RADIATION ONCOLOGY & MEDICAL PHYSICS IN TUNISIA

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International day of medical physics
7 November 2013
Paris- France
A small country with a big history
And the symbol of Arabic Spring

10 millions
164000 Km²
A Small country with a big history

ELJEM

KAIROUAN

13/11/13

First day of MP 7/11/2013
And the symbol of Arabic Spring
Creation in 1969 of the first Tunisian Anti-Cancer Centre:

“Salah Azaiz Institute”

(ISA) with a department of Radiotherapy.
RADIOThERAPY IN TUNISIA

- The number of treated patients is currently multiplied by 12 since the opening of ISA: more than 7000 patients in 2012.
FACILITIES
1992

- First radiotherapy treatment with photons X of clinac. (with the assistance of the experts of the IAEA)- 1992-

- The first treatment with electrons -1994-

- Installation of the treatment planning system (TPS) and development of estimated dosimetry of the external radiotherapy and the gynaecological brachytherapy procedures.

- Renewal of the simulator and two cobalt units

- Renewal of two curiethrons (LDR)

- Acquisition of contactherapy (50 → 150 kV)
NEW TECHNIQUES

- Starting of the ocular brachytherapy, with radioactive discs of Ruthénium106 in collaboration with the Institute of Ophthalmology (1996)
- Introduction of the thermoplastic masks for head and neck tumours (1997)
- Introduction of TBI (2000)
- Development of brachytherapy of NPC and HDR (2005)
- 3D Conformal Radiotherapy (2010)
- IMRT irradiation (2013)
Facilities of radiotherapy in Tunisia
Public Sector

Tunis- Salah Azaiz Institute-
- 1 accelerator (Varian iX)
- 1 TPS
- 2 cobalt units
- 1 contactherapy RT 150 kV
- 1 simulator scan
- 2 curiethron LDR
- 1 HDR (24 Channels) Ir192

Sfax- Habib Bourguiba Hospital
- 1 cobalt unit
- 1 accelerator (Varian iX)
- 1 contactherapy unit RT 150 kV
- 1 simulator-scanner
- 1 curiethron LDR(AIEA)
- 1 TPS

Sousse- Farhat Hached Hospital-
- 1 cobalt unit
- 1 accelerator (Varian iX)
- 1 contactherapy unit RT 150 kV
- 1 curiethron LDR
- 1 TPS

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Facilities of radiotherapy in Tunisia

Private Sector

**Tunis**
- Taoufik: 1 cobalt (1982)
- Centre Gamma: 1 cobalt (1992)
- Clinique Hannibal: Accelerator (Varian iX) (2011)
- Clinique ENNASR: Accelerator (Varian iX) (2009)

**Sfax**
- Chifa: 1 cobalt (1992) and 1 simulator

**Sousse**
- Ibn Khaldoun: 1 cobalt unit (2005)
  - 1 simulator (2005)

One machine per 750,000 habitants wish is one of the highest rates of radiotherapy equipment per habitant in Africa.
Acquisition of a second accelerator for the ISA

Acquisition of 2 accelerator and 2 TPS for Sfax and Sousse in private.

Acquisition of an accelerator and a scan simulator and TPS for new public centre in Ariana
Summary of facilities

- 5 LINAC
- 9 Cobalt 60
- 3 LDR afterloaders
- 1 HDR (24 channels)
- Acquisition for 2014
  - 2 LINAC in Public
  - 2 LINAC in Private

1.4 machine/million

1.8 machine/million
32 Radiation oncologists
10 Medical Physicists (2 PhD and 8 professional master)
8 training physicists (bachelors)
3 dosimetrist... 
40 radiation technologists
Contribution of IAEA

- Since 1990, IAEA project have contributed to improve radiotherapy and medical physics in Tunisia with five cooperation projects:
  - TUN/06-04: Improvement of radiotherapy in Tunisia (1990-1996)
  - TUN/06/-13: Improvement of radiotherapy and medical physics in Tunisia: Phase II (2009-2011)
  - TUN/06/-14: Introduction of stereotactic radiotherapy in Tunisia (2012-2013)
Since 1995, Tunisia took part in program AFRA XII. This program has contributed also to improve radiotherapy and medical physics in Tunisia by two cooperation projects:

- AFRA/06-027_28: (2000-2005)
- AFRA/06-031-35: (2005-2010)
- AFRA/06-044-45: (2010-2015)
ACADIMIC EDUCATION & TRAINING

- Research Master in Medical Physics (2011-20013) : first promotion end 2013
- Training for radiographers (3 schools)
- Training for residents in radiotherapy departments
MEDICAL PHYSICS EDUCATION IN TUNISIA
Radiotherapy started with a physicist "Mr. Hedi Damak" was protection specialist and who has worked at the Atomic Energy Commission of Tunisia.

