

Surgery
Colo-Rectal Cancer

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Today we will be talking about Colorectal Cancer

- Review of Anatomy
- Colo-rectal cancer genetics
- How colo-rectal cancer spreads
- Staging Dukes and TNM
- History, Examination and Investigations
- Neo-adjuvant and Adjuvant therapy
- Operations for colon and rectal cancer
- Followup CEA, scope, liver

Epidemiology

- 2nd commonest cancer in the Western World
- 10% of all Irish Cancers
- 1800 new cases in Ireland per year
- Surgery offers potential for cure in 50 %
- Burkitt's observation on fibre
- Role of consumption of broccoli
- Hereditary cancers and the adenoma-carcinoma sequence

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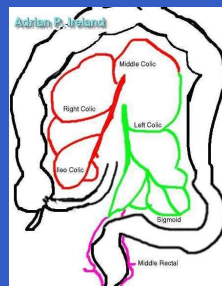
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Anatomy

- The most important anatomy is the blood supply. Because the lymphatics follow the vessels.
- Surgical definition of the rectum
- Surgical definition of the anal canal

Arterial supply of the colon



- Superior mesenteric artery (Red)
- Inferior mesenteric artery (Green)
- Middle rectal arteries (Pink)

Anatomy of the rectum

- Starts; where the taenia coli fuse to form the a fully circumferential longitudinal muscle
- Parts; Upper, Middle and Lower $\frac{1}{3}$
- Outside the rectum posteriorly is the mesorectum where most of the rectal lymphatics drain
- Valves of Houston; Two on one side and one on the other
- Ends at the anal canal

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Anatomy of the anal canal

- Starts; at the end of the rectum
- Haemorrhoidal Cushions; Terminal branches of the rectal arteries
- Sphincters; Two internal (circular smooth muscle, involuntary), external (skeletal muscle, three parts, voluntary)
- Dentate line; where the columnar lining changes to squamous, the squamous lining is very, very sensitive (don't inject haemorrhoids here)

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Polyps

Mass of tissue protruding into the bowel lumen. If it has a stalk it is pedunculated otherwise it is sessile.

- Adenomatous (Villous, Tubular, Tubulo-Villous)
- Hyperplastic
- Hamartomatous
- Pseudopolyps (false polyps)
- Others, Juvenile polyp, Serrated Adenoma

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Polyps - Facts

- Controversy about adenoma carcinoma sequence (Vogelgram)
- Less than 1% of polyps smaller than 1.2 cm are malignant
- You have to remove about 36 adenomatous polyps to prevent one cancer

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Colorectal cancer - Predispositions

- Hereditary cancer syndromes
- Polyps (Adenomatous)
- Chronic inflammation, in particular chronic ulcerative colitis (more than 10 years of pan-colitis)
- Previous uretero-sigmoidostomy
- Previous gastrectomy, vagotomy (about 2 fold increase)
- Previous cholecystectomy, controversial (probably not)

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Genetics of colo-rectal cancer

- Hereditary non polyposis colorectal cancer (HNPCC)
- Familial adenomatous polyposis coli (FAP)
- Juvenile Polyposis
- Peutz-Jegher's
- Cowden
- Mixed Polyposis Syndromes
- Hyperplastic Polyposis

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HNPCC

- Lynch syndrome I and II
- Mutator Phenotype, mismatch repair genes
- 6 different genes hMLH1, hMSH(2,3,6), hPMS(1,2)
- Mucinous, right, metachronous, synchronous
- Endometrial, ureteric, renal pelvis, small bowel
- Amsterdam I (1990) and II (1999) criteria

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HNPCC - Amsterdam II

- At least 3 relatives with an HNPCC associated cancer (colorectal, endometrial, small bowel, ureter, renal pelvis), one of these should be a first degree relative of the other two
- At least two successive generations should be affected
- At least one should be diagnosed before the age of 50
- FAP excluded in the colo-rectal cancer cases
- The tumors should be verified pathologically

