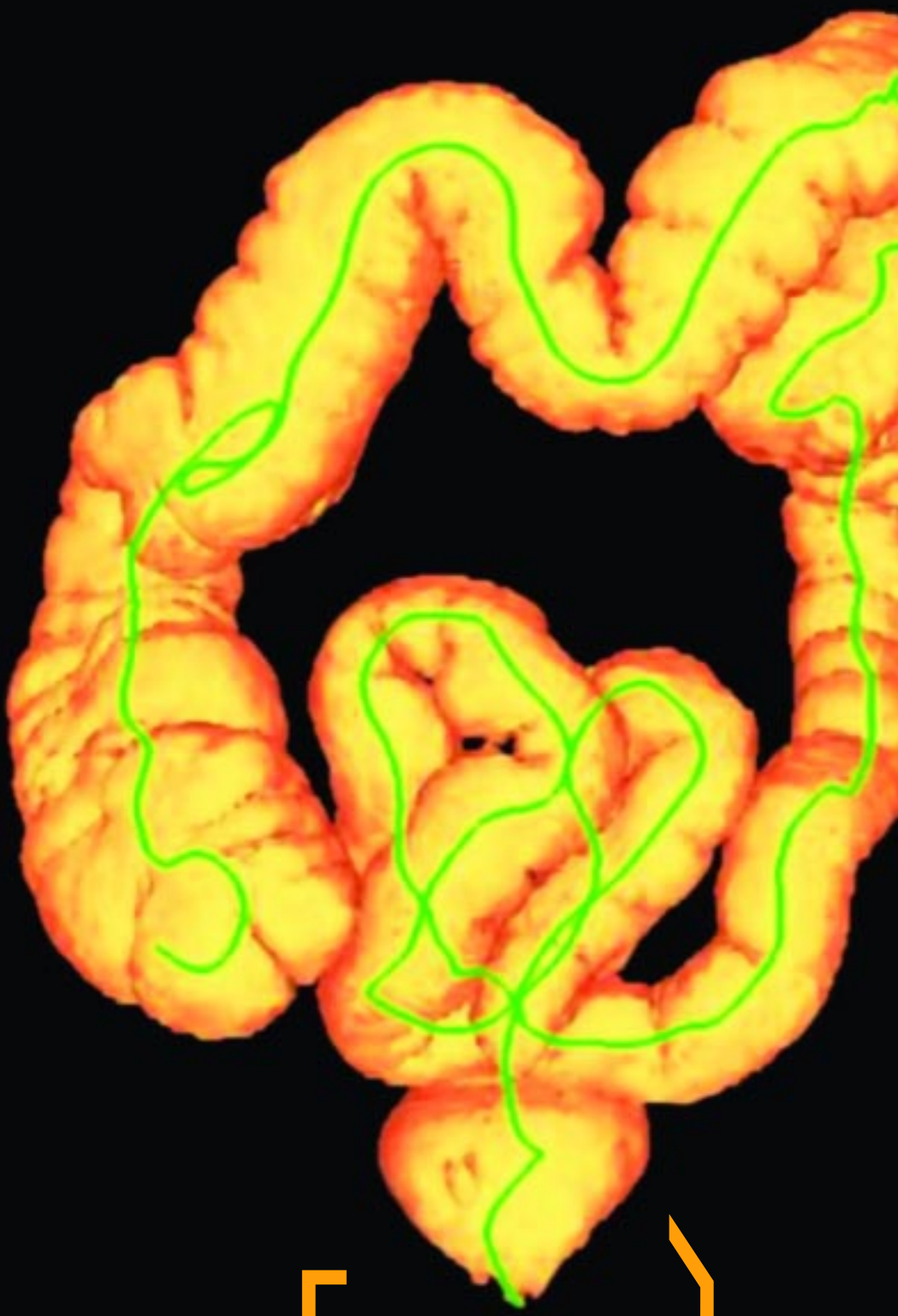
John&Lizzie's

The Hospital of
St John & St Elizabeth

150 years of compassion and excellence



A Journal from the Hospital of St John & St Elizabeth

Colorectal Services

Contents

Introduction

This is the first of the new style 'Journal' from the Hospital of St John & St Elizabeth. The publication has a number of purposes, firstly it addresses the Hospital's desire to demonstrate that our specialists operate to the highest standard, carrying out their practice under strict governance procedures, audited and monitored by their peers; secondly we hope this journal will increase your knowledge of the activities at John & Lizzies; and finally we hope that the format is educational and informative.

