B B51
basiliximab	L04A A09	bupivacaine	N01B B01
BCG-vaccine	L03A X03	buprenorphine	N02A E01
beclometasone	R01A D01	buprenorphine	N07B C01
beclometasone	R03B A01	(bupropion)	N07B A02
bendroflumethiazide	C03A A01	buserelin	L02A E01
bendroflumethiazide		buspironone ▲	N05B E01
+ potassium	C03A B01	busulfan ▲	L01A B01
bensoyl peroxide	D10A E01	butylscopolamine ▲	A03B B01
benzylpenicillin/G/	J01C E01	C	
(benzatropine)	N04A C01	cabergoline ▲	G02C B03
(benzylamine)	A01A D02	cabergoline ▲	N04B C06
betamethasone+		cadexomer iodine	D03A X01
+ neomycin	D07C C01	caffeine	N06B C01
betamethasone+		caffeine + ephedrine +	
+ gentamicin	D07C C01	+ promethazine	R06A D52
betamethasone +		calcipotriol	D05A X02
+ chinofom	D07B C01	calcipotriol +	
betamethasone	D07A C01	+ betamethasone	D05A X52

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calcitonin		cetorelix	H01C C02
/salmon synthetic/	H05B A01	(chlorambucil)	L01A A02
calcitriol	A11C C04	chloramphenicol ▲▲	J01B A01
calcium acetate	A12A A12	chloramphenicol	S01A A01
calcium carbonate	A12A A04	(chlorcyclizine	
calcium fluoride +		+ guaifenesin)	R05C A10
+ sodium fluoride	A01A A30	chlorhexidine	A01A B03
calcium folinate	V03A F03	chlorhexidine	B05C A02
calcium glubionate	A12A A02	chlorhexidine,	
calcium laktogluconate	A12A A06	skin solution	D08A C02
calcium + vitamin D	A12A X00	chlorhexidine,	
candesartan	C09C A06	vaginal crème	D08A C02
candesartan + hydro-		(chloroquine)	P01B A01
chlorothiazide	C09D A06	chlorpromazine	N05A A01
capecitabine	L01B C06	(chlorprotixene)	N05A F03
capsaicin	N01B X04	chlortetracycline	S01A A02
captopril	C09A A01	(chlorzoxazone)	M03B B03
carbachol	S01E B02	chlorzoxazone + ASA	M03B B53
carbamazepine ▲▲	N03A F01	cholinetheophyllinate ▲	R03D A02
carbamide	D02A E01	(chorionic gonadotrophin)	G03G A01
carbohydrates, solution	B05B A03	chromoglicic acid	A07E B01
carboplatin	L01X A02	chromoglicic acid	R01A C01
carboprost	G02A D04	chromoglicic acid	R03B C01
carisoprodol ▲▲	M03B A02	chromoglicic acid	S01G X01
carisoprodol + paracetamol		(cyclosporin)	L04A A01
+ caffeine ▲▲	M03B A52	cilazapril	C09A A08
carteolol	S01E D05	cilazapril + hydro-	
(carvedilol)	C07A G02	chlorothiazide	C09B A08
cascara	A06A B07	cimetidine	A02B A01
cascara +		cinchocaine	S01H A06
+ sodium docusate	A06A B57	cinupristhine+	
caspofungin	J02A X04	dalfopristhine	J01F G02
cefadroxil	J01D A09	ciprofloxacin	J01M A02
cefalexin	J01D A01	ciprofloxacin	S01A X13
cefepime	J01D A24	(cisapride)	A03F A02
cefixime	J01D A23	cisatracurium	M03A C11
cefotaxime	J01D A10	cisplatin	L01X A01
cefoxitin	J01D A05	(citalopram)	N06A B04
cefpodoxime	J01D A33	cladribine	L01B B04
ceftazidime	J01D A11	clarithromycin ▲	J01F A09
ceftibuten	J01D A39	clemastine ▲	R06A A04
ceftriaxone	J01D A13	(clindamycin)	D10A F01
ceftriaxone + lidocaine ▲	J01D A63	clindamycin ▲	G01A A10
cefuroxime	J01D A06	clindamycin ▲▲	J01F F01
(celecoxib)	M01AH01	clobetasol	D07A D01
cerivastatin ▲	C10A A06	clobetasone	D07A B01
cetirizine ▲	R06A E07	clodronic acid	M05B A02

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C-D

(clomethiazole)	N05C M02	(desogestrel)	G03A C09
(clomiphene)	G03G B02	desogestrel + estrogen ▲	G03A B05
(clomipramine)	N06A A04	desogestrel + estrogen ▲	G03A A09
clonazepam	N03A E01	desonide	D07A B08
clonidine ▲	C02A C01	desoximethasone	D07A C03
(clopidogrel)	B01A C04	desoximethasone + ASA	D07X C02
clotrimazole	D01A C01	dexamethasone	H02A B02
(clotrimazole)	G01A F02	dexamethasone	S01B A01
cloxacillin	J01C F02	dexamethasone	S03B A01
clozapine	N05A H02	dexamethasone +	
codeine	R05D A04	+ neomycin	S03C A01
codeine + paracetamol	N02A A59	(dexchlorpheniramine)	R06A B02
colecalfiferol	A11C C05	dexibuprofen	M01A E14
colestipol	C10A C02	dextran	B05A A05
colestyramine	C10A C01	dextropropoxyphene ▲▲	N02A C04
combination	S01A A20	dextropropoxyphene + ASA +	
combinations	B05B A10	+ phenazone ▲▲	N02A C54
(cortisone)	H02A B10	dextropropoxyphene +	
cyancobalamin	B03B A01	+ paracetamol ▲▲	N02A C54
cyancobalamin tannin		Diabact®	V04C X00
complex	B03B A02	diazepam ▲	N05B A01
(cyclandelate)	C04A X01	dienogest + estrogen ▲	G03F A15
cyclizine ▲	R06A E03	(dichlorobenzyl alcohol)	R02A A03
cyclopentolate	S01F A04	diclofenac ▲	M01AB05
(cyclophosphamide)	L01A A01	diclofenac	S01B C03
(cyproheptadine)	R06A X02	dicloxacillin	J01C F01
cyproterone ▲	G03H A01	didanosine	J05A F02
cyproterone + estrogen ▲	G03H B01	diflunisal	N02B A11
cysteamine	A16A A04	digestion enzymes in	
cytarabine	L01B C01	combination	A09A A02

D

(dacarbazine)	L01A X04	digitalis antitoxin	V03A B24
daclizumab	L04A A08	digitoxin	C01A A04
dactinomycin	L01D A01	digoxin	C01A A05
dalteparin	B01A B04	dihydralazine ▲▲	C02C B01
danaparoid	B01A B09	dihydrocysterole	A11C C02
danazol ▲	G03X A01	dihydroergotamine ▲▲	N02C A01
darbepoetin alfa	B03X A02	diltiazem ▲	C08D B01
(daunorubicin)	L01D B02	dimeticon	A03A X13
deferiprone	V03A C02	dinoprost	G02A D01
delavirdine ▲	J05A G02	diphenhydramine ▲	R06A A02
deoxyribonuclease	R05C B13	diphtheria toxoid	J07A F01
deferoxamine	V03A C01	dipivephrine	S01E A02
desflurane	N01A B07	dipyridamole	B01A C07
desirudin	B01A X02	dipyridamole + ASA	B01A C30
desloratidine	R06AX27	disodium phosphate	
desmopressin	H01B A02	dodecahydrate, sodium	
		dihydrogen phosphate	A06A D10

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disopyramide ▲	C01B A03	enoxaparin	B01A B05
disulfiram ▲	N07B B01	entacapone	N04B X02
disulfiram +		ephedrine	R03C A02
+ combinations ▲	P03A A54	epinephrine	C01C A24
(ditranol)	D05A C01	epinephrine	S01E A01
dixyrazine	N05A B01	epirubicin	L01D B03
dobutamine	C01C A07	eprosartan	C09C A02
(docetaxel)	L01C D02	eptacog alfa	B02B D08
docusate sodium	A06A A02	eptifibatide	B01A C16
docusate sodium +sorbitol	A06A G10	ergoloide mesylate ▲▲	C04A E01
(donepezil)	N06D A02	ergotamine + chlorcyclizine +	
dopamine	C01C A04	meprobamat + caffeine	N02C A72
dopexamine	C01C A14	ergotamine + caffeine	N02C A52
dornase alpha	R05C B13	ertapenem	J01D H03
dorzolamide	S01E C03	erythromycin ▲▲	J01F A01
doxazosin	C02C A04	erythropoietin	B03X A01
doxorubicin	L01D B01	(escitalopram)	N06A B10
(doxycycline)	J01A A02	esmolol	C07A B07
droperidol	N01A X01	(esomeprazole)	A02B C05
drosiprenone +		(esomeprazole +amoxicillin +	
+ estrogen ▲▲	G03A A12	clarithromycin)	A02B D06
drotrecogin alfa	B01A D10	essential amino acids	V06D D00
hydrogestrone ▲▲	G03 D B01	estradiol/transdermal patch/	G03C A03
		(estradiol /tablets/)	G03C A03
		estradiol /vaginal tablet/	G03C A03
		estramustine ▲	L01X X11
		(estriol /tablets/)	G03C A04
		estriol /vaginal	
		creme, tablet/	G03C A04
		(estrogen,conjug.)	G03C A57
		etacrynic acid	C03C C01
		etanercept	L04A A11
		ethambutol	J04A K02
		ethosuximide ▲	N03A D01
		(ethylmorphine + cocillanum	
		extract + senega extract)	R05F A02
		ethylmorphine + ephedrine	R05D A20
		etidronic acid	M05B A01
		etilefrine	C01C A01
		etonogestrel ▲▲	G03A C08
		etoposide ▲	L01C B01
		exemestane ▲	L02B G05
		ezetimibe	C10AX09

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F-G**F**

factor VIII inhibitor		fluphenazine	N05A B02
bypassing activity	B02B D03	fluprednidene	D07A B07
famciclovir	J05A B09	(flutamide)	L02B B01
famotidine	A02B A03	fluticasone	D07A C17
famotidine + magnesium		fluticasone	R01A D08
hydroxide + calcium		fluticasone	R03B A05
carbonate	A02B A53	fluvastatin ▲	C10A A04
fat emulsions	B05B A02	(fluvoxamine)	N06A B08
felbamate ▲	N03A X10	folic acid	B03B B01
felodipine ▲	C08C A02	(follitropin alfa)	G03G A05
felodipine + metoprolol ▲	C07F B02	(follitropin beta)	G03G A06
fenofibrate	C10A B05	fomepizole	V03A B34
fenoterol	R03A C04	fomivirsen	S01A D08
fentanyl	N01A H01	fondaparinux sodium	B01A X05
fentanyl, adhesive	N02A B03	formoterol	R03A C13
fentanyl, tablet	N02A B03	foscarnet	J05A D01
ferric salts + caffeine +		fosfomycin	J01X X01
+ vitamins	B03A E10	fosinopril	C09A A09
ferrous fumarate	B03A A02	fosinopril + hydro-	
ferrous gluconate	B03A A03	chlorothiazide	C09B A09
ferrous succinate	B03A A06	fosphenytoin sodium ▲▲	N03A B05
ferrous sulphate	B03A A07	furosemide	C03C A01
fexofenadin	R06A X26	fusidic acid	D06A X01
fibers	A06A C07	fusidic acid	D09A A02
fibrinogene + trombin		fusidic acid	J01X C01
/tissue glue/	V03A K00	fusidic acid	S01A A13
filgrastim	L03A A02		
(finasteride)	D11A X10	G	
(finasteride)	G04C B01	gabapentin	N03A X12
(flecainide)	C01B C04	(galantamine)	N06D A04
(flucloxacillin)	J01C F05	gancyclovir	J05A B03
fluconazole ▲	J02A C01	ganirelix	H01C C01
flucytosine	J02A X01	gemcitabine	L01B C05
fludarabine	L01B B05	gemeprost	G02A D03
fludrocortisone	H02A A02	gemfibrozil	C10A B04
flumazenil	V03A B25	gentamicin	D06A X07
flumethasone + clioquinol	S02C A02	gentamicin	J01G B03
flunitrazepam ▲	N05C D03	glatiramer acetate	L03A X13
fluocinolone acetonide	D07A C04	glibenclamide ▲	A10B A02
fluorescein	S01J A01	(glimepiride)	A10B B12
fluorescein + lidocaine	S01J A51	(glipizide)	A10B B07
fluorescein +		glukagon	H04A A01
+ oxibuprocaine	S01J A51	glutamic acid	
fluorouracil	L01B C02	hydrochloride	A09A B01
(fluoxetine)	N06A B03	glyceryl trinitrate	C01D A02
(flupentixol)	N05A F01	glycopyrronium	A03A B02
		(gonadorelin)	H01C A01

