calculated from the date of surgery until the date of death or until the last known vital status. Conditional survival was defined as the survival conditional on surviving one year after surgery and was calculated in order to avoid the impact of adverse events in the postoperative course.

Multivariable Cox proportional-hazards regression models were applied to evaluate the association of preoperative treatment, type of radical resection and use of adjuvant chemotherapy with survival, adjusting for the baseline characteristics age, gender, WHO score and clinical stage.

Results: A total of 5173 eligible rectal cancer patients were identified from the national database. Preoperative treatment was as follows: none in 1354 (26.2%), radiotherapy in 797 (15.4%) and chemoradiotherapy in 3022 (58.4%) patients. Patients who received no preoperative therapy or preoperative radiotherapy and those who underwent abdominopelvic resection had a lower observed survival as compared with patients receiving preoperative chemoradiotherapy or treated with sphincter-sparing surgery respectively (Table). The patient group receiving adjuvant chemotherapy had a worse observed survival than the group receiving no adjuvant therapy. These effects were age-dependent. Multivariable analysis demonstrated similar findings for the observed survival conditional on surviving the first year after surgery.

Conclusion: In this population-based study, preoperative chemoradiotherapy, sphincter-sparing surgery and no adjuvant chemotherapy were associated with a superior survival in clinical stage I-III rectal cancer patients.

OC-0240
Lumbarsacral bone marrow modeling of acute hematological toxicity in chemoradiation for anal cancer
P. Franco1, Ospedale Molinette University of Turin A.O.U. San Giovanni Battista di Torino, Department of Oncology - Radiation Oncology, Torino, Italy
F. Arcadipane1, R. Ragona1, M. Mistrangelo2, P. Racca4, U. Ricardi1
1Ospedale Molinette University of Turin A.O.U. San Giovanni Battista di Torino, Digestive and Colorectal Surgical Department- Centre for Minimal Invasive Surgery- University of Turin- Turin- Italy, Torino, Italy
2Ospedale Molinette University of Turin A.O.U. San Giovanni Battista di Torino, Department of Medical Sciences - Pathology Unit, Torino, Italy
3Ospedale Molinette University of Turin A.O.U. San Giovanni Battista di Torino, Oncological Centre for Gastrointestinal Neoplasms- Medical Oncology 1- Turin- Italy, Torino, Italy
4Ospedale Molinette University of Turin A.O.U. San Giovanni Battista di Torino, Department of Oncology - Radiation Oncology, Torino, Italy

Purpose or Objective: To model acute hematologic toxicity (HT) and dose to pelvic osseous structures in anal cancer patients treated with definitive chemosensitization (CT-RT).

Material and Methods: 53 patients receiving CT-RT were analyzed. Pelvic bone marrow (PBM) and corresponding subsites were contoured: ilium (IBM), lower pelvis (LPBM) and lumbosacral spine (LSBM). Dose-volume histograms points and mean doses were collected. Logistic regression was performed to correlate dosimetric parameters and > G2-G3 HT as endpoint. Normal tissue complication probability (NTCP) was evaluated with the Lyman-Kutcher-Burman (LKB) model.

Results: Logistic regression showed a significant correlation between LSBM mean dose and >G2 neutropenia ($b$ coefficient:0.109; $p=0.037$;95%CI:0.006-0.212) and >G3 leukopenia ($b$ coefficient:0.122; $p=0.030;95\%CI:0.012-0.233$) (Table 1). According to NTCP modeling, the predicted HT probability had the following parameters: $TD_{50}=32.6 \text{ Gy}$, $m:0.449$ (>G2 neutropenia) and $TD_{50}=37.5 \text{ Gy}$, $m:0.347$ (>G3 leukopenia) (Figure 1). For node positive patients $TD_{50}=30.6 \text{ Gy}$, $m:0.181$ (>G2 neutropenia) and $TD_{50}=35.2 \text{ Gy}$, $m:0.176$ (>G3 leukopenia) were found (Figure 1)
and 26 Gy (>G2 neutropenia) and 24 Gy, 27 Gy and 30 Gy (>G3 leukopenia). On the whole cohort, within a dose range between 25 and 40 Gy, this probability rises from 30.3% to 49.1% for >G2 neutropenia and from 17.5% to 57.1% for >G3 leukopenia. For node positive patients these ranges were 16.5%-93.7% (>G2 neutropenia) and 6.7%-77.6% (>G3 leukopenia).

Conclusion: LKB modeling seems to suggest that LSBM mean dose should be kept below 32 Gy to minimize >G2-G3 HT in anal cancer patients treated with IMRT and concurrent chemotherapy. The sensitivity of LSBM and its contribution to the development of HT above 25 Gy seems higher in node positive patients. 

