Pediatrics & Therapeutics
ISSN: 2161-0665
OPEN ACCESS Freely available online
Short Communication

Pediatric Ependymoma and Proton Beam Therapy

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DESCRIPTION

A main Central Nervous System (CNS) tumour is an ependymoma. This indicates that it starts in the spinal cord or brain. The ependymal cells that line the pathways in the brain and spinal cord where the fluid (cerebrospinal fluid) that nourishes your brain flows are where ependymoma develops. Although it can happen to anyone, ependymoma most frequently affects young children. Ependymoma in children can cause headaches and seizures. Adult-onset ependymoma is more likely to develop in the spinal cord and can result in weakness in the area of the body that is controlled by the nerves that are damaged by the tumour. The main form of treatment for ependymoma is surgery. Additional therapies, such as radiation therapy or chemotherapy, may be advised for more aggressive cancers or tumours that cannot be entirely eliminated during surgery.

One of the most frequent malignant brain tumours found in children under the age of 10 is an epidermoma. In patients with nonmetastatic disease, advancements in surgery and radiation have significantly increased cure rates during the past 40 years [1]. Children with ependymoma are at risk for serious late sequelae such as neurocognitive impairment, neurologic impairments, neuroendocrine deficiency, and secondary malignancies because of their early patient age and aggressive local therapy. Through the use of advanced radiation techniques, systematic target volume reduction, and selective radiation avoidance, numerous studies have tried to lessen the effects of late radiation toxicity.

Neurosurgeons want to remove as much of the ependymoma as is practical. Although it is ideal to remove the entire tumour, there are instances where doing so would be too dangerous due to the ependymoma's proximity to delicate brain or spinal tissue. That child might not need any further treatment if the surgeon is able to remove the entire tumour during surgery. The neurosurgeon may advise a further procedure to try to remove the remaining tumour if some of it is still there. For more aggressive cancers or in cases when the entire tumour cannot be removed, other therapies, such as radiation therapy, may be advised [2].

High-energy beams, such as X-rays or protons, are used in radiation therapy to kill cancer cells. The child will lie on a table during radiation therapy as a machine moves all around them, aiming beams at specific areas of the brain. Radiation therapy may be recommended following surgery to help prevent the recurrence of more aggressive tumours or if neurosurgeons were unable to completely remove the tumor. Utilizing specialized methods can ensure that the radiation therapy targets the tumour cells while sparing as much of the surrounding healthy tissue as feasible. Radiation therapy techniques, including conformal radiation therapy, intensity-modulated radiation therapy, and proton therapy, enable medical professionals to deliver radiation with care and accuracy.

Since proton treatment enables reductions in the low and intermediate radiation dose to normal tissue outside of the target region, it is particularly promising. Ependymomas are now the most frequent pediatric tumours in the US to be treated with proton therapy as a result [3]. The therapeutic ratio of proton therapy in comparison to other methods is still being characterized by outcome studies due to the low likelihood of a randomized trial assessing radiation modality in pediatric ependymoma.

Protons are accelerated by a device known as a synchrotron or cyclotron. Rapid energy is produced by the protons' high speed. The protons are propelled by this energy to the precise location within the body. The targeted radiation dose is subsequently delivered to the tumour by the protons. Less radiation is administered outside of the tumour while using proton treatment [4]. As x-rays depart the patient's body, they continue to deliver radiation doses during conventional radiation therapy. This indicates that radiation potentially causes negative effects by damaging surrounding healthy tissues.

CONCLUSION

The actual procedure is painless. Patients may feel tired out afterward. Additionally, they could experience skin issues like blistering and peeling, redness, inflammation, edoema, and

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Received: 02-Aug-2022; Manuscript No. PTCR-22-19219; **Editor assigned:** 04-Aug-2022; PreQC. No. PTCR-22-19219 (PQ); **Reviewed:** 18-Aug-2022; QC. No. PTCR-22-19219; **Revised:** 25-Aug-2022; Manuscript No. PTCR-22-19219 (R); **Published:** 05-Sep-2022, DOI: 10.35841/2161-0665.22.S6.001.

Citation: Scheiman AO (2022) Pediatric Ependymoma and Proton Beam Therapy. Pediatr Ther. S6.001.

dryness. The size of the tumour, the type of healthy tissue close to the tumour, and the area of the body being treated all affect the proton therapy's negative effects.

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