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goserelin	L02A E03	hydrocortisone butyrate	D07A B02
(gramicidin)	R02A B30	hydrocortisone +	
granisetron	A04A A02	+ carbamide	D07X A01
(guaifenesin)	R05C A03	hydrogen peroxide	D08A X01
glycerol	D02A X00	hydromorphone	N02A A03
H		hydromorphone + atropine	N02A G04
haloperidol	N05A D01	hydroxyzine ▲▲	N05B B01
halothane ▲	N01A B01	(hydroxycarbamide)	L01X X05
Helicobacter diganosticum	V04CX00	(hydroxychloroquine)	P01B A02
Helicobacter test	V04CX00	hydroxycobalamin	B03B A03
hemofiltrates	B05Z B00	hyoscyamine ▲	A03B A03
heparin	B01A B01	hypertonic solutions	B05D B00
heparinic substances	C05B A01	I	
hepatitis A and B vaccine	J07B C20	ibandronic acid	M05B A06
hepatitis A vaccine	J07B C02	ibuprofen	M01A E01
hepatitis B vaccine, purified		ibuprofen + codeine	M01A E51
antigen	J07B C01	(ibutilide)	C01B D05
hepatitis B		idarubicin	L01D B06
immunoglobulins	J06B B16	ifosfamide ▲	L01A A06
Histilos®	R06A E55	iloprost	B01A C11
human hematine	B06A B00	(imatinib)	L01X X28
human insulin	A10A C01	imipenem + cilastatin	J01D H51
human insulin	A10A E01	imipramine ▲	N06A A02
human insulin	A10A B01	imiquimod	D06B B10
human insulin	A10A D01	immunglobulins, intramusc.	J06B A01
human plasmaproteins		immunglobulins, intraven.	J06B A02
hyaluronic acid	M09A X01	indinavir ▲▲	J05A E02
hydralazine ▲▲	C02C B02	(indomethacin)	M01A B01
hydrochlorothiazide	C03A A03	infliximab	L04A A12
hydrochlorothiazide +		influenza vaccine,	
+ amiloride	C03E A01	purified antigen	J07B B02
hydrocortisone	A07E A02	insulin aspart	A10A B05
hydrocortisone	D07A A02	insulin aspart	A10A D05
(hydrocortisone)	H02A B09	insulin human	A10A
hydrocortisone	S01B A02	insulin lipro	A10A B02
hydrocortisone +		insulin lipro	A10A D04
+ fucidic acid	D07C A01	interferon alfa	L03A B01
hydrocortisone +		interferon alfa-2a	L03A B04
+ oxitetracycline	D07C A01	interferon alfa-2b	L03A B05
(hydrocortisone +		interferon beta-1a	L03A B07
+ cinchocaine +		interferon beta-1b	L03A B08
+ framycetine)	C05A A01	interferon gamma	L03A B03
(hydrocortisone +		ipratropium	R01A X03
+ lidocaine)	C05A A01	ipratropium	R03B B01
hydrocortisone +		irbesartan	C09C A04
+ polymyxin B	S03C A04		

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I-L

irbesartan + hydrochlorothiazide	C09D A04	levocabastine	S01G X02
irinotecan ▲	L01X X19	(levodopa + benzerazide)	N04B A02
iron + multivitamines + folic acid	B03A E02	levofloxacin	J01M A12
iron saccharos	B03A C02	levomepromazine	N05A A02
isoflurane	N01A B01	(levonorgestrel 20 µg/24h, intrauterin)	G03A C03
isoniazide ▲	J04A C01	levonorgestrel 30 µg, tablets ▲	G03A C03
isosorbide mononitrate	C01D A14	levonorgestrel 750µg, tablets ▲▲	G03A C03
isosorbide dinitrate	C01D A08	levonorgestrel, implant ▲	G03A C03
isotonic solutions	B05D A00	levonorgestrel + estrogen ▲	G03F B09
ispaghula	A06A C01	levonorgestrel + estrogen ▲	G03A A07
isradipine ▲	C08C A03	levonorgestrel + estrogen ▲	G03A B03
itraconazole ▲	J02A C02	(levosimendan)	C01C X08
K		levothyroxine sodium	H03A A01
ketamine ▲▲		lidocaine ▲▲	C01B B01
ketobemidone	N02A B01	lidocaine	D04A B01
(ketobemidone + DDBA)	N02A G02	lidocaine, gel, solution for surface anaesthesia	N01B B02
(ketoconazole)	D01A C08	lidocaine, mixture, viscous ▲	N01B B02
ketoconazole ▲▲	J02A B02	lidocaine, inj. ▲	N01B B02
ketoprofen	M01A E 03	(lidocaine,solution for gargling)	R02A D02
ketoprofen, gel	M02A A10	(lidocaine + epinephrine)	N01B B52
(ketorolac)	M01A B15	lidocaine + prilocaine, surface anaesthesia	N01B B20
ketotifen	S01G X08	(linezolid)	J01X X08
koriongonadotropin	G03G A01	liothyronine sodium	H03A A02
L		lipid emulsion	B05B A02
labetalol	C07A G01	lisinopril	C09A A03
lactitol	A06A D12	lisinopril + hydrochlorothiazide + mannitol + calcium + hydrogenphosphate dihydrate	C09B A03
lactulose	A06A D11	lithium	N05A N01
lamivudine	J05A F05	(lofepramine)	N06A A07
lamivudine+ zidovudine ▲	J05A F30	(lomustine)	L01A D02
(lamotrigine)	N03A X09	loperamide	A07D A03
lanreotide	H01C B03	loperamide oxide	A07D A05
lanzoprazole ▲	A02B C03	lopinavir ▲	J05A E06
latanaprost	S01E X03	loracarbef	J01D A38
laurilsulfate + sorbitol	A06A G11		
leflunomide	L04A A13		
lenograstim	L03A A04		
lepirudin	B01A X03		
lercanidipine ▲	C08C A13		
(letrozole)	L02B G04		
leuprorelin	L02A E02		
levetiracetam	N03A X14		
levibupivacaine	N01B B10		
levocabastine	R01A C02		

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Documented porphyrinogenicity.

Prescribed only on urgent indication (see p16)

loratidine	R06A X13	(mepivacaine +	
lorazepam	N05B A06	+ epinephrine)	N01B B53
lornoxicam	M01AC05	(mercaptapurine)	L01B B02
(losartan)	C09C A01	meropenem	J01D H02
(losartan + hydro- chlorothiazide)	C09D A01	mesalazine	A07E C02
lutropin alfa ▲	G03G A07	mesna	V03A F01
lymecycline ▲	J01A A04	metformin	A10B A02
lynestrenol +		(methadone)	N07B C02
+ estrogen ▲▲	G03A A03	methenamine	J01X X05
lynestrenol ▲	G03A C02	methocarbamol	M03B A03
lynestrenol ▲▲	G03D C03	methotrexate	L01B A01
M		methylergometrine ▲▲	G02A B01
macrogol, sodium sulphate, sodium		methylidopa ▲▲	C02A B01
hydrogen carbonate, sodium chloride,		methylphenidate	N06B A04
potassium chloride	A06A D10	(methylprednisolone)	H02A B04
magnesium hydroxide	G04B X01	(metixene)	N04A A03
magnesium oxide	A06A D02	metoclopramide ▲	A03F A01
magnesium salts	A12C C30	(metolazone)	C03B A08
magnesium sulphate	B05X A05	metoprolol	C07A B02
(malathion)	P03A X03	metoprolol + ASA	C07A B52
mannitol	B05B C01	(metronidazole)	A01A B17
(maprotiline)	N06A A21	(metronidazole)	G01A F01
(mebendazole)	P02C A01	metronidazole ▲	D06B X01
mecillinam ▲▲	J01C A11	metronidazole ▲	J01X D01
meclozine ▲	R06A E05	metronidazole ▲	P01A B01
medicinal charcoal	A07B A01	metyrapone ▲	V04C D01
medroxyprogesterone ▲▲	G03A C06	(mexiletine)	C01B B02
medroxyprogesterone ▲▲	G03D A02	(mianserin)	N06A X03
medroxyprogesterone +		miconazole	A01A B09
+estrogen ▲	G03F A12	miconazole	D01A C02
medroxyprogesterone +		miconazole + hydro-	
+ estrogen ▲	G03F B06	cortisone	D01A C20
medroxyprogesterone ▲▲	L02A B02	(midazolam)	N05C D08
(mefloquine)	P01B C02	mifepristone ▲▲	G03X B01
megestrol ▲▲	L02A B01	miglitol	A10B F02
meloxicam	M01AC06	milrinone	C01C E02
(melperone)	N05A D03	miltefosine	L01X X09
(melphalan)	L01A A03	(minoxidil)	D11A X01
memantine	N06D X01	(mirtazapine)	N06A X11
meningococcus vaccine,		misoprostol	A02B B01
monovalent	J07A H03	(mitomycin)	L01D C03
meningococcus vaccine,		(mitoxantrone)	L01D B07
bivalent	J07A H03	mivacurium	M03A C10
(mepenzolate)	A03A B12	mizolastine	R06A X25
(mepivacaine)	N01B B03	(moclobemide)	N06A G02
(mepivacaine, "Dental")	N01B B03	modafinil	N06B A07
		moexipril	C09A A13

Black text:

Safe or probably safe.

First hand choice

(Black text, brackets):

Possibly porphyrinogenic. Only used where no safer alternative is available (see p 16)

M-O

molgramostin	L03A A03	nicotinic acid + meclozine +	
momethasone	D07A C13	hydroxyzine ▲▲	R06A E55
momethasone + ASA	D07X C03	nifedipine ▲	C08C A05
momethasone	R01A D09	(nilutamide)	L02B B02
momethasone	R03B A07	nimodipine ▲	C08C A06
(montelukast)	R03D C03	nitrazepam ▲	N05C D02
morbilli vaccine +		nitrofurantoin ▲▲	J01X E01
+ parotitis + rubella	J07B D52	nizatidine	A02B A04
morphine	N02A A01	norethisterone ▲	G03A C01
(morphine + scopolamine)	N02A G01	norethisterone ▲▲	G03D C02
moxifloxacin	J01M A14	norethisterone +	
moxonidine ▲	C02A C05	+ estrogen ▲	G03A A05
multienzymes	A09A A02	norethisterone +	
multienzymes + acid		+ estrogen ▲	G03A B04
preparations	A09A C02	norethisterone +	
(multivitamins, other		+ estrogen, tablets ▲	G03F A01
combinations)	A11A B00	(norethisterone + estrogen,	
multivitamins + iron	A11A A01	depot transderm. patch)	G03F B05
multivitamins, without		norfloxacin	J01M A06
addition	A11B A00	norgestimate +	
(mupirocin)	D06A X09	+ estrogen ▲▲	G03A A11
muromonab-CD3	L04A A02	nortriptyline ▲	N06A A10
mycophenolic acid	L04A A06	(noscapine)	R05D A07

