

# ***Paperless Radiotherapy Department: Digital Procedures For Radiation Delivery***

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## ***Abstract***

The activities of a Radiation Oncology Department are based on the collection, processing, use, transmission, exchange and storage of a large amount of data, information, images and knowledge. It imposes, therefore, the need to manage data flow in an efficient mode. Since clinical evaluation, treatment prescription, anatomical data acquisition, volumes delimitation, dose calculation up to treatment verification and delivery, data and images of each step are digitally recorded in Record and Verify system. Paperless can potentially relieve radiotherapy oncology, nurses, technical radiotherapy and secretaries from simple and repetitive tasks, and allow them to work on other important tasks, and in the end to improve the quality and safety of radiation therapy treatments.

## ***Introduction***

The activities of a Radiation Oncology Department are based on the collection, processing, use, transmission, exchange and storage of a large amount of data, information, images and knowledge. It imposes, therefore, the need to manage data flow in an efficient mode.

The large number of data, especially in the calculation and delivery of the treatment therapy, requires also a computerized management.

## ***Materials and methods***

Since clinical evaluation, treatment prescription, anatomical data acquisition, volumes delimitation, dose calculation up to treatment verification and delivery, data and images of each step are digitally recorded in Record and Verify system.

In the Radiotherapy Department of Perrino Hospital in Brindisi are installed: a Siemens 20 slices Computed Tomography for the acquisition of patient anatomical images and to defining the correct positioning of patient for treatment; two Linear Accelerators of Varian Medical System: a Clinac 600 (Millenium 80MLC) and a Trylogy (Millenium 120MLC ), with which it is possible to performe 3DCRT, IMRT, RAPIDARC therapy; furthermore a Varian System Remote Afterloading is used to performe High Dose Rate Brachytherapy treatment with a Ir192 source.

The Eclipse Treatment Planning System (TPS-Varian Medical System) allows the calculation of radiotherapy plans with different algorithms and modules; in External Beam Planning module for Clinac 600 PBC11.031 algorithm and for Trylogy AAA13.5.35 algorithm are used; in Brachytherapy

Planning module Brachyvision TG43 is used. The module Registration allows, for the target volume and organs at risk definition, to match CT images with images imported from NMR (Achieva 1.5 T Philips, Radiology Department) and from PET (Discovery 600 PET/CT System, Nuclear Medicine Department). The Eclipse TPS is integrated in the ARIA Record and Verify System (vers.13) on a single platform.

## **Results**

The ARIA R&V System allows to organize, monitor and record all of steps of the therapeutic process of the patients, from the first access to the Radiotherapy ward to the treatment delivery (Figure1\_Patient Care Path), and the whole patient medical history is record. All users with different skills can access to ARIA have a personal password and all actions are traceable.

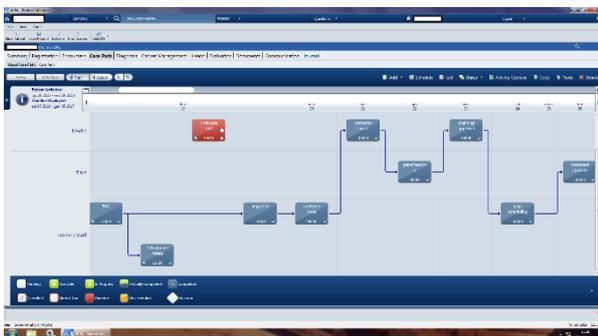


Figure 1: Patient Care Path

## **Discussion**

All that allows to work in paperless modality. Similar setup should be extended to every point of cancer treatment in order to achieve a high level of information to ameliorate knowledge and improve therapeutic results.

## **Conclusions**

An international consensus has been reached in order to share data from different points of cancer treatment for deep analysis and

improvement of results. So, the paperless department is a first step towards this goal. Paperless can potentially relieve radiotherapy oncology, nurses, technical radiotherapy and secretaries from simple and repetitive tasks, and allow them to work on other important tasks, and in the end to improve the quality and safety of radiation therapy treatments (1).

## **References**

- [1] Yang D, Wu Y, Brame RS, Yaddanapudi S, Rangaraj D, Li HH, Goddu SM, Mutic S. Technical note: electronic chart checks in a paperless radiation therapy clinic. *Med Phys.* 2012 Aug; 39 (8): 4726-32. doi: 10.1118/1.4736825.