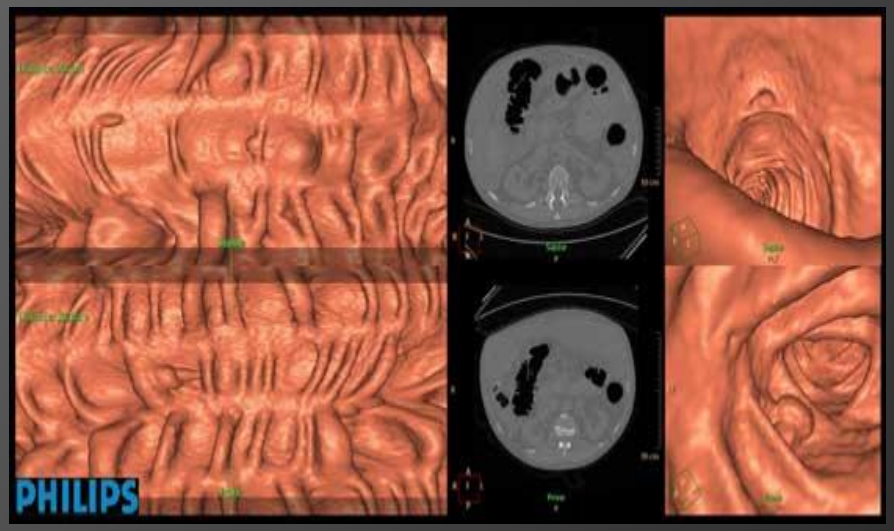
# CT COLONOSCOPY

## RADIOGRAPHER LED SERVICE




JOANNE CLAYTON

CT RADIOGRAPHER
SEHSCT

# Introduction

- Why we image the Colon
- Anatomy and function of the Colon
- What CT Colonoscopy is
- Training and Equipment Needs
- Patient Preparation
- Examination Technique
- Bowel Navigation
- Aftercare of the Patient
- Benefits of CT Colonoscopy
- Changes to Our Techniques

# Why do we image the Colon?

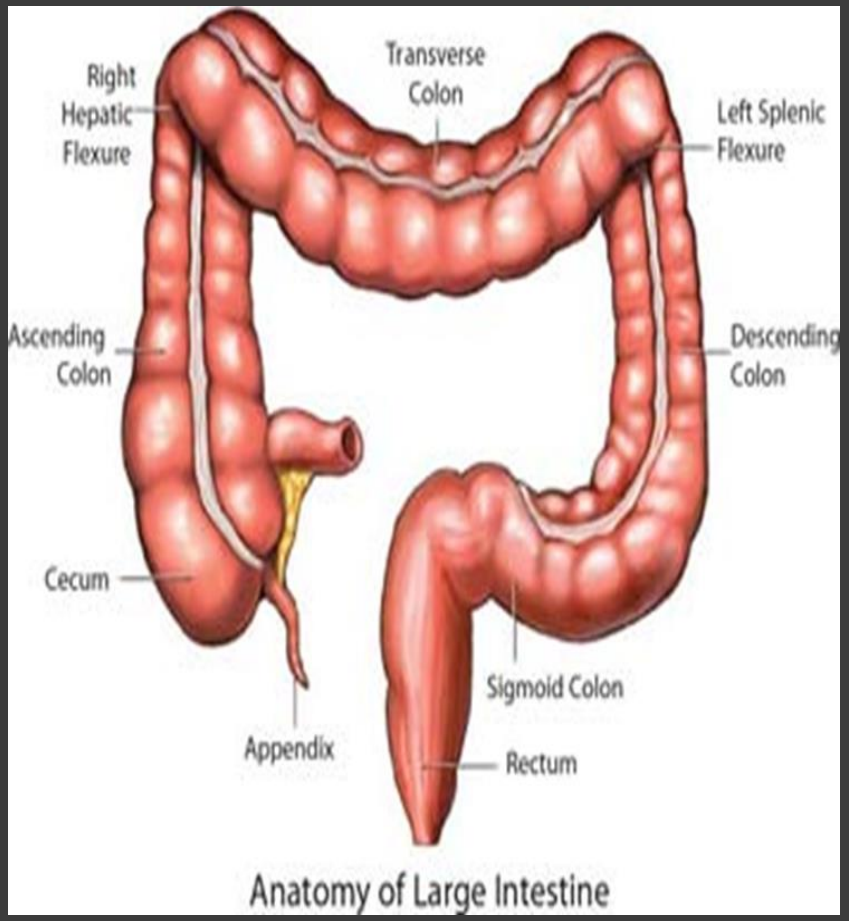
- Bowel cancer is the 4th most common cancer in the UK.
- >42,000 people diagnosed each year
- Bowel cancer is treatable and curable if diagnosed early

- CT virtual colonoscopy images the entire colon and rectum and can detect polyps and cancer

- Optical Colonoscopy is the gold standard investigation of the colon

- However, in some circumstances CT virtual colonoscopy can be an alternative first line investigation.

# Anatomy of the Colon




- Muscular tube

- Approx. 1.8 metres long
- Made up of 6 sections:

- Caecum and appendix
- Ascending colon
- Transverse colon
- Descending colon
- Sigmoid colon
- Rectum connects the anus to the sigmoid.

# Functions of the Colon

- Reabsorb Fluids
- Process waste products
- Absorption of certain vitamins – Vitamin K
- The colon contains numerous varieties of microflora/bacteria which aid digestion, promote vital nutrient production, maintain pH and prevent proliferation of harmful bacteria.

# What is CT Colonoscopy?

- Also known as Virtual CT
- Minimally invasive imaging examination of the large bowel
- CT examination following some form of bowel cleansing and colonic distension
- Images are then interpreted using 2-D and 3-D techniques
- Results are interpreted by a Radiographer and/or a Radiologist and communicated to the Referring Clinician.

# Background

- RCR Guidelines – CT Colonoscopy replaces(?) Ba Enema
- Radiologist training – RCR approved course; report at least 100 CTCs per year
- Radiographer training – St Marks “Hands on” CT Colonography Course
- Advise referring clinicians of changes
- Arrange dispensing mechanism with Pharmacy for bowel preparation
- Devise Patient Group Directives for prescribing
- Devise protocol for procedure
- Ensure appropriate equipment/software available
- Optical Colonoscopy is the gold standard investigation.

