High Tech – High Touch – the Two Sides of Radiation Oncology

Monica-Emilia Chirilă¹, Alessio Giuseppe Morganti²,³

¹ Mvision AI, Helsinki, Finland
² Radiation Oncology, IRCCS Azienda Ospedaliero-Universitaria di Bologna, 40138 Bologna, Italy.
³ Radiation Oncology, Department of Experimental, Diagnostic and Specialty Medicine, Alma Mater Studiorum University of Bologna, 40138 Bologna, Italy.

Professor Alessio Giuseppe Morganti teaches at the University “Alma Mater Studiorum” from Bologna. He is an expert in radiotherapy of prostate cancer and gastrointestinal malignancies (rectal, pancreatic and biliary tract cancers), and in palliative care. He was the principal investigator in more than 50 clinical studies and published more than 400 papers in Scopus-indexed journals. He kindly agreed to share his view about current aspects of Radiation Oncology.

MC: Professor Morganti, what is your opinion on the technological advancement in radiotherapy?

AGM: We have good news, indeed, most of them due to the technological advances, which allow us to use a higher dose to treat the tumor while keeping the risk of treatment-related toxicity at the same level. There are several examples of this (1).

However, sometimes I think our enthusiasm for new technologies and tools – artificial intelligence – radiomics - is exaggerated. I was asked once which the best technology in Radiotherapy is. So, I showed a picture of a Cobalt machine, used by a colleague from an African country. He also uses a classical simulator, based on fluoroscopy. This African colleague told me that it happens many times that a urologist calls him at the end of the working day for a prostate cancer patient who has a painful bony metastasis that needs palliative Radiotherapy. So, he frequently arrives home 20 minutes late because of this emergency that he has to solve. Twenty minutes - which includes seeing the patient, simulation, planning and treatment delivery. In my environment, I am absolutely unable to treat a patient in such a short time, having to proceed with all the phases from which we are now unable to ignore (CT-simulation, contouring, treatment planning, image-guidance, and so on). Therefore, I should conclude that, at least in that setting, 2D radiotherapy is the most practical and efficient way to quickly treat a symptomatic patient. I see in my
daily practice my younger colleagues doing a carefully planned VMAT for a similar case. Do we really need to do that? Are we using our resources wisely? Do we always need the latest technology? I believe that many times we buy machines from which we use only half of their technical possibilities, and some other times we use a newer technology even if it would not be really necessary.

**MC:** Since you mentioned the benefits of implementing new technologies, do you see any possible disadvantages?

**AGM:** One of the disadvantages of focusing on technology is to lose sight of the clinical part. For example, clinical research on pancreatic cancer is mainly focus on any – even very small -benefits in terms of survival, but with a low interest about the benefit in terms of quality of life. Sometimes what we offer are a few more weeks in which the patients are highly symptomatic and have a poor quality of life. When assessed in a study, the quality of life is mentioned only as something of secondary importance, and I believe we should take this aspect into account in research and also in clinical practice. A recently published paper reported on the quality of pain management in radiotherapy departments by analyzing the analgesic prescriptions and concluded that almost half of the cancer patients had suboptimal pain management (2).

**MC:** What could be the cause of this situation?

**AGM:** I would say there is a lack of training and education on pain management. I saw in my daily practice that my residents should improve their knowledge in this field. To compensate for that, I tried to invite specialists to give lectures on this topic, to improve juniors’ skills in symptoms and particularly pain management. But sometimes, the specialists have the tendency to get into details on the pathophysiological aspects of pain, and the simple practical message that the trainees need might be partially lost.

**MC:** Could it be also because of some patients hesitate to use opioids? We sometimes see the fear of tolerance or addiction and the fact that they perceive it as a sign of terminal disease, and this thought can be disturbing, and as a result, rejected.

**AGM:** Indeed, we see this situation in our clinical practice, but these misconceptions can be overcome by talking to patients and providing information and support. One recent study proved this concept by showing that pain control was significantly better in patients who, in addition to the pharmacologic (and radiotherapy treatment) had also a discussion with a nurse, regarding the causes of the pain and the way they can manage it (3).

**MC:** This example of the positive impact of the discussion with the patient makes me think of the importance of psychologists in oncological care.