We are proud to announce that the Hospital received recognition of its colorectal cancer services in the Spring of 2006, and as a result has created a comprehensive clinical governance group of clinicians who are accredited within colorectal services. This includes a team of gastroenterologists, colorectal surgeons and histopathologists, working alongside our clinical governance co-ordinator, Matron and Intensive Care Sister, to further develop services for the Hospital.

We can now offer patients the option of access to one of the specialists on a daily basis and our team also participates in our 24 hour emergency referral service for inpatient admission.

I hope you will enjoy this journal, if you have any ideas for future topics or would like to give your feedback on the publication I would be delighted to hear your views. If you wish you can email on info@hje.org.uk or call me on 020 7806 4089.

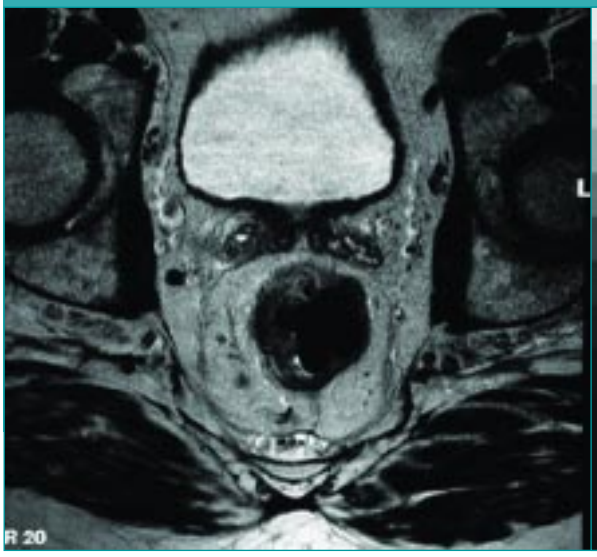
For all other information, please contact Claire Hornick on bleep 11.

Christopher Board
Chief Executive

Advances in the management of rectal cancer

Colorectal Cancer is one of the most common cancers in the Western World, with 30,000 new cases being diagnosed in the UK per annum. A large proportion, nearly 70%, are present in the recto sigmoid region and left colon. Despite the recent advances made, the mortality sadly remains static. The government has gone some way towards addressing this issue, by the implementation of a national screening programme, targeting asymptomatic patients, in an attempt to identify high risk patients and recognise early cancers (Dukes stage A or stage T1 lesions) with a view towards improving long term prognosis. The screening methods utilised include the use of faecal occult bloods, flexible sigmoidoscopy or colonoscopy (in high risk patients). Screening has a proven track record in the USA and more recently other parts of Europe, where the incidence of colorectal cancer is falling.

Mr Romi Navaratnam – MSc, MS, FRCS (Lon), FRCS (Gen)
Consultant Colorectal & Laparoscopic Surgeon/Hon. Senior Lecturer in Surgery



