

### PO-0856 Age and frailty do not limit Magnetic Resonance guided Radiotherapy (MRgRT) in elderly patients

L. Boldrini<sup>1</sup>, G. Colloca<sup>1</sup>, F. Cellini<sup>1</sup>, G. Chiloiro<sup>1</sup>, A. Bellieni<sup>2</sup>, G.C. Mattiucci<sup>1</sup>, M.V. Antonelli<sup>1</sup>, V. Pollutri<sup>1</sup>, C. Votta<sup>1</sup>, M. Massaccesi<sup>1</sup>, S. Manfrida<sup>1</sup>, B. Fionda<sup>1</sup>, V. Frascino<sup>1</sup>, V. Masiello<sup>1</sup>, A. Petrone<sup>1</sup>, F. Catucci<sup>1</sup>, S. Luzi<sup>3</sup>, E. Villani<sup>2</sup>, M. Balducci<sup>1</sup>, V. Valentini<sup>1</sup>

<sup>1</sup>*Polo Scienze Oncologiche ed Ematologiche- Università Cattolica del Sacro Cuore- Fondazione Policlinico Universitario Agostino Gemelli- Rome- Italy, Gemelli ART, Rome, Italy*

<sup>2</sup>*Polo Scienze dell'invecchiamento- neurologiche- ortopediche e della testa-collo- Università Cattolica del Sacro Cuore- Fondazione Policlinico Universitario Agostino Gemelli- Rome- Italy, Geriatric Medicine, Rome, Italy*

<sup>3</sup>*Polo Scienze dell'invecchiamento- neurologiche- ortopediche e della testa-collo- Università Cattolica del Sacro Cuore- Fondazione Policlinico Universitario Agostino Gemelli- Rome- Italy, Gemelli ART, Rome, Italy*

#### Purpose or Objective

MR guided Radiotherapy (MRgRT) represents a new frontier of RT delivery technology and the use of hybrid treatment units is getting more common for various diseases.

The enhanced target visualization and motion management resources of these machines offer significant advantages in optimizing dose coverage and reducing organs at risk irradiation, but high compliance from patients (pts) is required (MR compatibility, breathing control, endurance in treatment position). Elderly pts are usually frail and affected by comorbidities that limit their compliance and access to MRgRT and no specific experience has been published about. Aim of this investigation is to assess the feasibility of MRgRT treatments in pts at least 80 years old and to describe their compliance to these complex procedures.

#### Material and Methods

Pts at least 80 years old, candidate for MRgRT treatments on a hybrid Tri-Co<sup>60</sup> MRI unit (MRIdian,ViewRay), were considered for this analysis. All pts underwent an interview for informed consent acquisition and procedure explanation. Frailty condition, sarcopenia, physical and cognitive performances were assessed during oncogeriatric visits through a Comprehensive Geriatric Assessment, Time up & Go test, DEXA Scan, SPPB, hand grip strength, distress scale and MMSE test.

All the tests were done before and at the end of RT. No restrictions relative to primary tumor site, disease staging or type (IMRT step and shoot or SBRT) and intent of RT treatment (curative with or without concurrent chemotherapy or palliative) have been applied. Pts were immobilized according to treatment site and type and respiratory gating protocols have been performed when indicated. Treatment time was recorded.

Absolute exclusion criteria were MR incompatibility, claustrophobia and cognitive impairment.

#### Results

13 pts were enrolled from February to October 2017 (see fig.1).

Mean age was 83.5 years (80-88), 3 pts were female and 10male.

3 pts were mobility-impaired and not ambulating. 10 pts resulted to be frail at performance measure before startingRT.

No cognitive impairment was observed.

Treatment sites were 7 pelvic (4 rectal cancer, 2 bladder, 1 sacrum), 3 thoracic (2 lung and 1 sternum) and 3 abdominal (1 pancreas, 2 nodal lesions).

RT intent was curative in 8 pts (5 SBRT and 3 IMRT) and palliative in 5 cases (IMRT), with a mean number of fractions of 8,4 (5-25).

SBRT treatments had a mean duration of 21 (9-32) minutes (min) per fraction, while IMRT ones of 15 (4-35) min and all the pts successfully concluded the scheduled treatment.

At the end of the treatment, no differences were observed in the Qualiife indexes, while a reduction of distress was observed.