**AGM:** The psychologist’s work is important, without a doubt, but also in the clinics where there is no psychologist or where he or she cannot see all the patients, we can train a nurse to manage pain education of patients and to have discussion regarding pain management with patients and relatives.

**MC:** These results that you mention are in line with another exciting study, which showed that when using the same treatment, the outcomes were better for the patients who had a careful, periodic assessment of their symptoms (4).

**Coming back to the possible disadvantages of the new technologies, change with should we fear that the incidence of radio-induced cancers could be higher for intensity modulated radiation therapy (IMRT) / volumetric modulated arc therapy (VMAT)?**

**AGM:** I tried to gather evidence to answer this question. We pooled together data from more than 2500 patients, and the incidence was significantly higher for the patients treated with IMRT/VMAT than for patients treated with 3 dimensional -Conformal Radiotherapy 3(D-CRT, in the population we studied. This does not mean that we should reject the new technologies, but this kind of information can raise awareness and change some practices for follow-up (5).
MC: We could also analyze the cases with radio-induced cancers and identify some biomarkers that increase this risk. Also, these results are significant because they raise awareness and increase the chance of detecting radio-induced cancers earlier. Of course, not only the fact that they are more frequent, but the degree of this increase in frequency matters, so, as Marie Curie said: “Now is the time to understand more, so that we may fear less.”

AGM: Yes, I want that my message is correctly interpreted. There are also other data in line with our findings. I am using IMRT/VMAT/ and stereotactic body radiotherapy (SBRT), and hypofractionation, but despite the advantages of the high doses per fraction, we should not forget that there are also studies that showed a positive effect of hyper-fractionation. Very low doses, around 0.5 Gy per fraction, seem to have good results and also a chemosensitizing and immunostimulating effect (6).

MC: Should we reframe the radiobiology laws in the context of delivering high doses per fraction?

AGM: I'm not entirely sure of this. Traditionally it is not recommended to use the good old linear-quadratic model in the case of extreme hypofractionation, but some radiobiologists believe that, on the contrary, that model is still alive and well (7,8).

MC: Who should do the follow-up of the patients treated with Radiotherapy?

AGM: The answer to this question is simple in my opinion. We, the radiation oncologists, should be the ones to follow the radio-treated patients in the follow-up. In fact, we are supposed to be the most experienced clinicians in identifying and managing late complications, and in distinguishing them from other conditions, such as tumor recurrences.

MC: In this case, some colleagues might find themselves in a difficult situation. Those who see a lot of new cases - either as part of their regular work or by choice, and also have some years of practice behind, so many more follow-up cases - would have to spend more hours at work.

AGM: Honestly, I found myself in the same situation. As a result, we developed an efficient system in which we rely a lot on nurses. The patient sees the nurse first, she collects data on symptoms and current situation, and when the patient comes to me, I do not need to spend so much time to find out the news. This way I have more time to answer patients' questions. Also, the patient might share with the nurse more personal details or questions and might hesitate to address me, especially if other members of their family are present, too. However, the patient still need a discussion with the doctor, they need to ask for his/her opinion on the possibility of a cure or the risk of relapse, about what the future could bring.

MC: What is your approach regarding communication with the patients, especially when they look at the physician for the reassurance of cure, or in those situations when we are the messengers of bad news?

AGM: When I have reasons to believe that the risk of relapse is very low, I deliver an optimistic message. When the situation is severe, I tell the patients and their families that they should try to spend the remaining time in such a way that it gives it value. There are situations when family members of patients who have cancer in an advanced, incurable stage, ask me if they should try to take their dear ones to another country, where they heard there is a "special machine" that does miracles. My advice for them is to facilitate meetings with relatives, friends, or people that the patient did not see for a long time, and wishes to see or to do other small things that they enjoy, like eating a certain type of food they enjoy. Small things make a difference in the patient's life and are more important than chasing an impossible cure.

Abbreviations:
IMRT - intensity modulated radiation therapy
VMAT - volumetric modulated arc therapy
3D-CRT - 3 Dimensional-Conformal Radiotherapy
SBRT - stereotactic body radiotherapy
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References:


