

# AB051. SOH21AS114. A radiogenomic model to classify response to neoadjuvant chemotherapy

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**Background:** Medical imaging analysis has evolved to facilitate the development of AI-enhanced methods for high-throughput extraction of quantitative features that can potentially contribute to the diagnostic and treatment paradigm of cancer. For breast cancer patients undergoing neoadjuvant chemotherapy (NAC), response to NAC can be estimated pre-operatively based on the molecular subtype and biological characteristics of the tumour. However, there remains a lack of accurate predictive markers of response to NAC. The aim of this study was to develop and validate a radiogenomic classifier to predict the response to NAC pre-operatively in breast cancer.

**Methods:** Data on patients who were treated for breast cancer with NAC ± endocrine therapy/radiotherapy and surgery and had a pre-NAC dynamic contrast enhanced (DCE) breast MRI were included. Response to NAC was assessed using the Miller-Payne classification system. Tumour segmentation was carried out manually under the supervision of a consultant breast radiologist. Radiomic features were extracted using LIFEx™ software. Features were selected using a random forest and support vector machine (SVM) learning approach. The radiogenomic classifier was built using a least absolute shrinkage selection operator (LASSO) regression.

**Results:** One hundred and forty-seven patients were included in the study, of which 95 were suitable for evaluation. Mean age 49 years. Thirteen patients had a complete pathological response (pCR) following NAC. Five radiomic features were significantly associated with pCR. In combination with molecular subtype, the radiogenomic model was able to predict pCR with an AUC <0.75.

**Conclusions:** This study validated a radiogenomic classifier to accurately classify response to NAC in breast cancer.

**Keywords:** Radiogenomics; breast cancer; neoadjuvant chemotherapy; MRI; molecular subtype

## Acknowledgments

*Funding:* None.

## Footnote

*Conflicts of Interest:* AL serves as an unpaid editorial board member of *Mesentery and Peritoneum*. The other authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/map-21-ab051

**Cite this abstract as:** McAnena P, Fahy Y, Moloney B, Iqbal T, Sheppard D, Dennedy C, Kerin M, Quill D, Lowery A. A radiogenomic model to classify response to neoadjuvant chemotherapy. *Mesentery Peritoneum* 2021;5:AB051.