IMAGEN

CT PROTOCOL REFERENCE

# CT COLONOGRAPHY

## Preparation · $CO_2$ Insufflation · Acquisition · Post-Exam

**PURPOSE** To standardize patient preparation, $CO_2$ insufflation, image acquisition, and post-examination care for CT colonography.

## 1. Patient preparation

### 1.1 Pre-procedure screening

Before initiating bowel preparation, obtain the patient's relevant medical history and complete the following screening:

| | |
|---|---|
| **ALLERGIES / ASPIRATION**<br>Review allergies and assess aspiration risk. Do not administer barium when contraindicated. | **PREPARATION INSTRUCTIONS**<br>Confirm that the patient understands the bowel preparation instructions. |
| **CONFIRM ABSENCE OF CONTRAINDICATIONS**<br>● Active colitis or diarrhea<br>● Recent colonoscopy with biopsy<br>● Recent diverticulitis<br>● Symptomatic abdominal wall hernia<br>● Small bowel obstruction<br>● Recent surgery<br>● Known or suspected colonic perforation | **PREPARATION TOLERANCE**<br>Assess the patient's ability to tolerate the prescribed laxative preparation. Review renal function and risk factors for magnesium retention (for example, renal impairment, advanced age, or diuretic use) before the magnesium citrate preparation. If a concern is identified, consult the responsible provider. |

**IMPORTANT** If a potential contraindication or concern regarding preparation tolerance is identified, consult the responsible provider before proceeding.

| | |
|---|---|
| **SUPPLIES TO PURCHASE (PATIENT)**<br>● Two 28 oz bottles of sports drink, vitamin water, coconut water<br>● Two Dulcolax laxative tablets (5 mg each)<br>● Two 10 oz bottles of Magnesium Citrate | **SUPPLIES PROVIDED TO THE PATIENT**<br>● Omnipaque 350 mgI/mL: One bottle, 50 mL<br>● Readi-Cat 2: One bottle, 250 mL |

### 1.2 Bowel preparation schedule

| WHEN | INSTRUCTIONS |
|---|---|
| TWO DAYS BEFORE | **Diet: Low-Fiber Diet.** See suggested menu below with recommended items. |
| ONE DAY BEFORE | **Diet: Clear Liquids Only**<br>Clear liquid diet starting at 12:00 a.m. (midnight) at the start of the day before your examination. This consists of any liquid that you can see through. Do not eat any solid foods or juices with pulp. Drink large amounts of liquid to avoid hunger and dehydration.<br>**Examples include:** Black coffee · Fat-free broth · Sports drinks such as Gatorade with no red dyes · Plain tea · Water · Honey · Non-pulp or strained, light-colored fruit juice (white grape juice, apple) · Clear soda (like Sprite) · Gelatin with no red dyes (DO NOT add extra ingredients, i.e: fruit) · Ice pops with no red dyes |
| 8:00 a.m. | Clear liquid diet beginning at midnight. |
| 11:00 a.m. | Take two Dulcolax tablets (5 mg each) with 1 glass (8 oz) of clear liquid. |
| 2:00 p.m. | Drink 1 bottle (10 oz) of magnesium citrate. Drink at least 4-6 glasses of clear liquid. |
| 5:00 p.m. | Drink the entire bottle of Readi-Cat 2. Follow this with 1 bottle (10 oz) of magnesium citrate. Drink at least 4-6 glasses of clear liquid. |
| 9:00 p.m. | Mix the entire bottle of Omnipaque (50 mL) into 8 oz of clear liquid and drink. |
| DAY OF THE EXAMINATION | **If your exam is in the morning, start fasting at midnight. If your examination is in the afternoon, you may drink clear liquids until four hours before the examination.** |
| PREPARATION TOLERANCE | **Some patients may have difficulty tolerating the laxative portion of the preparation. Escalate concerns to the responsible provider before proceeding.** |
| AFTER INCOMPLETE COLONOSCOPY | **The patient is to drink dilute iodinated contrast (50 mL Omnipaque 350 mgI/mL with 8 oz clear liquid). Wait at least 2.5 hours to scan. If contrast has not transited the colon, technologists may wait further or contact the radiologist at their discretion.** |

# CT COLONOGRAPHY | Suggested menu: 2 days before

## Suggested menu for 2 days before the CT Colonography

**DIET** What you must eat will improve the performance of the bowel preparation and enhance the diagnostic accuracy of the procedure. It is highly recommended that you eat less than usual, beginning 2 days before the CT procedure.

