

Division of Radiotherapy, Brachytherapy Unit and Molecular Imaging Unit

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Activities 2007. The Division of Radiotherapy is an academic department with around 65 employees including a staff of 10 radiation oncologists, 5 physicists and 1 bioengineer committed to the quality care delivery enhanced by research activities and resident and student education. The Division has the convention with the Faculty of Medicine of the University of Milan for post-graduate teaching in radiation oncology.

The Division has the latest equipment available for the high-precision radiotherapy including Intensity Modulated Radiotherapy (IMRT), Image-Guided Radiotherapy (IGRT), respiratory gating, intra- and extra-cranial stereotactic radiotherapy and 3-D conformal radiotherapy. There are 4 treatment planning systems (with image fusion modality), 2 computer tomography units and 3 linear accelerators for external beam radiotherapy. Two mobile linear accelerators are installed in the operating theatres for the intraoperative electron beam radiotherapy (IORT). Each external beam linear accelerator is equipped with one in-room Image-Guided Radiotherapy system (based on ultrasound imaging, computer tomography and X-ray system combined with a robotic 6-degrees of freedom treatment couch, respectively). The Record & Verify system, connecting all treatment planning systems to the 3 linear accelerators, ensures an automatic, fast and safe treatment delivery. High precision radiotherapy allows for excellent tumor targeting and maximum sparing of normal tissue. In consequence, several clinical protocols with dose escalation and accelerated hypofractionated schedules (higher dose per fraction, leading to the reduction of the overall treatment time) have been activated. In particular, the FAST project (Frazionamenti Accelerati dello Schema Terapeutico, i.e. Accelerated Fractionation of the Therapeutic Schedule) has been applied to the breast and prostate cancer. Apart from the hypothetical radiobiological advantages, FAST might significantly increase the patient convenience. Molecular Imaging Unit is involved in the research protocols on better definition of biological target volume, allowing for further improvement of radiotherapy precision.

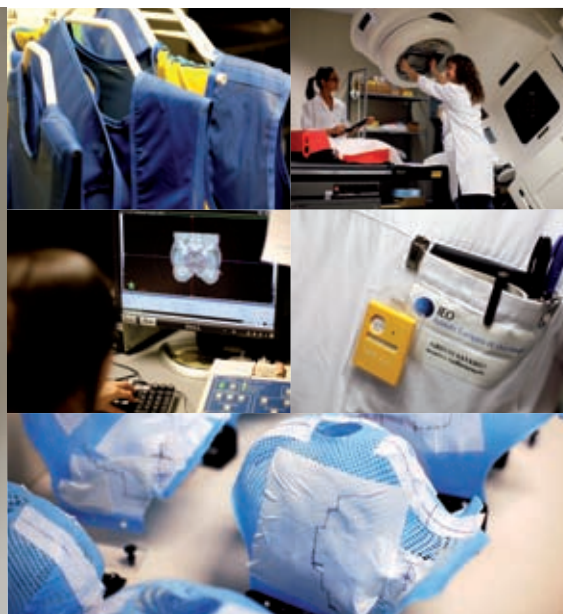
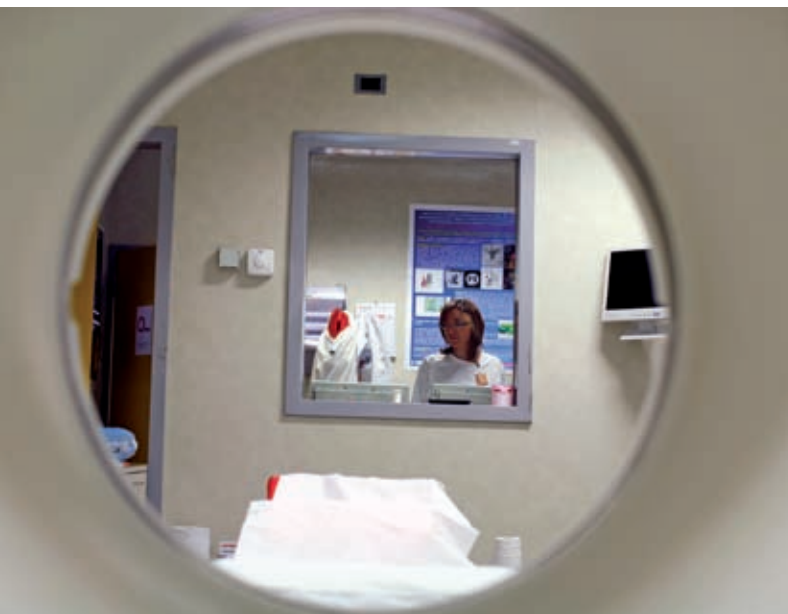
Brachytherapy & Radiotherapy Day Hospital

Admissions		Day Hospital	
Admissions	160	Cycles	323
-Surgery Adm	135	-Surgery Cyc	2
-Medical Adm	25	-Medical Cyc	321
Surgical Index	84,38%	Surgical Index	0,62%
Days	545	Treatments	2.787
Alos	3,41	Alos Treat	8,63
ARW	1,15	ARW	0,98



Brachytherapy Unit is a full-profile unit equipped with both low-, pulsed- and high dose rate systems. The unit is committed to the integrated approach in the field of radiotherapy. Several clinical protocols are active with brachytherapy as a boost or exclusive treatment. In particular, prostate cancer patients are treated with exclusive interstitial implant or high dose brachytherapy combined with external beam irradiation, depending on the risk factors. Dedicated planning systems and treatment units allow for image-guided high-precision brachytherapy application. There is an excellent collaboration with other departments within the frame of the disease-specific multidisciplinary

teams (see Clinical Research and Management Section). Such multidisciplinary approach allows in many clinical situations for less invasive therapy (organ preservation). There is also an active collaboration with the Department of Experimental Oncology investigating radiosensitivity of breast cancer stem cells. During 2007 more than 3000 new patients were treated in our Department. The highest proportion of patients were treated for breast cancer (36%) followed by metastatic disease (20%) and prostatic cancer (14%). More than 2000 patients received external beam irradiation, more than 900 patients - IORT (mainly for breast cancer) and the rest - brachytherapy.



Educational activities of the Division include in-department teaching for pre- and postgraduate medicine, physics and biotechnology students and radiology&radiotherapy technicians (University of Milan and Politecnico of Milan). External educational activities include teaching within the programmes of the European School of Oncology (ESO), the European Society for Therapeutic Radiation Oncology (ESTRO), the American Society of Therapeutic Radiation Oncology (ASTRO), the Italian Association of Radiation Oncology (AIRO), and the PTCOG (Proton Therapy Co-operative Group) and other national and international societies. Each year the Division hosts numerous visitors from radiotherapy and oncology centres from all over

the world (including the fellowship programme of the European Agency for Atomic Energy). The Division participates in the establishment of numerous national and international guidelines on cancer treatment. In research activities of the Division the emphasis is placed on breast cancer, prostate tumours and head and neck malignancies. The main aspects include new fractionation protocols, treatment accuracy, side effects and patient's quality of life, combined modality approach (including organ preservation studies) and new prognostic and predictive factors. During 2007 the Division published 29 full papers with an overall Impact Factor of 101.