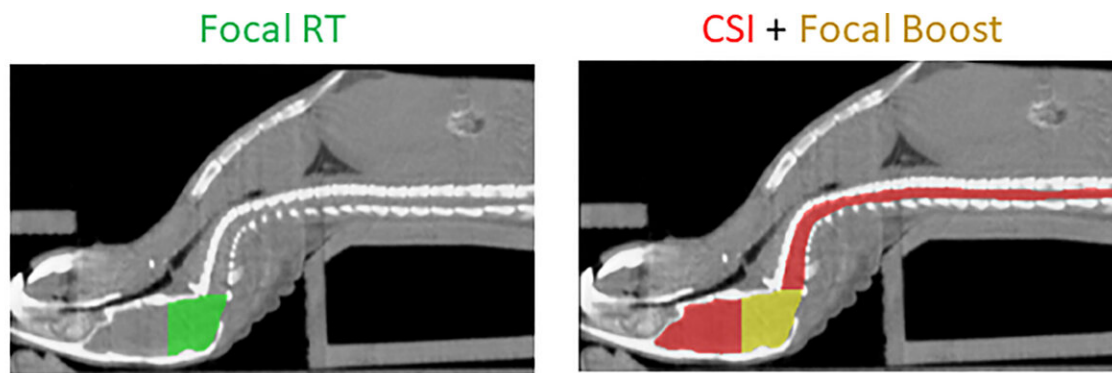


# Finding new ways to treat diffuse midline gliomas

May 22 2023, by Greg Glasgow



	Day 1	Day 2	Day 3	Day 4	Total pons dose delivered
Focal	4 Gy Focal	4 Gy Focal	4 Gy Focal	4 Gy Focal	16 Gy
CSI + Boost	4 Gy CSI	4 Gy CSI	4 Gy Focal	4 Gy Focal	16 Gy

Planning CTs demonstrating positioning of the mouse on the custom platform and RT fields for the two RT groups, along with the RT schedule for both groups. Credit: *Frontiers in Oncology* (2023). DOI: 10.3389/fonc.2023.1105395

Cancer is a sneaky disease. Find one method of treating it successfully, and it finds another way to survive.

Take, for example, pediatric diffuse midline gliomas, [brain tumors](#) that are among the most common cause of childhood cancer death.

"These are tumors that occur in key midline structures in the [childhood brain](#)," says University of Colorado Cancer Center member Adam Green, MD. "They occur in the brainstem, which controls basic functions like breathing and swallowing, in the cervical spinal cord, which is responsible for movement, and in other very important parts of the childhood brain, places that are very hard to operate in."

Because they are difficult to operate on, diffuse midline gliomas, previously known as diffuse intrinsic pontine gliomas (DIPG), traditionally are treated with focal radiation—radiation aimed directly at the area where the tumor is located.

Treatment for other pediatric brain cancers often involves delivering radiation to the whole brain and spinal cord to stop the cancer from spreading, but since diffuse midline gliomas are so deadly, and because craniospinal radiation is more toxic and takes longer to give, doctors haven't been as concerned about treating diffuse midline gliomas in the same way.

"These tumors actually do metastasize to other parts of the brain and spinal cord, but the issue has been that in the past, the tumor recurs in the local area, and that's what these children die from, before they can die of metastatic disease," says Green, associate professor of pediatric hematology, oncology, and [bone marrow transplantation](#) in the CU School of Medicine.

## **Treatment success creates new challenges**

Recently, however, doctors have had more success treating diffuse midline gliomas at the source, in some cases using catheters to deliver

chemotherapy directly to the tumor.

This introduces a new problem, however—some patients are now living long enough to develop metastatic disease that eventually results in death. Green and other CU Cancer Center members recently published research in *Frontiers in Oncology* on a dual-[treatment](#) method that looks to be successful in controlling metastasis in diffuse midline gliomas.

Using animal models, the researchers compared the effects of focal radiation just to the tumor, radiation to the entire brain and spinal cord, with a boost of focal radiation to the tumor, or no radiation at all.

"What we found is that if we just give focal radiation, the tumors in the brain shrink at first, but then they grow again, and the animals develop metastatic disease," says Green, who treats patients at Children's Hospital Colorado. "In the models we treated with craniospinal radiation, plus a boost to the [tumor](#) area, those tumors eventually regrow just like in patients currently. But a lot of them never developed metastatic disease either in the [brain](#) or in the [spinal cord](#)."

## Looking for the perfect combination

The takeaway? Craniospinal radiation looks to be a helpful addition to treatment for diffuse midline gliomas to keep the cancer from spreading to other parts of the central nervous system. The researchers are now planning to test additional combinations of treatments—including [radiation](#), chemotherapy, and immunotherapy—to see which has the best results.

"We hope that that this approach will allow long-term survival for these patients, rather than just the temporary responses that we currently see," Green says. "We're trying to get these potentially successful treatments across different treatment modalities into a combination, multimodality

trial that would bring successful treatments together and have a potentially curative effect for these patients."

## Promising progress

The research represents real progress in a deadly childhood cancer that has been treated in the same way since the 1960s, when the daughter of astronaut Neil Armstrong died from a diffuse midline [glioma](#).

"She got exactly the same treatment that we still have as our standard of care 60 years later," Green says. "It's devastating for a family to have their child diagnosed with [cancer](#), but for other cancers, we can almost always offer them a potentially curative treatment regimen. For some cancers, that chance is very, very high. For some cancers, it's not as high, but it's still not zero. In this disease right now, we're still not able to even recommend a potentially curative regimen."

"The goal of this research, if it all works out, is to bring these treatments together into the types of combination regimens that we have for other childhood cancers and actually offer hope for cure to these patients for the first time."

**More information:** Aaron J. Knox et al, A novel preclinical model of craniospinal irradiation in pediatric diffuse midline glioma demonstrates decreased metastatic disease, *Frontiers in Oncology* (2023). [DOI: 10.3389/fonc.2023.1105395](#)

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