I. Gastrointestinal Tract, Liver, Biliary Tract and Pancreas

The Experimental Study on the Permeability of the Oral Mucosa with $^{24}$Na.

K. Furumoto, W. Aoyama and T. Seki

Department of Radiology, Nippon Dental College, Tokyo

The basic study was done on the permeability of the oral mucosa in order to use clinically in future.

Mucous membranes of rabbits were studied with radioactive isotope technic. After pouring 20 $\mu$Ci of $^{24}$NaCl solution into the standard area of the oral mucosa, $^{24}$Na activity in blood per 1 ml was measured by scintillation counter.

The results of basic studies are as follows:

1. $^{24}$Na was transported through the lingodorsal mucosa, and radioactivity in blood constantly increased for 60 minutes after dropping $^{24}$NaCl solution.

2. In microautoradiograms of lingal tissue, $^{24}$Na particles were found in submucous connective tissue through keratinized mucous membrane, as early as 5 minutes after application of $^{24}$NaCl solution.

3. According to these results, the permeability of $^{24}$Na on the oral mucosa was analysed quantitatively from the blood. The absorption rates in five sites of oral mucosa were as follows: Buccal: Palatinal: Oral floor: Lingo-dorsal: Lingo-ventral = 2.4: 1.4: 1: 0.9.

4. The rates of permeability through the lingodorsal mucosa were in proportion to these followed concentrations of 1, 10 and 20% NaCl solution. But the permeability showed little in 0.1% NaCl solution.

5. The permeabilities of the oral mucosa were accelerated higher by hyaluronidase or polysorbate (Tween 20) and these two medicines were similar to each other in the effect.

6. In the relationship of permeability the buccal mucosa was almost the same as in the case of the lingal mucosa.

According to above results, it may be useful for the clinical diagnosis of disturbances of oral mucosa.

Evaluation of the Salivary Gland Scanning with $^{99m}$Tc-pertechnetate

K. Furumoto, K. Maeda and T. Seki

Department of Radiology, Nippon Dental College, Tokyo

A study on salivary gland scanning with $^{99m}$Tc-pertechnetate ($^{99m}$TcO$_4^-$) was made in order to evaluate salivary gland diseases and space occupying lesions in or near salivary gland. Apparatus used in this study was Shimadzu-made-scintiscanner with $^{2}$NaI crystal and 10 or 5 cm focusing honeycomb collimator, and dot-recording system was applied.

In every adult patient, 5mCi of $^{99m}$TcO$_4^-$ was injected intravenously 10 minutes prior to scanning.
Some interesting cases were investigated on salivary scintigrams.

1. Malignant tumor (reticulo-sarcoma originated in the left submandibular gland). \(^{99m}\text{Tc}\)-uptake was absent. This absence was result of hypofunction of the gland.

2. Benign tumor (fibroma occurred near the right submandibular gland).—The scintigram showed the displacement of the gland, but \(^{99m}\text{Tc}\)-accumulation was normal.

3. A patient after treatment of telecobalt-60, whose left parotis was included in radiation field, showed no visualization of parotis on the scintigram.

It resulted from hypofunction due to radiation injury.

Summary

In our study it was found that obtained scintigrams were valuable for diagnosis of salivary disorders. Thus salivary scanning must be used more as routine examination of the gland because of informations on the location, the size and the function of salivary parenchyma with easier technics and less pain to patients. Further the diagnosis of salivary disorders will be more accurate in this scanning together with sialograms which give information on the status of duct system.

Reevaluation of \(^{131}\text{I}\)-Triolein Test—Clinical and Basic Studies

II) Significance of purified \(^{131}\text{I}\)-Triolein


Department of Internal Medicine, School of Medicine, Keio University, Tokyo

This study was performed to reevaluate \(^{131}\text{I}\)-Triolein test.

1) Experimental study

Cannules were placed in thoracic duct, portal vein and femoral vein of adult dogs. Labelled Triolein (commercial or purified by thin layer chromatography) was administered into the stomach or duodenum with cold meal of peanut oil. The results are as follows; In the case of commercial triolein, the radioactivity appeared predominantly in thoracic lymph in comparison with portal plasma, 90.4 ± 6.3% of radioactivity of thoracic lymph was precipitated by T.C.A. By thin layer chromatography, 76.7 ± 8.1% of radioactivity of thoracic lymph existed in the fraction of T.G. In portal plasma, however, 40% of radioactivity was found in PL fraction.

In the case of purified triolein administration, radioactivity appeared only in thoracic lymph but activity of portal plasma was negligible. So was in the case of \(^{14}\text{C}\)-Triolein absorption test. Not only the high ratio of 97.4 ± 3.9% of radioactivity precipitated by T.C.A. from thoracic lymph, but also 86.8 ± 3.9% of the activity of thoracic lymph lipids was recovered in TG fraction. This result means the same biochemical mechanism of absorption of chromatographically purified \(^{131}\text{I}\)-Triolein with \(^{14}\text{C}\)-labelled Triolein.

2) Clinical study

Radioiodinated Triolein tests using commercial or purified substances were performed on patients in order to compare with fat balance study. Stool specimens were collected for three days and blood samples were also collected in 3, 4, 5 and 6 hours after administration of radioiodinated triolein. Fat balance study was performed after the method of van de Kamer.

The results are as follows; Only from 30 to 50% of the radioactivity of the venous blood was precipitated by T.C.A. regardless of commercial or purified triolein. Radioactivity of fats in the blood extracted after Folch method was evaluated in each fraction by T.L.C. Much radioactivity was observed in the fraction of FFA instead of TG which contained high radioactivity in thoracic lymph. From above findings, it is not proper to evaluate fecal excretion rate of \(^{131}\text{I}\)-Triolein on the basis of radioactivity levels of blood, which are effected by the metabolism of fat as well as absorption. Fecal excretion rate using purified \(^{131}\text{I}\)-Triolein corresponded more to that of fat balance study than the results

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