N

(nabumetone)	M01A X01
nadroparin	B01A B06
(nafarelin)	H01C A02
naloxone	V03A B15
(naltrexone)	N07B B04
nandrolone ▲	A14A B01
naphazoline	S01G A01
naphazoline + antazoline	S01G A51
naproxen	M01A E02
naratriptan	N02C C02
(nateglinide)	A10B X03
nedocromil	S01G X04
nefazodone ▲	N06A X06
nelfinavir ▲	J05A E03
neostigmine	N07A A01
neostigmine +	
+ glucopyrronium	N07A A51
netilmicin	J01G B07
nevirapine ▲	J05A G01
niclosamide	P02D A01
nicotine	N07B A01
nicotinic acid	C10A D02

Black text ▲:
Probably porphyrogenic. Prescribed only
on strong or urgent indication (see p16)

O

obidoxime	V03A B13
octreotide	H01C B02
ofloxacin	J01M A01
olanzapine	N05A H03
olsalazine	A07E C03
(omeprazole)	A02B C01
ondansetron	A04A A01
orfenadrin + paracetamol	M03B C51
organo-heparinoid	C05B A01
orlistat	A08A B01
orphenadrine ▲▲	M03B C01
orphenadrine ▲▲	N04A B04
oseltamivir	J05A H02
oxaliplatin	L01X A03
oxazepam	N05B A04
oxcarbazepine ▲	N03A F02
oxybuprocaine	S01H A02
(oxybutynin)	G04B D04
(oxycodone)	N02A A05
oxymetazoline	R01A A05

Black text ▲▲:
Documented porphyrogenicity.
Prescribed only on urgent indication (see p16)

oxytetracycline ▲	J01A A06	piperacillin and	
oxytetracycline +		beta lactamase inhibitor	J01C R05
+ polymyxin B	D06A A03	piracetam	N06B X03
oxytocin	H01B B02	piroxicam	M01A C01
P		pivampicillin ▲▲	J01C A02
paclitaxel ▲	L01C D01	pivmecillinam ▲▲	J01C A08
palivizumab	J06B B16	(pizotifen)	N02C X01
pamidronic acid	M05BA03	pneumococcus vaccine,	
pancuronium	M03AC01	inactivated whole cell	J07A L01
(pantoprazole)	A02B C02	podophyllotoxin	D06B B04
(papaverin)	A03A D01	(polidocanol)	C05B B02
paracetamol	N02B E01	polio vaccine	J07B E03
paracetamol + codeine	N02B A59	poliomyelitis vaccine, oral	J07B F03
paroxetine ▲	N06A B05	poly hydroxyethyl starch	B05A A07
(parecoxib)	M01AH04	(polyestradiol phosphate)	L02A A02
peginterferon alfa-2b	L03A B10	polyethyleneglycol, sodium sulphate,	
peginterferon alfa-2a	L03A B11	sodium hydrogen carbonate,	
pelfigrastim	L03A A13	potassium chloride	A06A D10
peniclovir	D06B B06	polyethyleneglycol, sodium sulphate,	
penicillamine	M01C C01	sodium hydrogen carbonate,	
penicillin /V/	J01C E02	sodium chloride	A06A D10
pentamidine isethionate	P01C X01	polymyxin B + neomycin +	
(pentifylline)	C04A D01	+ metaoxedrine	S01A A20
(pentoxyverine)	R05D B05	polystyrene sulfonate	V03A E01
permethrin	P03A C04	(potassium canreonate)	C03D A02
perphenazine	N05A B03	potassium chloride	A12B A01
pertussis, purified antigen	J07A J02	potassium chloride	B05X A01
pethidine	N02A B02	potassium citrate	A12B A02
phenazone + caffeine ▲	N02B B51	potassium iodide	V03A B21
phenobarbital ▲▲	N03A A02	potassium salts,	
phenoxy methylpenicillin	J01C E02	combinations	B05X A06
phenylephrine	S01F B01	potassium sodium-citrate	G04B C00
phenylephrine +		pramipexole	N04B C05
+ zinc sulphate	S01G A55	(pravastatin)	C10A A03
phenylpropanolamine	R01B A01	prednisolone	A07E A01
(phenylpropanolamine +		(prednisolone)	H02A B06
+ cinnarizin)	R01B A51	prednisolone	S01B A04
phenytoin ▲▲	N03A B02	(prednisolone +	
phospholipide, natural	R07A A02	+ cinchocaine)	C05A A04
phytomenadione	B02B A01	prednisone	H02A B07
pilocarpine	N07A X01	prilocaine, gel	N01B B04
pilocarpine	S01E B01	(prilocaine, inj.)	N01B B04
pimecrolimus	D11A X15	(prilocaine + octapressin)	N01B B54
pindolol	C07A A03	primidone ▲▲	N03A A02
pioglitazone ▲	A10B G03	probenicid ▲	M04A B01
piperacillin	J01C A12	prochlorperazine	N05A B04

Black text:
Safe or probably safe.
First hand choice

(Black text, brackets):
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no safer alternative is available (see p 16)*

P-S

progesterone, vaginal gel ▲	G03D A04	+ isoniazide ▲▲	J04A M02
(proguanil)	P01B B01	riluzole ▲	N07X X02
(proguanil + atovaquone)	P01B B51	rimexolone	S01B A13
promethazine	R06A D02	risedronic acid	M05BA07
propacetamol	N02B E05	risperidone ▲	N05A X08
(propafenone)	C01B C03	ritonavir ▲▲	J05A E03
propiomazine	N05C M06	rituximab	L01X C02
propofol	N01A X10	rivastigmine	N06D A03
propranolol	C07A A05	(rizatriptan)	N02C C04
propylene glychole	D02A X00	rocuronium	M03AC09
propylthiouracil	H03B A02	(rofecoxib)	M01AH02
protein C	B01A D12	(ropinirol)	N04B C04
(pseudoephedrine + + dexbrompheniramine)	R01B A52	(ropivacaine)	N01B B09
pyridostigmine	N07A A01	rosiglitazone ▲	A10B G02
pyridoxine/vitamin B6/ pyrvinium	A11H A02 P02C X01	rosuvastatin	C10A A07
		(roxithromycin)	J01F A06
		rubella vaccine, live attenuated	J07B J01

Q

(quinagolide)	G02C B04
quinapril	C09A A06
quinapril + hydro- chlorothiazide	C09B A06
quinidine ▲	C01B A01
(quinine)	P01B C01
(quinupristin + + dalfopristin)	J01F G02

R

rabeprazole ▲	A02B C04
rabies vaccine, inactivated	J07B G01
raloxifene ▲	G03X C01
ramipril	C09A A05
ramipril + + hydrochlorothiazide	C09B A05
ranitidine	A02B A02
rasburicase	V03A D07
(reboxetine)	N06A X18
remifentanil	N01A H06
(repaglinide)	A10B X02
reteplase	B01A D07
retinol	A11C A01
ribavirin	J05A B02
rifabutin ▲	J04A B04
rifampicin ▲▲	J04A B02
rifampicin +	

S

saccharated iron oxide	B03A C02
saccharomyces boulardii	A07F A02
salbutamol	R03A C02
salbutamol	R03C C02
salbutamol + + ipratropiumbromide	R03A K04
salicylic acid derivative	M02AC00
salmeterol	R03A C12
salmeterol + fluticasone	R03A K06
saquinavir ▲	J05A E01
scopolamine	A04A D01
selegiline ▲	N04B D01
selenium sulphide	D11A C03
senna glycosides	A06A B06
sermorelin	V04C D03
(sertraline)	N06A B06
sevelamer	V03A E02
(sevoflurane)	N01A B08
(sibutramine)	A08A A10
(sildenafil)	G04B E03
silicone	D02A A00
simvastatin ▲	C10A A01
simvastatin + ASA ▲	C10A A51
(sirolimus)	L04A A10
(sodium aurothiomalate)	M01CB01
sodium bicarbonate	A02A H00

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on strong or urgent indication (see p16)

Black text ▲▲:
Documented porphyrogenicity.
Prescribed only on urgent indication (see p16)

sodium bicarbonate	A06A X02	tenecteplase	B01A D11
sodium chloride	B05X A03	tenofovir + disoproxil	J05A F07
sodium chloride	V07A B00	tenoxicam	M01A C02
sodium fluoride	A01A A01	terazosin	G04C A03
sodium glycerophosphate	B05X A14	terbinafine ▲	D01B A02
(sodium oleate +		terbinafine	D01A E15
+ chlorocymol)	C05A X03	terbutaline	R03AC03
sodium picosulfate	A06A B08	terbutaline	R03C C03
somatotropin	H01A C01	terfenadine ▲	R06A X12
sorbitol	A06A G07	testosterone, inj. ▲▲	G03B A03
sotalol	C07A A07	testosterone, transdermal	
specific immunoglobulin	J06B B01	patch ▲	G03B A03
specific immunoglobulin	J01B B04	tetanus toxoid	J07A M01
specific immunoglobulin	J01B B16	tetracaine	S01H A03
spironolactone ▲▲	C03D A01	tetracosactide	H01A A02
(stavudine)	J05A F04	tetracycline ▲	J01A A07
sterculia	A06A C03	theophylline ▲	R03D A04
sterile water	V07A B00	thiopental ▲▲	N01A F03
streptokinase	B01A D01	(thioridazine)	N05A C02
streptokinase	B06A A55	thiamazole ▲	H03B B02
sucralfate	A02B X02	thiamine	A11D A01
sulfadiazine +		tibolone ▲	G03D C05
+ trimethoprim ▲▲	J01E E02	ticlopidine ▲	B01A C05
sulfamethoxazole +		thiethylperazine	R06A D03
+ trimethoprim ▲▲	J01E E01	tiludronic acid	M05B A05
sulfasalazine ▲	A07E C01	timolol	C07A A06
sulfentanil	N01A H03	timolol	S01E D01
(sulindac)	M01A B02	timolol + dorzolamide	S01E D51
sulphur combinations	D11A C08	timolol + latanoprost	S01E D51
(sumatriptan)	N02C C01	timolol + pilocarpine	S01E D51
suxamethonium	M03A B01	tinidazole ▲	J01X D02
T		tinidazole ▲	P01A B02
(tacrolimus)	L04A A05	tinzaparine	B01A B10
(tadalafil)	G04B E08	(tioguanine)	L01B B03
tamoxifen ▲▲	L02B A01	thiotepa ▲	L01A C01
tar	D05 A00	tiotropium	R03B B04
tasonermin	L03A X11	tirofiban	B01A C17
tazarotene	D05A X05	tobramycin	J01G B01
tear substitute	S01X A20	tobramycin	S01A A12
(tegafur + uracil)	L01B C53	tochopherol /vitamin E/ (tolphenamic acid)	A11H A03
teicoplanin	J01X A02	(tolterodin)	M01A G02
telithromycin ▲	J01F A15	topiramate ▲	G04B D07
(telmisartan)	C09C A07	topotecan ▲	N03A X11
(telmisartan +		(torasemide)	L01X X17
+ hydrochlorothiazide)	C09D A07	toremifene ▲	C03C A04
temozolomide	L01A X03	tramadol ▲	L02B A02
			N02A X02

Black text:
Safe or probably safe.
First hand choice

(Black text, brackets):
Possibly porphyrinogenic. Only used where
no safer alternative is available (see p 16)