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FAP

- APC gene, on 5q ? cell adhesion
- Dense and Attenuated varieties, depending on APC mutation
- Hundreds of polyps in the colon by age 20-30
- 100% will develop colon cancer if they survive

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FAP - Surgical options for the colon

- Total abdominal colectomy with ileo-rectal anastomosis
- Pan proctocolectomy with end ileostomy
- Restorative proctocolectomy with ileal pouch-anal anastomosis

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FAP - Extra colonic manifestations

- Adenomas
 - Gastric (10%), lower but not absent malignant potential
 - Duodenal (100%, severe in 10%), around the ampulla, ? need for pancreatico-duodenectomy ?
 - Hepatobiliary system, Small bowel, Pancreas, Adrenal cortex and Thyroid
- Epidermoid cysts, Pilomatrixoma, Osteoma, Exostosis, Desmoid tumors

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FAP - NSAID

- Sulindac shown to reduce rectal and pouch polyps
- Celecoxib reduces large bowel polyps

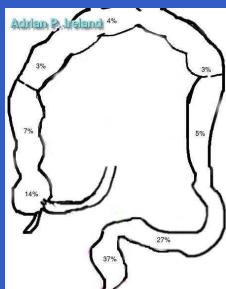
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FAP - Desmoids

- Troublesome in about 10% of patients with FAP
- 10% mortality in those affected
- Associated with specific APC mutations
- Associated with two hits (ie both alleles)
- Aggravated by trauma and oestrogen
- May be in the abdominal wall or intra-abdominal
- NSAID and anti-oestrogens

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Distribution of Colo-Rectal tumors



- 33% may be palpable
- 70% within reach of the 60 cm flexible scope
- Flexures are favoured sites

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Presentation of Colon cancer

- Left sided tumours present with altered bowel habit, a mass and rectal bleeding
- Right sided tumours present later
 - Liquid stool
 - Greater diameter
- Right sided tumours present with anaemia

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How colo-rectal cancer spreads

- Direct invasion
- Haematogenous
- Lymphatic
- Trans coelomic
- Trans luminal

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Staging - Dukes

- Dukes depended on pathology rather than what the surgeon saw
- Initially for rectal, he did not describe Duke's D

Stage	Description	5 year survival
A	Not breaching muscularis propria	80-85%
B	Through the muscularis propria	60-67%
C	Involving the lymph nodes	30-37%

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Staging - T (tumour) N (nodes) M (metastases)

T 1	Involves the submucosa
T 2	Involves muscularis propria
T 3	Into subserosa or non peritonealised peri-colic or peri rectal tissues
T 4	Through the visceral peritoneum or invading adjacent organs

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History - Presenting Complaint

- Change in bowel habit
- Rectal bleeding - don't ascribe to haemorrhoids
- Loss in appetite
- Weight loss - ? metastatic with cachexia
- Abdominal pain - ? locally advanced
- Symptoms of obstruction
- Tenesmus

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History

- Had this before?
- Previous surgery
- Other illness (drugs)/ Co-morbidities
- Familial cancer ?

Important other points in History

- Problems with anaesthetics
- Family history of problems with surgery
- Drug allergies (document; when, what happened)

Examination

- Anaemia, Jaundice, Stigmata weight loss
- Pleural effusions, Hepatomegaly
- Mass on abdominal examination
- Mass on rectal examination (differentiate prostate, cervix etc)
- FOB test positive

Investigation

- FOB test
- Blood; U & E, FBC, Liver, CEA
- Endoscopy; Proctoscopy, Rigid Sigmoid, Flex sigmoid, Colonoscopy
- Radiological; PFA, Erect CXR, CT scan, MRI, PET, Enemas

Investigations; Faecal Occult Blood (FOB)



FOB test

- Blotting paper impregnated with GUAIC
- Rub a small amount of stool on the paper
- Drop a few drops of dilute H_2O_2
- Blood in stool will act a peroxidase and catalyse the breakdown of the H_2O_2
- The released substance will cause a change in colour of the GUAIC to blue

