Adverse effect of cytostatic treatment

The **side effects** of **cytostatic therapy** are due to their narrow therapeutic range and therefore occur to varying degrees with each administration. The most common side effects arise by interfering with the metabolism of healthy cells (by inducing apoptosis), especially in highly proliferating tissues: mucosal GIT, skin + adnexa, bone marrow, spermatogonia.

Common manifestations include nausea and vomiting, fatigue, weakness, sweating and hair loss, including hair. **Life-threatening reactions** , especially bone marrow depression with the development of febrile neutropenia , require special attention .

Adverse reactions and the resulting risk to the patient are mainly influenced by the **dose** and **general condition** (comorbidities, liver and renal function, previous therapies). Last but not least, side effects in patients are a source of **psychological stress** for many reasons . Patient information about their mitigation options should not be overlooked.

Dividing by onset

The onset of adverse reactions often has a similar pattern, the knowledge of which is clinically important for the early diagnosis of the development of the adverse reaction and its mitigation. *Optionally, the drugs listed in parentheses typically cause the side effect.*

Immediately

They arise in a number of **hours** , possibly **during administration** :

- vomiting, diarrhea;
- allergic reactions (asparaginase, eg ***pegaspargase***);
- fever.

Early

They develop over several days :

- bone marrow depression (leukopenia, thrombocytopenia, anemia, pancytopenia);
- hair and hair loss, dermatitis (***bleomycin***), mucosal defects (especially oral mucositis), onychodystrophy;
- hepatotoxicity and nephrotoxicity;
- hyperuricemia from tumor lysis (often accompanied by treatment of hematological malignancies);
- hemorrhagic cystitis (***cyclophosphamide***).

Late

They start after a few **weeks, months or years** and are often **irreversible** :

- delayed leukopenia and anemia (nitro compounds, ***mitomycin***);
- interstitial pneumonia and pulmonary fibrosis;
- anthracycline cardiomyopathy;
- polyneuropathy;
- azoospermia and amenorrhea ;
- induction of secondary malignancies (alkylating cytostatics, eg ***doxorubicin***);
- growth arrest in children.

Typical Manifestations

In the clinical picture, the manifestations can be divided into general and local.

Overall

These most often include **vomiting, nausea and diarrhea** . Allergic reactions, flu-like syndrome or metabolic changes also occur.

Local

The spectrum of local manifestations is very wide, the characteristic manifestation is **alopecia** , which exceptionally may not manifest itself. The local reaction can also be caused by **extravasation** of cytostatics, especially with severe skin damage and phlebitis.

Signs of selected side effects

Organ toxicity

Organ toxicity may be acute or late in the treatment of cytostatics, therefore a cumulative dose should be considered. The specific forms with the following common agents are:

- **Cardiotoxicity** (anthracyclines) - left ventricular ejection fraction should be monitored during therapy and the cumulative dose observed.
- **Hepatotoxicity** (***methotrexate***) - frequent reversible elevation of liver transaminases, which should be differentiated diagnostically from the condition of metastases, for example.
- **Nephrotoxicity** (platinum derivatives, eg ***cisplatin***) - direct nephrotoxicity and the consequence of tumor lysis syndrome is partially preventable by sufficient hydration.
- **Pneumotoxicity** (***bleomycin***) - eg acute interstitial pneumonitis or dose-dependent pulmonary fibrosis occurs .

Vomiting

Vomiting and the associated nausea are a very unpleasant impact for the patient during cytostatic therapy and at the same time, in connection with the subsequent weight loss, the effectiveness of the treatment is reduced. Vomiting is divided according to onset after administration of cytostatics and the effect on antiemetic therapy on:

- acute (within 24 hours)
- late (next day);
- anticipatory (before cytostatic administration);
- refractory (persistent despite treatment).

Most cytostatics cause vomiting, but cisplatin, dacarbazine and carmustine have the greatest **emetogenic potential** .

Infertility

Gonadal toxicity of cytostatic therapy is manifested in men by azoospermia and in women by sterility. It is therefore standard to offer **cryopreservation** (preservation of genetic material by freezing) of sperm or oocytes in patients who are interested in offspring after therapy.

Treatment options for adverse reactions

Hand in hand with the treatment of side effects is their prophylaxis, so they are listed at the same time. **Knowledge of the principles of therapy of acute conditions** arising, for example, during severe bone marrow suppression or anaphylactic shock play an important role . **In addition to supportive care, dose interruption of cytostatics** is sometimes required . The following points often belong to the treatment scheme:

- **Antiemetics** : setrons, metoclopramide, glucocorticoids in the acute phase, ***aprepitant*** is recommended in late forms, eg lorazepam in anticipatory vomiting.
- **Prophylaxis of allergic reactions** : premedication with antihistamines and dexamethasone.
- **Oral mucositis** : mainly treated symptomatically with analgesics, partial prevention is dental rehabilitation and in case of impossibility to eat, parenteral nutrition is necessary.
- **Therapy of local extravasation** : symptomatic antiphlogistics, or antidote to the given cytostatic.
- **Diarrhea** : according to the severity from sufficient hydration, electrolyte supplementation and dietary treatment, or administration of antidiarrheals (***loperamide***) to intensive antibiotic to surgical therapy in neutropenic enterocolitis.
- **Cosmetic therapy** : alopecia wigs help relieve mental strain in women.
- **Infection prevention** : balanced effort management, avoiding places with an increased risk of infection.

Links

Related articles

- Febrile neutropenia
- Cytostatics

External Links

- Anthracycline cardiotoxicity

References

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Reference

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