

Title

Guide for radiologists and nuclear medicine physicians for a standardized radiomics analysis.

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Learning objectives

To sensitize radiologists and nuclear medicine physicians about Radiomics analysis in the field of oncology to provide the basic skills to be able to start their own radiomics analysis.

Background

In recent years, radiomics has become an essential tool in oncology research, allowing the extraction of quantitative data from radiologic images to improve the assessment of tumor diagnosis and prognosis, as well as prediction of side effects.

Currently, in the literature, several papers have shown promising results of applying radiomics to different cancers, but a large methodological heterogeneity was revealed across studies which limits reproducibility between centers and so the external validation.

Thus, given the growing need to understand and apply these tools in oncology research practice, we present a summary of the radiomics workflow, as well as examples, and discuss the factors influencing the radiomics features and current limitations of this approach.

Imaging findings or Procedure details

First, the radiomic study is planned after considering several fundamental questions regarding: the impact sought, the sufficient number of observations, the quality of data and their distribution (proportion and homogeneity) across the population.

Second, the workflow starts with image preprocessing and then proceed with segmentation of the region of interest with dedicated software. The stability of the contouring method can be evaluated using methods such as a specific reliability measure named Intraclass Correlation Coefficient (ICC). Then, the quantitative tumor features are extracted. The last steps is to find a model that would have a significant clinical impact and would be reproducible. For this, it is necessary to maintain methodological homogeneity of the studies by using guidelines and radiomic quality scores, that we will mention.

Conclusion

This poster aims to present a simplified approach to radiomics analysis with a summary of the basic concepts and the typical radiomics workflow, and with a discussion about his limitations.

Keywords: Radiomics, Oncology, Segmentation, Features, Models