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Original article

# Ethical reflections on proton radiotherapy

*Reflejos éticos en la radioterapia con protones*

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## Introduction

Radiation oncology is a medical discipline mainly involved in the treatment of cancer with ionizing radiation. It is based on full knowledge of individual patient cancer disease, delineation of the target volume including tumor that has to receive therapeutic radiation dose, delineation of normal tissues to be spared, treatment planning with dedicated calculation algorithms, radiation delivery to patient with radiation emitting machines as a linear accelerator, patient follow up for tumor response and toxicity evaluation (Clifford Chao, Mohan, Marinetti, & Dong, 2013; Purdy, 2013).

These procedures must be preliminarily discussed with the patient, in particular as regards benefit and possible damage as a consequence of treatment. Then, fully informed consent must be obtained from the patient before starting irradiation.

Radiation oncology is subject to the same ethical principles as other disciplines of medicine and surgery but at the same time must satisfy requirements that are more

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specific, especially as far as patient clinical radio protection and full availability of resources are involved.

The recent development and wider applications of proton therapy with its inherent possibility of optimal dose distribution inside patient tumor and normal tissues in comparison to other irradiation modalities highlights the need to better focus attention to more complex ethical issues in this field (Shultz-Ertner & Tsuijii, 2007).

In fact, currently more than 150,000 patients have been treated with proton therapy in more than 70 centers in the world. Almost 50 new centers are under construction to be followed by other 20 in project.

## General ethical principles

It is certainly not necessary to mention here the fundamental principles of medical ethics that we shall briefly recall only for the sake of explicitness (AMA, 2011).

The principles of compassion, respect and safeguard of patient welfare, dignity, rights and confidence are mentioned in the Code of Ethics of the American Society of Radiation Oncology as the first step in assuring ethical behavior (Donaldson, 2017). Then, a common point of understanding with the patient concerning treatment objectives, risks, alternatives shall be reached. This holds true particularly in the case of patient entering a clinical trial (Hellman & Hellman, 1991).

Eventually, any potential conflict of interest, real or perceived, should be avoided to ensure independent medical judgment in pursuing the genuine patient interest. The duty of the physician to treat and manage disease in the best interest of the patient sometimes can, at least partially, conflict with the principle that it is necessary to maximize the health of the entire community rather than that of the individual (Tepper, 2017). This holds true for example when resources are limited.

General ethical principles applicable also in medicine can be related to the moral obligation as delineated by Immanuel Kant, while in clinical medicine an example of framework to analyze ethical issues has been developed by Tom Beauchamp and James Childress (Beauchamp & Childress, 2012; Stanford, 2016), who proposed the following four principles:

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