information is used in DRE based nomograms. Furthermore, by incorporating additional core-specific biopsy information instead of the percentage of positive cores as mentioned in the existing nomograms, this nomogram could handle with the paradigm shift from saturation biopsies towards targeted biopsies. This updated nomogram could be a useful tool that helps urologists and radiation oncologists to accurately predict the likelihood of LNI before treatment.

OC-0161 Validation of clinical/dosimetric/genetic risk factor models for late RT-induced rectal bleeding

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Purpose or Objective

REQUITE is an international, prospective observational cohort study, which recruited patients (pts) in 8 countries (April2014-March2017). It is aimed at multinational validation of clinical/dosimetric/genetic risk factors for prediction of late toxicity following radiotherapy (RT). The purpose here was to present preliminary results on validation of such features for late rectal bleeding (LRB) after conventionally fractionated external beam RT (EBRT) for prostate cancer (PCa).

Material and Methods

REQUITE PCa pts treated with 2Gy/fr EBRT and complete 2-year follow-up were included.

RT was prescribed according to local regimens, but centres used standardised data collection. Blood samples were collected for DNA extraction/genotyping. Grade≥1 LRB (LRB1+) and grade≥2 LRB (LRB2+) were considered as separate endpoints.

Clinical/dosimetric/genetic risk factors already published in the literature were selected from Landoni (Phys Med 2016) and Kerns (Ebiomedicine 2016). Selected features are reported in Figure 1a. Association of selected features with LRB was investigated through logistic regression. A final logistic model including only validated predictors was fitted and a nomogram was developed. Confirmed SNPs were used to calculate a polygenic risk score which was included in modeling as a single genetic parameter.

Results

REQUITE enrolled 1190 PCa pts with 2Gy/fr EBRT, 1178 had complete clinical/dosimetric data, 933/1178 had complete 2-year follow-up and were included in this analysis. Description of the population is in Figure 1b. 147/933 (15.8%) LRB1+ and 29/933 (3.1%) LRB2+ were scored.Rectal EUD was confirmed as a predictor for both LRB1+ (OR=1.03 for 1Gy increase) and LRB2+ (OR=1.06 for 1Gy increase), with Odds Ratios similar to those reported in literature.Cardiovascular disease (OR=1.97) and abdominal surgery (OR=1.83) were confirmed for LRB2+, with slightly lower ORs with respect to those previously found.

Three SNPs were associated with LRB: rs6999859 (OR=1.37), rs4804134 (OR=0.97) and rs7432328 (OR=1.51) with ORs slightly lower than reported previously. The 3 SNPs were included in a polygenic risk score. Diabetes and androgen deprivation were not confirmed as risk factors, and not included in the final models. Figure 2 reports the two model-derived nomograms, model parameters and summary of performance measures.

Figure 1a: Clinical/dosimetric/genetic risk factors already published in the literature and selected for validation.

From Landoni et al. (Phys Med 2016):
- rectal Equivalent Uniform Dose (EUD) calculated with n=0.12
- cardiovascular diseases
- abdominal surgery
- diabetes
- androgen deprivation

From Kerns et al. (Ebiomedicine 2016):
SNPs associated to LRB
- rs12497518
- rs141044160
- rs6999859
- rs4804134
- rs360071
- rs7432328

Figure 1b: Population and Radiotherapy treatment characteristics

T stage	
T1a-T1b	1.5%
T1c	33.7%
T2	46.4%
T3	17.5%
T4	0.9%
Gleason Score	
3+3	16.3%
3+4	32.1%
4+3	26.5%
8	11.5%
>8	13.6%
Pre-RT PSA (ng/ml)	
2.5th-percentile: 2.6	
25th-percentile: 6.5	
median: 9.4	
75th-percentile: 15.6	
97.5th-percentile: 15.7	
Patients with positive lymph node	22.1%
Post-prostatectomy patients	36.0%
cardiovascular diseases	24.0%
diabetes	12.9%
abdominal surgery	36.6%
TURP	6.3%

RT type	
3DCRT	21.0%
static-field IMRT	5.9%
VMAT/Rapid Arc	73.1%
neoadjuvant/concomitant hormone	71.4%
Irradiation of Pelvic Lymph Nodes	41.0%
Irradiation of Seminal Vesicles	55.0%
Prescribed dose to prostate (Gy)	
2.5th-percentile: 54.4	
25th-percentile: 69.3	
median: 74	
75th-percentile: 76	
97.5th-percentile: 80	
Rectal Equivalent Uniform dose (Gy)	
2.5th-percentile: 46.6	
25th-percentile: 53.5	
median: 56	
75th-percentile: 58	
97.5th-percentile: 63.8	

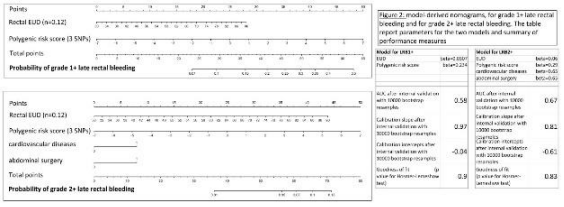

Figure 2: model-derived nomograms, for grade 1+ late rectal bleeding and for grade 2+ late rectal bleeding. The table report parameters for the two models and summary of performance measures

Conclusion

REQUITE highlighted the need to collect standardized data and the importance of model validation. The present analysis confirmed the predictive value for LRB of most clinical/dosimetric features previously published, together with validation of some SNPs. Resulting models including validated features well described clinical observation in the multi-center REQUITE population, but discriminative power remained suboptimal. Use of 3-dimensional dose distributions might overcome the limitations of using dose-volume histogram parameters, which can be explored using the REQUITE resource.

OC-0162 PSMA PET/CT for intraprostatic tumor delineation and characterization based on radiomic features

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