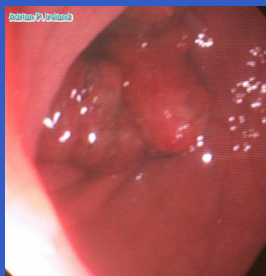
Colonoscopy; Polyps



- Two polyps in the sigmoid
- Bx
- Snare excision

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Colonoscopy; Local recurrence



- Tumour at site of colo-rectal anastomosis
- ? implantation
- ? hematogenous and healing milieu
- ? ingrowth

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Work up

- Clinical indication
- Examination
- Scope and biopsy
- ? Need for contrast study (? Virtual colonoscopy)
- ? Proceed if biopsy negative
- If rectal local staging ? neoadjuvant therapy
- Liver work up
- Baseline CEA

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Neo adjuvant and adjuvant therapy

Neo-adjuvant

- For T3 rectal cancer
- Before surgery
- Chemotherapy
- Radiotherapy
- Followed by surgery
- Followed by further treatment

Adjuvant

- Colon and Rectal Ca
- Dukes C
- Post operative
- 5-FU based

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Adjuvant 5FU and Levamisole

- Intergroup study 1987
- 40% of patients could not complete course
- This study initially showed a benefit in Dukes B(2) but this has not been substantiated by other trials.

Stage	Without Adjuvant	With Adjuvant
C	55%	71%

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Adjuvant 5FU and Folinic Acid

- Intergroup study 1993
- Addition of Folinic Acid doubled response to 5FU
- This study initially showed a benefit in Dukes B(2) but this has not been substantiated by other trials.

Stage	Without Adjuvant	With Adjuvant
B2 and C	71%	77%

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QUASAR: QUick And Simple And Reliable Study

- UK study
- Four regimens compared, Levamisole contributes little

Stage	Regimen
B2 and C	5FU + High dose Folinic Acid + Levamisole
	5FU + High dose Folinic Acid + Placebo
	5FU + Low dose Folinic Acid + Levamisole
	5FU + Low dose Folinic Acid + Placebo

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Other

- Folinic Acid + Bolus + Infusion of 5FU, + Oxaliplatin (FOLFOX), adds 5%
- Loco-regional chemotherapy,
 - AXIS trial
 - Portal Vein Infusion for 1 week post op
 - Survival benefit of 5%
- Anti growth factor, anti EGFR, (Cetuximab)
- Anti angiogenesis, anti VEGF, (Bevacizumab)

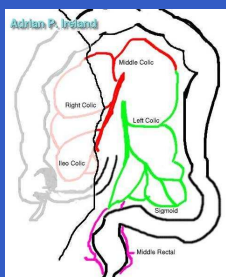
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Preparation for surgery

- Informed consent, risks, benefits and alternatives
- Major co-morbidities ?
- Group and Cross Match, ECG, CXR, U&E, FBC, ? COAG
- Thrombo-embolism prophylaxis, sc heparin, TEDS
- Mechanical Bowel Preparation
- Antibiotic prophylaxis; Single dose, Metronidazole, Cefuroxime

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Right Hemicolectomy



- Nodes follow arteries
- Ureter
- Gonadal Vessels
- Duodenum

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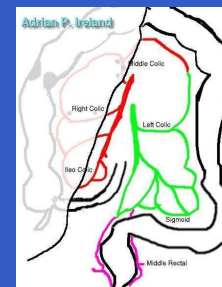
Caecal tumor



- Encroachment on ileum
- Adjacent polyp
- Characteristic rolled everted edge

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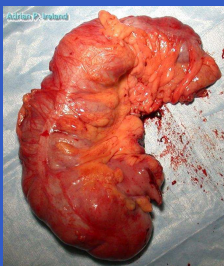
Hepatic Flexure tumour - Extent of Resection



- Need to take Middle Colic
- Preserve more ileum

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Hepatic Flexure tumour - Operative Specimen



