difference in BMI, weight loss, tumor stage, or ECOG score between muscularity groups. The LM group had a lower skeletal muscle area ($p < 0.001$), lower visceral adipose tissue area ($p = 0.01$), and there is no difference in skeletal muscle radiodensity ($p = 0.85$), subcutaneous adipose tissue area ($p = 0.76$), and intramuscular adipose tissue area ($p = 0.46$) when compared to normal muscularity group. A lower handgrip strength was also observed in the LM group ($p < 0.01$). Regarding insulin sensitivity, the LM group had a higher M-value adjusted for Free Fat Mass (FFM) ($p = 0.01$) and M-value adjusted for Total Body Weight (TBW) ($p = 0.0347$). Additionally, a significant negative correlation was found between muscularity and M-value-FFM (rho = -0.5047, $p = 0.004$) and M-value-TBW (rho = -0.4742, $p = 0.0076$). There was no difference in M-value between cachexia and non-cachexia patients. No statistical difference was observed in inflammatory markers (C-reactive protein, Glasgow prognostic score (mGPS), and neutrophil-to-lymphocyte ratio (NLR)) according to muscularity groups. **Conclusion:** There is no insulin resistance associated with LM or cachexia. It is possible that the main determinant of insulin sensitivity is the amount of visceral adipose tissue and systemic inflammation. The LM group exhibits a lower area of visceral adipose tissue, with no discernible difference in inflammatory markers. This study highlights the importance of expanding investigations into the determinants of metabolic changes and body composition in cancer cachexia.

Keywords: Cachexia, Insulin resistance, Metabolism, Muscularity, Rectal neoplasia.

https://doi.org/10.1016/j.htct.2024.04.057

DEEP LEARNING FOR CT IMAGES SEGMENTATION

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Introduction/Justification: Computed tomography (CT) scans are integral to cancer patient diagnosis, revealing changes in body composition linked to survival progression. The conventional approach to body composition analysis using CT scans is labor-intensive and expensive, demanding skilled professionals and licensed software for manual segmentation of Regions of Interest (ROIs). To address these challenges, we introduce a Deep Learning algorithm designed for automated CT image segmentation, presenting an efficient alternative that overcomes the limitations of the current methodology. Beyond the advantages of speed, automation enhances result uniformity and enables uncertainty estimation. In this presentation, we will show preliminary results from our algorithm, highlighting its potential contributions to survival analysis in cancer patients. **Objectives:** The primary goal of this study was to develop an automated segmentation algorithm for CT scans using Deep Learning models. **Materials and Methods:** In developing segmentation algorithms, a dataset of 453 CT slices at the L3 lumbar vertebral level from gastric cancer patients was utilized, with an 80% training and 20% testing partition. Employing the UNET+ResNet18 deep learning architecture, supervised training utilized manually generated segmentation masks as references. Four dedicated UNET+ResNet18 algorithms were trained for distinct ROIs: Skeletal Muscle (SM), Intramuscular Adipose Tissue (IMAT), Visceral Adipose Tissue (VAT), and Subcutaneous Adipose Tissue (SAT). Segmentation performance on the test set was evaluated using the Dice Coefficient, underestimation and overestimation percentages, Bland-Altman analyses, and qualitative visual inspection of segmented images. **Results:** The UNet+ResNet18 models demonstrated superior segmentation performance for SM, VAT, and SAT, achieving mean Dice scores exceeding 0.95. In comparison to manual segmentation, the Deep Learning algorithm exhibited minor average underestimations and overestimations, both below 5% for these tissues. However, IMAT segmentation exhibited relatively lower performance, with a mean Dice score of approximately 0.86 and underestimation and overestimation percentages around 15% and 13%, respectively. The Bland-Altman analysis revealed mean bias and limits of agreement for mean radiodensities of SM, VAT, SAT, and IMAT as follows: 0.14 [-0.82, 1.10] HU, -0.53 [-2.03, 0.98] HU, -0.18 [-1.70, 1.33] HU, and 0.48 [-3.86, 4.82] HU, respectively. **Conclusion:** The Deep Learning approach provides a standard and fast solution for CT image segmentation, demonstrating good results for SM, VAT and SAT. For these tissues, derived radiomics features could provide valuable insights into the analysis of cancer patient outcomes. Further studies are necessary for enhancing IMAT segmentation, given its challenging small area. Additionally, future investigations should focus on uncertainty estimation in CT images, exploring its impact on segmentation procedures and radiomic feature extraction.

