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Stereotactic body radiation therapy in a public oncologic hospital in Brazil: a five years experience

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Introduction: The challenge of implementing a new technology in a developing country is huge in many aspects. Personnel training and updating are cornerstones in this process. Brazil has an incidence of about 596,000 new cases of cancer per year. In May 2008, the Instituto do Câncer do Estado de São Paulo (ICESP) Octavio Frias de Oliveira, a public institution linked to University of São Paulo, was established. The radiation oncology department started its'activities in 2010. With 6 linear accelerators, 1 high dose-rate brachytherapy equipment and 1 computed tomography (CT) simulator, about 300 patients are treated per day using different techniques (conventional, 3D-conformal, intensity modulated radiation therapy, volumetric modulated arc therapy –VMAT, conventional and 3D image-guided brachytherapy). In 2011 the first case of stereotactic body radiation therapy (SBRT) was performed. The technique has potential benefits, as improvement of the quality of life of patients (by reducing the numbers of visits to the hospital and promoting better tumor control), and the possibility of treating a larger number of patients in busy departments likes ours (due to the potential more vacancy in the machines). On the other hand, requires high radiotherapy technology and appropriate personnel training. The clinical protocol, for such treatment, includes a CT scan with appropriate immobilization (eg thermoplastic mask, body fix), image fusion when indicated, delineation according to international protocols. Treatment planning is performed with Monaco® software, followed by quality assurance using an ionization chamber (0.125 cc) and a matrix detector (PTW 729®). Irradiation is delivered with Elekta Axxesse® linear accelerator and daily cone beam CT.

The purpose of this study is to analyze the evolution of the use of SBRT in the institution after the implementation of the technology and personnel training.

Methodology: treatment records of the institution were reviewed and all SBRT treatments were selected. The numbers of procedures, the treated sites and respective treatment techniques were verified.

Results: From September 2011 to September 2016, 106 treatments in 94 patients were performed (Figure1). The mean age of the patients was 68 years. Treatment sites were lung (60) followed by liver (22), bone metastases (15), pancreas (5), soft tissue sarcomas (2), and isolated lymphatic relapse (2). There are two clinical studies being developed: one for hepatocellular carcinoma and another one for soft tissue sarcoma. VMAT was used to treat 79 % of the cases, the number of fractions ranged from 1 to 8. The most used dose/fraction was 7.5 Gy (range: 5 –20 Gy) with total doses ranging from 18 to 60 Gy.

The number of procedures performed in the last two years (66) is higher than the sum of all other years (40). In 2016, a mean of at least 3 procedures/month was performed. This runs in parallel with the end of personnel training (2014) as well.

Conclusions: after implementation of SBRT, the number of procedures increased exponentially during the observed period. The personnel training and learning curve may be related to these findings. There is still potential to grow in the field. This is a landmark for our institution that is offering and delivering high quality ablative treatments in the public context.

Institution

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