T-W

trandolapril	C09A A10	vaccine against diphteria, hepatitis B,	
trandolapril +		pertussis and tetanus	J07C A05
verapamil-hydrochloride	C09B B10	vaccine against diphteria, pertussis,	
tranexamic acid	B02A A02	polio and tetanus	J07C A02
trastuzumab	L01X C03	vaccine against hemophilus	
travoprost	S01E X06	influenza B, purified	J07A G01
tretinoin	D10A D01	valaciclovir	J05A B11
triamcinolone	A01A C01	(valerian)	N05C M09
triamcinolone	D07A B09	valganciclovir	J05A B14
triamcinolone + halquinol		valproic acid ▲▲	N03A G01
/cloxiquine/	D07B B03	valsartan	C09C A03
triamcinolone +		valsartan + hydro-	
+ benzalconium + ASA	D07X B02	chlorothiazide	C09D A03
triamcinolone + nystatin	D07X B02	vancomycin	A07A A09
(triamcinolone)	H02A B08	vancomycin	J01X A01
triamcinolone	R01A D11	varicella vaccine,	
triazolam	N05C D05	live attenuated	J07B K01
(trihexyphenidyl)	N04A A01	(venlafaxine)	N06A X16
trimegestone + estrogens▲	G03F B00	verapamil ▲	C08D A01
trimethoprim ▲▲	J01E A01	vercuronium	M03A C03
(trimipramine)	N06A A06	verteporfin	L01X D02
triptorelin	L02A E04	(Vicks VapoRub®)	R05X X00
triticum /weat fiber/	A06A C07	vigabatrin	N03A G04
trometamol	B05B B03	(vinblastine)	L01C A01
trometamol /THAM/	B05X X02	(vincristine)	L01C A02
tropicamide	S01F A06	(vindesine)	L01C A03
tropisetron	A04A A03	(vinorelbine)	L01C A04
tuberculin	V04C F01	vitamin A + D	A11C B00
tuberculosis vaccine,		vitamin B1 + B6 + B12	A11B B00
live attenuated	J07A N01	vitamin B-complex	A11E A00
typhoide vaccine, oral,		vitamin B-complex +	
live attenuated	J07A P01	+ vitamin C	A11E B00
typhoide vaccine, purified		vitamin B-complex,	
polysacc. antigen	J07AP 03	other combinations	A11E X00
tyrothopine	V04C J01	vitamins	B05X C00
U		vitamins – other	
urokinase	B01A D04	combinations	A11J C00
ursodeoxycholic acid	A05A A02	vitamins + calcium	A11J B00
V		voriconazole ▲	J02A C03
vaccine against cholera,		W	
inactivated	J07A E01	warfarin	B01A A03
vaccine against diphteria, hemophilus		water in polymer against	
influenzae B, pertussis,		vaginal dryness	G02C X00
polio and tetanus	J07C A06	von Willebrand factor +	
		acoagulation factor VIII	B02B D06

Black text ▲:
Probably porphyrinogenic. Prescribed only
on strong or urgent indication (see p16)

Black text ▲▲:
Documented porphyrinogenicity.
Prescribed only on urgent indication (see p16)

X _____
xantinol nicotinat C04A D01
(xylometazoline) R01A A07

Y _____
yellow fever vaccine,
live attenuated J07B L01

Z _____
zalcitabine J05A F03
(zaleplon) N05C F03
zanamivir J05A H01
zidovudine/AZT/ ▲ J05A F01
zinc D09A B01
zinc sulphate A12C B01
(ziprasidone) N05A E04
zoledronic acid M05B A08
(zolmitriptan) N02C C03
(zolpideme) N05C F02
zopiclone N05C F01
(zuclopenthixol) N05A F05

FOR YOUR DOCTOR

Drugs can trigger the acute porphyric attack

In the carrier of acute porphyria the disease lies dormant most of the time. Symptoms usually do not develop until several factors cooperate in lowering the activation threshold. The age and sex of the carrier, and the current activity of the disorder, determine the susceptibility to agents that may precipitate the disease.

An agent often found to have triggered the porphyric process is a porphyrinogenic drug.

The vulnerability of the patient to the action of porphyrinogenic agents is increased by a negative caloric balance, current infection, physical or mental stress, use of alcohol, exposure to an organic solvent or current treatment with a potentially porphyrinogenic drug or sex hormone. In women the sensitivity is also increased during periods of hormonal turbulence, i.e. premenstrual, in the first month of pregnancy and in the period following delivery.

The choice of drug

First choice in medication of a carrier of acute porphyria is always a drug classified as safe or probably safe.

An unsafe drug may not be prescribed or administered without strong cause.

First choice should always be a substance classified as safe or probably safe in the drug lists, black text without brackets

If no safe alternative is available a drug classified as possibly unsafe is given; (black text within brackets). For vulnerable patients some precautions should be undertaken (see below).

Drugs classified as probably unsafe, black text ▲, or dangerous, black text ▲▲, shall only be administered on strong or imperative indication and no safer alternatives are at hand and that preventive measures adapted to the vulnerability of the patient are undertaken (see below).

Preventive measures to be undertaken if a potentially unsafe drug must be prescribed

If there are strong or imperative indications for prescribing a potentially dangerous drug, the vulnerability of the patient is to be assessed and used as a basis for individual preventive measures to be undertaken. *See the matrix* (next page):

1. Start the prescription by establishing the susceptibility class of the patient (left column).
2. Enter the column for the risk class of the drug (according to the list).
3. Notice preventive measures to take for the patient in question.

In cases where a potentially dangerous drug must be prescribed:

Matrix over preventive measures

Observance: Tell the patient to observe and immediately report porphyric symptoms, including red urine.

Normosang[®] ready (page 62)

Prescribe carbohydrate (page 62)

Monitor U-PBG: daily the first 4-6 days after start of medication.

Carrier category Susceptibility to porphyrinogenic agents	Drug porphyrinogenicity ATC-list p.34-56			
	Safe or probably safe black text	Possibly unsafe (black text)	Probably unsafe black text ▲	Unsafe black text ▲▲
<p>Highly susceptible</p> <ul style="list-style-type: none"> Carrier with current symptoms 	—	Observance U-PBG (Carbohydrate) (Normosang [®] ready)	Observance U-PBG (Carbohydrate) (Normosang [®] ready)	Observance U-PBG (Carbohydrate) (Normosang [®] ready)
<p>Probably susceptible</p> <ul style="list-style-type: none"> Fertile woman with or without a history of porphyric symptoms. Male carrier below middle age with a history of symptoms or red urine/ increased U-PBG Carrier in or above middle age with recent (<5y) history of clinical symptoms Carrier currently exposed to other porphyrinogenic agents 	—	Observance U-PBG (Carbohydrate) (Normosang [®] ready)	Observance U-PBG (Carbohydrate) (Normosang [®] ready)	Observance U-PBG (Carbohydrate) (Normosang [®] ready)
<p>Possibly susceptible</p> <ul style="list-style-type: none"> Male carrier below middle age without a history of symptoms or red urine/increased U-PBG 	—	Observance U-PBG	Observance U-PBG (Carbohydrate)	Observance U-PBG (Carbohydrate) (Normosang [®] ready)
<p>Probably not susceptible</p> <ul style="list-style-type: none"> Carrier at, or above middle age without a history of symptoms and with normal U-PBG 	—	Observance	Observance U-PBG (Carbohydrate)	Observance U-PBG (Carbohydrate) (Normosang [®] ready)
<p>Not susceptible</p> <ul style="list-style-type: none"> Children before puberty 	—	—	Observance	Observance

ALIMENTARY TRACT AND METABOLISM

A01A Stomatological preparations

sodium fluoride
 calcium fluoride + sodium fluoride
 chlorhexidine
 amphotericin
 miconazole
 ascorbic acid
 (metronidazole)
 triamcinolone

A02A Antacids

aluminium-, calcium- and
 magnesium salts
 sodium bicarbonate

A02B Drugs for peptic ulcer and gastro-oesophageal reflux disease

cimetidine
 ranitidine
 famotidine
 nizatidine
 famotidine + magnesium hydroxide
 + calcium carbonate
 misoprostol
 (omeprazole)
 (pantoprazole)
 lansoprazole ▲
 rabeprazole ▲
 (esomeprazole)
 (esomeprazole, amoxicillin,
 clarithromycin)
 sucralfate
 alginic acid

A03A Drugs for functional gastrointestinal disorders

glycopyrronium
 (mepenzolate)
 (papaverin)
 dimeticon

A03B Belladonna and derivatives, plain

atropine
 hyoscyamine ▲
 butylscopolamine ▲

A03F Propulsives

metoclopramide ▲
 (cisapride)

A04A Antiemetics and anti-nauseants

aprepitant ▲
 ondansetron
 granisetron
 tropisetron
 scopolamine

A05A Bile therapy

ursodeoxycholic acid

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A06A Laxatives

bisacodyl
senna glycosides
sodium picosulfate
cascara + sodium docusate
ispaghula
sterculia
triticum (weat fiber)
magnesium oxide
polyethyleneglycol, sodium sulphate,
sodium hydrogen carbonate,
sodium chloride
macrogol, sodium sulphate, sodium
hydrogen carbonate, sodium
chloride, potassium chloride
polyethyleneglycol, sodium sulphate,
sodium hydrogen carbonate,
potassium chloride
disodium phosphate, dodecahydrate,
sodium dihydrogen phosphate
lactulose
lactilol
bisacodyl
sorbitol
docusate sodium + sorbitol
laurilsulfate + sorbitol
sodium bicarbonate

A07A Intestinal antiinfectives

nystatin
vancomycin

A07B Intestinal adsorbents

medicinal charcoal

A07D Antipropulsives

loperamide
loperamide oxide

A07E Intestinal antiinflammatory agents

prednisolone
hydrocortisone
budesonide

chromoglicic acid
sulfasalazine ▲
mesalazine
olsalazine
balsalazide

A07F Antidiarrheal microorganisms

saccharomyces boulardii

A08A Antiobesity preparations, excl. diet products

(sibutramine)
orlistat

A09A Digestives, incl enzymes

multienzymes
glutamic acid hydrochloride

A10A Insulines and analogues

insulin (human)
insulin lispro
insulin aspart

A10B Oral blood glucose lowering drugs

metformin
glibenclamide ▲
(glipizide)
(glimepiride)
acarbose
miglitol
rosiglitazone ▲
pioglitazone ▲
(repaglinide)
(nateglinide)

A11A Multivitamins

multivitamins + iron
(multivitamins, other combinations)

Black text:
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First hand choice

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A**A11B Multivitamins, without addition**

multivitamins, without addition

A11C Vitamins A and D, incl. combinations of A+D

retinol
 vitamin A + D
 dihydrotachysterol
 alfa calcidol
 calcitriol
 cholecalciferol

A11D Vitamin B1 , incl. combinations with B6 +B12

thiamine
 vitamin B1 + B6+ B12

A11E Vitamin B-complex, incl. combinations

vitamin B-complex
 vitamin B-complex + vitamin C
 vitamin B-complex , other combinations

A11G Vitamin C, incl. combinations with potassium

ascorbate acid
 ascorbate + calcium

A11H Other vitamins, excl. vitamin K and P

pyridoxine (vitamin B6)
 toopherol (vitamin E)

A11J Other comb. with vitamins

vitamins + calcium
 vitamins - other combinations

A12 Mineral supplements

calcium glubionate
 calcium carbonate
 calcium laktogluconate
 calcium acetate
 calcium + vitamin D
 potassium chloride
 potassium citrate
 zinc sulphate
 magnesium salts

A14A Anabolic steroids

nandrolone ▲▲

A16A Other alimentary tract and metabolism products

cysteamine

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BLOOD AND BLOODFORMING ORGANS

B01A Antithrombotic agents

warfarin
 heparin
 antithrombin III
 dalteparin
 enoxaparin
 nadroparin
 danaparoid
 tinzaparine
 (clopidrogel)
 ticlopidine ▲
 acetylsalicylic acid
 dipyridamole
 iloprost
 abciximab
 eptifibatide
 tirofiban
 dipyridamole + ASA
 streptokinase
 alteplase
 urokinase
 reteplase
 drotrecogin alfa
 tenecteplase
 protein C
 desirudin
 lepirudin
 fondaparinux sodium

B02A Antifibrinolytics

tranexamic acid
 aprotinin

B02B Vitamin K and other hemostatics

phytomenadione

antihemophilic factor A (factor VIII)
 factor VIII inhibitor bypassing activity
 antihemophilic factor B (factor IX)
 von Willebrand factor + acoagulation
 factor VIII
 eptacog alfa

B03A Iron preparations

ferrous fumarate
 ferrous gluconate
 ferrous succinate
 ferrous sulphate
 saccharated iron oxide
 ferric salt + caffeine + vitamins