- Hugely dilated ascending colon
- Huge caecum
- Little ileum resected

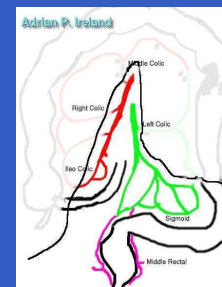
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Splenic flexure tumors

- Somewhat poorer prognosis
- ? related to difficulty in surgery
- ? related to inadequate surgery
- May invade, stomach, pancreas, Gerota's fascia
- Most prefer the extended right hemicolectomy

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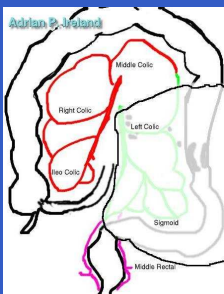
Extended Right Hemicolectomy



- Nodes follow arteries
- Ureter (Both)
- Gonadal Vessels (Both)
- Duodenum
- Spleen

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Left Hemicolectomy



- Nodes follow arteries
- Ureter
- Gonadal Vessels
- Spleen

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Inferior Mesenteric Artery - High or Low ligation

The inferior mesenteric artery may be divided flush with the aorta or below the origin of the left colic artery. This seems to make no difference to outcome in patients with rectal cancer, exact role in sigmoid cancer is not totally definite but probably makes no difference.

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Laparoscopic Assisted?

It appears that the greater the surgical insult the worse the oncological outcome from the patient.

- Initial scepticism regarding oncological principle
- Initial scepticism regarding port site mets
- Barcelona Spain
- Lancet
- Improved outcome in Dukes C compared to open surgery

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Emergency Surgery

- 16-20% of presentations
- Mortality much higher than in elective
- Higher rate of advanced disease
- Outcome stage for stage with elective cases worse

Perforated caecum due to obstruction in recto-sigmoid

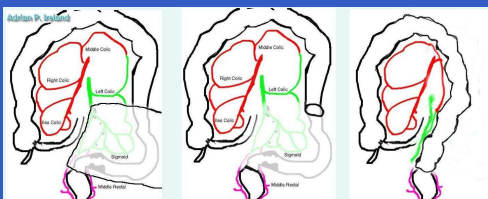


- Total abdominal colectomy with end ileostomy
- Total abdominal colectomy with ileo-rectal anastomosis

Large bowel obstruction - tumor in recto-sigmoid

- One, two and three stage operations
- Three stage; stoma, then resect and join, then close stoma
- Two stage (Hartman's); resect and stoma, then restore continuity
- One stage; On table lavage and then resect and anastomose

Emergency Surgery; Hartmann's



Rectal cancer

- Local staging important in tumors in the middle and lower third
 - EUA
 - Stage liver
 - MRI
 - Endoluminal Ultrasound
- ? need Neo-adjuvant therapy T3

Rectal cancer - Upper

- Some treat as recto-sigmoid tumor
- Left hemicolectomy extended to include upper half of the rectum
- Role of TME unproven
- Clear mesorectum to 5 cm below tumour
- Better function with preservation of distal rectal pouch
- Hand sewn or stapled anastomosis

Rectal cancer - Middle

- Local staging +/- Neoadjuvant therapy
- Anterior Resection (Left hemicolectomy extended to include upper 2/3 of the rectum)
- Total mesorectal incision important
- Most prefer stapled anastomosis

Rectal cancer - Lower

- Local staging +/- Neoadjuvant therapy
- Local trans anal surgery in selected cases (early tumors)
- Abdomino-Perineal Resection of the rectum and anal canal
- Total mesorectal incision important
- End colostomy

Radiology; What is this?



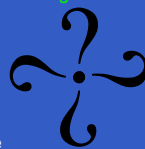
Colorectal cancer - By the Numbers

- 5% mortality for elective 20% for emergency surgery
- 10% wound infection rate
- 20% present with disseminated disease
- 30% palpable on rectal exam
- 30% 5 year survival following hepatic resection of metastases
- 70% within reach of the flexible sigmoidoscope
- 80% survival for Dukes A

Thanks

Look for the pdf download (1275 K, 1.24 M) at

<http://elise.farnelnuis.org>



Questions please