Keywords: Automated body composition analysis, Computed tomography, Deep learning.

https://doi.org/10.1016/j.htct.2024.04.058

AUTOMATED SYNTHESIS AND IN VITRO STUDIES OF [68GA]GA-FAPI-46 IN HOSPITAL RADIOPHARMACY

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Introduction/Justification: Early evidence appointed fibroblast activation protein (FAP), a type II transmembrane serine protease, as highly expressed in the stroma of various tumor entities, designating FAP as the next target for cancer studies in nuclear medicine. Several radiolabeled fibroblast activation protein inhibitors (FAPI) are currently in development and investigation as potential PET imaging agents for different neoplasms, with the potential for future theranostic applications. **Objectives:** The aim of this study was to implement the efficient and convenient automated synthesis of [68Ga]Ga-FAPI-46 from ABX, using Modular Lab Pharm Tracer and the generator Gallia Pharm® from Eckert & Ziegler, for clinical applications in nuclear medicine services, as well as to evaluate routine quality control parameters such as radiochemical yield and purity, radiochemical stability, and sterility tests in accordance with the GMP rules. **Materials and Methods:** The synthesis was conducted in automated module, employing disposable cassettes in an adapted synthesis template with high purity raw materials and reagents. [68Ga]GaCl3 was percolated through resin and eluted with 0.5 mL of 5.5 M HCl in saline into a reaction vial containing 50 μg of FAPI-46 in 1.5 mL of 0.1 M acetate buffer (pH = 4.5) and 100 μL of ethanol. The solution was heated at 95°C for 10 min. The resulting product was purified through a Sep-Pak C18 cartridge, which was preconditioned with ethanol and 0.9% saline, and eluted with 0.4 mL of 70% ethanol. The final product was diluted with 0.9% saline and filtered through a Millipore 0.22 μm filter. Radiochemical yield (RCY) was assessed by determining the activity retained in the module in relation to the final product. Radiochemical purity (RCP) of [68Ga]Ga-FAPI-46 was analyzed by ascending chromatography using either ITLC-SG strip and 0.1 M ammonium acetate and methanol (1:1) solution or TLC and 1 M sodium citrate (pH = 5.5), and Sep-Pak C18 cartridge. Radiochemical stability was assessed through UHPLC analysis. Microbiological, pyrogenic, and filter tests were conducted on all batches. Additionally, in-vitro studies were carried out to assess Log P and serum protein binding for [68Ga]Ga-FAPI-46. **Results:** The automated synthesis produced [68Ga]Ga-FAPI-46 with an activity of 684 ± 67 MBq, a RCY of 88.4 ± 2.6%, and pH = 4.5 (n = 8). The RCP was determined as 97.32 ± 1.92% by ascending chromatography and 97.74 ± 2.12% by Sep-Pak C18 cartridge. The RCP remained above 97% for more than 120 min as analyzed by UHPLC, showing high radiochemical stability. Microbiological assays demonstrated that the final product was obtained as a sterile and pyrogen free solution. The filter test passed for all batches. The Log P was determined as -3.57 ± 0.15 (n = 10), showing the hydrophilic characteristics of [68Ga]Ga-FAPI-46 with a serum protein binding of 52.11 ± 1.49% (n = 6). **Conclusion:** The [68Ga]Ga-FAPI-46 was synthesized with consistently high RCY and RCP, exhibiting reproducibility, yielding a sterile and pyrogen free final solution, that means an efficient way for routine syntheses in nuclear medicine services confirmed by clinical application in six patients.

Keywords: Automated syntheses, PET-CT, Quality control., [68Ga]Ga-FAPI-46.

https://doi.org/10.1016/j.htct.2024.04.059

CONTINUING EDUCATION IN RADIOPHARMACY IN LATIN AMERICA

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Introduction/Justification: Radiopharmacy is an area with increasing development and technological complexity. According to WHOs official documents (WHO Annex 2,3) the production of radiopharmaceuticals requires the supervision of qualified personnel with postgraduate training and appropriate experience in their function. Although most countries in Latin America have adopted these documents in their legislation the real situation is highly heterogeneous and specific qualification in Radiopharmacy is not clearly specified in the national regulations. Furthermore, the adequate educational offer is very restricted and heterogeneous in all Latin American countries. **Objectives:** With the objective to prepare the future generations of Radiopharmacists according to international and national regulations we have developed a series of options for postgraduate and continuing education in the field. **Materials and Methods:** N/A. **Results:** The Diploma of Specialization in Radiopharmacy offers a postgraduate program for specialization in Radiopharmacy. This diploma integrates comprehensive theoretical knowledge with the necessary practical experience to prepare professionals for specialized roles in this field. Admission to the program requires candidates to hold a university degree, with a minimum duration of four years, in Pharmacy, Chemistry, or Biochemistry, obtained from institutions in Uruguay or other countries. Applications from candidates with alternative qualifications are reviewed by a dedicated admission committee, and additional courses may be prescribed to supplement their foundational knowledge. The curriculum comprises both theoretical and practical components, totaling approximately 300 hours of instruction. The courses can be partially performed virtually, thus facilitating the participation of foreign students. However, practical laboratory sessions and supervised practice are required to be completed in Uruguay, typically spanning a duration of 3-4 months. Additionally, partial validation of prior studies may be considered, allowing eligible students to receive credit for relevant coursework completed elsewhere. Besides the postgraduate program we also offer the possibility of taking continuous education courses both with basic (physics of radiation, chemistry of radiopharmaceuticals, etc) and applied topics (legislation, clinical applications, et). We also offer customized courses for institutions or private radiopharmaceutical firms. Up to the moment we have more than 10 graduates, 40% coming from Colombia, Costa Rica or Bolivia and 7 students, 6 of which are from different countries in Latinamerica. Our continuing education courses have been taken by around 100 professionals from Chile, Costa Rica, México, Bolivia, Ecuador, Perú, Costa