# Radiographer's Training

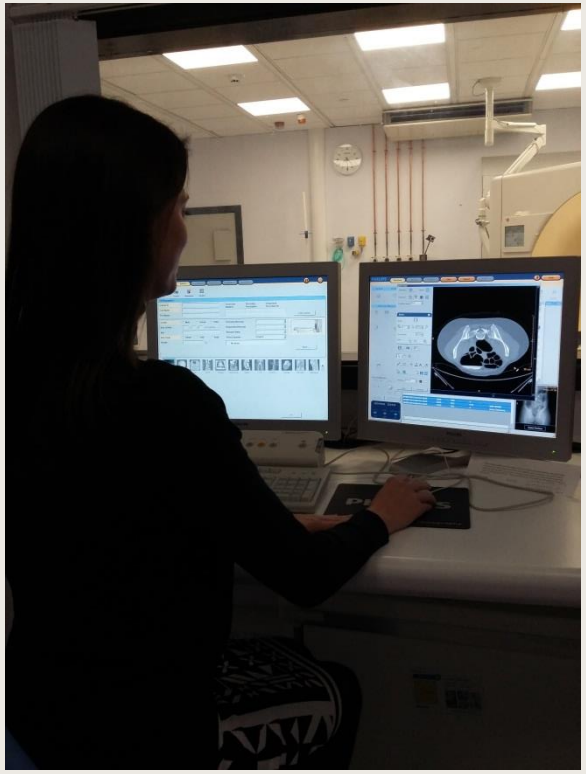

- Core team of Radiographers identified for training
- Study all aspects of the procedure in house
- Study Patient Group Directives for prescribing bowel prep, contrast and Buscopan
- Attend St Mark's "Hands on" CT Colonography Training Course
  - 5 day intensive clinical and lecture based programme

# What you will need


- Philips Brilliance 64 ICT (256 slice) with I-Patient
- $CO_2$ Insufflator (Protocol Touch)
- Intravenous Contrast Pump
- A Patient
- Some of these…


And…

some of these…



# Patient Referrals

- Two main clinical areas
  - Diagnostic
  - Bowel Screening
- Diagnostic/Symptomatic
  - Blood in stools
  - Change in bowel habit
  - Abdominal pain with unexplained weight loss
  - Palpable mass
  - Failed optical colonoscopy
- Asymptomatic
  - Patients from NHS NBCSP who have had failed optical colonoscopy
  - Patients not fit for optical colonoscopy.

# Why not CT Colonoscopy?

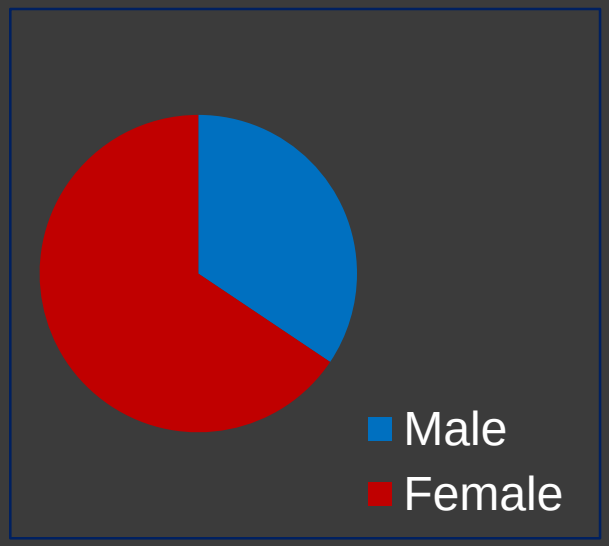
Most contraindications are relative and not absolute.

- Active or acute colitis
- Acute diarrhoea
- Acute diverticulitis
- Pregnancy
- Recent colorectal surgery
- Colon containing inguinal hernia
- Recent deep tissue endoscopic biopsy or polypectomy
- Known or suspected colonic perforation
- Routine follow-up of inflammatory bowel disease.

# Patient Statistics

In the last six months:

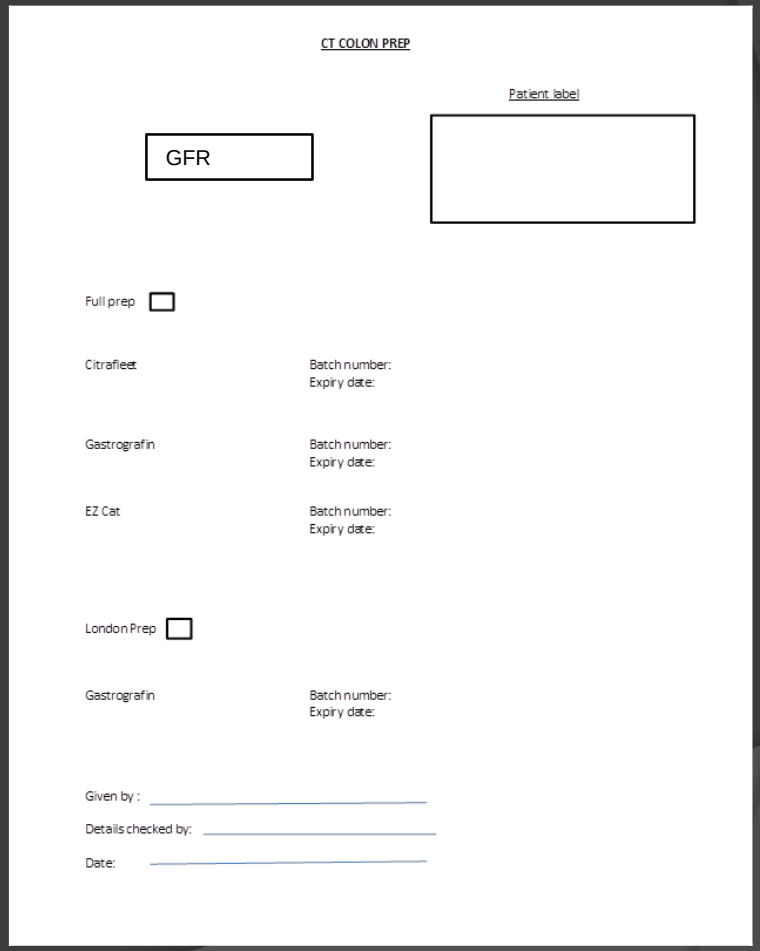
- 625 patients across 3 sites




- 210 male, 415 female
- Aged 32 – 94 years

# Patient Preparation

- Probably the most important aspect
- Appointment letter clearly states prep to be collected at X-Ray Department
- Collected 5 working days prior to exam
- Prep is given out by designated staff
- Prep form scanned into RIS
- Multi-site collection.