Patient	Sex	Age	Ambulating	Primary Tumor	RT site	Total dose (Gy)	Dose per fraction (Gy)	Fractions number	Effective RT time (min)
1	2	88	1	Rectum	Pelvis	25	5	5	11,37
2	1	87	1	Rectum	Pelvis	55	2,2	25	3,9
3	1	87	1	Lung	Thorax	50	10	5	9,33
4	1	85	1	Prostate	Thorax	20	4	5	35,46
5	1	85	1	Lung	Thorax	50	10	5	21,6
6	1	83	1	Bladder	Pelvis	20	4	5	14,19
7	2	82	0	Bladder	Pelvis	20	4	5	18,75
8	1	82	1	Pancreas	Abdomen	25	5	5	25,71
9	1	82	1	Prostate	Pelvis	30	3	10	19,53
10	2	81	1	Ovary	Pelvis	25	5	5	11,76
11	1	80	1	Rectum	Pelvis	55	2,2	25	8,16
12	1	82	0	Colon (N)	Abdomen	35	7	5	31,74
13	1	82	0	Rectum (N)	Abdomen	30	6	5	15,3

Legend: Sex 1=male, 2=female; Ambulating 1=yes, 2=no; Primary tumor (N)=nodal lesion

#### Conclusion

MRgRT treatments appear to be feasible in oldest old pts and in frail elderly, regardless of disease type and stage and RT treatment intent or delivery technique. Particularly, SBRT treatments appear to be well tolerated even if longer than IMRT ones.

This study may represent a new scenario about the management of elderly patient undergoing RT.

### PO-0857 Radiotherapy Utilisation and Treatment Completion in the Elderly - A Single Institution Analysis

T. Mee<sup>1</sup>, N.F. Kirkby<sup>1</sup>, A. Choudhury<sup>2</sup>, R. Jena<sup>3</sup>, K.J. Kirkby<sup>1</sup>

<sup>1</sup>*University Of Manchester, Division of Cancer Sciences, Manchester, United Kingdom*

<sup>2</sup>*The Christie NHS Foundation Trust, Division of Clinical Oncology, Manchester, United Kingdom*

<sup>3</sup>*University of Cambridge, Department of Oncology, Cambridge, United Kingdom*

#### Purpose or Objective

The elderly are prescribed fewer radiotherapy treatments compared to their younger counterparts. The research question is whether this is best practise or an overestimation of frailty and inability to cope with the demands of aggressive treatment. Here we calculate the radiotherapy treatment completion rate (TCR) to investigate the differences between the elderly and younger patients and the extent of the differences, in both radical and palliative settings. Additionally, we study the access rates to radiotherapy across different cancer sites to determine the differences between the age bands.

#### Material and Methods

A record of every single fraction prescribed and delivered for a single, comprehensive, cancer treatment centre was obtained and the data for three tumour sites were extracted: breast, lung and colorectal. The records were split by age, fractions prescribed, fractions delivered, site treated, radiotherapy intent and patient healthcare region. The data for new cancer incidences for the healthcare regions was obtained from the cancer registries, broken down by age to match the fraction records. A comparison was made between the number of fractions prescribed and the number of fractions delivered across the age bands. A separate comparison was made between the number of patients treated and the number of new incidences recorded within the regions surrounding the hospital, to calculate the local radiotherapy access rate across the age bands.

#### Results

Table 1 shows the treatment completion rate, broken down (split) by treatment intent and age band. For breast and colorectal there is a clear increase in radical TCR from age 60+. Palliative TCR in the elderly decreases in

breast cancer, but increases in colorectal cancer. Lung cancer shows a decrease in radical TCR, but an increase in palliative completion rate. Across all three sites the radiotherapy access rates decrease in the elderly.

<b>Lung (n=557)</b>		<b>Treatment Completion</b>		<b>Local Access Rate</b>
<b>Age band</b>	<b>Palliative</b>	<b>Radical</b>		
0-49	100%	75%		40%
50-59	95%	100%		69%
60-69	91%	84%		63%
70-79	90%	89%		45%
80+	97%	81%		18%
<b>Breast (n=1175)</b>		<b>Treatment Completion</b>		<b>Local Access Rate</b>
<b>Age band</b>	<b>Palliative</b>	<b>Radical</b>		
0-49	95%	88%		93%
50-59	98%	82%		93%
60-69	93%	76%		84%
70-79	91%	80%		66%
80+	86%	85%		33%
<b>Colorectal (n=262)</b>		<b>Treatment Completion</b>		<b>Local Access Rate</b>
<b>Age band</b>	<b>Palliative</b>	<b>Radical</b>		
0-49	70%	82%		38%
50-59	93%	67%		28%
60-69	80%	76%		21%
70-79	83%	83%		20%
80+	100%	85%		9%

Table 1. Treatment completion rates, separated by treatment intent, and local access rate for lung, breast and colorectal cancer.