OC-0241
MR radiomics predicting complete response in radiochemotherapy (RTCT) of rectal cancer (LARC) N. Dinapoli1, B. Barbaro2, R. Gatta1, G. Chiloio1, C. Casà1, C. Masciocchi3, A. Damiani1, L. Baldrini1, M.A. Gambacorta1, M. Di Matteo2, G.C. Mattiucci1, M. Balducci1, L. Bonomo3, V. Valentini1
1Università Cattolica del Sacro Cuore - Policlinico A. Gemelli, Radiation Oncology Department, Rome, Italy
2Università Cattolica del Sacro Cuore - Policlinico A. Gemelli, Radiology Department, Rome, Italy

Purpose or Objective: RTCT is widely used as treatment in LARC before surgery. A challenging aspect for tailoring radiation dose prescription is prediction of cases that will show a pathological complete response (PCR) after surgery, because they have better expectation in survival outcomes. “Radiomics” refers to the extraction and analysis of large amounts of advanced quantitative imaging features with high throughput from medical images. Up today radiomics findings in LARC have been limited either to small case series and CT or PET scan imaging. Objective of this study is to find a radiomics signature able to distinguish PCR patients using pre-treatment MR.

Material and Methods: Histologically proven LARC patients were recruited retrospectively since May 2008 to December 2014. They were staged by T2 MR, high resolution (0.7 x 0.7 x 3 mm pixel spacing on x-y-z axes) perpendicular to tumor major axis oblique scans, before RTCT start. Finally they underwent to surgery with definition of pathological response. All patients were addressed to RTCT treatment with 50.4 Gy @ 1.8 Gy/fr prescription dose on GTV+surrounding mesorectum (PTV1) and 45 Gy @ 1.8 Gy/fr on lymphatic drainage (PTV2). For radiomics analysis GTV was delineated on pre treatment MRI by a radiologist and a radiation oncologist experienced in GI. Images were processed by using a home-made software. Before analysis MR images were pre-processed using a normalization procedure and application of Laplacian of Gaussian (LoG) filter on raw data. After pre-processing, GTV volumes were analyzed extracting 1st order features (Kurtosis, Skewness and Entropy). These features were extracted by scanning all possible values of α in LoG filter from 0.3 to 6 (step 0.01). A total number of 570 x 3 features were analyzed respect to the PCR in order to detect the most significant ones using AUC and Mann-Whitney test. Tumor clinical (cT, cN) and geometrical features (volume, surface, volume/surface ratio) were finally added for building a multivariate logistic model and predicting PCR. Model performance was evaluated by ROC analysis and internal bootstrapping for detecting calibration error (TRIPOD Ib classification).

Results: 173 patients have been enrolled in this study. 1st order features analysis shows as candidate-to-analysis ones the Skewness (σ =0.69 - SK069) and Entropy (σ=0.49 - EN049). Multivariate logistic model shows as significant covariates cT (p-val = 0.003), SK069 (p-val = 0.006) and EN049 (p-val = 0.049). AUC of model is 0.73 and bootstrap based internal calibration shows prediction mean absolute error = 0.017. The model has been summarized in a nomogram.

OC-0242
Follow-up time and prediction model performance in a pooled dataset of rectal cancer trials J. Van Soest1, E. Meldolesi2, A. Damiani2, N. Dinapoli2, J.P. Gerard3, C. Van de Velde4, C. Rödel1, K. Bukja5, A. Sainato6, R. Glynne-Jones6, P. Lambin1, A. Dekker1, V. Valentini1
1Maastricht University Medical Centre, Department of Radiation Oncology MAASTRO- GROW School for Oncology and Developmental Biology, Maastricht, The Netherlands
2University of Rome “La Sapienza”, Rome, Italy
3Surgical Oncology- Endocrine and Gastrointestinal Surgery, Leiden, The Netherlands
4Goethe University Frankfurt, Department of Radiotherapy and Oncology, Frankfurt am Main, Germany
5Maria Sklodowska-Curie Memorial Cancer Centre, Department of Radiotherapy, Warsaw, Poland
6Azienda Ospedaliera Universitaria Pisana, Department of Radiotherapy, Pisa, Italy
7Mount Vernon Cancer Centre, Department of Medical Oncology, Northwood, United Kingdom

Purpose or Objective: Predictive and prognostic models in locally advanced rectal cancer have been developed in the last years. Starting with predictions models on pathologic complete response (as intermediate endpoint), afterwards local recurrence (LR), distant metastasis (DM) and overall survival (OS) at different time points (e.g. 5 or 10 years post-treatment) finally resulting in a model for the aggregate outcome, disease free survival (DFS). The current work aimed to reproduce the prediction models for LR, DM and OS, and to investigate the time dependence of these models.

Material and Methods: The dataset characteristics are shown in Table 1. This pooled dataset merged the datasets of the ACCORD, TME, CAO/ARO/AIO ’94, Polish, FFCD, Italian (Sainato) and UK (Glynne-Jones) trials. As the current pooled dataset contains different trials, we used 20% of patients (stratified on the trial) as a validation dataset. In accordance to the methods used in previous work, we trained prediction models for the outcomes LR, DM and OS on this larger