


XXXII CONGRESSO NAZIONALE AIRO  
XXXIII CONGRESSO NAZIONALE AIRB  
XII CONGRESSO NAZIONALE AIRO GIOVANI

# AIRO2022

Radioterapia di precisione per un'oncologia innovativa e sostenibile

BOLOGNA, 25-27 NOVEMBRE  
PALAZZO DEI CONGRESSI

 Associazione Italiana  
Radioterapia e Oncologia clinica

 Società Italiana di Radiobiologia

 Associazione  
Italiana  
Radioterapia  
e Oncologia  
clinica  


XXXII CONGRESSO NAZIONALE AIRO  
XXXIII CONGRESSO NAZIONALE AIRB  
XII CONGRESSO NAZIONALE AIRO GIOVANI

# AIRO2022

Radioterapia di precisione per un'oncologia innovativa e sostenibile

BOLOGNA, 25-27 NOVEMBRE  
PALAZZO DEI CONGRESSI

## **ANAL SQUAMOUS CELL CARCINOMA: IMPACT OF RADIOCHEMOTHERAPY EVOLUTION OVER YEARS AND AN EXPLORATIVE ANALYSIS OF MRI PREDICTION OF TUMOR RESPONSE IN A MONO-INSTITUTIONAL SERIES OF 131 PATIENTS.**

MARCO LORENZO BONU<sup>1</sup>, SALVATORE LA MATTINA<sup>1</sup>, NAVDEEP SINGH<sup>1</sup>, CRISTIAN TORACI<sup>2</sup>, LUIGI SPIAZZI<sup>2</sup>, FABRIZIA TERRANEO<sup>1</sup>, FERNANDO BARBERA<sup>1</sup>, PAOLA VITALI<sup>1</sup>, FRANCESCO FRASSINE<sup>1</sup>, ANDREA GUERINI<sup>1</sup>, LUCA TRIGGIANI<sup>1</sup>, DAVIDE TOMASINI<sup>1</sup>, VITTORIO MORELLI<sup>1</sup>, JESSICA IMBRESCIA<sup>1</sup>, JACOPO ANDREUCCETTI<sup>3</sup>, BARBARA FRITTOLE<sup>4</sup>, FRIDA PITTIANI<sup>4</sup>, LUIGI GRAZIOLI<sup>4</sup>, NAZARIO PORTOLANI<sup>5</sup>, LUCA NICOSIA<sup>6</sup>, DOMENICO ALBANO<sup>7</sup>, FRANCESCO BERTAGNA<sup>7</sup>, STEFANO MARIA MAGRINI<sup>1</sup> AND MICHELA BUGLIONE<sup>1</sup>

<sup>1</sup>Istituto del Radio O. Alberti, Department of Radiation Oncology, University of Brescia and Spedali Civili Hospital, Brescia, Italy;

<sup>2</sup>Department of Medical physics, Spedali Civili Hospital, Brescia, Italy;

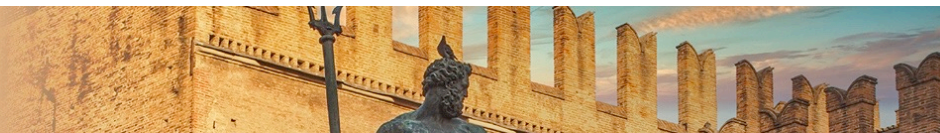
<sup>3</sup> Department of General Surgery, Spedali Civili Hospital, Brescia, Italy;

<sup>4</sup> Department of Radiology, Spedali Civili Hospital, Brescia, Italy;

<sup>5</sup> Department of General Surgery, University of Brescia and Spedali Civili Hospital, Brescia, Italy.

<sup>6</sup> Advanced Radiation Oncology Department, Cancer Care Centre, IRCCS Sacro Cuore Don Calabria Hospital, Negrar, Italy

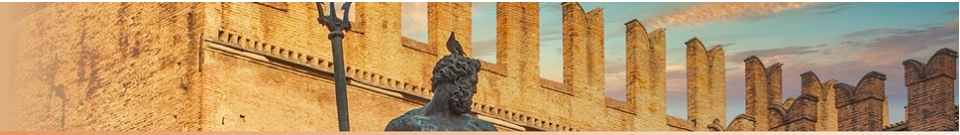
<sup>7</sup> Department of Nuclear Medicine, ASST Spedali Civili di Brescia and Brescia University



## DICHIARAZIONE

Relatore: Marco Lorenzo Furio Bonu'