B03B Vitamin B12 and folic acid

cyancobalamin
 cyancobalamin tannin complex
 hydroxycobalamin
 folic acid

B03X Other antianemic preparations

erythropoietin
 darbepoetin alfa

B05A Plasma proteins and other plasma substitutes

albumin
 dextran
 hydroxyethyl starch

B-C

B05B I.v. solutions

amino acids
amino acids + electrolytes
fat emulsions
carbohydrates (solution)
amino acids + lipids + glucose +
electrolytes (solution)
electrolytes: solution for
hemofiltration; sodium
bicarbonate, sodium chloride,
Ringer-
acetate
electrolytes+ carbohydrates
trometamol
mannitol

B05C Irrigating solutions

chlorhexidine

B05D Peritoneal dialytics

isotonic solutions
hypertonic solutions

B05X I.v. solutions additive

potassium chloride
sodium chloride
ammonium chloride
magnesium sulfate
potassium salts, combinations
sodium glycerophosphate
electrolytes in combination with
other agents
alanyl glutamine
vitamins
trometamol (THAM)

B05Z Hemodialytics and hemofiltrates

hemofiltrates

B06A Other hematological agents

streptokinase
human hematin

DRUGS USED IN CARDIOVASCULAR DISEASE

C01A Cardiac glycosides

digitoxin
digoxin

C01B Antiarrhythmics class I and III

quinidine ▲
disopyramide ▲
lidocaine ▲▲
(mexiletine)
(propafenone)
(flecainide)
amiodarone ▲
(ibutilide)

C01C Cardiac stimulators excl. cardiac glycosides

etilefrine
dopamine
phenylephrine
dobutamine
dopexamine
epinephrine
amrinone (inamrinone)
milrinone
(levosimendan)

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C01D Vasodilators used in cardiac disease

glyceryl trinitrate
 isosorbide dinitrate
 isosorbide mononitrate

C01E Other cardiac preparations

alprostadil
 adenosine

C02A Antiadrenergic agents, centrally acting

methyl dopa ▲▲
 clonidine ▲
 moxonidine ▲

C02C Antiadrenergic agents, peripherally acting

doxazosin

C02D Arteriolar smooth muscle, agents acting on

dihydralazine ▲▲
 hydralazine ▲▲

C02K Other antihypertensives

bosentan ▲

C03A Low-ceiling diuretics, thiazides

bendroflumethiazide
 hydrochlorothiazide
 (metolazone)
 bendroflumethiazide + potassium

C03C High-ceiling diuretics

furosemide
 bumetanide
 (torasemide)
 etacrynic acid

C03D Potassium-sparing agents

spironolactone ▲▲
 (potassium canreonate)
 amiloride

C03E Diuretics and potassium-sparing agents in combination

hydrochlorothiazide + amiloride

C04A Peripheral vasodilators

(pentifylline)
 ergoloide mesylate ▲▲
 (cyclandelate)

C05A Antihemorrhoidals for topic use

(hydrocortisone + lidocaine)
 (hydrocortisone + cinchocaine + framycetine)
 (prednisolone + cinchocaine)
 (sodium oleate + chlorothymol)

C05B Antivaricose therapy

organo-heparinoid
 (polidocanol)

C07A Beta-blocking agents

pindolol
 propranolol
 timolol
 sotalol
 metoprolol
 atenolol
 (betaxolol)
 bisoprolol
 esmolol
 metoprolol + ASA
 labetalol
 (carvedilol)

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C**C07F Beta-blocking agents and other antihypertensives**

felodipine + metoprolol ▲

C08C Selective calcium channel blockers with mainly vascular effect

amlodipine ▲
 felodipine ▲
 isradipine ▲
 nifedipine ▲
 nimodipine ▲
 lerkandipine ▲

C08D Selective calcium channel blockers with direct cardiac effects

verapamil ▲
 diltiazem ▲

C09A ACE-inhibitors, plain

captopril
 enalapril
 lisinopril
 ramipril
 quinapril
 cilazapril
 fosinopril
 trandolapril
 moexipril

C09B ACE-inhibitors, combinations

enalapril+ hydrochlorothiazide +
 sodium bicarbonate
 lisinopril + hydrochlorothiazide +
 mannitol +
 kalcium hydrogenphosphate
 dihydrate

ramipril + hydrochlorothiazide
 quinapril + hydrochlorothiazide
 cilazapril + hydrochlorothiazide
 fosinopril + hydrochlorothiazide
 trandolapril + verapamilhydrochloride

C09C Angiotensin II-antagonists, plain (sartans)

(losartan)
 eprosartan
 valsartan
 irbesartan
 candesartan
 (telmisartan)

C09D Angiotensin II-antagonists and diuretics

(losartan + hydrochlorothiazide)
 valsartan + hydrochlorothiazide
 irbesartan + hydrochlorothiazide
 candesartan + hydrochlorothiazide
 (telmisartan + hydrochlorothiazide)

C10A Cholesterol and triglyceride reducers

simvastatin ▲
 (pravastatin)
 fluvastatin ▲
 atorvastatin ▲
 cerivastatin ▲
 rosuvastatin
 simvastatin +ASA ▲
 bezafibrate
 gemfibrozil
 fenofibrate
 colestyramine
 colestipol
 nicotinic acid
 ezetimibe

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DERMATOLOGICAL AGENTS

D01A Antifungals for topical use

nystatin
 clotrimazole
 miconazole
 econazole
 (ketoconazole)
 bifonazole
 miconazole + hydrocortisone
 terbinafine
 amorolfine

D01B Antifungals for systemic use

terbinafine ▲

D02A Emollients and protectives

silicone
 carbamide
 acetylsalicylic acid
 propylene glycol
 glycerol

D03A Preparations for treatment of wounds and ulcers

cadexomer iodine

D04A Antipruritics, incl. antihistamines, anesthetics

lidocaine

D05A Antipsoriatics

tar

(ditraanol)
 calcipotriol tazarotene
 calcipotriol + betamethasone

D05B Antipsoriatics for systemic use

(acitretine)

D06A Antibiotics for topical use

oxytetracycline + polymyxin B
 fusidic acid
 gentamicin
 (mupirocin)

D06B Chemotherapeutics for topical use

acyclovir
 podophyllotoxin
 penciclovir
 imiquimod
 metronidazole

D07A Corticosteroids plain

hydrocortisone
 clobetasone
 hydrocortisone-butyrate
 fluprednidene
 desonide
 triamcinolone
 alclomethasone
 betamethasone
 desoximethasone
 fluocinolone acetonide
 mometasone
 fluticasone
 clobetasol

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First hand choice

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D-G

D07B Corticosteroids, combinations with antiseptics

triamcinolone + halquinol (cloxiquine)
betamethasone + chinofom

D07C Corticosteroids, combination with antibiotics

hydrocortisone + fusidic acid
hydrocortisone + oxitetracycline
betamethasone + neomycin
betamethasone + gentamicin

D07X Corticosteroids other combinations

hydrocortisone + carbamide
triamcinolone + benzalconium + ASA
triamcinolone + nystatin
betamethasone + ASA
desoximethasone + ASA
mometasone + ASA

D08A Antiseptics and disinfectants

chlorhexidine, skin solution
chlorhexidine, vaginal creme
hydrogen peroxide

D09A Medicated dressings

fusidic acid
zinc glue

D10A Anti-acne preparations

tretinoin
adapalene
bensoyl peroxide
(clindamycin)
(azelaic acid)

D11A Other dermatological preparations

selenium sulphide
acetylsalicylic acid + sulphur
(minoxidil)
(finasteride)
tacrolimus
pimecrolimus

GENITO-URINARY SYSTEM AND SEX HORMONES

G01A Antiinfectives and antiseptics, excl. combinations with corticosteroids

clindamycin ▲
(metronidazole)
(clotrimazole)
econazole ▲

G02A Oxytocics

methylergometrine ▲▲
dinoprost
gemeprost
carboprost

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G02C Other gynecologicals

bromocriptine ▲
 cabergoline ▲
 (quinagolide)
 water in polymer against vaginal
 dryness
 atosiban

**G03A Hormonal
contraceptives for systemic
use**

lynestrenol + estrogen ▲▲
 norethisterone + estrogen ▲
 levonorgestrel + estrogen ▲
 desogestrel + estrogen ▲
 norgestimate + estrogen ▲▲
 drospirenone + estrogen ▲▲
 levonorgestrel + estrogen ▲
 norethisterone + estrogen ▲
 desogestrel + estrogen ▲
 norethisterone ▲
 lynestrenol ▲
 levonorgestrel, tabl. 30 mikrog. ▲
 (levonorgestrel, intrauterin
 20 mikrog./24h)
 levonorgestrel, tabl. 750 mikrog. ▲▲
 levonorgestrel, implantat 36mg
 (30 mikrog./24h) ▲
 medroxyprogesterone ▲▲
 etonogestrel ▲▲
 (desogestrel)

G03B Androgener

testosteron, inj., capsulae ▲▲
 testosteron, transdermal patch, gel ▲

G03C Estrogens

estradiol, transdermal patch
 estradiol, vaginal tablet
 (estradiol, tablet)
 (estriol, tablet)
 estriol, vaginal creme/vagitorium
 (conjugated estrogens)

G03D Prostagens

medroxyprogesterone ▲▲
 progesterone, vaginal gel ▲
 dydrogesterone ▲▲
 norethisterone ▲▲
 lynestrenol ▲▲
 tibolone ▲

**G03F Prostagens and female
sex hormones incombination**

norethisterone + estrogen, tabl. ▲
 (norethisterone + estrogen,
 depot transdermal patch)
 medroxyprogesterone + estrogen ▲
 dienogest + estrogen ▲
 trimegestone + estrogen ▲
 levonorgestrel + estrogen ▲

**G03G Gonadotropins and
other ovulation stimulants**

(chorionic gonadotrophin)
 (follitropin alfa)
 (follitropin beta)
 lutopin alfa ▲
 (clomifene)

G03H Antiandrogens

cyproterone ▲
 cyproterone + estrogen ▲

**G03X Hormones and
modulators of the genital
system**

danazol ▲
 mifepristone ▲▲
 raloxifene ▲

G04B Urologicals

potassium - sodium citrate
 (emepromium)
 (oxybutynin)
 (tolterodine)

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G-H

alprostadil
sildenafil
apomorphine
(tadalafil)
magnesium hydroxide

G04C Drugs used in benign prostatic hypertrophy

(alfuzocin)
terazosin
(finasteride)

HORMONES EXCLUDING REPRODUCTIVE HORMONES

H01A Anterior pituitary lobe hormones and analogues

tetracosactide
somatropin

(methylprednisolone)
(prednisolone)
(prednisone)
(triamcinolone)
(hydrocortisone)
(cortisone)

H01B Posterior pituitary lobe hormones

desmopressin
oxytocin

H03A Thyroid preparations

levothyroxine sodium
liothyronine sodium

H01C Hypothalamic hormones

(gonadorelin)
(nafarelin)
octreotide
lanreotide
ganirelix
cetorelix

H03B Antithyroid preparations

propylthiouracil
thiamazole ▲

H02A Cortico-steroids for systemic use, plain

fludrocortisone
betamethasone
dexamethasone

H04A Glukogenolytic hormone

glucagons

H05B Antiparathyroid hormones

calcitonin /salmon synthetic/

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DRUGS USED IN INFECTIOUS DISEASES

J01A Tetracyclines

(doxycycline)
lymecycline ▲
oxytetracycline ▲
tetracycline ▲

J01B Amphenicols

chloramphenicol ▲▲

J01C Beta-lactam, anti-bacterials, penicillins

ampicillin
pivampicillin ▲▲
amoxicillin
bacampicillin
pivmecillinam ▲▲
mecillinam ▲▲
piperacillin
benzylpenicillin/penicillin G/
phenoxymethylpenicillin/penicillinV/
dicloxacillin
cloxacillin
(flucloxacillin)
amoxicillin and betalactamase inhibitor
piperacillin and betalactamase inhibitor