CT COLON PREP

Patient label

GFR

Full prep ☐

Citrafleet — Batch number: Expiry date:

Gastrografin — Batch number: Expiry date:

EZ Cat — Batch number: Expiry date:

London Prep ☐

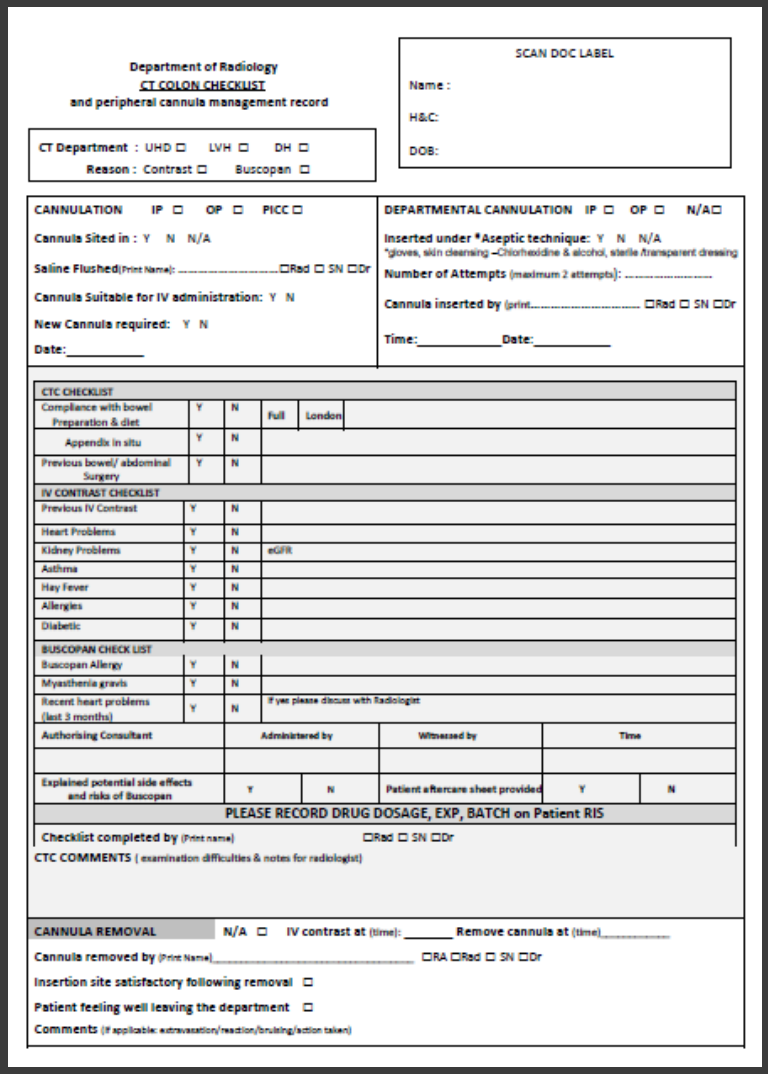
Gastrografin — Batch number: Expiry date:

Given by : _____

Details checked by: _____

Date: _____

# Patient Preparation



Department of Radiology
CT COLON CHECKLIST
and peripheral cannula management record

SCAN DOC LABEL
Name :
H&C:
DOB:

CT Department : UHD ☐ LVH ☐ DH ☐
Reason : Contrast ☐ Buscopan ☐

**CANNULATION** IP ☐ OP ☐ PICC ☐
Cannula Sited in : Y N N/A
Saline Flushed(Print Name): .....☐Rad ☐ SN ☐Dr
Cannula Suitable for IV administration: Y N
New Cannula required: Y N
Date:_____

**DEPARTMENTAL CANNULATION** IP ☐ OP ☐ N/A☐
Inserted under *Aseptic technique: Y N N/A
*gloves, skin cleansing –Chlorhexidine & alcohol, sterile /transparent dressing
Number of Attempts (maximum 2 attempts): .....
Cannula inserted by (print..... ☐Rad ☐ SN ☐Dr
Time:_____Date:_____

| CTC CHECKLIST | | | | |
|---|---|---|---|---|
| Compliance with bowel Preparation & diet | Y | N | Full | London |
| Appendix in situ | Y | N | | |
| Previous bowel/ abdominal Surgery | Y | N | | |
| **IV CONTRAST CHECKLIST** | | | | |
| Previous IV Contrast | Y | N | | |
| Heart Problems | Y | N | | |
| Kidney Problems | Y | N | eGFR | |
| Asthma | Y | N | | |
| Hay Fever | Y | N | | |
| Allergies | Y | N | | |
| Diabetic | Y | N | | |
| **BUSCOPAN CHECK LIST** | | | | |
| Buscopan Allergy | Y | N | | |
| Myasthenia gravis | Y | N | | |
| Recent heart problems (last 3 months) | Y | N | If yes please discuss with Radiologist | |

| Authorising Consultant | Administered by | | Witnessed by | Time | |
|---|---|---|---|---|---|
| | | | | | |
| Explained potential side effects and risks of Buscopan | Y | N | Patient aftercare sheet provided | Y | N |

PLEASE RECORD DRUG DOSAGE, EXP, BATCH on Patient RIS

Checklist completed by (Print name) ☐Rad ☐ SN ☐Dr
CTC COMMENTS ( examination difficulties & notes for radiologist)

**CANNULA REMOVAL** N/A ☐ IV contrast at (time): _____ Remove cannula at (time)_____
Cannula removed by (Print Name)_____ ☐RA ☐Rad ☐ SN ☐Dr
Insertion site satisfactory following removal ☐
Patient feeling well leaving the department ☐
Comments (If applicable: extravasation/reaction/bruising/action taken)

- Patient explanation
- Bowel prep compliance
- Routine IV checks
- Cardiac history
- Buscopan check/details
- Scanned into RIS.

