

CLINICAL USAGE OF KRYPTON-81m GAS

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As Krypton-81m is an inert gas, with its 13 second half-life and 190 KeV gamma emission, it is suited for imaging with present gamma cameras. Especially because of its low radiation dose in human body, the clinical studies could be repeated readily. Continuous inhalation of Krypton-81m gas therefore produces functional image of pulmonary ventilation.

The Krypton-81m gas was bubbled out with oxygen gas from the Rubidium-81 ($T_{1/2}=4.6$ Hr) solution. We designed three types of bubbling vessels for the prototype Krypton-81m generator. Fig. shows schematic views of Type I, II and III vessels. The maximum efficiency was 27% for the Type I, 86% for the Type II and 94% for the Type III.

In a few patients, ventilation images were obtained in two views (anterior and posterior view) with the Krypton-81m gas and compared with an evaluation of regional ventilation derived from the standard chest radiography. Each image was recorded for 100,000 counts with an individual imaging time of 0.5-2.0 minutes.

Patients were examined in sitting position. The gas was added to a face mask at a flow of 1 l/min. and anterior and posterior views of radioactivity distribution were recorded with gamma camera.

References

- 1) E.Kaplan and L.W.Mayron : Evaluation of Perfusion with the Rb-81 - Kr-81m Generator. Seminars in Nuclear Medicine 6: 163-192,1972
- 2) J.D.Idoline,B.L.Holman, A.G. Jones, R.J.Schneider, K.L.Schroeder and R.E.Zimmerman : Quantification of Flow in a Dynamic Phantom Using Rb-81 - Kr-81m and a NaI Detector. J Nucl Med 18: 570-578, 1977
- 3) M.Kato and M.Hazue : Trial Preparation and Evaluation of a Kr-81m Generator for Medical Use. RADIOISOTOPES 26:27-31, 1977
- 4) T.Suzuki, Y.Ishii, Y.Yonekura, D.Hamanaka, K.Torizuka, T. Mukai and T.Fujita : An Evaluation of Inhalation and Perfusion Scintigraphy with Kr-81m. RADIOISOTOPE 27:24-29, 1978
- 5) M.L.Goris, S.G.Daspit, J.D.Walter, J.McRae and J.Lamb : Applications of Ventilation Lung Imaging with Krypton-81m. Radiology 122;399-403, 1977
- 6) F.Fazio, J.P.Lavender and R.E.Steiner : Kr-81m Ventilation and Tc-99m Perfusion Scans in Chest Disease : Comparison with Standard Radiographs. Am J Rentgenol 130;421-428,1978
- 7) T.Koyama, T.Koyama, Y.Hirokawa, Y.Yoshizawa, H.Noma, T. Horiguchi, Y.Kiso, H.Hasai and H.Takemi : Kr-81m Gas Generator for Lung Ventilation Study. Eur.J. Nucl. Med. : to be published

