RADIOPAQUE MARKERS

INDICATION: patients with severe constipation but otherwise negative GI evaluations. Radiopaque Markers are to be dispensed only by physicians to patients for oral intake.

SUGGESTED DIRECTIONS TO THE PHYSICIAN:

SIMPLIFIED RADIOPAQUE MARKERS METHOD
(1 capsule with 24 markers)

STEP 1:
1. On day 1, direct patient to take one capsule (with 24 Radiopaque Markers) by mouth with water, preferably with confirmation by office observation. Instruct patient to use no laxatives, enemas or suppositories for 5 days.
2. Arrange a flat plate abdominal X-ray on day 5 to determine the location and extent of elimination of the Radiopaque Markers.
3. Patients who expel at least 80% (19 or more) of the markers have grossly normal colonic transit.
4. Patients who retain 6 or more markers may have follow-up abdominal X-rays within several days.
5. For patients whose markers accumulate in the rectosigmoid or when markers are retained diffusely, STEP 2 may be warranted.

STEP 2: If more than 20% (5-6 markers) are still retained by day 5
1. Have patient take a bulking agent daily for 1 to 2 weeks. Encourage liquid intake to maximize product efficacy.
2. Have patient take another capsule (with 24 Radiopaque Markers) in 1 to 2 weeks and repeat X-rays in 5 days to determine the location and extent of elimination of the markers.

READING THE RESULTS: If over 80% of the markers are passed by day 5, colonic transit is not grossly abnormal. If the remaining markers are scattered about the colon, the condition is most likely hypomotility or colonic inertia. If the remaining markers are accumulated in the rectum or rectosigmoid, the condition is most likely functional outlet delay, e.g., internal rectal prolapse, anismus.

A. If 5 or less markers remain, patient has grossly normal colonic transit.
B. Most rings are scattered about the colon. Patient most likely has hypomotility or colonic inertia.
C. Most rings are gathered in the rectosigmoid. Patient has functional outlet obstruction.
SEGMENTAL RADIOPAQUE MARKERS METHOD
(3 capsules: each capsules with 24 markers)

METCALF PROTOCOL:
1. On day 1, day 2, and day 3, administer one capsule (each with 24 Radiopaque Markers) by mouth with water, preferably with confirmation by office observation. Instruct patient to use no laxatives, enemas or suppositories for the duration of the test.
2. Arrange a flat plate abdominal X-ray on day 4 and, if necessary, again on day 7 to determine the location and extent of elimination of the Radiopaque Markers.
3. The total number of markers in each segment is used to determine transit time.

EXAMPLE: Total number of markers present in each segment will be equivalent to the transit time in hours.

<table>
<thead>
<tr>
<th></th>
<th>Right Colon</th>
<th>Left Colon</th>
<th>Rectosigmoid</th>
<th>Colon</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th day</td>
<td>12</td>
<td>14</td>
<td>14</td>
<td>40</td>
</tr>
<tr>
<td>7th day</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Transit time</td>
<td>12 hours</td>
<td>14 hours</td>
<td>16 hours</td>
<td>42 hours</td>
</tr>
</tbody>
</table>

Normal Values:
Right Colon = 11.3 hours
Left Colon = 11.3 hours
Rectosigmoid = 12.4 hours
Total = 35 hours

4. On day 4, if there are more than 50 markers, transit time is abnormal and an x-ray needs to be taken at day 7.
5. If total colonic transit time is > 70 hours, then transit in any segment is abnormal if > 30 hours. (> = more than)