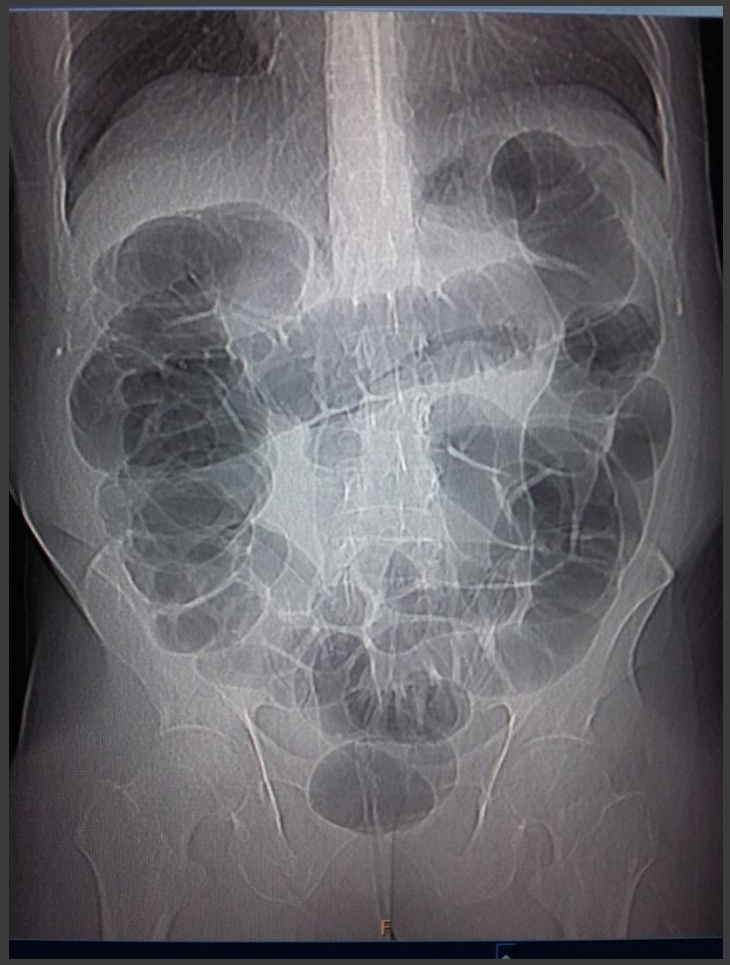
# Technique

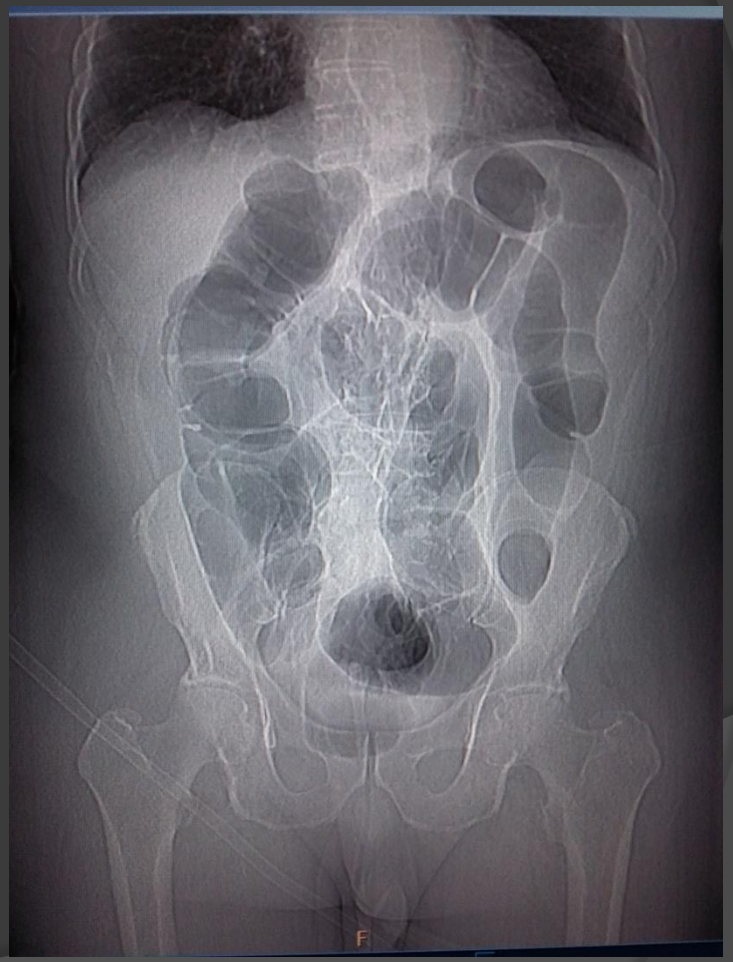
- Patient cannulated
- Assess: Supine/Prone or Decubs
- If suitable Buscopan is given
- Turned onto left side
- Catheter inserted - residue may pass into tube, small amount manageable - should be trapped in reservoir.
- $CO_2$ insufflation started
- Patient remains on side during initial insufflation.

# Insufflation

- $CO_2$ continually absorbed, insufflation should remain on throughout examination
- Watch pressure level it will stabilize
- Position patient for initial scan when volume reaches 1.5 - 2.0L
- Attach IV contrast if required and perform scout to assess distention
- If adequate proceed with exam if not continue insufflation and rescout.