J01D Other beta-lactam antibacterials

cefalexin
cefoxitin
cefuroxime
cefadroxil
cefotaxime
ceftazidime
ceftriaxone
cefixime
cefepime
cefepodoxime

loracarbef
ceftibuten
ceftriaxone + lidocaine ▲
aztreonam
meropenem
ertapenem
imipenem + cilastatin

J01E Sulfonamides and trimethoprim

trimethoprim ▲▲
sulfamethoxazole + trimethoprim ▲▲
sulfadiazine + trimethoprim ▲▲

J01F Macrolides, lincosamides och streptogramins

erythromycin ▲▲
(roxithromycin)
clarithromycin ▲
azithromycin
telithromycin ▲
clindamycin ▲▲
(quinupristin + dalfopristin)

J01G Amino-glycoside antibacterials

tobramycin
gentamicin
amikacin
netilmicin

J01M Quinolone antibacterials

ofloxacin
ciprofloxacin
norfloxacin
levofloxacin
moxifloxacin

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First hand choice

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J**J01X Other antibacterials**

vancomycin
 teicoplanin
 fusidic acid
 metronidazole ▲
 tinidazole ▲
 nitrofurantoin ▲▲
 fosfomycin
 methenamine
 (linezolid)

J02A Antimycotics for systemic use

amphotericin B
 ketoconazole ▲▲
 fluconazole ▲
 itraconazole ▲
 voriconazole ▲
 flucytosine
 caspofungin

J04A Drugs for treatment of tuberculosis

rifampicin ▲▲
 rifabutin ▲
 isoniazide ▲
 ethambutol
 rifampicin + isoniazide ▲▲

J05A Antivirals for systemic use

acyclovir
 ribavirin
 ganciclovir
 famciclovir
 valaciclovir
 valganciclovir
 foscarnet
 saquinavir ▲

indinavir ▲▲
 ritonavir ▲▲
 nelfinavir ▲
 amprenavir ▲
 lopinavir ▲
 zidovudin/AZT/ ▲
 didanosine
 zalcitabine
 (stavudine)
 lamivudine
 abacavir
 tenofovir disoproxil
 adefovir dipivoxil
 emtricitabine
 lamivudine + zidovudine ▲
 nevirapine ▲
 delavirdine ▲
 efavirenz ▲
 zanamivir
 oseltamivir

J06B Immunoglobulins

immunoglobulins, intramuscular
 immunoglobulins, intravenous
 anti-D (rh) immunoglobulin
 hepatitis B immunoglobulins
 palivizumab

J07 Vaccines

vaccine against diphtheria, hepatitis B, pertussis and tetanus
 cholera vaccine, inactivated, whole cell
 diphtheria toxoid
 vaccine against hemophilus influenzae B, purified antigen conjugated
 meningococcus vaccine, monovalent
 meningococcus vaccine, bivalent
 pertussis, purified antigen
 pneumococcus vaccine inactivated, whole cell
 tetanus toxoid

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J07 Vacciner

tuberculosis vaccine, live attenuated
 typhoide vaccine, oral, live attenuated
 typhoide vaccine, purified polysaccharide antigen
 encephalitis vaccine, tick borne,
 influenza vaccine, purified antigen
 hepatitis B vaccine, purified antigen
 hepatitis A vaccine
 hepatitis A and B vaccine
 morbilli vaccine in combination with parotitis and rubella

poliomyelitis vaccine, oral
 rabies vaccine, inactivated
 rubella vaccine, live attenuated
 varicella vaccine, live attenuated
 yellow fever vaccine, live attenuated
 vaccine against diphteria, pertussis, poliomyelitis and tetanus
 vaccine against diphteria, hepatitis B, pertussis and tetanus
 vaccine against diphteria, hemophilus influenzae B, pertussis, poliomyelitis and tetanus
 vaccine against diphteria, hemophilus influenzae B, pertussis, tetanus, poliomyelitis and hepatitis B

ANTINEOPLASTIC AND IMMUNOMODULATING AGENTS**L01A Alkylating agents**

(cyclophosphamide)
 (chlorambucil)
 (melphalan)
 ifosfamide ▲
 busulfan ▲
 thiotepa ▲
 (lomustine)
 temozolomide
 (dacarbazine)

L01B Antimetabolites

methotrexate
 (mercaptapurine)
 (tioguanine)
 cladribine
 fludarabine
 cytarabine
 fluorouracil
 gemcitabine
 capecitabine
 (tegafur + uracil)

L01C Plant alkaloids and other natural products

(vinblastine)
 (vincristine)
 (vindesine)
 (vinorelbine)
 etoposide ▲
 paclitaxel ▲
 (docetaxel)

L01D Cytotoxic antibiotics and related substances

dactinomycin
 doxorubicin
 (daunorubicin)
 epirubicin
 idarubicin
 (mitoxantrone)
 bleomycin
 (mitomycin)

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First hand choice

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L**L01X Other antineoplastic agents**

cisplatin
 carboplatin
 oxaliplatin
 rituximab
 trastuzumab
 alemtuzumab
 verteporfin
 (amsacrine)
 asparaginase
 altretamine ▲
 (hydroxycarbamide)
 miltefosine
 estramustine ▲
 topotecan ▲
 irinotecan S ▲
 (imatinib)

L02A Hormones and related agents

(polyestradiol phosphate)
 megestrol ▲ ▲
 medroxyprogesterone ▲ ▲
 buserelin
 leuprorelin
 goserelin
 triptorelin

L02B Antihormones

tamoxifen ▲ ▲
 toremifene ▲
 (flutamide)
 (nilutamide)
 (bicalutamide)
 (anastrozole)
 (letrozole)
 exemestane ▲

L03A Cytokines and immuno modulators

filgrastim
 molgramostim
 lenograstim
 pelfigrastim
 interferon alfa
 interferon gamma
 interferon alfa-2a
 interferon alfa-2b
 interferon beta-1a
 interferon beta-1b
 peginterferon alfa-2b
 peginterferon alfa-2a
 BCG vaccine
 tasonermin
 glatiramer acetate

L04A Immunosuppressive agents

(cyclosporin)
 muromonab-CD3
 antithymocyte immunoglobulin
 (tacrolimus)
 mycophenolic acid
 daclizumab
 basiliximab
 (sirolimus)
 etanercept
 infliximab
 leflunomide
 anakinra
 azathioprine ▲

Black text ▲:
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Black text ▲ ▲:
Documented porphyrinogenicity. Prescribed only on urgent indication (see p16)

MUSCLE, JOINTS, SKELETON

M01A Antiinflammatory and antirheumatic products, non-steroids

(indometacin)
 (sulindac)
 diclofenac ▲
 (ketorolac)
 (aceclofenac)
 diclofenac + misoprostol ▲
 piroxicam
 tenoxicam
 lornoxicam
 meloxicam
 ibuprofen
 naproxen
 ketoprofen
 dexibuprofen
 ibuprofen + codeine
 (tolphenamic acid)
 (celecoxib)
 (rofecoxib)
 (valdecoxib)
 (parecoxib)
 (etoricoxib)
 (nabemutone)
 glucosamine

M01C Specific antirheumatic agents

(sodium aurothiomalate)
 (auranofin)
 penicillamine

M02A Topical products for joint and muscular pain

ketoprofen, gel
 ibuprofen, gel
 diclofenac, gel ▲
 acetylsalicylic acid, ointment

M03A Muscle relaxants, peripherally acting agents

suxametonium
 pancuronium
 vecuronium
 atracurium
 rocuronium
 mivacurium
 cisatracurium
 botulinum toxin

M03B Muscle relaxants, centrally acting agents

carisoprodol ▲▲
 carisoprodol + paracetamol
 + caffeine ▲▲
 (chlorzoxazone)
 chlorzoxazone + ASA
 + dextropropoxyphene ▲▲
 orphenadrine ▲▲
 orphenadrine + paracetamol ▲▲
 baclofen

M04A Antigout preparations

allopurinol
 probenecid ▲

M05B Drugs affecting bone structure and mineralization

etidronic acid
 clodronic acid
 pamidronic acid
 alendronic acid
 tiludronic acid
 ibandronic acid
 risedronic acid
 zoledronic acid

M09A Other drugs for disorders of the musculo-skeletal system

hyaluronic acid

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First hand choice

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DRUGS WITH ACTION IN THE NERVOUS SYSTEM

N01A Anaesthetics general

halothane ▲
 enflurane
 isoflurane
 desflurane
 (sevoflurane)
 thiopental ▲▲
 fentanyl
 alfentanil
 sufentanil
 remifentanil
 droperidol
 ketamine ▲▲
 propofol

N01B Anaesthetics local

bupivacaine
 lidocaine, gel, solution for
 surface anesthesia
 lidocaine mixture, viscous ▲
 lidocaine, solution for injection ▲
 (mepivacaine)
 (mepivacaine "Dental")
 prilocaine gel
 (prilocaine, solution for injection)
 (ropivacaine)
 levibupivacaine
 lidocaine + prilocaine, surface
 anesthesia
 bupivacaine + epinephrine
 (lidocaine + epinephrine)
 (mepivacaine + epinephrine)

articaine + epinephrine
 (prilocaine + octapressin)
 capsaicin

N02A Opioids

morphine
 hydromorphone
 (oxycodone)
 codeine + paracetamol
 ketobemidone
 pethidine
 fentanyl, adhesive
 fentanyl, tabl
 dextropropoxyphene ▲▲
 dextropropoxyphene
 + paracetamol ▲▲
 dextropropoxyphene + ASA+
 + phenazone ▲▲
 buprenorphine
 (morphine + scopolamine)
 (ketobemidone + DDBA)
 hydromorphone + atropine
 tramadol ▲

N02B Other analgesics and antipyretics

acetylsalicylic acid
 diflunisal
 acetylsalicylic acid + caffeine
 phenazone + caffeine ▲
 paracetamol
 propazetamol, infusion
 paracetamol + codeine

N02C Antimigraine preparations

dihydroergotamine ▲▲
 ergotamine + caffeine ▲▲
 ergotamine + chlorcyclizine +
 meprobamate + caffeine ▲▲
 (sumatriptan)
 (naratriptan)
 (zolmitriptan)
 (rizatriptan)
 almotriptan
 (eletriptan)
 (pizotifen)

N03A Antiepileptics

phenobarbital ▲▲
 primidone ▲▲
 phenytoin ▲▲
 fosphenytoin sodium ▲▲
 ethosuximide ▲
 clonazepam
 carbamazepine ▲▲
 oxcarbazepine ▲
 valproic acid ▲▲
 vigabatrin
 (lamotrigine)
 felbamate ▲
 topiramate ▲
 gabapentin
 levetiracetam

N04A Anti-cholinergic agents

(trihexyphenidyl)
 (biperiden)
 (metixene)
 orphenadrine ▲▲
 (benzatropine)

N04B Dopaminoergic agents

(levodopa + benzerazide)
 bromocriptine ▲
 (ropinirol)
 pramipexole
 cabergoline ▲
 selegiline ▲
 entacapone

N05A Antipsychotics

chlorpromazine
 levomepromazine
 dixyrazine
 fluphenazine
 perphenazine
 prochlorperazine
 (thioridazine)
 haloperidol
 (melperone)
 droperidol
 (ziprasidone)
 (flupentixol)
 (chlorprotixene)
 (zuchlopenthixol)
 clozapine
 olanzapine
 (quetiapine)
 lithium
 risperidone ▲

N05B Anxiolytics

diazepam ▲
 oxazepam
 lorazepam
 alprazolam
 hydroxyzine ▲▲
 buspirone ▲

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N**N05C Hypnotics and sedatives**

nitrazepam ▲
 flunitrazepam ▲
 triazolam
 (midazolam)
 zopiclone
 (zolpidem)
 (zaleplon)
 (clomethiazole)
 propiomazine
 (valerian)

