MEDICINE INFORMATION

MAP chemotherapy for osteosarcoma

MAP is a combination of three chemotherapy medicines used to treat osteosarcoma, a cancer that starts in bone. It is often given before and after surgery.

At a glance

Treatment	Methotrexate + Doxorubicin + Cisplatin
When it may be used	MAP is used for some people with high-grade osteosarcoma.
How it is given	Methotrexate, doxorubicin and cisplatin are all given through a vein on different days in the plan.
Before you start	Before treatment, the team checks your blood counts, kidneys, liver, heart and hearing.

What this treatment is and how it works

MAP contains high-dose methotrexate, doxorubicin (also called Adriamycin) and cisplatin. The letters stand for methotrexate, Adriamycin and platinum, which refers to cisplatin. The three medicines interfere with the growth and division of cancer cells in different ways. Folinic acid, also called leucovorin, is a separate medicine given after methotrexate to protect healthy cells.

When it may be used

Chemotherapy before surgery treats the tumour and cancer cells that may be too small to see on scans. After surgery, further chemotherapy aims to reduce the chance of the cancer returning. Your team considers your age, kidney function, other health conditions and the operation planned. Some people have a different combination without high-dose methotrexate.

Before treatment

Tell them about kidney or heart problems, hearing changes and any medicines or supplements you take. Ask how the treatment fits around surgery, whether you need a hospital stay and who to call between visits.

How treatment is given

The medicines are given through a drip into a vein on different days of a planned cycle. The schedule can change around surgery and according to your recovery. For high-dose methotrexate, the team gives fluids and makes your urine less acidic to help your kidneys clear the medicine. Folinic acid starts at a scheduled time afterwards and continues as directed by your team.

Tests and monitoring during treatment

The team measures methotrexate in your blood and checks how your kidneys are working. They also check your urine and fluid balance. If methotrexate takes longer to clear, you may need extra time in hospital, more fluids or a change to your folinic acid. During the course, the team checks your blood counts and salts such as magnesium. Hearing tests and heart checks help detect effects of cisplatin and doxorubicin.

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.
- **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.
- **Nausea and vomiting after cisplatin.** Cisplatin can cause nausea on the treatment day and on later days. Keep the prescribed anti-sickness timetable after going home. Ask which medicine to use if nausea breaks through. Contact the unit if you cannot drink or take essential medicines. The team may need to check hydration and kidney function.
- **Urine colour after doxorubicin.** Doxorubicin can colour the urine red or orange temporarily. Pain, clots or urine that stays red need an assessment. Call the team if you are unsure whether the colour is from the medicine or if you see blood. The team will want to know when you last received the infusion.

Other reported side effects

Cisplatin can cause ringing in the ears or hearing changes. It can also cause tingling or numbness in the hands or feet. Tell the team early, even if symptoms are mild. Doxorubicin can turn urine red or orange for a short time after the drip. If you are unsure whether you are seeing blood, or you have pain passing urine, contact the team.

Serious effects to recognise

- **Methotrexate staying in the blood for longer.** After high-dose methotrexate, blood tests track how quickly the drug leaves your body. Slower clearance can worsen kidney injury or lead to mouth sores, low blood counts and other effects. The team may extend fluids or folinic acid rescue. Tell staff about reduced urine or symptoms that limit how much you can drink.
- **Effects on heart function.** Doxorubicin can affect the way the heart pumps during or after treatment. Tell the team about swelling, shortness of breath when lying flat or becoming more breathless doing usual activities. Check whether you need a heart scan or follow-up even when you feel well.

- **Hearing or balance changes.** Platinum chemotherapy can cause ringing in the ears or hearing loss. Ask if you need a baseline or follow-up hearing test. Report new ringing, poorer hearing or changes that make it hard to follow conversations. Your team can check how this affects the next treatment.

Tell the nurse immediately if the drip site burns, hurts or swells, or if you feel suddenly unwell during an infusion.

When to seek urgent help

Call your hospital's 24-hour cancer care number for fever, shaking chills, repeated vomiting, trouble drinking, much less urine than usual, or mouth sores that stop you from drinking. Tell the team you are having MAP and when you last had high-dose methotrexate. 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

Planning the hospital stay

High-dose methotrexate stays in the blood for different lengths of time in different people. Ask whether you may need to stay an extra night and who can help with transport if discharge moves. Blood results, urine checks and kidney function help the team decide when it is safe to leave.

Protecting your kidneys and hearing

The team checks kidney function before treatment and uses fluids during cisplatin and methotrexate treatment. The fluids used with high-dose methotrexate can also make your urine less acidic, which helps your kidneys clear it. Tell the team if you are passing far less urine, develop ringing in your ears or find it harder to follow conversations. Ask how to report changes between appointments.