# Is this bowel distension good enough?





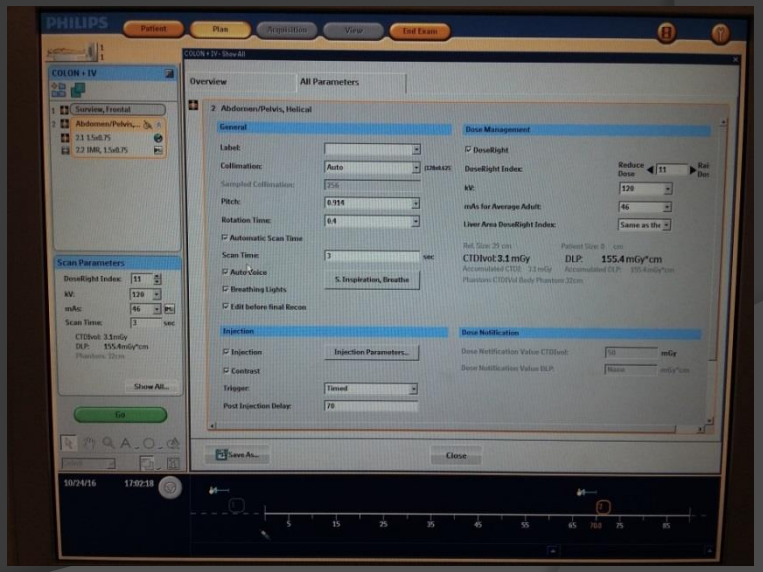
# Scan Parameters

Philips Brilliance 64 (256 slice) with iPatient

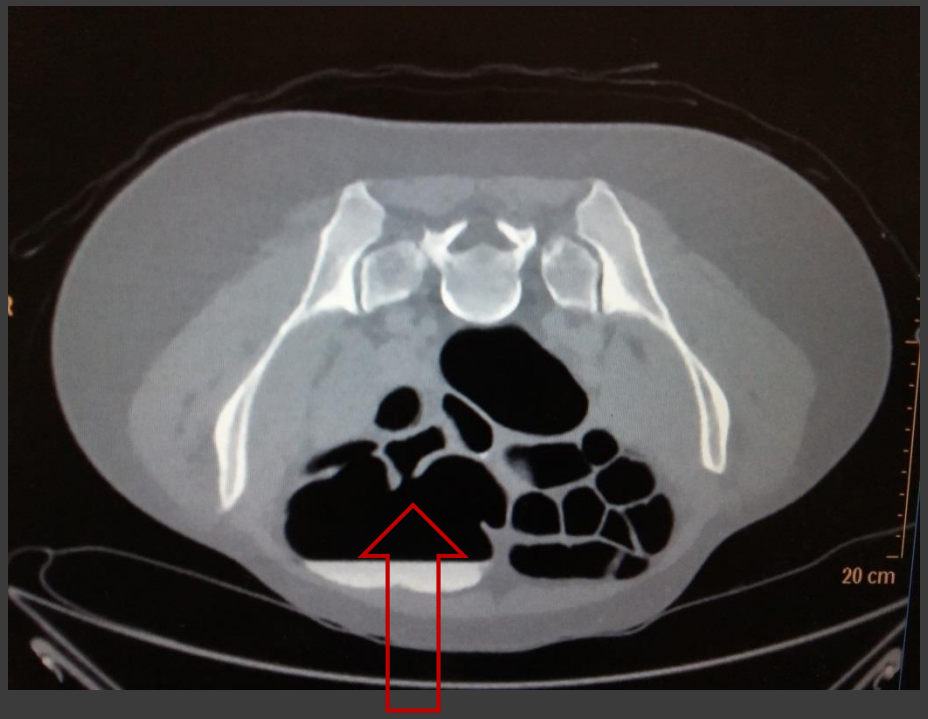
Low dose scout - 120kv 30mA

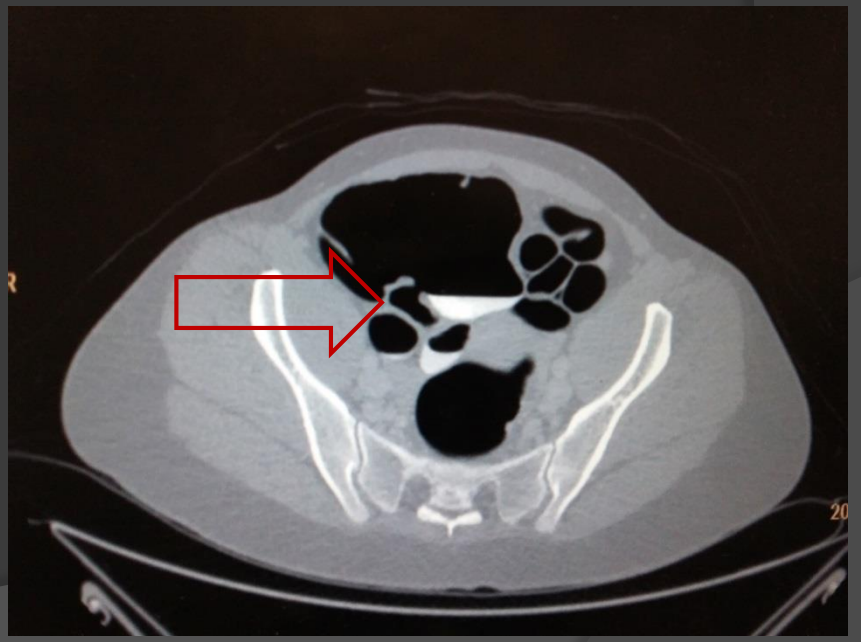
Contrast Scan

- 120kv
- Dose right index 11 – average mAs  approx. 46
- iDose 2
- Pitch 0.914
- Rotation time 0.4 seconds
- Standard filter
- Slice thickness  1.5mm; Increment  0.75mm
- Standard Portal venous delay – 70 seconds
- Include liver on contrast scan
- Dose modulation applied
- Scan in craniocaudal direction
- Arrested inspiration
- Navigate from Rectum to Caecum.