N06A Antidepressants

imipramine ▲
 (clomipramine)
 (trimipramine)
 (lofepramine)
 amitriptyline ▲
 nortriptyline ▲
 (maprotiline)
 (fluoxetine)
 (citalopram)
 paroxetine ▲
 (sertraline)
 (fluvoxamine)
 (escitalopram)
 (moclobemide)
 (mianserin)
 nefazodone ▲
 (mirtazapine)
 (venlafaxine)
 (reboxetine)
 Saint John's Wort ▲▲

**N06B Psychostimulants, agents used for ADHD
nootropics**

methylphenidate
 modafinil
 caffeine
 piracetam

N06D Antidementia drugs

(donepezil)
 rivastigmine
 (galantamine)
 memantine

N07A Parasympathometics

neostigmine
 pyridostigmine
 ambenonium
 neostigmine + glucopyrronium
 pilocarpine

**N07B Drugs used in
addictive disorders**

nicotine
 (bupropion)
 disulfiram ▲
 acamprosate
 (naltrexone)
 buprenorphine
 (methadone)

**N07X Other nervous system
drugs**

riluzole ▲

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ANTIPARASITIC DRUGS, INSECTICIDES, REPELLENTS

P01A Agents against amoebiasis and other protozoal diseases

metronidazole ▲
tinidazole ▲
atovaquone

P01B Antimalarials

(chloroquine)
(hydroxy-chloroquine)
(proguanil)
(proguanil + atovaquone)
(quinine)
(mefloquine)
artemether + lumefantrine ▲

P01C Agents against leishmaniasis and trypanosomiasis

pentamidine isethionate

RESPIRATORY SYSTEM

R01A Decongestants and other nasal preparations for topical use

oxymetazoline
(xylometazoline)
chromoglicic acid
levocabastine
(azelastine)
beclometasone
budesonide
fluticasone
mometasone
triamcinolone
ipratropium

R01B Other nasal preparations

phenylpropanolamine
(phenylpropanolamine + cinnarizine)
(pseudoephedrine + dexbrompheniramine)

P02C Anti-nematodal agents

(mebendazole)
pyrvinium

P02D Antisestodals

niclosamide

P03A Ectoparasitocides, incl. scabicides, insecticides and repellents

disulfiram + benzyl benz.
+ triethanolamine stearate ▲
permethrin
(malathion)

R02A Throat preparations

(dichlorobenzyl alcohol /2,4
dichlorophenylcarbinol + 5-
methyl- 2- pentyl-phenol/)
(gramicidin)
(lidocaine, solution for gargling)

R03A Adrenergics, inhalants

salbutamol
terbutaline
fenoterol
salmeterol
formoterol
salbutamol + ipratropium bromide
salmeterol + fluticasone
formoterol + budesonide

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R**R03B Other drugs for obstructive airway diseases**

beclometasone
 budesonide
 fluticasone
 mometasone
 ipratropium
 tiotropium
 chromoglicic acid

R03C Alpha - and beta - adrenoreceptor agonists

ephedrine
 salbutamol
 terbutaline
 bambuterol

R03D Other systemic drugs for obstructive airway diseases

choline theophyllinate ▲
 theophylline ▲
 aminophylline ▲
 (montelukast)

R05C Combinations with cough suppressants

(guaifenesin)
 (ammonium chloride
 + diphenhydramine)
 (chlorcyclizine + guaifenesin)
 (ammonium chloride+quilliaia extract)
 acetylcysteine
 (bromhexine)
 (bromhexine + ephedrine)
 dornase alpha /deoxyribonuclease /

R05D Cough suppressants, excl. combinations with expectorants

codeine
 (noscapine)
 ethylmorphine + ephedrine
 (pentoxyverine)

R05F Cough suppressants and expectorants, combinations

(ethylmorphine + cocillanum extract
 + senega extract)

R05X Other cold combination preparations

(Vicks VapoRub®)

R06A Antihistamines for systemic use

diphenhydramine ▲
 clemastine ▲
 (dexchlorpheniramine)
 alimemazine
 promethazine
 thiethylperazine
 caffeine + ephedrine + promethazine
 cyclizine ▲
 meclozine ▲
 cetirizine ▲
 nicotinic acid + meclozine +
 hydroxyzine ▲▲
 (cyproheptadine)
 terfenadine ▲
 loratadine
 (acrivastine)
 ebastine ▲
 mizolastine
 fexofenadine
 desloratadine

R07A Other respiratory system products

phospholipids, natural

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EYES AND EAR**S01A Antiinfectives**

chloramphenicol
 chlortetracycline
 tobramycin
 fusidic acid
 polymyxin B + neomycin +
 metaoxedrine
 aciclovir
 fomivirsen
 bibrocatol
 ciprofloxacin

S01B Antiinflammatory agents

dexamethasone
 hydrocortisone
 prednisolone
 rimexolone
 diclofenac

S01E Antiglaucoma preparations and miotics

epinephrine
 dipivephrine
 apraclonidine
 brimonidine
 pilocarpine
 carbachol
 dorzolamide
 brinzolamide
 timolol
 betaxolol
 carteolol
 timolol + dorzolamide
 timolol + pilocarpine
 timolol + latanoprost
 latanoprost
 travoprost

S01F Mydriatics and cycloplegics

atropine
 cyclopentolate
 tropicamide
 fenylephrine

S01G Decongestants and antiallergics

naphazoline
 naphazoline + antazoline
 fenylephrine + zinc sulphate
 chromoglicic acid
 levocabastine
 nedocromil
 emedastine
 azelastine
 ketotifen

S01H Local anaesthetics

oxybuprocaine
 tetracaine
 cinchocaine

S01J Diagnostic agents

fluorescein
 fluorescein + oxybuprocaine
 fluorescein + lidocaine

S01X Other ophthalmologicals

tear substitute

S02B Corticosteroids

betamethasone

S02C Corticosteroids and antiinfectives in combination

flumethasone + clioquinol

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First hand choice

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S-V**S03B Corticosteroids
(eyes/ears)**

dexamethasone

**S03C Corticosteroids and
antiinfectives in combination**dexamethasone + neomycin
hydrocortisone + polymyxin B**VARIOUS AGENTS****V01 Allergens**

allergen extract

tuberculin
aminohippuric acid
thyrotropine
Helicobacter diagnosticum
Helicobacter Test**V03 All other therapeutic
products**obidoxime
(naloxone)
potassium iodide
digitalis antitoxin
(flumazenil)
(fomepizole)
deferoxamine
deferiprone
polystyrene sulfonate
sevelamer
mesna
calcium folinate
amifostine
rasburicase
fibrinogen + thrombin, tissue glue**V06 Other nutrients**aminoacids and minerals
aminoacids**V07 All other non-
therapeutic products**sodium chloride
sterile water
fluid for organ storage**V08 X-ray contrast media,
iodinated**

amidotrizoic acid

V04 Other diagnostic agentsmetyrapone ▲
sermorelin

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SURGERY AND ANAESTHESIA

Unclear abdominal pain?

Symptom of acute porphyria?

The most frequent symptom in acute porphyria is abdominal pain. Many carriers have experienced one or more laparoscopies without objective findings.

Today most carriers of acute porphyria are aware of their diagnosis and are able to inform the doctor of this condition. In some cases they also recognize the pains as clearly porphyric.

Family history of acute porphyria?

Ask for family history in unclear cases; most porphyrics know whether there is porphyria in their family.

Porphyria warning card?

In some countries the Porphyria Patients' Association issues a personal warning card to be presented by the porphyria carrier in health care contacts.

Red urine?

Porphyria does not protect against other disease conditions. Thus abdominal pain in a carrier of acute porphyria is not necessarily due to the porphyric disposition of the patient. One help in the diagnosis is whether red or red-brown urine is observed or not. In a porphyric attack of some magnitude this sign is invariably present, being due to increased excretion of porphyrins and the porphyrin precursor PBG. Red or red-brown urine (not due to blood admixture or ingestion of foods or drugs that colour the urine) is diagnostic for acute porphyria.

If the urine has a normal colour, in dubious cases a safety measure before operation may be to keep the specimen at room temperature in daylight for half an hour. During this time the colourless PBG will oxidize turning the urine specimen red, which is the marker for acute porphyria in active phase. Ask the laboratory to make a qualitative test for PBG, sending about 30 mL of the spot sample collected.

False signals

The urine may take on a reddish colour also in hematuria and after ingestion of beetroot, rhubarb or medication containing phenothiazines, ibuprofene, metyldopa, phenytoin, and rifampicin. (Note that the last three drugs mentioned may indeed have been the triggering agent in a current porphyric attack.)

It should be noted that the antibiotic cilastatin (Tienam[®]) will disturb the laboratory analysis of the porphyrin precursor 5-aminolevulinic acid (ALA), which is also increased in concentration in urine in active phase of acute porphyria. Falsely elevated levels of ALA may thus be reported, if the laboratory staff does not observe the slightly different, and mauve colour developed in the assay in the presence of this antibiotic.

Adapt medication and anaesthesia to the porphyric disposition of the patient

If it is suspected, or is clear, that the patient is a carrier of acute porphyria, the choice of drugs to be administered must be adapted to this circumstance. Otherwise there is a significant risk for precipitation of an acute porphyric crisis.

Risk assessment in medication

The risk for starting an acute porphyric attack by administration of a drug is minimized by selecting, where available, a substance classified as safe in the drug lists (pages 34 – 56).

When it comes to potentially dangerous drugs any actual porphyrinogenic effect is difficult to foresee. If the carrier is in a stable porphyrin-metabolic balance and not subjected to other porphyrinogenic challenges, a drug reported to have caused symptoms in other carriers of acute porphyria may well show to be tolerated. This statistical fact is, however, for obvious reasons of restricted practical significance in the individual case. Therefore, where a porphyrinogenic drug must be prescribed, this should only be undertaken under an umbrella of individual protective measures for the patient (page 33).

If the porphyric mechanisms are activated in the patient, e.g. by fasting, infection, other drugs or anaesthesias, stress, sleep deprivation or alcohol, and the triggering threshold thus is low, a more pessimistic view on the outcome is motivated and prophylactic measures should be strengthened.

Preoperative neurological evaluation

Preoperative neurological assessment should consider a possible sequel from previous attacks, if such. If the patient is currently symptomatic the investigation is focused on motor function and on bulbar engagement possibly predisposing for respiratory crisis.

Prophylactic glucose administration

The need for preoperative fasting and the physical and mental stress connected with operation may be factors contributing to a negative metabolic strain in a patient who is a carrier of acute porphyria. If the patient recently has been affected by porphyric symptoms the risk for precipitation of an acute porphyric crisis by the surgery is even larger.

The protective effect of carbohydrates can be taken advantage of by infusion of 10 % glucose from the start of the preoperative fasting until the patient post-operatively is on a diet providing adequate caloric intake. A daily dose of at least 300 g is recommended.