#### Conclusion

Our analysis confirms that access rates for radiotherapy decline with advancing age. However, in the case of breast and colorectal cancer the elderly are more likely to complete their scheduled treatment than their younger counterparts. The effect is reversed in lung-cancer, likely due to higher co-morbidity rates in the elderly. These comparisons indicate that there is value in combining local usage statistics and cancer registry data to investigate the appropriateness of radiotherapy utilisation in across different disease sites in this age group.

Poster: Clinical track: Health services research / health economics

#### PO-0858 Case/Budget Impact Analysis of Intraoperative breast cancer radiotherapy in the German health care

B. Both<sup>1</sup>, V. Anil<sup>2</sup>

<sup>1</sup>Carl Zeiss Meditec, Radiotherapy, Oberkochen, Germany

<sup>2</sup>University of Alberta, Canada School of Public Health, Edmonton, Canada

#### Purpose or Objective

To inform reimbursement policy a case number and a budget impact analysis was carried out. The statistics in the statutory system and the billing behavior of the medical institutions were evaluated as well as the financial implications for the health care spending when using the low energy intraoperative radiotherapy (IORT) for breast cancer treatment. The IORT (as a definitive dose or as a boost) reduces or eliminates the need for several radiation center visits and minimizes radiation exposure to healthy tissue and organs.

#### Material and Methods

The analysis was based on the case-related hospital statistics of the Federal Statistical Office (Destatis) for the years 2008 to 2016. An incidence-based budget impact model in MS Excel was developed over a five-year time horizon employing the German health care system perspective. Epidemiologic data were used to quantify the proportion of patients diagnosed with early breast cancer in Germany. Diagnosis Related Group (DRG) based IORT base case cost was varied in a reasonable range for the sensitivity analysis.

#### Results

The introduction of the specific low kV IORT OP key 8-52.d showed relevant changes in coding behavior in 2013 and a shift of 960 cases in favor of OPS 8-52.d took place. The OP key 8-52.d was applied in 2013-15 1,341, 1,282 and 1,125 times. Thus in the German statutory system over the years 2008 - 2015 10,000 breast cancer patients have been treated with low kV IORT. According to the Budget Impact Analysis 10 Million Euros have been saved to the public system from 2008-2015 with the application of IORT. With the progressive introduction of IORT the total annual cost of treatment for early breast cancer patients in Germany gradually decline from 244 Million Euros in the first year to 189 Million Euros in the fifth year. Therefore, the introduction of IORT in phasic manner could save 241 Million Euros over the next five years. In the alternative scenario, where all applicable patients are treated with IORT from now, the annual cost saving for the payer would be 78 Million Euros and would save 389 Million Euros.

#### Conclusion

IORT (boost and single treatment) is clearly the cost saving treatment strategy for patients with early-stage breast cancer. The impact of IORT treatment decision extends beyond these model results as the implementation of this shorter radiation course could improve quality of life by sparing patients from the longer course of conventional radiotherapy, improve compliance, prevent unnecessary mastectomies and save valuable health care resources.

#### PO-0859 Project S32: decision support system for lung cancer patients

J.L. Lopez Guerra<sup>1</sup>, B. Pontes<sup>2</sup>, A. Moreno<sup>3</sup>, C. Rubio<sup>2</sup>, F. Núñez<sup>2</sup>, I. Nepomuceno<sup>2</sup>, J. Moreno<sup>3</sup>, J. Cacicedo<sup>4</sup>, J.M. Praena-Fernandez<sup>5</sup>, G.A. Escobar Rodriguez<sup>3</sup>, C. Parra<sup>3</sup>, J. Riquelme<sup>2</sup>, M.J. Ortiz-Gordillo<sup>1</sup>

<sup>1</sup>Hospital Universitario Virgen del Rocío, Radiation oncology, Sevilla, Spain

<sup>2</sup>Universidad de Sevilla, Department of Computer Language and Systems, Seville, Spain

<sup>3</sup>Hospital Universitario Virgen del Rocío, Group of Technological Innovation, Seville, Spain

<sup>4</sup>Cruces University Hospital, Radiation Oncology, Bilbao, Spain

<sup>5</sup>Hospital Universitario Virgen del Rocío, Methodology Unit, Seville, Spain

#### Purpose or Objective

A decision support system (DSS) has been proposed to predict survival and apply knowledge from routine care data rather than solely relying on clinical guidelines in lung cancer (LC) patients.

#### Material and Methods

To implement the technological architecture of this DSS, we integrated a set of open source tools which allowed us to register information during daily clinical practice through electronic health records and use this information to automatically execute different Data Mining analyses. It is based on the XGBoost and Generalized Linear Models algorithms applying a 10-fold cross validation to explore its potential for predicting survival from a heterogeneous dataset. Prospective multicenter data from 543 consecutive LC patients that