# Ileocecal Valve



# Technique

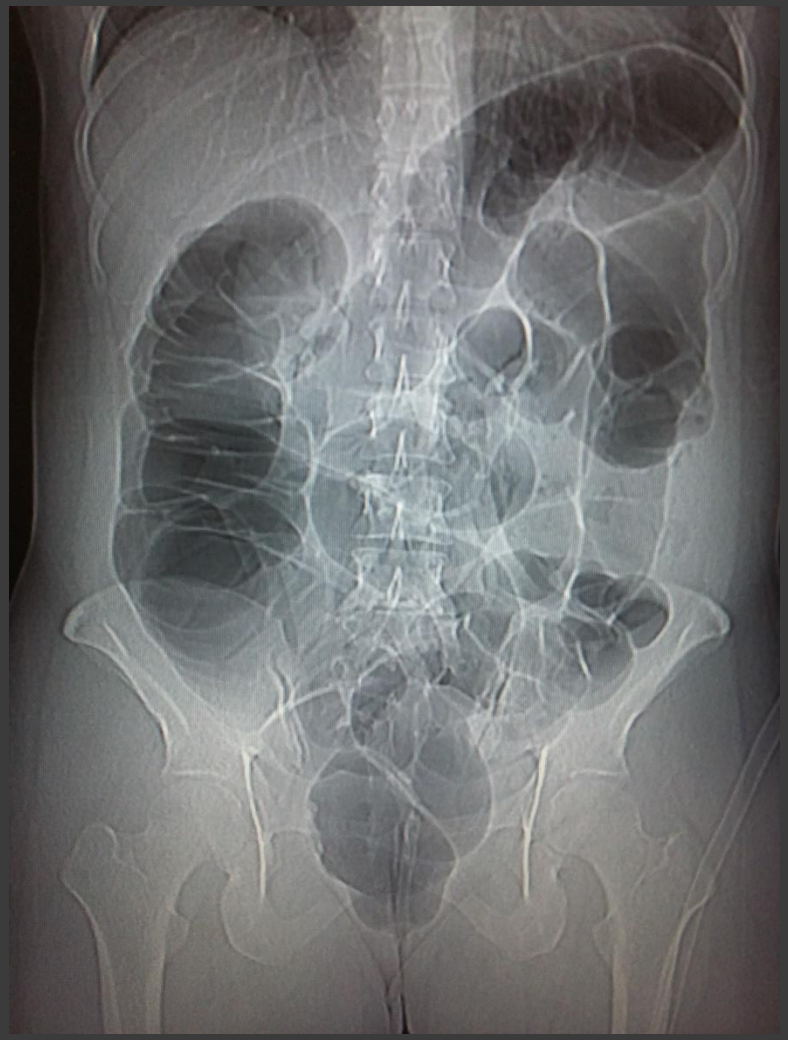
2nd Low Dose Scan

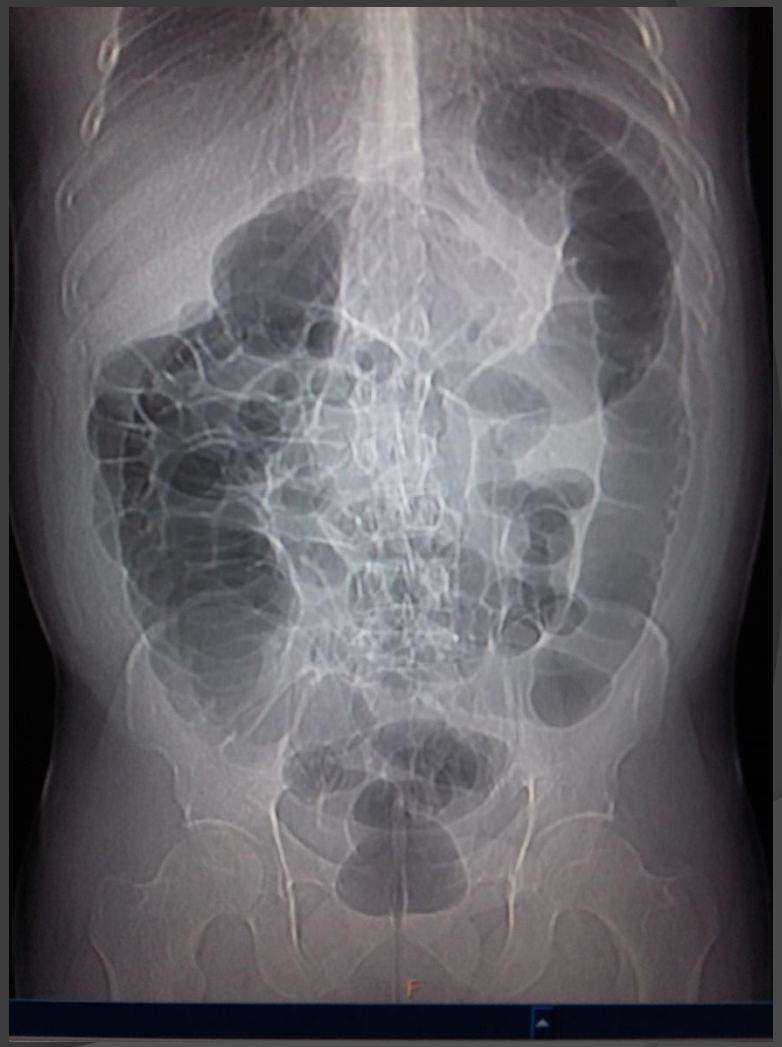
Include all of colon

Additional Scan performed with Dose right index 2 – average mAs approx. 17

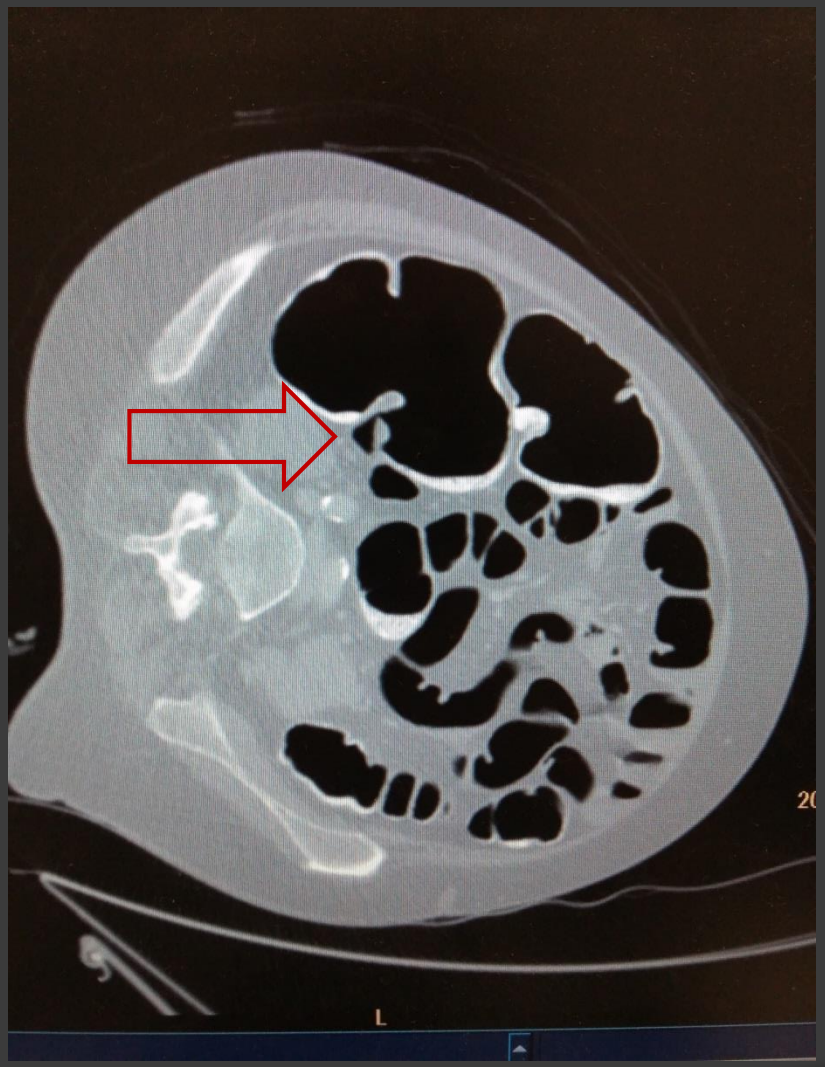
- Disconnect IV contrast
- Reposition patient at 180 degrees to the first scan
- If prone place a pillow under the patient's chest
- Perform scout scan
- If adequate distension proceed with scan
- Scan in craniocaudal direction
- Arrested inspiration
- Navigate from Rectum to Caecum
- Decide if any additional scans are required.

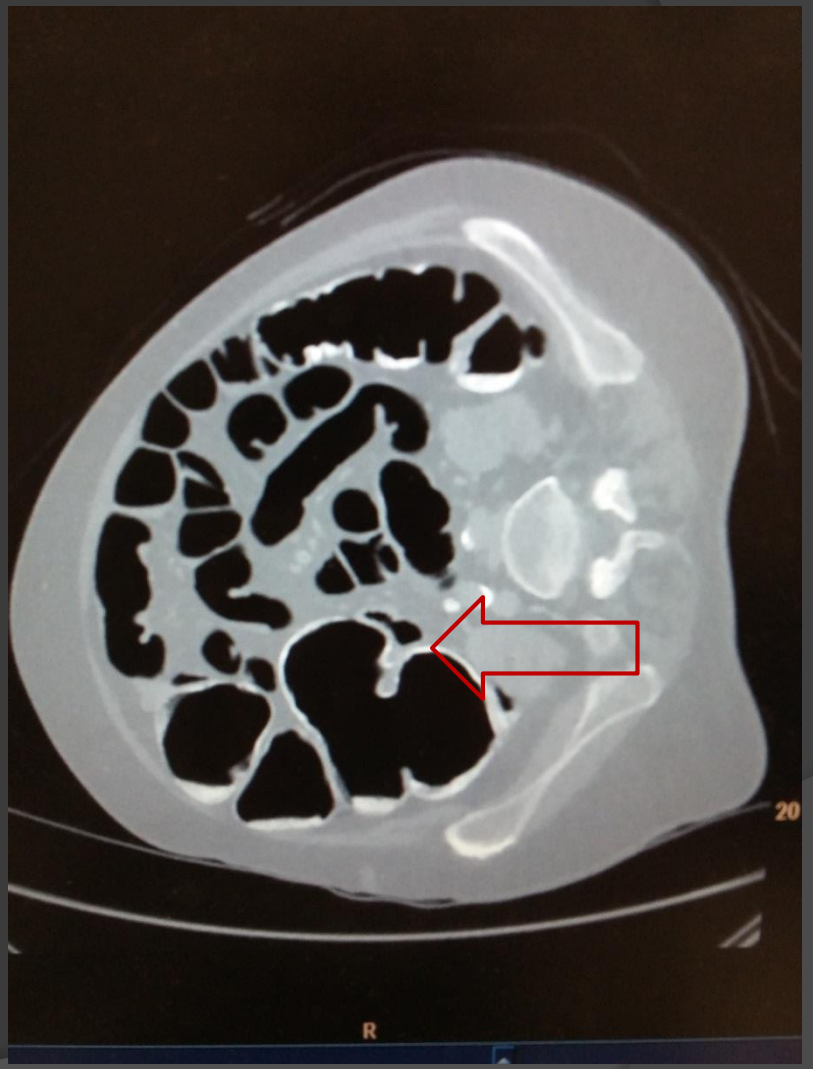
# Adequate distension?





