

# Biokinetics and dosimetry of DaTSCAN™ ioflupane ( $^{123}\text{I}$ ) in patients with suspected Parkinsonism or Lewy body dementia



Marie Sydoff\*, Helena Lizana, Sören Mattsson, Sigrid Leide-Svegborn

Medical Radiation Physics, Department of Clinical Sciences, Lund University, Skane University Hospital, Malmö, Sweden, SE-205 02 Malmö

## INTRODUCTION

$^{123}\text{I}$ -ioflupane is used in imaging of dopamine transporters for the investigation of Parkinson's disease or Lewy body dementia and is today common in the nuclear medicine clinical departments. Despite this, the biokinetic behavior of  $^{123}\text{I}$ ioflupane is only investigated in a few studies. In order to estimate the absorbed and effective dose, the biokinetics and activity content of DaTSCAN™ ioflupane ( $^{123}\text{I}$ ) in different organs were determined using both whole-body (WB) planar and thoracic SPECT/CT imaging.

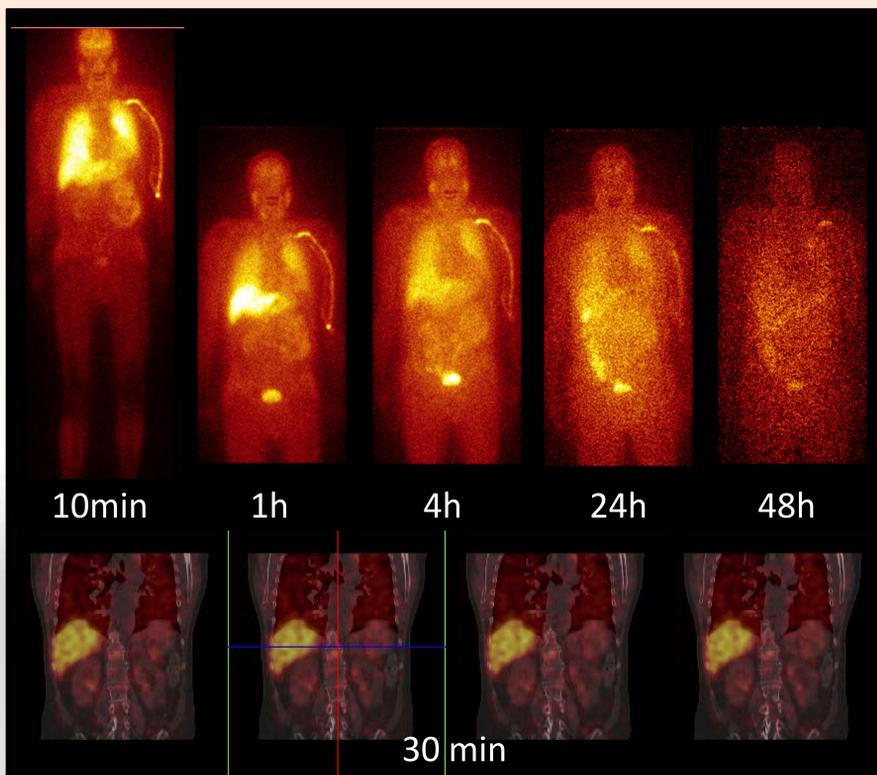


Fig. 2. Top: anterior whole-body emission images of a 68-year-old male at five different time points p.i.. Bottom: SPECT/CT image obtained 30 min p.i..

## RESULTS

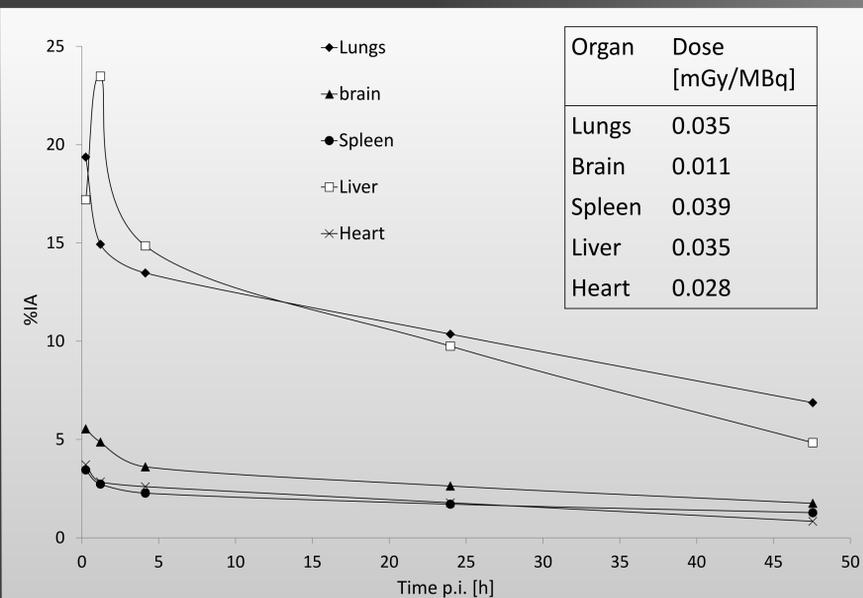


Fig. 3. Percent of injected activity over time for a number of source organs. The table shows preliminary absorbed dose estimates for  $^{123}\text{I}$ -ioflupane.

## STUDY PROTOCOL

- 1 h before injection: Potassium iodide is given to patient
- Injection of 185 MBq  $^{123}\text{I}$ -ioflupane
- 10 min after injection: 1st planar whole-body scan
- 30 min after injection: SPECT/CT thorax
- 1 h after injection: 2nd planar whole-body scan
- 3 h after injection: SPECT/CT brain, (routine measurement)
- 4 h after injection: 3rd planar whole-body scan
- 24 h after injection: 4th planar whole-body scan
- 48 h after injection: 5th planar whole-body scan

Fig.1. Study protocol showing the timeline of the study. Blood samples were collected prior to each WB scan and all voided urine was collected from the time of injection until 48h p.i.

## MATERIALS AND METHODS

Eight adult males (62-78 years) referred for a routine examination, were included in the study. Whole-body conjugate view emission scans were performed at five different time points p.i.. SPECT/CT measurements were performed at 30 min p.i. (thorax) and 3 h p.i. (brain). Blood samples were collected prior to each whole-body scan and all voided urine was collected from the time of injection to 48 h p.i.. Activity quantification was made based on the activity seen in the SPECT/CT images and the shape of the time-activity curve was based on the planar images. Correction for attenuation, scatter and background activity was made. Transfer rate coefficients for all organs were estimated using SAAMII software and the number of disintegrations in the source organs were calculated as the area under the curve based on the best fitted time-activity curves obtained from the compartmental model in SAAMII. Organ and effective doses were calculated using the OLINDA/EXM1.1 software.

## CONCLUSION

The average effective dose to the patients per unit administered activity was determined to 0.025 mSv/MBq, which yields that a patient undergoing an examination with 185 MBq  $^{123}\text{I}$ -ioflupan receives an effective dose of approximately 4.6 mSv. This is an effective dose well within the range of doses which are acceptable given to patients undergoing a nuclear medicine investigation.