General anaesthesia	
<p>Premedication</p> <p><i>use</i></p> <p>Atropine Droperidol Fentanyl Midazolam (prepubertal patient) Morphine analgetics Oxacepam Scopolamine (hyacine)</p> <p><i>do not use</i></p> <p>Thiopental(strongly porphyrinogenic)</p>	<p>Induction</p> <p><i>use</i></p> <p>Droperidol Desflurane Isoflurane Midazolam (prepubertal patient) Propofol Remifentanil</p> <p><i>avoid if possible</i></p> <p>Ketamine (probably unsafe, use only on urgent indication) Halotane (probably porphyrinogenic)</p>
<p>Sustaining narcosis</p> <p><i>use</i></p> <p>Alfentanil Desflurane Droperidol Fentanyl Isoflurane Midazolam (prepubertal patient) Propofol Remifentanil</p> <p><i>avoid if possible</i></p> <p>Ketamine (probably unsafe, use only on urgent indication) Halotane (probably porphyrinogenic)</p> <p><i>do not use</i></p> <p>Thiopental (strongly porphyrinogenic)</p>	<p>Analgesics</p> <p><i>use</i></p> <p>Buprenorphine Droperidol Hydromorphone Ibuprophene Ketobemidone Morphine Naproxene Paracetamol</p> <p>Pethidine (<i>avoid if porphyria is activated!</i>) Remifentanil Sufentanil</p>
<p>Muscle relaxants</p> <p><i>use</i></p> <p>Atracurium Cisatracurium Mivatracurium Pancuronium Rocuronium Vecuronium Glycopyrronium (for reversal)</p>	<p>Sedatives / antiemetics</p> <p><i>use</i></p> <p>Alimemazine Cyclizine Droperidol Granisetron Leptanal Ondasetron Prochlorperazine Thiethylperazine Triazolam Tropisetron</p> <p><i>avoid</i></p> <p>Metoclopramide Nitrazepam Diazepam</p>
<p>Hypotensives</p> <p><i>use</i></p> <p>Adrenaline Noradrenaline</p>	

Postoperative monitoring

Porphyric symptoms or symptoms of sodium or magnesium deficiency?	Daily controls
Prolonged vomiting Red or red-brown urine Tachycardia, hypertension, obstipation Heart arrhythmia Agitation, insomnia, psychosis, hallucinosis Unexplained abdominal pain, gluteal or back pain Numbness in the extremities, pareses, paralysis Hoarseness, whispering voice, respiratory distress Seizures Urinary retention Blindness	Colour of urine (red?) Heart rate, blood pressure Serum sodium and magnesium concentrations

Local anaesthesia

Agents used in local anaesthesia are porphyrinogenic in a dose-dependent way. If a large dose is needed other forms of anaesthesia may be considered.

Bupivacaine (Marcaine®) is first choice and has in no case been reported to have caused any porphyric adverse effects.

Articaine (Septocaine®) is a relatively new local anaesthetic and not yet reported to have been tested in carriers for acute porphyria. It can from theoretical considerations be said to be suited for use.

Addition of adrenaline to the anaesthetic will decrease the risk and increase the dose that can be tolerated, since the systemic effect per unit time is lessened.

In recommended, restricted application on skin and mucous membranes the systemic effects generally are limited, and anaesthesia can probably be given with any of the local anaesthetics without risk for porphyric adverse reactions.

PREGNANCY AND ACUTE PORPHYRIA

Previously the morbidity in acute porphyria was rather high during pregnancy. The most risky periods were the first two months after conception and in the puerperium, i.e. during periods when the hormonal changes are explicit. Today, carriers of acute porphyria are generally well informed about the mechanisms behind the acute attack and the way to prevent outbreaks. Porphyrin problems during pregnancy are not common in carriers usually free from symptoms, but the risk is increased and attention is motivated. Therefore it is important that the mother-to-be knows about her predisposition and about preventive and therapeutic measures to be taken. Advice regarding medication and lifestyle, including alcohol and smoking, is to be adhered to.

Controls of urinary PBG

As soon as the pregnancy is recognized, urine excretion of PBG should be quantified. The result will be of use as a reference in the following controls after three months and immediately before delivery, as well as if signs and symptoms pointing to porphyria develop. Vomiting may occasionally be a sign of activation of the porphyria.

Medication only with safe drugs.

Urinary tract infections increase the susceptibility to other porphyrinogenic factors and should be treated.

Porphyrin symptoms during pregnancy are treated as usual with carbohydrate and/or hemarginate, which are stated not to be dangerous for the child.

At delivery

In especially vulnerable patients carbohydrates can be given the day before delivery as a protection against the porphyrinogenic stress of labour. Due to the risk for lactacidosis in the child in asphyxia, glucose should not be administered to the mother during the delivery.

Local anaesthesia is administered with bupivacaine. Oxytocine and propanteline are safe. Beware of ergotamine.

TREATMENT OF THE ACUTE PORPHYRIC ATTACK

Initial measures:

Give symptomatic relief by use of safe drugs

Start specific treatment

Stop any unsafe medication if possible

Secure as soon as possible a urine specimen for quantitation of PBG

Control fluid and electrolyte balance

Specific treatment:

Control the pathogenetic mechanism

The underlying pathogenetic mechanisms are addressed by parenteral administration of *glucose* and/or heme in the form of *hemarginate* (Normosang[®]) or *hematin* (Panhematin[®]). In less severe cases, and where the patient is not vomiting, infusion of a carbohydrate solution via a fine nasogastric tube may suffice to turn the process. The specific treatment aims at damping the flux through the heme synthetic pathway, thus lessening the strain on the deficient enzyme and consequently the accumulation of the presumably neurotoxic metabolites. Infusion of glucose may also help to correct a negative fluid and caloric balance resulting from prolonged vomiting and sustaining the porphyric disease process. Administration of large volumes of hypotonic solution is to be avoided since hyponatremia may develop or be made worse. In most patients symptoms such as pain and nausea usually give way within 4-5 day under treatment. Loss of muscular strength may take longer to yield, but is in most cases reversible. Start immediately infusion of *glucose in saline*. Give 2 litres of 10 % glucose in

saline / 24 hours via central venous catheter or a permanent venous catheter. In a less severe attack it is motivated to wait for perhaps twenty-four hours with further treatment in order to see whether the glucose may be sufficient to turn the process.

In a more serious attack (severe pain, prolonged vomiting, hyponatremia, pareses, respiratory distress or other signs of motor or bulbar engagement, distressing mental symptoms) glucose treatment is without delay supplemented with administration of *hemarginate or hematin in albumin solution*. Where hemarginate is available give daily 1 ampoule Normosang[®] dissolved (in glass vial) in 100 mL 20% (200 mg/ml) albumin solution, which is immediately administered after the preparation. The solution is infused during 20 minutes in a large vein, or if such is available via central venous catheter. In order to counteract thrombophlebitis, the vein is rinsed with saline for 15 minutes after the infusion. If there is need for repeated treatment episodes indwelling catheter (Portacath[®]) is used.

Give symptomatic treatment	
<p>Pain The pain in an acute attack of porphyria may be excruciating and opiates are often needed to control it. Under circumstances of closely repeated attacks the risk for development of dependence should be kept in mind.</p> <p>Severe abdominal pain may depend on visceral ischemia (“abdominal angina”). Try giving nitroglycerine.</p> <p>Help the patient to sleep through the crisis by the aid of a suitable neuroleptic and a darkened silent room.</p>	<p><i>Use:</i> <i>Acetylsalicylic acid</i> <i>Acetaminophen</i> <i>Morphine</i>, maximally 50 mg i.m. twice daily, rather not longer than 4-5 days. (Avoid pethidine on grounds of its neurotoxic metabolite norpethidine.) If needed, give <i>buprenorphine</i> inbetween the doses, 0.15 mg i.m. four times daily, or 0.20 mg tablets sublingually four times daily. <i>Glycerylnitrate</i> <i>Dixyrazine</i>, 5 mg i.m four times during the first 24 hours, the following days 10 mg p.o. four times daily.</p>
<p>Nausea, vomiting Opiates may worsen nausea. Give antiemetic before their administration.</p>	<p><i>Use:</i> <i>Clorpromazine</i> <i>Cyclicine</i> <i>Droperidone</i> <i>Prochlorperazine</i></p>
<p>Agitation, insomnia, confusion, psychosis Hyponatremia? Hypomagnesemia? Mental symptoms are characteristically fluctuating.</p>	<p><i>Monitor serum electrolytes</i> <i>Use:</i> <i>Chlorpromazine</i> <i>Fluphenazine</i> <i>Triazolam</i> <i>Dixyrazine</i></p>
<p>Depression Avoid lithium since there is risk for renal engagement in acute porphyria</p>	<p><i>Use:</i> <i>Lofepramine</i> <i>Mianserine</i></p>
<p>Tachycardia, hypertension Sympaticotonic manifestations are rule if the patient is not on betablocker medication. Observe that paroxysmal heart arrhythmia and circulatory collapse due to autonomous lability can be precipitated if the patient is rapidly raised from lying position to sitting up.</p>	<p><i>Use:</i> <i>Propranolol</i> Observe that many patients in acute porphyric crisis are sensitive even to a dose as low as 10 mg three times daily. Start with a low dose, which also may occasionally give rise to hypotension and bradycardia.</p>

<p>Heart arrhythmia Irregular heart action may be a sign of hypomagnesaemia, where also mental symptoms and seizures may be part of the clinical picture.</p>	<p><i>Monitor electrolyte balance.</i> In hypomagnesaemia give 30-40 mmol <i>magnesium sulphate</i> solution parenterally daily until the serum concentration normalizes. After that a sustaining dose of 10 mmol/day may be administered. Follow patellar reflex and breathing frequency.</p>
<p>Seizures Hyponatremia? Hypomagnesaemia? Hypertensive encephalopathy? Blood pressure?</p>	<p>Check electrolyte balance including plasma osmolality and urinary sodium excretion. If needed restore serum electrolyte balance to normal. In hypomagnesaemia give 30-40 mmol <i>magnesium sulphate</i> solution parenterally daily until the serum concentration normalizes. After that a sustaining dosis of 10 mmol/day may be administered. Follow patellar reflex and breathing frequency. <i>Use:</i> <i>Diazepam i.v.</i></p>
<p>Obstipation</p>	<p><i>Use:</i> <i>Cisapride</i> <i>Senna</i> <i>Lactulose</i> <i>Sorbitol</i></p>
<p>Ileus</p>	<p><i>Use:</i> <i>Neostigmine</i></p>
<p>Diarrhoea</p>	<p><i>Use:</i> <i>Loperamide</i></p>

Monitoring the acute porphyric crisis

Follow urinary porphobilinogen excretion

The concentrations in urine of the porphyrin precursors porphobilinogen (PBG) and 5-aminolevulinic acid (ALA) reflect the current activity of the porphyric process, clinical improvement being accompanied by falling excretion. If possible check daily the concentration of PBG in a morning spot-sample of urine.

Observe the colour of the specimen; a decrease in the intensity of the red or red-brown colour may indicate remission, provided the concentration of the urine has not changed too much since the previous sample.

In order to compensate for differences in the concentration of the urine, ask the laboratory to normalize the quantitative result of U-PBG to the creatinine concentration of the sample.

The result shall be given immediately by telephone; yesterday's value is only of minor interest in the handling of the patient during the acute crisis.

Monitor fluid and electrolyte balance

Hyponatremia or hypomagnesaemia may present very fast; monitor water and electrolyte balance closely.

Serum sodium of 120 mmol/L or less are generally accompanied by alarming symptoms: confusion, hallucinations, psychosis, seizures.

Do not administer NaCl routinely in hyponatremia. Find the cause and treat adequately.

Correct slowly, especially in a longstanding condition; otherwise there is a risk for damage to the central nervous system (pontine myelinolysis).

Origin	Treatment
Overhydration May be iatrogenic or due to renal insufficiency. Oedema is present. Plasma osmolality is lower than 270 mosm/kg. Urine sodium concentration is lower than 10 mmol/L (iatrogenic) or higher than 10 mmol/L (renal insufficiency).	Fluid restriction; less than 700 ml/day, NaCl-restriction.
Sodium loss and dehydration Due to vomiting or diarrhoea turgor is increased. Plasma osmolality is lower than 280 mosm/kg. Urine sodium concentration is lower than 10 mmosm/L	Administration of NaCl and fluid.
Antidiuresis (SIADH) Due to inappropriate secretion of antidiuretic hormone, secondarily to porphyric neuro- pathy with a "leaking hypothalamus". There is no oedema and turgor is normal. Plasma osmolality is lower than 270 mosm/kg. Urine sodium concentration is higher than 20 mosm/L. Urine osmolality is over 100 mosm/kg, and often higher than plasma osmolality. There are no signs of renal insufficiency. The low serum sodium is not normalized on administration of NaCl.	Fluid restriction; less than 700 ml/d.

Neurological state	Check daily. Peripheral neuropathy may develop fast and can in severe cases give rise to tetraplegi. Weakening of the voice may herald respiratory paralysis.
Blood gases	Is there need to make preparations for assisted ventilation?
Muscle and tendon functions	Check daily. Need for physiotherapy?

Good nursing is of paramount importance! See to it that the patient is undisturbed and allowed sleep! Show empathy and keep up courage!

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