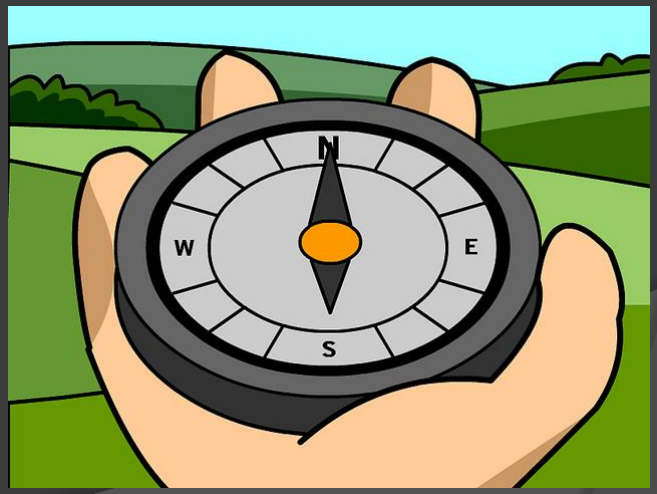
# Ileocecal Valve



# Bowel Navigation

- View images from rectum to caecum
- Travel up the descending colon and down the ascending!
- IC valve is a reference point
- When practiced should take about 2 minutes
- So you can make a decision about further scans and best position
- If pathology is identified consider scanning chest.



# Patient Aftercare

When the colon has been fully visualised and procedure complete –

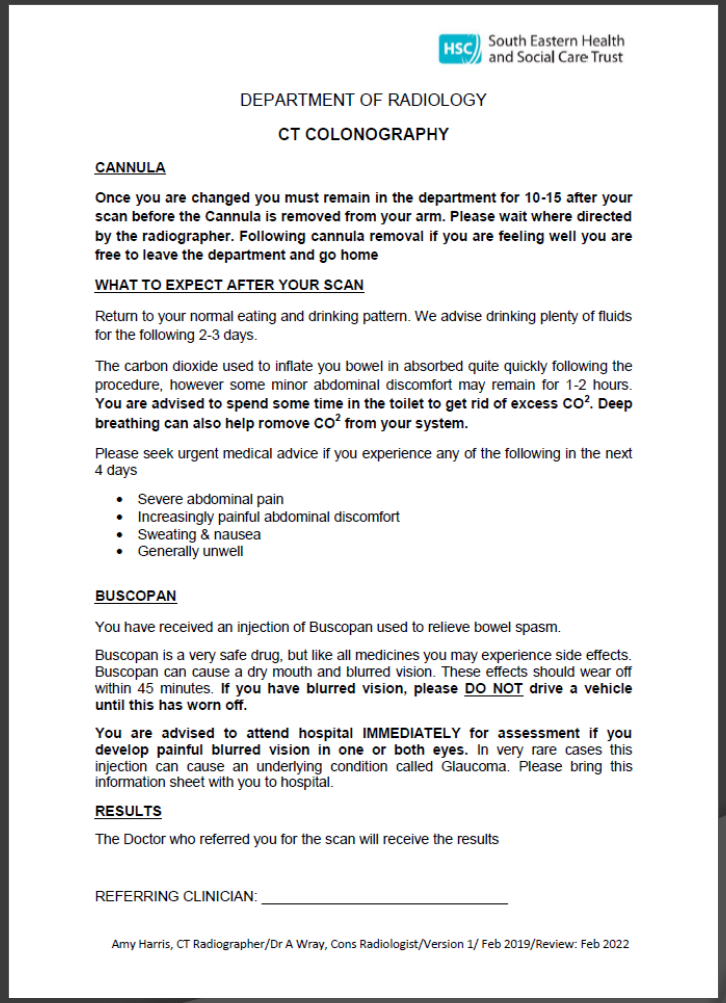
- Stop insufflation
- Vent $CO_2$ to reduce pressure and bowel distension
- Deflate retention cuff and remove catheter
- Direct patient to toilet/changing cubicle
- Advise to take a seat in waiting room when ready
- Remove cannula
- Provide light refreshments
- Aftercare sheet.

# Aftercare Information

- Normal aftercare instructions following IV contrast
- Resume normal activity
- Normal diet
- Plenty of fluids
- Some discomfort 1-2 hours
- When to seek medical advice

- Buscopan
  - Dry mouth
  - Blurred vision, no driving
  - Develop painful blurred vision – hospital immediately – underlying Glaucoma

- Results
  - Referring Clinician.



South Eastern Health and Social Care Trust

DEPARTMENT OF RADIOLOGY

**CT COLONOGRAPHY**

**CANNULA**

**Once you are changed you must remain in the department for 10-15 after your scan before the Cannula is removed from your arm. Please wait where directed by the radiographer. Following cannula removal if you are feeling well you are free to leave the department and go home**

**WHAT TO EXPECT AFTER YOUR SCAN**

Return to your normal eating and drinking pattern. We advise drinking plenty of fluids for the following 2-3 days.

The carbon dioxide used to inflate you bowel in absorbed quite quickly following the procedure, however some minor abdominal discomfort may remain for 1-2 hours. **You are advised to spend some time in the toilet to get rid of excess $CO^2$. Deep breathing can also help romove $CO^2$ from your system.**

Please seek urgent medical advice if you experience any of the following in the next 4 days

- Severe abdominal pain
- Increasingly painful abdominal discomfort
- Sweating & nausea
- Generally unwell

**BUSCOPAN**

You have received an injection of Buscopan used to relieve bowel spasm.

