Radiomics-Assisted Computed Tomography-Based Analysis to Evaluate Lung Morphology Characteristics after Congenital Diaphragmatic Hernia

Autor:	Silviu-Viorel Virlan
Institut / Klinik:	Klinik für Radiologie und Nuklearmedizin
Doktormutter:	Prof. Dr. M. Weis

Purpose: Children with congenital diaphragmatic hernia suffer from long-term morbidity, including lung function impairment. Our study aims to analyze lung morphology characteristics via radiomic-assisted extraction of lung features in patients after congenital diaphragmatic hernia repair.

Materials and Methods: 72 patients were retrospectively analyzed after approval by the local research ethics committee. All the image data were acquired using a third-generation dual-source CT (SOMATOM Force, Siemens Healthineers, Erlangen, Germany). Dedicated software was used for image analysis, segmentation, and processing.

Results: Radiomics analysis of pediatric chest CTs of patients with status after CDH was possible. Between the ipsilateral (side of the defect) and contralateral lung, three shape features and two higher-order texture features were considered statistically significant. Contralateral lungs in patients with and without ECMO treatment showed significant differences in two shape features. Between the ipsilateral lungs in patients with and without the need for ECMO 1, a higher-order texture feature was depicted as statistically significant.

Conclusion: By adding quantitative information to the visual assessment of the radiologist, radiomics-assisted feature analysis could become an additional tool in the future to assess the degree of lung hypoplasia in order to further improve the therapy and outcome of CDH patients.