Managing nausea, mouth soreness and activity

Take your prescribed anti-sickness medicines as directed. Call if you cannot keep fluids down or take your medicines. Tell your team about mouth sores early, especially if drinking or swallowing is difficult. If you are preparing for limb surgery or recovering from it, ask which movements and weight-bearing activities are safe for your bone and operation.

Medicines, interactions and vaccinations

Ask the cancer pharmacist to check all medicines before each high-dose methotrexate visit. Some painkillers such as ibuprofen, acid-reducing medicines such as omeprazole and antibiotics such as trimethoprim can interact. Ask which medicines to pause and when to restart them. Check with the team before vaccinations, including live vaccines.

Everyday life

Keep a copy of your treatment calendar and hospital number. Some visits may take longer than expected while the team waits for blood results. If surgery affects how you move, ask the physiotherapy team which activities are safe. Tell the team if hearing changes, pain or fatigue are affecting school, work or daily life.

Pregnancy, fertility and breastfeeding

Ask about sperm, egg or embryo storage before treatment if having children in the future matters to you. This combination can affect fertility and harm an unborn baby. Ask your team about contraception and how long to use it after the final treatment. Avoid breastfeeding during treatment and ask when it is safe to restart.

After treatment

After the course, your team will explain the scan and follow-up plan. Follow-up may also cover movement and rehabilitation after surgery, hearing, heart health and kidney function. Let the team know about symptoms that continue after chemotherapy.

Words you may hear

- **High-grade osteosarcoma.** A bone cancer whose cells look very abnormal and tend to grow faster under the microscope.
- **Folinic acid rescue.** Folinic acid, also called leucovorin, helps protect healthy cells after high-dose methotrexate. Its timing matters.
- **Clearance.** How quickly your body removes a medicine. Blood tests track methotrexate clearance.
- **Glucarpidase.** A medicine a specialist team may use for dangerously delayed methotrexate clearance, particularly when the kidneys have been injured.

Frequently asked questions

Why might I have chemotherapy before and after surgery?

Before surgery, chemotherapy treats the tumour and any cancer cells that scans cannot show. After surgery, the team uses the remaining chemotherapy to reduce the chance of cancer returning.

Do I receive all three drugs on the same day?

Usually they are spaced over different days. Some parts of the course may use fewer than three. Ask your team for a calendar that shows your medicines, surgery and planned recovery breaks.

What is folinic acid rescue?

Folinic acid, also called leucovorin, protects healthy cells after high-dose methotrexate. It starts at the time set by the team and continues until blood tests show the methotrexate level has fallen enough. Ask who will tell you when it can stop.

Why do I need to stay for repeat blood tests?

The team checks how quickly methotrexate leaves your body. If the level stays high, the team can adjust fluids and folinic acid and keep monitoring you.

What if my methotrexate level takes longer to fall?

The team may keep you in hospital longer and change your supportive medicines. If delayed clearance is severe, the team can consider specialist treatment to lower the level.

Is high-dose methotrexate the same as the tablets used for arthritis?

It is the same medicine used in a different way. The large doses given into a vein in MAP need specific fluids, folinic acid and blood tests. Follow only the instructions your cancer team gives you.

Should I report ringing in the ears?

Yes. Ringing, muffled hearing or difficulty following conversation can be early signs of a cisplatin effect. Tell your team promptly so they can assess your hearing.

What should I do if the drip site hurts?

Tell the nurse straight away. Doxorubicin can damage tissue if it leaks out of the vein, so the team needs to check the site immediately.

Can I use ibuprofen or my usual indigestion medicine during methotrexate treatment?

Check first. Some anti-inflammatory painkillers, acid-reducing medicines and antibiotics can interact with high-dose methotrexate. Take an up-to-date medicine list to hospital and ask which medicines to pause and restart.

Individual medicine guides

- Methotrexate
- Doxorubicin
- Cisplatin

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

- Methotrexate injection for systemic use - UK SmPC
- Conventional doxorubicin injection - UK SmPC
- Cisplatin injection - UK SmPC
- Folinic acid (calcium folinate) injection - UK SmPC
- Folinic acid (calcium folinate) tablets - UK SmPC

Clinical protocols and other references

- eviQ MAP protocol and high-dose methotrexate monitoring

- NCI osteosarcoma treatment evidence summary
- eviQ management of high-dose methotrexate toxicity
- Cancer Research UK patient information on MAP

Additional sources

- eviQ patient information on MAP

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Review record updated: 14 November 2026 · Editorial review policy