Buscopan is a very safe drug, but like all medicines you may experience side effects. Buscopan can cause a dry mouth and blurred vision. These effects should wear off within 45 minutes. **If you have blurred vision, please DO NOT drive a vehicle until this has worn off.**

**You are advised to attend hospital IMMEDIATELY for assessment if you develop painful blurred vision in one or both eyes.** In very rare cases this injection can cause an underlying condition called Glaucoma. Please bring this information sheet with you to hospital.

**RESULTS**

The Doctor who referred you for the scan will receive the results

REFERRING CLINICIAN: _____

Amy Harris, CT Radiographer/Dr A Wray, Cons Radiologist/Version 1/ Feb 2019/Review: Feb 2022

# Perforation

If a perforation is identified/suspected during exam:

- Stop insufflation and remove tube – allow colon to deflate
- If the patient is well – asymptomatic – inform radiologist
- Leave cannula in situ
- Symptomatic patient – confirmed perforation – radiologist will inform referring consultant to arrange surgical assessment.
- Patient transferred to A+E.

# Troubleshooting

- Non compliance with preparation
- Not retaining $CO_2$
- Patient mobility/body habitus

## Bowel not insufflating :

- Check $CO_2$ is switched on
- Check $CO_2$ level in cylinder
- Check tube position
- Check tube connections
- Large amount of residue in tube – may need to change

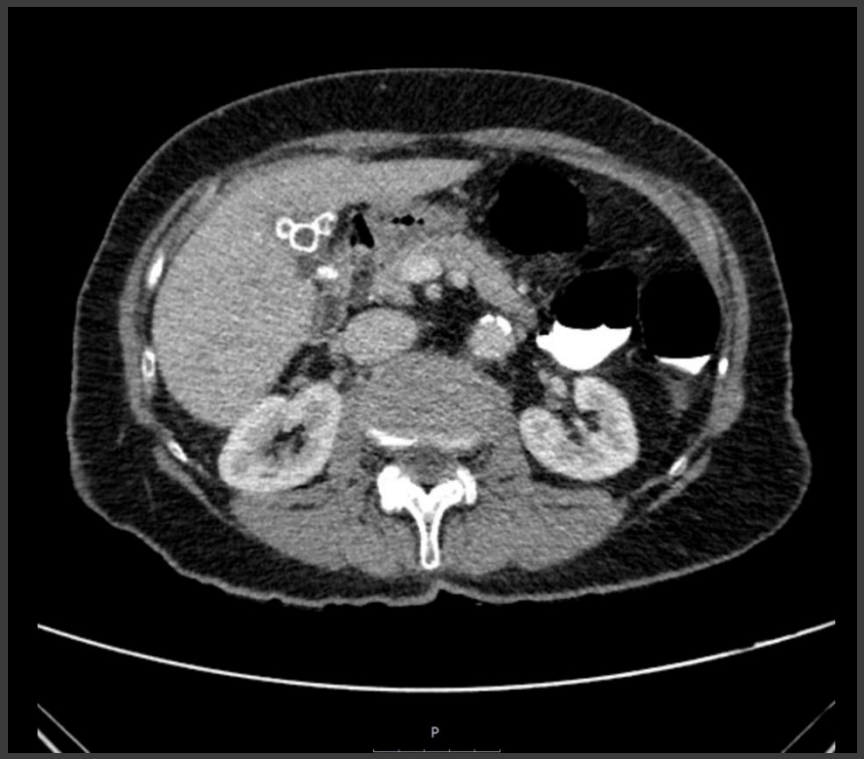
## Distention poor:

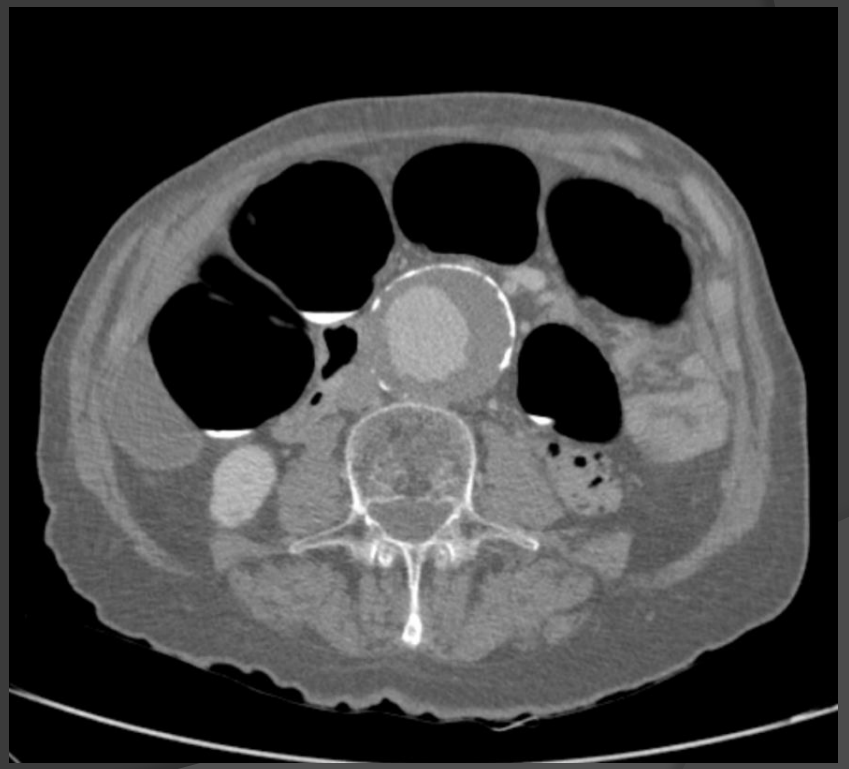
- Give clear instructions to patient
- Try turning patient during insufflation process
- Poor Sigmoid insufflation
- Poor Caecum insufflation
- Transverse colon collapse

# Benefits of CT Colonoscopy

- Less invasive than Optical Colonoscopy
- Use of IV contrast to help visualise extra-colonic structures
- Staging CT Chest can be performed at same time if a cancer is identified
- No nursing aftercare is required
- More tolerable for patients, especially the elderly, failed Optical Colonoscopy
- No sedation is required
- However, remember that Optical Colonoscopy is the gold standard investigation.

# Extra-colonic Findings





# Changes to Our Technique

- Scanning patients in alternative positions
- By completing  IV Contrast scan first you can also visualise the urinary system on the second scan range
- Introduction of Gastrografin only prep (London Prep); especially for frail, elderly patients and those with a low GFR
- Keeping record of prep being collected
- Same day service for failed Optical Colonoscopy
- Radiographer Led Service from Vetting to Scan!

# Thank You

- Thank you for listening
- Allison Lecky
- A huge thank you to the CT Team in the Ulster Hospital
  - Especially my glamorous models – Amy, Kevin & Michelle
  - Dr Wray
  - Jayne Hutchinson.