

Pediatric cancer treatment using radiation therapy

Sir,

Radiotherapy of pediatric cancer patients can become quite challenging due to immobility of patients during the treatment procedure. Basu *et al.*,^[1] published an article in Clinical Cancer Investigation Journal highlighting anesthesia versus sedation during the course of radiotherapy of pediatric cancer patients. Some of the cancer centers may not choose to anesthetize or sedate pediatric cancer patients. This can be due to increase in treatment time, thus ultimately leading to the decrease of the throughput of patients at Busy Cancer Center. Some of the commonly used radiotherapy techniques in photon therapy are three-dimensional conformal therapy (3DCRT), intensity modulated radiation therapy (IMRT), volumetric modulated arch therapy (VMAT).^[1,2] The shorter treatment time can be very important in order to reduce the setup uncertainties, inter- and intra-fractional errors, etc. It has been mentioned that treatment time using VMAT is shorter than using IMRT. However, the dose distributions generated by both the IMRT and VMAT were found to be comparable for various disease sites.^[3,4]

It is well known that radiation therapy often delivers dose to the normal tissues while delivering dose to the cancer tumor volume. This could lead to secondary cancer in pediatric patients. Hence, it is essential to come up with an efficient radiotherapy technique which can deliver maximum dose to the target volume while minimizing dose to the critical structures so that secondary cancer can be avoided and normal tissue toxicities can be reduced. Radiation therapy techniques (3DCRT, IMRT, and VMAT) mentioned in the first paragraph fall in the category of photon therapy. Recently, medical communities have shown a great interest to utilize proton therapy to treat the cancer.^[5,6] In proton therapy, most of the dose is deposited in the tumor volume with sharp lateral penumbra and very steep dose-fall off at the end of proton beam path.^[5] Researchers from Harvard Medical School^[6] found that the risk of radiation-induced secondary cancer in pediatric patients using proton therapy technique is very less than using photon therapy. Dose-volume results of proton therapy plans were also found to be better than that of photon therapy plans for the pediatric patients.^[7] In conclusion, literature suggests that

radiotherapy using proton therapy sounds promising and it can improve the survival rate of pediatric patients and as well as reduce the chance of getting secondary cancer in the future.

Ravinath Pandey, Narayan Kharel

Department of Medical Science, Tribhuvan University, Kathmandu, Nepal

Correspondence to: Dr. Narayan Kharel,

Department of Medical Science, Tribhuvan University, Kathmandu, Nepal.

E-mail: doc.kharelnarayan@gmail.com

REFERENCES

1. Basu A, Gupta R, Prabudoss F. Radiotherapy in pediatric patients without anesthesia or sedation: Feasibility and challenges. Clin Cancer Invest J 2014;3:55-7.
2. Rana S, Pokharel S, Zheng Y, Zhao L, Risalvato D, Vargas C, *et al.* Treatment planning study comparing proton therapy, RapidArc and IMRT for a synchronous bilateral lung cancer case. Int J Cancer Ther Oncol 2014;2:020216.
3. Bansal A, Kapoor R, Kumar N, Oinam AS, Sharma SC. Feasibility of simultaneous integrated boost intensity modulated radiotherapy treatment plans in patients with localized carcinoma prostate. Clin Cancer Invest J 2012;1:206-11.
4. Ali MA, Babaiah M, Madhusudhan N, George G, Jain S, Ramalingam K, *et al.* Comparative dosimetric analysis of IMRT and VMAT (RapidArc) in brain, head and neck, breast and prostate malignancies. Int J Cancer Ther Oncol 2015;3:03019.
5. Rana S, Singh H. Impact of heterogeneities on lateral penumbra in uniform scanning proton therapy. Int J Cancer Ther Oncol 2013;1:01026.
6. Moteabbed M, Yock TI, Paganetti H. The risk of radiation-induced second cancers in the high to medium dose region: A comparison between passive and scanned proton therapy, IMRT and VMAT for pediatric patients with brain tumors. Phys Med Biol 2014;59:2883-99.
7. Yock T, Schneider R, Friedmann A, Adams J, Fullerton B, Tarbell N. Proton radiotherapy for orbital rhabdomyosarcoma: Clinical outcome and a dosimetric comparison with photons. Int J Radiat Oncol Biol Phys 2005;63:1161-8.

Access this article online

Quick Response Code:



Website:

www.ccij-online.org

DOI:

10.4103/2278-0513.157818