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RADIOMICS IN PREDICTING STAS: COULD IT BE USEFUL FOR PLANNING LUNG RESECTION?

Marco Anile

University of Rome Sapienza

Since its first official appearance in the World Health Organization paper about classification of lung tumor published in 2015 (1), Spread Through Air Spaces (STAS) has progressively gained importance as negative prognostic factor, in particular in patients with early-stage lung adenocarcinoma. Briefly, it represents a pattern of local invasion due to the presence of neoplastic cells beyond the main tumor edge; the pathophysiologic mechanisms undergoing this finding are not completely understood but, even though there are still some debating points, literature corroborate by now that its detection indicates a more aggressive biological behavior of cancer. Although in the minimally invasive surgical era, sublobar resections are constantly growing up worldwide, however, those are the proper cases in which the presence of STAS could influence more the prognosis of patients. In fact, in several experiences it has been reported that recurrence free survival (RFS) and overall survival (OS) are worse in patients STAS positive (2). One controversial point is the possibility to detect whether STAS is present at froze section to potentially change the surgical strategy performing a lobar resection. Unfortunately, in different studies the sensitivity rate of STAS identification at frozen section ranged only from 50% to 71%. Although the positive predictive value reached constantly high percentages, the negative predictive value was often very low, leading to not satisfying results (3, 4).

The development of Artificial intelligence and Radiomics could represent a resource by detecting STAS in the preoperative plan. Radiomics is a process allowing the conversion of medical characteristics images into quantitative information. With a dedicated software, a lot of features can be extracted from medical images, providing much more information than the "human eyes" and improving the accuracy of imaging decoding. Radiomics-based models have been recently proposed with encouraging results to detect STAS starting to preoperative CT imaging. The high accuracy of STAS prediction reached in different studies, conducted either on homogenous or heterogenous setting, allows to consider this technology as a promising and fascinating tool in the surgical decision-making process, in particular when a sublobar resection is planned (5,6). Nevertheless, further studies are needed to confirm these encouraging preliminary data and to make radiomics assessment easily available in the daily practice.

References

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