7 Advances in Enteroclysis

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7.1 Introduction

Diagnostic radiologists currently assume the primary responsibility for the imaging evaluation of the small bowel. While the modalities of ultrasonography, computed tomography, and magnetic resonance imaging are utilized to provide unique information, their role in small bowel evaluation remains complementary to the primary demonstration of small bowel details by barium contrast studies.

In medical centers particularly throughout Europe, the conventional barium methods for small bowel examination have been largely replaced by the enteroclysis procedure. This practice owes much to the work of SELLINK and MILLER (1982) and later NOLAN and CADMAN (1987), who perfected and popularized the single-contrast enteroclysis methods. In the United States, enteroclysis was met with relative skepticism until the early 1980s, when the diagnosis of various focal lesions, including Meckel’s diverticulum, could be made by the technique preoperatively and with reliability (MAGLINTE et al. 1980, 1984). Such reported experience stimulated interest in enteroclysis among North American radiologists.

The significant improvements in small bowel radiography are mainly attributable to the refinements in enteroclysis methods occurring during the course of the past 15 years. Advances in enteroclysis can be considered in two interrelated areas, beginning with the various technical details that improve the performance of enteroclysis, namely: patient premedication, modifications in enteroclysis catheters, contrast delivery systems, an understanding of infusion flow rates and intestinal response, and application of double-contrast methylcellulose forms of enteroclysis. Equipped with these improvements in technique, enthusiastic investigators continue to broaden the clinical application of the examination and the range of small bowel abnormalities amenable to radiologic diagnosis.

7.2 Methodologic Improvements

Improvements in technique are presented within the framework of the specific components of the enteroclysis examination.

7.2.1 Patient Preparation and Premedication

Adequate colon preparation for enteroclysis is advised as this allows for a faster examination with improved results (MAGLINTE et al. 1987). A

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full cecum retards intestinal flow through the ileum to the degree that more contrast medium is required to complete the procedure and patient comfort is compromised accordingly. Particulate material in the terminal ileum does not preclude a diagnostic examination, however, since these artifacts are removed by the luminal flow of contrast fluids. Satisfactory cleansing preparation is achieved with methods similar to those for barium enema studies: low-residue diet, ample fluids, and two laxatives on the day prior to examination and nothing by mouth on the day of examination. Administration of rectal enemas is discouraged because of the confusing small bowel patterns that may develop from admixing of refluxed enema fluid with the antegrade small bowel contrast media. Enteroclysis performed urgently for small bowel obstruction does not require bowel preparation.

Premedication for enteroclysis has received recent attention (Maglinte et al. 1987, 1988). Promotility agents that increase small bowel transit and thus reduce procedure time are recommended. Of the available drugs, metoclopramide hydrochloride (Reglan, A.H. Robins Co.) is preferred because of its combined stimulation of gastric and small bowel peristalsis and its infrequent association with side-effects. Specifically, administration of metoclopramide (10 mg, intravenously) immediately prior to the study facilitates the process of transpyloric intubation and also allows faster contrast infusion flow rates during enteroclysis (Maglinte et al. 1982). The dosage of metoclopramide should be increased accordingly if the patient has been taking medications that alter small bowel peristalsis, such as anticholinergic drugs, atropine, or narcotic analgesics and sedatives.

Efforts to improve patient comfort are an important consideration of current enteroclysis practice. In a clinical trial performed with and without mild sedation, the routine use of sedation was shown to improve patient tolerance and acceptance of enteroclysis without interfering in the quality of the examination or its duration (Maglinte et al. 1988). Intravenous premedication, preferably with 2–5 mg midazolam hydrochloride (Versed, Roche Laboratories) or 3–10 mg diazepam (Valium, Roche Laboratories), carefully titrated, is recommended. Some sedated patients may require a correspondingly appropriate increase in the dose of the promotility agent.

### 7.2.2 Enteroclysis Catheters and Intubation

Enteroclysis catheters are modifications of an original 14-F duodenal tube. Investigators have lengthened the catheter and provided various arrangements of infusion sideports. Nolan recently reduced its size to 10 F for increased flexibility (Trail and Nolan 1995). Currently, the most significant adaptation to the enteroclysis catheter is that of a distal inflatable balloon that prevents duodenogastric reflux while allowing high infusion rates of the contrast media (Fig. 7.1) (Maglinte 1994). A multilumen small bowel tube for diagnostic enteroclysis and therapeutic gastrointestinal tract decompression also represents an innovative design (see Sect. 7.2.7) (Maglinte et al. 1992b).

Fig. 7.1. Enteroclysis catheter (Maglinte Enteroclysis Catheter, Cook) made of radiopaque polymer with latex balloon and distal infusion sideports. Measuring 13 F in diameter and 135 cm long, the balloon distends to 2.5 cm with 15 ml injected air (arrow). A flexible, but rotationally rigid Teflon-coated guidewire (175 cm, 0.065 in. diameter) with a straight or angled guide tip is supplied to allow versatility during intubation maneuvers. The balloon (arrow) is ideally situated to the left of midline, with the catheter tip positioned in the distal duodenum or first few centimeters of jejunum for a satisfactory infusion. Note the prevention of duodenogastric reflux of contrast media during enteroclysis.