- Posizione di dipendente in aziende con interessi commerciali in campo sanitario **(NIENTE DA DICHIARARE)**
- Consulenza ad aziende con interessi commerciali in campo sanitario **(NIENTE DA DICHIARARE)**
- Fondi per la ricerca da aziende con interessi commerciali in campo sanitario **(IPSEN)**
- Partecipazione ad Advisory Board **(NIENTE DA DICHIARARE)**
- Titolarità di brevetti in compartecipazione ad aziende con interessi commerciali in campo sanitario **(NIENTE DA DICHIARARE)**
- Partecipazioni azionarie in aziende con interessi commerciali in campo sanitario **(NIENTE DA DICHIARARE)**
- Altro **(NIENTE DA DICHIARARE)**



## ANAL SQUAMOUS CELL CARCINOMA: IMPACT OF RADIOCHEMOTHERAPY EVOLUTION OVER YEARS AND AN EXPLORATIVE ANALYSIS OF MRI PREDICTION OF TUMOR RESPONSE IN A MONO-INSTITUTIONAL SERIES OF 131 PATIENTS.

### PATIENTS AND METHODS

- Local relapse remains the main patter of failure; randomized trials selected patients with poor response at the end of treatment, however, ASCC is a slowing responsive tumor
- Dose escalation studies select pts with more advanced stage for personalized medicine
- HYPOTHESIS: identification of MRI signature related to a radioresistant phenotype “ab inizio”

### EXPLORATORY ENDPOINT: MRI PREDICTORS OF TUMOR RESPONSE

### METHODS

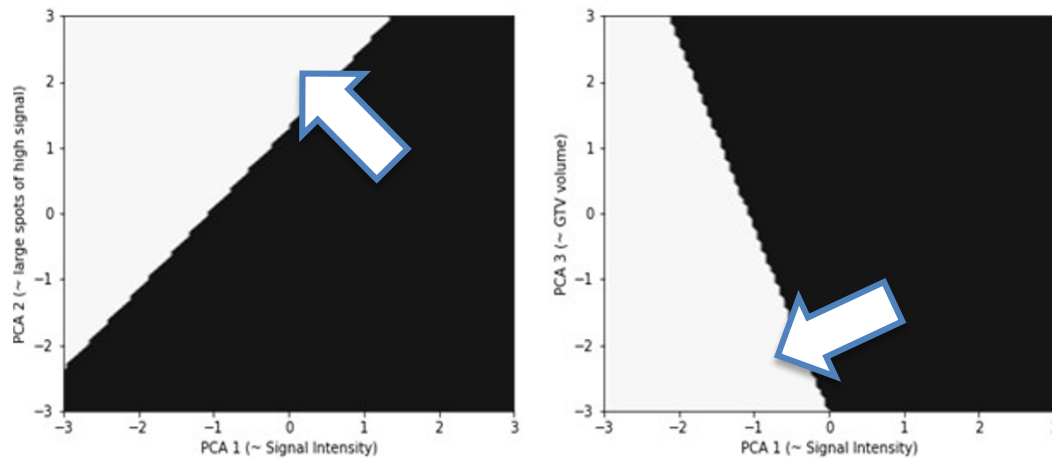
- T2 pre-treatment MRI sequences were collected (31/131 pts available)
- GTV (primary tumor) was re-contoured, images resampled
- Radiomic features of GTV were extracted with the goal of fitting radiomic features to local recurrence.
- Feature extraction and data analysis: Python<sup>TM</sup>



## EXPLORATORY ENDPOINT: MRI PREDICTORS OF TUMOR RESPONSE

### METHODS

- 159 VARIABLES (IBSI) -> SMALL DATASET application of Principal Components Analysis (PCA)
- Support Vector Machine (SVM) -> ROC curve (best fitting results)



**Figure 1.** The relapses are on the left side of both panes. The risk of relapse depends on a combination of the three parameters since the cut-off between relapse and non-relapse is never a horizontal or vertical line

### RESULTS

131 pts, 31 pts included in the exploratory analysis

Three variables identified related to the risk of relapse:

- SIGNAL INTENSITY
- Gray Level Size Zone Matrix's Large Area High Grey Level Emphasis (GLSZM's LAHGLE)
- GTV

### HIGHER RELAPSE IN:

- LOW SIGNAL INTENSITY TARGETS (hypoxic tumors?)
- HIGHER GLSZM'S LAHGLE TARGETS (signal etherogeneity)
- SMALL GTV



## CONCLUSIONS

- **LOW SIGNAL INTENSITY (SI), HIGH GRAY LEVEL SIZE ZONE MATRIX'S LARGE AREA HIGH GREY LEVEL EMPHASIS (GLSZM'S LAHGLE), AND SMALL GTV (VOLUME IN CC) ARE RELATED WITH HIGHER RISK OF RELAPSE**
- **A COMBINATION OF THE THREE PRE-TREATMENT MRI PARAMETERS COULD BE INTEGRATED IN RISK STRATIFICATION**
- **IDENTIFY CANDIDATES FOR RT DOSE-ESCALATION TO BE ENROLLED IN PERSONALIZED MEDICINE CLINICAL TRIALS.**