Manometry

“Manometry is a diagnostic test that measures changes in intraluminal pressure and the coordination of activity in the muscles of the GI tract.”


Learning Objectives

After attending this presentation, the learner will be able to:

Describes the general principles, equipment and procedures typically employed in manometry studies.

List the types of manometry: Esophageal, stomach and small bowel, Sphincter of Oddi and anorectal. Their indications and contraindications.

Discuss the manometry patterns of normal subjects and common abnormal studies.

Describe an awareness of Chicago Classification editing and Impedance Studies.

Three components to the equipment for any manometry:

- Probe with sensors - positioned in the lumen you are testing.
- Transducer – a device that transforms a pressure value into an electrical signal
- Computer or physiography – a system that displays a graphic image for editing and interpretation
Types of Manometry

• Esophageal
• Gastroduodenal small bowel
• Sphincter of Oddi
• Anorectal

Esophageal manometry

Anatomy

Physiology

Primary versus secondary peristalsis
Graphic view of secondary peristalsis

Indications for Esophageal Manometry

- Dysphagia
- Non-cardiac chest pain
- Pre-operative evaluation for anti-reflux surgery
- GERD
- Determine location of LES for placement of pH probe
- Evaluate diseases affecting the GI tract such as scleroderma
- Exclude esophageal etiology for suspected anorexia

Contraindications for Esophageal Manometry

- Uncooperative patients
- Recent gastric surgery
- Severe esophageal ulcers
- Known obstruction
- Recent administration of sedatives or narcotics
- BRAVO pH study within 2 weeks
Esophageal Manometry solid state probe

Graph recording of Esophageal Manometry
**Normal Values for Esophageal Manometry**

- Esophageal body amplitude: 30 – 180 mmHg
- Lower esophageal sphincter resting pressure: 10 – 45 mmHg
- Lower esophageal relaxation pressure: < 8 mmHg.

**Achalasia**

Graphic view of Achalasia
Distal Esophageal Spasm (DES)\textsuperscript{6}

Nutcracker Esophagus \textsuperscript{7}

Nutcracker

Jackhammer
Ineffective Esophageal Motility (IEM) 

Scleroderma 

Provocative Testing to reproduce symptoms

- **Bernstein Test** – Water infused manometry probe with alternating infusions of saline and hydrochloric acid. Test is positive if patient reports feelings of heartburn. Test not used much with 24 hour Ph testing methods now available

- **Tensilon** (edrophonium, a short acting cholinesterase inhibitor) – With manometry probe in place in esophagus, IV injection of saline placebo alternating with Tensilon. Test is positive if patient reports same type of chest pain.
Gastroduodenal/small bowel manometry

- Symptoms of delayed gastric emptying:
  - Severe gastric retention
  - Nausea and vomiting
  - Weight loss

- Not used very much except in research as other gastric emptying studies with radioisotope tagged foods are more common

Gastroduodenal Small Bowel Manometry

- Stomach – fundus, body, antrum
- Gastric pacemaker in middle of gastric body
- 3 peristaltic waves per minute
- 16 to 20 feet small intestine. Short, propulsive movement mixes chyme with intestinal secretions toward cecum.
- Probe placed endoscopically - test may last several hours
- Mostly in larger motility centers and for research

Sphincter of Oddi Manometry

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**Sphincter of Oddi Procedure**

**Indications**
- Abdominal pain
- Elevated liver enzymes
- Dilated common bile duct

**Contraindications**
- Acute pancreatitis
- Barium in GI tract
- Pregnancy
- Inability to tolerate anesthesia

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**Anorectal Manometry**

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**Solid State anorectal probe**

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**Air infused disposable probe**

**Balloon inflated / 4 directional sensors**

**Anorectal Manometry**

**Indications**
- Constipation
- Fecal incontinence
- Rectal/Anal pain
- Pre-surgical evaluation
- Rule out Hirschsprung's Disease,
- Chagas' Disease

**Contraindications**
- Uncooperative patient
- Patient unable to tolerate due to pain with probe inserted
- Infectious diarrhea

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12 Reveille, R. Matthew, and Linda Knight,
**Preparation and Patient Instruction**

- Procedure takes about 60 minutes (less in infants)
- Prepare with 2 fleets enemas
- No sedation involved
- Pt awake and lying on left side with parts of the test passive and parts interactive
- Study consists of six phases with instructions before each
- Once probe is out, no restrictions or post care needed

**Anatomy of rectum and anal sphincter**

![Image of rectum and anal sphincter]

**Six steps of the testing**

- Resting pressure Study
- Squeeze Study
- Squeeze Duration
- RAIR – Rectoanal Inhibitory Reflex
- Push (Strain) Study
- Rectal Compliance Study
Normal values

- Sphincter length: Male - 3-4 cm  Female - 2.5-3 cm
- Normal sphincter resting pressure: 50 - 120 mmHg
- Normal squeeze pressure is < 100 mmHg above resting pressure (Desirable to have at least 100 mmHg to maintain continence.)
- RAIR – At least a 15 % drop in resting pressure. Begins at 10cc, complete at 60 cc

Normal Sensation Thresholds

- First sensation – 10 cc  (15 cc over age 65)
- Urge sensation – 80-100 cc
- Maximum tolerance – we stop filling balloon at 200 cc

Chicago Classification of Esophageal Motility Disorders

- Impedance Manometry and 24 pH Impedance testing


