



## <sup>131</sup>I-labeled bovine serum albumin: A valuable marker for solid in the measurement of gastric emptying

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### Abstract

**AIM:** Various methods for measurement of gastric emptying have received widely study. In clinic, <sup>99m</sup>Tc-sulphur colloid (<sup>99m</sup>Tc-Sc), <sup>131</sup>I fiber and <sup>111</sup>In-DAPA have been accepted as a valuable markers for digestive solid, non-digestive solid and liquid component respectively. However, half life period for <sup>111</sup>In is only 1.5 h which is so short that incur a problem for shipment, and non digestive marker of <sup>131</sup>I fiber cannot response for the physiological function of the gut. In this study, we investigated the validity of <sup>131</sup>I-bovine serum albumin (<sup>131</sup>I-BSA), a possible candidate for digestive solid marker, together with <sup>99m</sup>Tc-DTPA as liquid marker in the determination of gastric emptying for solid and liquid simultaneously.

**METHODS:** *In vitro*, the solid phase of <sup>131</sup>I-BSA labeled EGG were incubated in human gastric juice (pH 2.0), 1 N NaCl (pH 7.0) and 0.1 N HCl (pH 1.0) over a period of 2 h for analysis of its stability. Stability for the liquid phase of <sup>99m</sup>Tc-DTPA and another solid phase of <sup>99m</sup>Tc-Sc were also studied in the same manner. *In vivo*, gastric emptying were measured using <sup>131</sup>I-BSA as solid marker and <sup>99m</sup>Tc-

DTPA as liquid marker in 35 patients with chronic gastric (group CG) and 10 healthy controls (group HC) to explore the ability of a combination of these 2 labels in the distinguishment of solid and liquid emptying.

**RESULTS:** Gastric emptying patterns of solid and liquid showed significant difference: solid emptying showed an evidence of lag phase and a significant prolongation of half emptying time for solid than that for liquid. Comparing to group HC, group CG showed a prolongation of solid lag time in 14 patients, slower half solid emptying in 15 patients and retarded liquid emptying rate in 12 patients. Solid emptying parameters for <sup>131</sup>I-BSA were significant correlated to those for <sup>99m</sup>Tc-Sc ( $r = 0.989$ ,  $P < 0.01$ ). Variability of solid emptying for <sup>131</sup>I-BSA and <sup>99m</sup>Tc-Sc, showed a maximal difference of 9.2% and a minimal difference of 0.8%.

**CONCLUSION:** <sup>131</sup>I-BSA labeled EGG showed a higher stability in different solutions and had a pattern of emptying similar to that of <sup>99m</sup>Tc-Sc, suggesting that <sup>131</sup>I-BSA is a valuable digestive solid marker for detection of solid emptying. A combination of use of <sup>131</sup>I-BSA, <sup>99m</sup>Tc-Sc, and <sup>111</sup>In-EHIDA imultaneously in the measurement of gastric emptying and bile reflux is anticipated.

**Key words:** <sup>131</sup>I-labeled bovine serum albumin; Marker; Gastric emptying

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