

## Standard Operating Procedure: Colonic Marker/Transit Study

### Introduction

Colonic motility is a critical process underlying the major functions of the large bowel such as storage, absorption, propulsion and defecation. Disorders of colonic motility typically present with constipation or diarrhea. Measurement of colonic transit time is useful in evaluating colonic motility, and allows both the severity of the problem and the response to therapy to be assessed.

Different methods exist to investigate colon transit time. The standard measurement of colonic transit time has been performed with radio-opaque markers or colonic scintigraphy. The traditional approach is to assess the progression time of radio-opaque markers along the large bowel. Colonic scintigraphy can evaluate whole-gut transit. Recently, wireless motility capsules have also been validated as a technique in measuring colon transit time.

### Radio-opaque Markers

Assessment of colon transit based on ingested radio-opaque markers has been widely adopted since Hinton *et al.* first described this technique in 1969. Radio-opaque marker testing distinguishes constipation subgroup such as normal or slow transit constipation, and assesses segmental transit times in patients with delayed total colon transit. This test is simple and inexpensive as well as reliable and reproducible. However it requires good compliance of the patient, produces radiation exposure, and does not measure the transit of a physiological meal.

### Methods

Radioopaque markers are plastic beads or rings that are usually ingested in a capsule containing 20-50 markers. Two kind of radioopaque markers, Sitzmarks® (Konsyl Pharmaceuticals, Texas, USA) and Kolomark™ (M.I.Tech., Pyongtaik, Korea). Each single capsule contains 24 or 20 radioopaque markers, respectively.

Several methods have been suggested when it comes to using radioopaque markers, including the single capsule technique and the multiple capsules technique. The single capsule technique requires ingestion of markers in a single capsule on a specific day, followed by several abdominal X-rays that are repeated until all markers are defecated or a single abdominal X-ray on day 5 (120 hours later). However the "single ingestion with multiple X-ray" technique is time-consuming and produces greater radiation exposure. The multiple capsules technique requires the ingestion of 1 capsule a day for 3 days, followed by abdominal X-rays on day 4 and 7 or only on day 7.

### Protocol

10 markers/day for six days, x-ray on day 7 - the dose on the last day divided 5 markers in the morning and 5 in the evening to detect rapid transit as well.