In 1986 I joined the team as an academic medical physics. In order to prepare the ground knowing that we have two university hospitals that will have radiotherapy, we sent students doing master of medical physics in Toulouse, France to Prof. Daniel Blanc who was my boss.

This experiment was a failure:
- One returned
- The others have preferred to stay in France
Job training
2002

- Recruitment of bachelors in science physics
- Job Training by myself
- No accreditation
Professional master
2007-2008

- Nine candidates were trained one of which now preparing a PhD in France
- 8 were recruited as technicians in medical physics
- This master has been sponsored by INCA within the #plan cancer du Président Chirac#
- Fellowship for 6 months training in France for 9 students

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History of medical physics in Tunisia

Doctorate school of medical physics

- Academic education
  - Bachelor in physic
  - Master (2011-2013)
  - ± Ph.D. (2013-2016)
- Training

Operators

- University El Manar Tunis
- STOR (Société Tunisienne d’Oncologie Radiothérapie)
- EDC (Education Doctorate Commission)
  - Proposed the contain of education program
- NCR (National Commission of Recruitment of Med. Phys.)
  - Accredited education program

First day of MP 7/11/2013
University Education

- University El manar Tunis
  - Institut Supérieur de Technologie Médicale de Tunis (ISTMT)
  - Faculté de Médecine de Tunis (FMT)
  - Salah Azaiez Institute Tunis
Education programm of Master

- Three semestriels course a full time
  - First session
    - applied Mathematics
    - quantum mechanics
    - Physical basis of radiation and medical applications
    - medical informatics
    - scientific English
    - biological Sciences
    - Optoelectronics
University Education Master

- Second session
  - Dosimetry and radiation detection
  - Basic physics of medical imaging
  - Absolute and relative dosimetry
  - Fundamentals in Oncology
  - Nuclear analytical techniques
  - Nuclear Medicine Instrumentation
  - Medical English
Third session

- Radiation and Radiobiology (common)
- Dosimetry in radiotherapy
- In vivo dosimetry in radiotherapy.
- Brachytherapy
- Quality Assurance (QA) in radiotherapy
- Numerical simulation in medical physics
- Medical Physics in nuclear medicine
- English and literature search and project management
forth session

- Research Project in medical physics
- Clinical training (Radiotherapy or medical imaging (nuclear medecine and radiodiagnostic)
University Education
Ph.D

- A student who wants to have a research project can go even further to the doctorate.
  - This research project takes an average of 3 to 4 years
  - The PhD student has developed a specialized expertise in the subject studied
  - The PhD student demonstrated that he can complete a major project
The physicist who wishes to improve his clinical knowledge can do a residency in medical physics.

- In a specific subspecialty
  - diagnostic imaging
  - nuclear medicine
  - radiation oncology
Diploma and university degree in medical physics are considered as accreditation
The medical physicist is considered a teaching profession in university
Member and funder of

- AFROG: African Radiation Oncology Groupe: sponsored by IAEA
- FAMPO: Federation of African Medical physics: sponsored by IOMP
- STOR: Société Tunisienne d’Oncologie Radiothérapie
FAMPO
Federation of African Medical Physicists Organisation

FAMPO is a new Regional Organization of IOMP it is our privilege that the Federation of African Medical Physicists are part of the global community of IOMP.

We are proud of FAMPO as the youngest Regional Organization of IOMP.

PROJECTS AND PERSPECTIVES
2013-2014
Objective 1
Enhance capacity and accessibility

Staff

- Medical Physicists (Master)
- Training of radiation oncologists
- Training of radiation technologists
Objective 2
Improve quality of treatment

Equipment
- Innovative accessories for Conformal radiotherapy, IMRT, and stereotactic radiotherapy (with the new 3 LINACS)

Technique
- Introduce HDR brachy for prostate

Staff
- Training on these new techniques
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