A modified technique for efficient radiolabeling of ^{68}Ga-citrate from a SnO_2-based ^{68}Ge/^{68}Ga generator for better infection imaging

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Keywords: - SnO_2-based ^{68}Ga/^{68}Ge generator
- ^{68}Ga-ACD-A
- ^{68}Ga-citrate
- PET/CT infection imaging

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Received:
16 September 2013
Accepted revised:
29 October 2013

Abstract

Our aim was to develop a practical method to prepare ^{68}Ga-citrate using a SnO_2-based ^{68}Ge/^{68}Ga generator and evaluate its use in infection imaging. *^{68}Ga-citrate synthesis was performed* in a straight forward, quantitative, one-step-aseptic procedure; an amended labeling method was applied using ACD-A buffered citrate as a precursor. We have studied 36 patients (12 with TB, 12 with various cancers, 12 with inflammation) and 10 controls. Study participants were imaged on a Siemens Biograph 40 PET/CT scanner 60min post intravenous injection. *Our results showed:* 90%-95% ^{68}Ga-yield was obtained and subsequently used at 324-527MBq to perform three to four parallel ^{68}Ga-citrate syntheses. ^{68}Ga-citrate of 96%-99% was yielded after 10min incubation. The radiochemical purity was >99% with a pH value of 4.0-4.5. All other quality control requirements were met. The ^{68}Ga-citrate stability was >96%. The final product was sterile, pyrogen and solvent-free, with very low ^{68}Ge-levels, with 191±33MBq in 6.6±2.8mL. High quality images were obtained at 60min post injection of 185MBq of ^{68}Ga-citrate. *In conclusion,* a fast, direct and cheap method with a quantitative preparation of ^{68}Ga-citrate was described. We reported on the adaptations needed when using a SnO_2-based ^{68}Ge/^{68}Ga generator and ACD-A buffered citrate as a precursor. This method allowed for multiple patient productions from one generator elution, with 300MBq/patient of ^{68}Ga-citrate produced in less than 30min and excellent labeling reproducibility for routine infection imaging.

Hell J Nucl Med 2013; 16(3): 193-198 *Published on line: 28 November 2013*