MEDICINE INFORMATION

GMALL treatment for adult ALL

What patients and caregivers can expect from a GMALL treatment plan for acute lymphoblastic leukaemia.

At a glance

Treatment	German Multicenter Study Group for Adult Acute Lymphoblastic Leukemia (GMALL) protocols treat adult acute lymphoblastic leukaemia (ALL) in phases.
Early treatment	Medicines may include a steroid, vincristine, daunorubicin and asparaginase. Later induction may use cyclophosphamide, cytarabine and mercaptopurine.
Further treatment	Consolidation and maintenance depend on the protocol. Treatment to protect the brain and spinal fluid is a standard part of ALL care.
Before you start	Ask which protocol and risk group apply to you. Get a written calendar and the urgent hospital number.
How it is given	Medicines are given through a vein, by injection and by mouth, depending on the phase. Treatment also includes medicine given into the fluid around the brain and spinal cord.
Medicines across phases	Prednisolone · Vincristine · Daunorubicin · L-asparaginase · Cytarabine · Etoposide · Dexamethasone · Cyclophosphamide · Methotrexate · Mercaptopurine

What this treatment is and how it works

GMALL is the name of a family of phased leukaemia protocols. The medicines used early in treatment can differ from those used later, and versions of the protocol vary.

When it may be used

GMALL protocols have been used for adults with acute lymphoblastic leukaemia (ALL). Your team uses the leukaemia type, gene test results, age and response to decide on the individual plan.

Before treatment

Ask for the name of the protocol version, calendar, urgent number and home medicine instructions. Tell the team about infections, diabetes, heart problems, blood clots and any medicines or supplements.

How treatment is given

Induction

Published GMALL versions use a steroid such as prednisone or dexamethasone according to the schedule, alongside drugs such as vincristine, an anthracycline such as daunorubicin, and asparaginase. Some versions include a second period of induction with cyclophosphamide, cytarabine and mercaptopurine. Medicines are given by drip or injection and by mouth. Your treatment calendar describes which you need.

Consolidation, intensification and maintenance

Consolidation uses more treatment to reduce the risk of relapse after remission. Methotrexate, cytarabine and other medicines may be used in different blocks. Some published versions include etoposide in selected blocks. Maintenance often uses oral mercaptopurine and methotrexate. Results can also lead to a discussion about targeted therapy, immunotherapy or a donor stem cell transplant.

Protecting the brain and spinal cord

Treatment of the central nervous system is standard because leukaemia cells can reach the fluid around the brain and spinal cord. A medicine such as methotrexate can be given into this fluid through a lumbar puncture. Your team can explain which medicines are used and how many visits your particular plan includes.

Tests and monitoring during treatment

Blood counts, liver function, blood sugar and clotting may be checked. Bone marrow and measurable residual disease tests show how much leukaemia remains and can guide later decisions.

Side effects

Common or more frequent side effects

- **Changes in blood counts.** Treatment can lower the white cells that fight infection, the red cells that carry oxygen and the platelets that stop bleeding. You may feel tired or get breathless sooner than usual. Let the unit know about nosebleeds, new bruises or small red or purple spots. Fever or shaking chills needs a call to the urgent number even if your next blood test is already booked.
- **Effects of steroid medicines.** A steroid may make it harder to sleep or cause changes in appetite, mood or blood sugar. Tell the unit if thirst or urination increases, especially if you have diabetes. Do not change the dose or timing on your own. Ask before treatment which symptoms should prompt a blood sugar check.
- **Constipation and nerve symptoms.** Some drugs in this regimen can slow your bowel and affect nerves. Write down how often you pass stools, and tell the team about tingling, weakness or a change in your balance. Ask about a bowel plan if you already take medicines that contribute to constipation. With severe belly pain, vomiting or a swollen abdomen, call urgently.

- **Sore mouth and changes in eating.** Your mouth may feel tender or dry, and some foods may sting. A soft toothbrush and the mouth care your unit recommends can help. Tell the team about ulcers, a white coating, or trouble swallowing so it can assess for mouth infection and help with pain. If you cannot drink enough, contact the unit promptly.

Other reported side effects

Ask what to do if you cannot take your tablets or have new weakness, constipation or mouth sores. Tell the team about pain, redness or swelling at an infusion site.

Serious effects to recognise

- **Pancreatitis or problems with clotting.** Asparaginase can inflame the pancreas or change the balance of proteins that control bleeding and clotting. Call about persistent upper tummy pain or vomiting, unexpected bleeding or a painful swollen limb. Severe headache with weakness, sudden chest pain or breathing difficulty needs emergency help.

Tell the nurse immediately if you develop itching, swelling or difficulty breathing during or after asparaginase.