**Beginning with lunch, 2 days prior, you can choose from the following foods:**

| FOOD GROUP | YOU CAN CHOOSE | AVOID |
|---|---|---|
| **Dairy** | Low-fat milk (only up to 2 cups), plain yogurt. | Yogurt with fruit skins or seeds. |
| **Meats** | Plainly prepared fish, poultry, eggs. | Added fats, gravies, and heavy seasonings. |
| **Starches** | Potatoes with no skin, white rice, spaghetti or pasta. | Potato skin and brown rice. |
| **Bread / Cereal** | White bread, saltine crackers. | Whole grain breads and cereals, popcorn. |
| **Fruit / Juices** | Clear fruit juices, canned fruit (no seeds, skin or membranes). | Fresh fruit, raisins, dried fruits, prunes, prune juice, skins. Also avoid fruits that are red in color. |
| **Beverages** | Water, fruit flavored drinks, decaffeinated coffee, carbonated drinks. | All other types of drinks. |
| **Soup** | Broth/bouillon, strained soups. | Cream-based soups. |
| **Dessert** | Jello/gelatin, fruit ice, popsicle (no red color). | Coconut, nuts, seeds, hard clear candies. |
| **Misc.** | Salt, pepper, jelly, sugar, honey, syrup. | Cloves, garlic, seed spices, chili sauce, BBQ sauce, peanut butter, or any strongly flavored mustard, jam, mayonnaise. |

# CT COLONOGRAPHY | Examination & $CO_2$ insufflation

## 2. Examination procedure

### 2.1 Patient instructions

Before beginning the examination:

| EXPLAIN | POSITIONING | BREATH-HOLD | PRACTICE | SENSATIONS |
|---|---|---|---|---|
| Explain the CT colonography procedure and the purpose of rectal $CO_2$ insufflation. | The patient will be positioned supine and prone. Occasionally, decubitus positioning may be required. | Typically at end expiration; expected breath hold is approximately 25–30 seconds. | Have the patient practice holding their breath without moving. | Fullness, cramping, or bowel gurgling is likely to occur during insufflation. |

### 2.2 $CO_2$ insufflation: PROTOCO$_2$L insufflator

Follow the manufacturer's current instructions for use and the facility's approved insufflation protocol.

| STEP | ACTION |
|---|---|
| **STEP 1 Patient and equipment setup** | • Position the patient on their left side.<br>• Insert the catheter tip from the administration set and inflate the retention cuff.<br>• Set the PROTOCO$_2$L insufflator dial between **22 and 25 mmHg**.<br>• Press the Flow Stop/Run button to initiate $CO_2$ administration.<br>• Monitor the digital pressure display above the control dial as the colon distends. |
| **STEP 2 Monitor insufflation volume and reposition patient**<br>**Visual Cue 1: approx. 1.5–2.0 L** | • Instruct the patient to slowly roll onto their **right side**.<br>• Remind the patient to relax their abdominal muscles. If transient discomfort and cramping occur, encourage the patient to take deep breaths.<br>• Monitor flow volume and digital pressure display. |
| **STEP 2 Monitor insufflation volume and reposition patient**<br>**Visual Cue 2: approx. 3.0–4.0 L** | • Monitor the pressure display. Assess whether pressure is stabilizing near the level associated with the selected dial setting.<br>• Instruct the patient to slowly roll to **supine** position. |
| **STEP 3 Maximum volume and additional insufflation** | The PROTOCO$_2$L insufflator automatically stops at **4.0 L** of administered $CO_2$ and every **2.0 L** thereafter. Equilibrium pressure means the displayed pressure holds near the set target while flow falls to near zero.<br>• If the volume reaches 4.0 L and equilibrium pressure has not been achieved, press the Flow Stop/Run button and continue insufflation.<br>• If volume reaches 6.0–8.0 L and equilibrium pressure has not been achieved: obtain a scout image to assess colon distention and evaluate for possible $CO_2$ reflux into the small bowel.<br>• If additional insufflation is indicated, resume administration.<br>• Continue monitoring the patient, pressure, and colon distention. |

| SAFETY NOTES | REQUIREMENT |
|---|---|
| DO NOT EXCEED LIMITS | **Do not exceed the manufacturer's specified limits.** |
| RED-FLAG STOP | **Terminate insufflation in the presence of concerning symptoms or findings, such as severe or increasing abdominal pain, or symptoms suggesting a vasovagal reaction, such as pallor, sweating, dizziness, presyncope, or syncope.** |
| AFTER A RED-FLAG EVENT | **The technologist should assess the patient, obtain vital signs, and initiate the appropriate clinical response. Insufflation should not be resumed after a red-flag event.** |
| URGENT ASSESSMENT / EMS | **Severe or persistent pain, peritoneal signs, syncope, hemodynamic instability, or suspected perforation should prompt urgent medical assessment and emergency transfer as indicated. EMS should be called for potentially serious or unstable presentations; the patient should not be sent to the ED unaccompanied.** |
| INADEQUATE DISTENTION | **If distention remains inadequate after the permitted troubleshooting steps, terminate the insufflation attempt and document the examination as technically limited rather than continuing to increase pressure or volume.** |

# CT COLONOGRAPHY | Acquisition & post-examination

## 3. Image acquisition

| PHASE | REQUIREMENTS |
|---|---|
| 3.1 SUPINE ACQUISITION | • Perform a scout image to evaluate colonic distension. If distension is inadequate, follow section 3.3.<br>• Perform the first scan with the patient in the supine position.<br>• Use the thinnest appropriate slice thickness permitted by the approved acquisition protocol and required breath hold.<br>• Confirm that the acquisition is completed with adequate patient cooperation and breath holding. |
| 3.2 PRONE ACQUISITION | • Instruct the patient to carefully roll into the prone position.<br>• Obtain a scout image to evaluate colon distention.<br>• If distention is satisfactory, proceed with the prone diagnostic scan. |
| IMPORTANT | • **Instruct the patient to roll carefully to avoid dislodging the rectal catheter.**<br>• **$CO_2$ must be infusing during image acquisition.**<br>• **Occasionally right and/or left lateral decubitus positioning will be required in addition to supine and prone acquisitions.** |
| 3.3 INADEQUATE COLON DISTENTION | If the scout image demonstrates inadequate distention and the pressure reading remains low:<br>• Reassess the patient and equipment.<br>• Resume insufflation only as permitted by the approved protocol.<br>• Allow pressure to stabilize.<br>• Obtain another scout image.<br>• Confirm adequate distention before proceeding with diagnostic image acquisition. |
| 3.4 AXIAL RECONSTRUCTIONS | Reconstruct thin axial images at **1.25 mm** slice thickness and **1 mm** intervals for colonic evaluation. Reconstruct standard-thickness axial images at **3 mm** to evaluate extracolonic findings. |
| 3.4 MULTIPLANAR REFORMATIONS | Reformat coronal and sagittal images at **1.25 mm** slice thickness with **1 mm** intervals to support polyp detection and evaluation in multiple planes. |

## 4. Post-examination procedure

### 4.1 EQUIPMENT AND CATHETER REMOVAL

1. Turn off the insufflator.
2. Deflate the retention cuff.
3. Gently remove the catheter.
4. Disconnect and appropriately discard the administration set.
5. Move the insufflator out of the working area, as needed.
6. Close the $CO_2$ supply valve securely by turning it to the right, following the manufacturer's instructions.
7. Confirm that the $CO_2$ tank valve is completely closed.

### 4.2 PATIENT INSTRUCTIONS FOLLOWING THE EXAMINATION

- Allow the patient to use the restroom to evacuate bowel contents.
- Encourage adequate fluid intake, subject to the patient's clinical circumstances.
- Explain that stool may appear chalky white following the examination.
- Explain that $CO_2$ is absorbed through the bowel and eliminated through the lungs; residual gas-related fullness should generally improve after the examination.
- No additional food or drink restrictions are specified in this draft beyond any restrictions required by the patient's clinical circumstances.

### 4.3 POST-PROCEDURE MONITORING

Monitor for signs of an allergic reaction, including hives or difficulty breathing.

### 4.3 CONTACT PHYSICIAN PROMPTLY OR SEEK EMERGENCY EVALUATION FOR

- Significant or worsening abdominal pain
- Fever
- Persistent nausea or vomiting
- Blood in the stool
- Inability to pass gas or stool

**EMERGENCY SYMPTOMS** Difficulty breathing or other signs of a severe allergic reaction require immediate emergency response.

**Clinical references:** Pickhardt PJ, Kim DH. CT Colonography: Principles and Practice of Virtual Colonoscopy. Elsevier; 2010. · American College of Radiology — CT Colonography Practice Parameter (https://gravitas.acr.org/PPTS/GetDocumentView?docId=33) · Published clinical literature (https://pmc.ncbi.nlm.nih.gov/articles/PMC11300474/)