Ommaya reservoir for acute lymphoblastic leukemia

- Ommaya reservoir use in pediatric ALL and NHL: a review at St. Jude Children's Research Hospital
- Medical and surgical treatment of rhino-orbital-cerebral mucormycosis in a child with leukemia
- Improving the Brain Delivery of Chemotherapeutic Drugs in Childhood Brain Tumors
- The Use of Ommaya Reservoirs to Deliver Central Nervous System-Directed Chemotherapy in Childhood Acute Lymphoblastic Leukaemia
- Image-guided Ommaya reservoir insertion for intraventricular chemotherapy: a retrospective series
- Multimodal Treatment of Rhinocerebral Mucormycosis in a Pediatric Patient With Relapsed Pre-B Acute Lymphoblastic Leukemia
- Managing CNS disease in adults with acute lymphoblastic leukemia
- Successful Treatment of Rhino-Orbital-Cerebral Mucormycosis in a Child With Leukemia

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Prophylactic eradication of central nervous system (CNS) leukemia is the current standard of care in treating childhood acute lymphoblastic leukemia (ALL). This is conventionally achieved through regular lumbar punctures with intrathecal injections of methotrexate into the cerebrospinal fluid (CSF). Ommaya reservoirs are subcutaneous implantable devices that provide a secure route of drug delivery into the CSF via an intraventricular catheter. They are an important alternative in cases where intrathecal injection via lumbar puncture is difficult. Among UK Paediatric Principal Treatment Centres for ALL we found considerable variation in methotrexate dosing when using an Ommaya reservoir. We review the current safety and theoretical considerations when using Ommaya reservoirs and evidence for methotrexate dose adjustments via this route. We conclude by summarising the pragmatic consensus decision to use 50% of the conventional intrathecal dose of methotrexate when it is administered via the Ommaya reservoir in front-line ALL therapy [1)]

The use of an Ommaya reservoir for acute lymphoblastic leukemia is to treat CNS leukemia by delivering chemotherapy directly to the CSF.

Chemotherapy delivered through an Ommaya reservoir is usually given in cycles, with the drug being administered over a period of a few days followed by a break of several days or weeks. The cycles are repeated until the cancer is under control or in remission.

The use of an Ommaya reservoir for ALL is usually reserved for cases where cancer has spread to the CNS and other treatments have not been successful. The procedure itself carries some risks, such as infection, bleeding, and damage to the brain or surrounding tissues. Therefore, patients need to discuss the benefits and risks of this procedure with their healthcare team before making a decision.

Case reports

A 3-year-old girl under treatment for acute lymphoblastic leukemia developed periorbital swelling,

ophthalmoplegia, and a necrotic palatal lesion during a period of neutropenia. Imaging revealed sinusitis and pre- and post-septal cellulitis. The disease later progressed to cerebral involvement and orbital apex syndrome with complete ophthalmoplegia, ptosis and loss of vision. The patient was treated with systemic antifungal therapy, hyperbaric oxygen, and extensive surgery. This included orbital exenteration, skull base resection, cerebral debridement with the placement of an Ommaya reservoir for intrathecal administrations of amphotericin B (AmB), and in addition endoscopic sinus surgery with local AmB installation. Chemotherapy was safely continued after resolution of the ROCM and the patient remains in complete remission after 5 years.

Patients with ROCM can be cured with aggressive multimodality treatment, including surgical intervention, even if in myelosuppression [2)].

A 17-year-old girl developed invasive rhinocerebral mucormycosis during intensive re-induction chemotherapy for relapsed pre-B acute lymphoblastic leukemia. Due to the high case fatality rate for invasive mucormycosis in profoundly immunosuppressed patients, an aggressive treatment regimen was pursued. In addition to the standard of care treatments with intravenous amphotericin and aggressive surgical debridements, she received intraventricular amphotericin to the brain via an Ommaya reservoir, hyperbaric oxygen treatments, filgrastim, intravenous immunoglobulin and antifungal in vitro synergy testing to allow for more targeted antifungal therapy with the addition of micafungin. After a 3-month treatment course, it was determined that her mucormycosis was under appropriate control, allowing her to continue treatment for her leukemia with a hematopoietic stem cell transplant with a plan for continued intravenous antifungal therapy through engraftment [3)].

Case reports from the HGUA

10 year old patient

1. FOURTH RECURRENCE B ALL Common combined hematological and CNS.

The dexamethasone regimen ended yesterday and the dasatinib dose was decreased to 20 mg/day

2. Non-neutropenic fever. Rotavirus infection. Consultation due to a fever of fewer than 24 hours of evolution, together with liquid stools and colicky abdominal pain, elevated AFR in laboratory tests, and antibiotic therapy with cefepime and teicoplanin is started, and after 48 hours IV ceftriaxone can be switched, which has completed 3 days further. Adequate evolution with clinical improvement of bowel movements and remaining afebrile

3. REACTIVATION BY CMV Given the suspicion of CMV reactivation, treatment with valganciclovir was started. In the 30/3 sample, it is detected (<34.5 IU/ml); so we maintain treatment.

Good overall condition. Well hydrated and perfused. Good mucocutaneous staining. AC: rhythmic tones. Don't blow. AP: Good bilateral air intake, no added noise. Globular, soft and depressible abdomen, not painful, no masses or megalia. ENT: normal pharynx. No adenopathies.

1)
Wilson R, Osborne C, Halsey C. The Use of Ommaya Reservoirs to Deliver Central Nervous System-Directed Chemotherapy in Childhood Acute Lymphoblastic Leukaemia. Paediatr Drugs. 2018

Aug;20(4):293-301. doi: 10.1007/s40272-018-0298-9. PMID: 29850985.
2)

Levinsen M, Kiilgaard JF, Thomsen C, Heegaard S, Nissen KR. Medical and surgical treatment of rhino-orbital-cerebral mucormycosis in a child with leukemia. Am J Ophthalmol Case Rep. 2021 Apr 16;22:101092. doi: 10.1016/j.ajoc.2021.101092. PMID: 34095606; PMCID: PMC8165661.
3)

Dworsky ZD, Bradley JS, Brigger MT, Pong AL, Kuo DJ. Multimodal Treatment of Rhinocerebral Mucormycosis in a Pediatric Patient With Relapsed Pre-B Acute Lymphoblastic Leukemia. Pediatr Infect Dis J. 2018 Jun;37(6):555-558. doi: 10.1097/INF.0000000000001839. PMID: 29189615.