When to seek urgent help

Call your hospital's 24-hour cancer care number straight away for fever, chills, new bleeding, severe belly pain or vomiting, or difficulty breathing. Follow your hospital's written temperature instructions. If you have no written threshold, call at 37.5°C (99.5°F) or above, or below 36°C (96.8°F). Call if you feel very unwell even when your temperature is normal.

Seek emergency care for severe breathing difficulty, swelling of the face or throat, chest pain, collapse or bleeding that will not stop.

Practical advice for this treatment

- Ask for a separate calendar for each block. Check which tablets are daily and which are weekly, especially when starting methotrexate or mercaptopurine. Have the team review missed or vomited doses before taking more.
- Constipation, tingling and weakness can develop with vincristine. Report changes early so your team can help you manage constipation and assess your nerves before the next treatment.
- Blood sugar can rise during steroid and asparaginase treatment. If you have diabetes, agree who will adjust your diabetes medicine and when to check your sugar.
- If you are offered asparaginase, ask who to call for persistent tummy pain, new bruising, a painful swollen leg, rash or swelling. Depending on the preparation and schedule the team may test whether asparaginase is active in your blood.

Medicines, interactions and vaccinations

Ask before adding or stopping medicines, including vitamins and painkillers. Steroid instructions may change by phase. Check with the team before vaccination.

Everyday life

Ask whether you need support for visits, home tablets and time away from work. Let a caregiver know what symptoms should prompt a call.

Pregnancy, fertility and breastfeeding

Discuss fertility preservation, contraception and breastfeeding before starting. Ask which precautions apply at each stage.

After treatment

Ask how results will shape the next phase and whether another treatment, such as a stem cell transplant, is being considered in your case.

Words you may hear

- **Induction.** The first phase aims to bring the leukaemia into remission.
- **Measurable residual disease (MRD).** Leukaemia cells that sensitive tests can detect even when routine tests show remission.
- **Philadelphia chromosome.** A change in the chromosomes of some leukaemia cells that can affect which medicines are used.

Frequently asked questions

What does GMALL stand for?

German Multicenter Study Group for Adult Acute Lymphoblastic Leukemia. The name refers to a family of protocols.

Does the drug list change over time?

Yes. Each phase has its own medicines, dates, and monitoring. Ask the team to mark which tablets finish and which begin when you change phase. Take the new calendar and your current packs to the pharmacist if any names or amounts are unclear.

What is measurable residual disease?

It is a very small amount of leukaemia still detectable with sensitive tests after treatment.

Should I report constipation early?

Yes. Vincristine can make constipation worse. Ask for a plan before it becomes difficult to manage.

What should I do if I get severe belly pain?

Contact your hospital urgently, especially if you are also vomiting.

Will I need a transplant?

That depends on the type of ALL, response and other factors. Ask when your team will discuss it.

Will a change in the MRD result change my schedule?

It can influence which treatment is offered next. Ask when your next marrow or blood sample is planned and which result would change the decision.

Can I take my usual medicine for gout during maintenance?

Show your team the exact medicine. Allopurinol can change the way mercaptopurine is handled, so the team may need to adjust treatment or choose another plan.

Individual medicine guides

- Prednisolone
- Vincristine
- Daunorubicin
- L-asparaginase
- Cytarabine
- Etoposide
- Dexamethasone
- Cyclophosphamide
- Methotrexate
- Mercaptopurine

Sources and further reading

Read this guide alongside your hospital's plan. Ask your pharmacist to confirm the exact product dispensed in India and follow the instructions for that product.

Summary of Product Characteristics (SmPC) and prescribing information

- Prednisone tablets (Cortancyl) - French product page with SmPC
- Prednisolone tablets - UK SmPC
- Dexamethasone tablets - UK SmPC
- Vincristine injection - UK SmPC
- Daunorubicin injection - UK SmPC
- Asparaginase (Spectrila) - EU product page with SmPC
- Pegaspargase (Oncaspar) - UK SmPC
- Cyclophosphamide injection - UK SmPC
- Cytarabine injection for systemic use - UK SmPC
- Mercaptopurine (Xaluprine) - EU SmPC
- Methotrexate injection - UK SmPC specifying the intrathecal presentation

- Methotrexate injection for systemic use - UK SmPC
- Methotrexate tablets - UK SmPC
- Etoposide infusion - Irish HPRA SmPC
- US prescribing information for daunorubicin
- Intravenous etoposide - US prescribing information
- Pegaspargase (Oncaspar) - EMA product information for one asparaginase preparation

Clinical protocols and other references

- Published GMALL protocols: treatment components across versions
- Published adult ALL phased protocol example
- GMALL follow-up study describing treatment across protocol versions

Additional sources

- Published adult GMALL protocol evidence
- NCI adult ALL treatment evidence

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