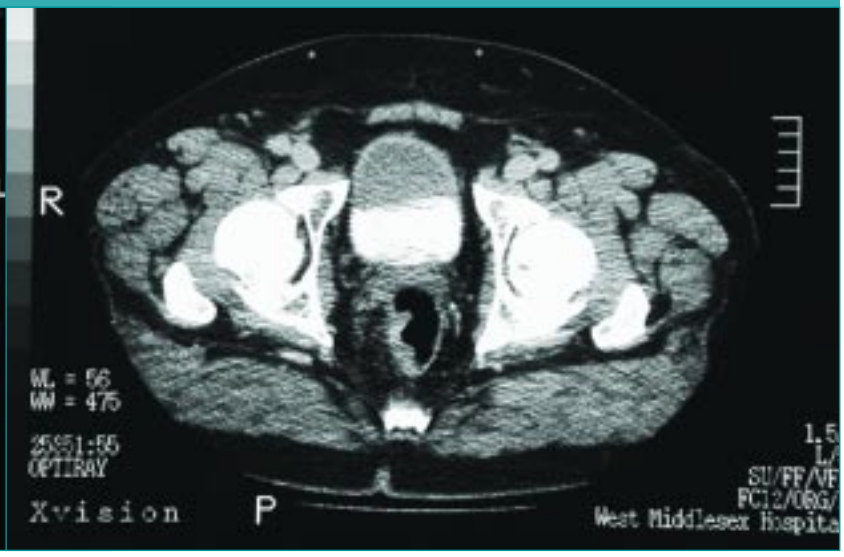


Figure 1: (left)
Staging MRI of Rectal Cancer.

Figure 2: (right)
Staging CT of Rectal Cancer.

What measures can be undertaken in the clinical setting?

New onset symptoms that are routinely encountered during a 2 week target consultation should be actively pursued during history taking, especially in patients over the age of 45. The maintenance of a high index of clinical suspicion is mandatory (see Table 1).

High risk symptoms

- Rectal bleeding with altered bowel habit (loose stools for more than 6 weeks) All ages
- Rectal bleeding in the absence of anal canal symptoms
- Increased frequency of defaecation of more than 6 weeks
- Palpable intra abdominal mass/rectal mass Iron deficiency anaemia (Men Hb less than 11, Females Hb less than 10).

Low risk symptoms

- Rectal bleeding in the presence of anal canal symptoms
- Transient change in bowel habit, less than 6 weeks (e.g constipation)
- Abdominal pain, with no associated risk factors (caveat age more than 50 yr (10% associated risk of intra abdominal malignancy)
- Impaired Glucose tolerance (NIDDM).

Family history

Inherited conditions such as FAP (Familial adenomatous polyposis coli), a mutation in the APC gene and HNPCC Hereditary non polyposis colon cancer (a defect in mismatch repair genes, resulting in microsatellite instability) account for only 5% of all colorectal cancers (CRC). First degree relatives of patients who have developed CRC under the age of 60 (in particular under the age of 45) or who alternatively have a family history of multiple cancers should be referred for early colonoscopy and genetic surveillance.

The patient pathway

On establishing the presence of a rectal tumour, it is important to obtain histological confirmation, which can either be done in the OPD setting, through rigid sigmoidoscopy and biopsy or alternatively by examination under anaesthesia (EUA), where the mobility and possible fixation of the tumour, to local structures, can also be assessed. Colonoscopy should also be performed, at an early stage, to exclude the presence of a synchronous lesion, present in approximately 3% of lesions.

Imaging

Following EUA, on identification of a histologically confirmed rectal cancer, a staging CT of the abdomen, pelvis and chest is necessary to exclude distant metastatic spread (see fig 1). In addition, a staging MRI of the pelvis (or alternatively trans rectal ultrasound) is mandatory to assess local spread. MRI is preferable to accurately identify the T stage of the tumour and to exclude tumour encroachment into the meso rectal envelope, which surrounds the rectum (see fig 2).
The primary aim, of local staging through the use of MRI, is to assess the resectability of the tumour and to ensure the risk of local recurrence is minimised. In the absence of local spread, then a conventional anterior resection (incorporating total mesorectal excision) with a defunctioning loop ileostomy, may be undertaken. The recently published CRO 7 data now suggests that mid rectal cancers may benefit from a short course of pre operative radiotherapy, one week prior to surgery. In the presence of local invasion, into the meso rectal fascial envelope, then this subgroup of patients require long course (6 weeks) of neo adjuvant chemo radiotherapy, prior to surgery.

The primary aim, of local staging through the use of MRI, is to assess the resectability of the tumour, whilst attempting to ensure the risk of local recurrence is minimised.

It is well established that MRI can predict pre-operative prognostic factors such as extra mural spread, extra mural venous invasion and circumferential resection margin (CRM) involvement, which are independent markers of poor prognosis and represent important means of predicting patients at high risk of local recurrence. Involvement of the CRM in 36% of patients, has led to recurrence rates of 64%, whereas, in the subgroup with an uninvolved CRM, the local recurrence rate was 9%.

Advances in the management of rectal cancer continued...

Neo adjuvant radiotherapy

Neo adjuvant radiotherapy in combination with improved surgical techniques, namely total meso rectal excision (TME) has resulted in significantly reduced rates of local rectal cancer recurrence. The recently published CRO7 data has suggested that a short (5 day course) of radiotherapy followed by an Anterior resection a week later, for mid rectal cancers (i.e. between 5–10cm away from the anal verge) may result in a 5% local recurrence rate (irradiated rectal cancer) in comparison to 10–15% incidence of local recurrence (non irradiated rectal cancers). Previous supportive evidence arises from the Dutch study, which also suggests that short course radiotherapy offers a reduction in local recurrence from 13% to 5%, over a 5 year period.

Previous supportive evidence arises from the Dutch study, which also suggests that short course radiotherapy offers a reduction in local recurrence from 13% to 5%, over a 5 year period.

Neo adjuvant chemo radiotherapy

The role of long course (6 weeks) neo adjuvant chemo radiotherapy, is indicated primarily in ultra low rectal cancers i.e. 5.0cm from the anal verge, these tumours are characteristically difficult to stage on MRI, in advanced rectal tumours (T3–T4), where there is encroachment of the circumferential resection margin (as identified by MRI) and in anterior tumours in males (which are in close proximity to the prostate). The primary aim is once again to reduce the risk of local recurrence and to maximise the chance of performing sphincter preserving surgery through an ultra low anterior resection or alternatively where this is not possible through an Abdomino perineal resection (APE).

Principles of rectal cancer surgery

The main surgical advance in colorectal surgery has been in the refinement of rectal cancer surgery. The role of TME (total mesorectal excision), as popularised by Prof Bill Heald, involves the removal of the rectal cancer and the surrounding meso rectal envelope, which has coincided with the reduction in the local (rectal cancer) recurrence rates. His published data confirms local recurrence rates of 3% at 5 years and 4% at 10 years for curative cases.

Whilst embracing traditional oncological principles, there has been an increasing trend towards abandoning abdomino perineal resection and its association with a permanent left iliac fossa colostomy and a move towards sphincter preserving ultra low anterior resection (which may incorporate inter sphincteric dissection, where the internal sphincter is sacrificed, with preservation of the external sphincter) with a temporary loop ileostomy, which is routinely reversed after adjuvant chemotherapy. This has primarily arisen as distal resection margins have reduced from the mandatory 5.0cm to 1.0cm, without oncological compromise. The one drawback tends to be the increased rates of incontinence associated with ultra low anterior resection (AR). This may result in patients being on constipating agents for 12 months post operatively, following the reversal of their loop ileostomy.

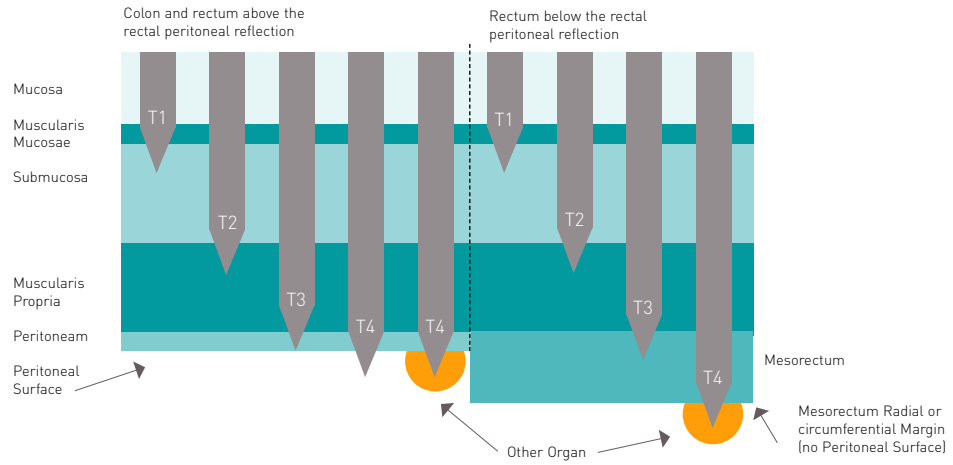
Ironically, on comparison of local recurrence rates between AR and abdomino perineal resection (APE), for similar tumours, the local recurrence rate was higher in the latter group, despite being a more radical procedure. Although controversial, it has been stated that an APE is a less oncologically acceptable procedure than AR, it may be due to the nature of the tumour i.e. APE are characteristically associated with lower tumours and thus a worse prognostic tumour, than the type of procedure involved. The Japanese support the role of aggressive Internal iliac lymph node dissection, as a further means of reducing local recurrence, however, this is not routinely practised in the UK and thus far, the differences in local recurrence rates are not significant.

The main disadvantages of rectal cancer surgery is the increased incidence of urinary and sexual dysfunction that is recognised post operatively. This is particularly problematic in the young patient. In addition, in the ultra low anterior resection, the residual rectal stump is rendered partly ischaemic, which almost mandates a temporary defunctioning loop ileostomy. The alternative to Anterior resection or APE is local excision, which can be undertaken through a trans anal approach, utilising a regional anaesthetic technique, which is eminently suitable for medically unfit patients, in early T1 tumours, which are less than 3.0cm in diameter. This enables potentially curative surgery (all be it with a moderate incidence of local recurrence) in medically unwell patients and avoids a permanent stoma.

Laparoscopic surgery

The role of laparoscopic surgery has been widely accepted in colonic cancer surgery, with significant advantages in terms of reduced postoperative discomfort, associated with cosmetically smaller scars, less analgesic requirements, reduced hospital stay and an earlier return to normal activity. However, thus far, laparoscopic surgery with specific regards to rectal cancer remains technically challenging in comparison to laparoscopic colonic cancer surgery.

Staging – TNM Staging of Colorectal Carcinoma



Dukes staging

A Tumour limited to the wall of the rectum
B Tumour extends through rectal wall into extra rectal tissues
C Lymph node involvement

Adjuvant chemotherapy

Adjuvant chemotherapy is indicated in Dukes C cancers, where there is loco regional lymph node involvement, or in patients with Dukes B tumours, with poor prognostic factors, such as extra mural involvement etc.

Hepatic metastases

It is now widely recognised that patients with documented hepatic metastases, if medically fit and in the absence of widespread metastatic disease elsewhere in the body, should be considered for surgery. Ideally 1.0cm clearance margins are required. Poor prognostic factors that affect survival include, synchronous presentation (with primary tumour), advanced stage of primary tumour, location of metastatic deposit (hilum difficult), multiple lesions (bilobar disease), lesion more than 5.0cm and a high CEA on presentation. 5 year survival rates are in the region of 20–40%. Improved results have been obtained with adjuvant chemotherapy (18 months). Radiofrequency ablation of individual metastatic lesions has also been used in patients unfit for surgery.

Palliation

In the presence of disseminated disease, palliation especially of recto sigmoid tumours, may be achieved through the use of a colonic stent, particularly in the presence of imminent obstruction, as this may avert the need for stoma and may allow definitive surgery with full bowel preparation as an elective procedure. A stent may be contraindicated in a low rectal cancer, as this may precipitate significant tenesmus.

Discussion

Rectal cancer surgery has been redefined through the role of pre-operative, staging MRI, which has identified those poor prognostic tumours that would benefit from neo adjuvant short course radiotherapy (5 days) followed by surgery a week later or alternatively advanced ultra low tumours which mandate long course (6 weeks) neo adjuvant chemo radiotherapy prior to surgery. The role of surgery alone in the absence of the therapeutic options discussed, is controversial. Although increased rates of urinary and sexual dysfunction and incontinence rates are associated with low rectal cancer surgery, the incidence tends to be much less in experienced centres.

The widespread acceptance of total mesorectal excison (TME) surgery and the neo adjuvant therapeutic options available, have led to increasing rates of sphincter preserving surgery, more recently through the laparoscopic approach, with reduced local recurrence rates and a reduction in permanent colostomy formation.

Colorectal cancer

The role of the histopathologist

Mention the word pathologist to a member of the general public and, depending upon their age/generation, they picture Quincy, Grayling Russell (Morse), McCallum or Sam Ryan (Silent Witness). The public and media's obsession with unnatural death does little to quash this misconception that all pathologists are forensic pathologists. In fact forensic pathologists only account for around 3% of histopathologists and 2% of pathologists as a whole. Many histopathologists (myself included) do perform the occasional non-forensic autopsy, but the average histopathologist spends most of his day examining pieces of tissue removed from the living. These tissue samples range from small biopsies and needle cores to whole organs.

Professor Marco Novelli – Professor of Gastrointestinal Pathology, UCL and Consultant Histopathologist, Independent Histopathology Services.

Why do we get sent these pieces of tissue?
As histopathologists our main clinical roles involve diagnosing disease, assessing disease activity, screening for early changes of cancer, assessing surgical resection specimens and accessing the effects of therapy.

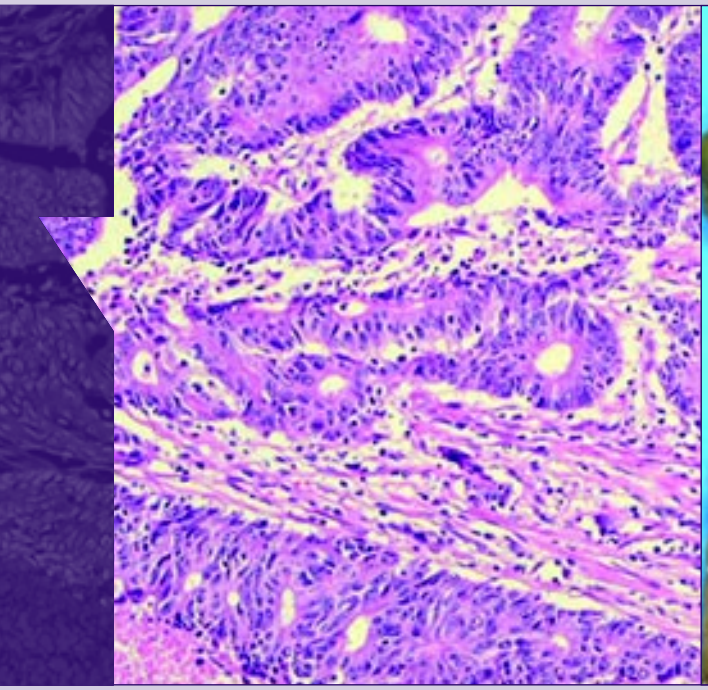
The clinical management of colorectal cancer has changed dramatically over the last 10 years. Patient survival has improved and, although surgery remains the primary treatment modality, there are now a variety of additional treatment options for patients with colorectal carcinoma (including chemotherapy, radiotherapy and radiofrequency ablation). These days patients are managed by a multidisciplinary team including surgeons, oncologists (clinical and medical), radiologists, pathologists, palliative care physicians, nurses and administrators each of whom have an important role in the patient care pathway.

The histopathologist's main roles in colorectal cancer management are in confirmation of the initial diagnosis of cancer and in the grading and staging of resected tumours. Patients clinically suspected of having a colorectal tumour are investigated typically with imaging and endoscopy. If a tumour is visualised at sigmoidoscopy/colonoscopy the endoscopist usually takes small biopsies from the tumour. These are put into specimen pots containing a formalin-based fixative and sent to the histopathology laboratory for processing, sectioning and staining. From receipt in the pathology laboratory it typically takes 18–24 hours to turn tissue biopsies into histological sections, although more rapid processing can sometimes be performed in urgent cases. The sections are then examined under a microscope by a histopathologist and a tissue diagnosis made.

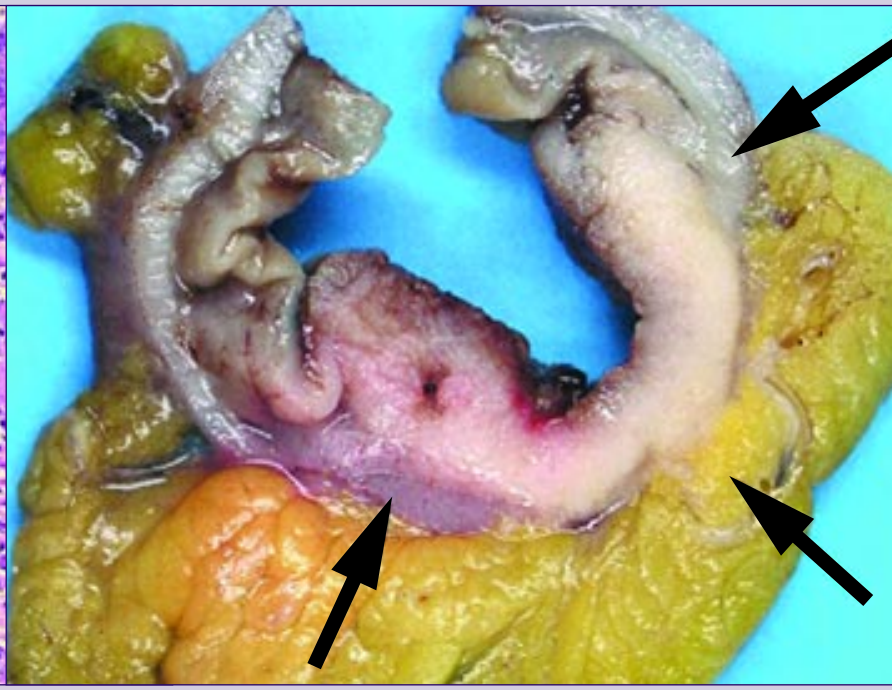
The vast majority of colorectal cancers are adenocarcinomas. These account for over 95% of colorectal malignancies, but there are a number of other types of malignant tumour that can occur in the large intestine including lymphomas, sarcomas and melanomas. Benign inflammatory diseases such as diverticulitis may also present as a 'tumour' mass. Clinically and radiologically many of these conditions can mimic adenocarcinomas. As their respective treatments differ markedly, surgeons usually require a tissue diagnosis before they will consider surgical intervention. In most circumstances oncologists also require a firm tissue diagnosis before they will consider neoadjuvent, curative or palliative therapies.

Once a firm diagnosis of colorectal cancer has been made the tumour is staged primarily using radiological techniques (typically one of, or a combination of, CT, MRI, PET and ultrasound scanning). This staging attempts to determine how large the primary tumour is, whether it has spread locally, surgical resectability, and whether there is any evidence of metastatic spread to the lymph nodes, liver or other parts of the body.

Colorectal cancer annotated



Coloscopy



If metastatic spread is suspected further biopsies of liver lesions, lymph nodes or other organs may be performed to confirm or refute the presence of metastases.

Surgical resection remains the treatment of choice for most patients who are medically fit and have a respectable tumour with no evidence of metastases. Surgery offers the best chance of a cure and can be augmented with postoperative chemotherapy and radiotherapy. The requirement for further therapies following surgical resection is dependent upon a number of factors, but foremost amongst these are whether the primary tumour has been completely removed and the stage of the tumour. It is at this point that the histopathologist becomes involved again. The assessment of surgically resected colorectal tumours is one of the most time consuming jobs of a gastrointestinal histopathologist. Upon receipt in the pathology laboratory the resected specimen is briefly inspected, incised to allow drainage of intestinal contents, and immersed in a large volume of a formalin-based fixative. The specimen is then allowed to fix for 48–72 hours. Upon complete fixation the specimen is re-examined by the pathologist, the gross appearances described and dimensions of the specimen recorded. The size and extent of the tumour is assessed and samples of the tumour, lymph nodes and background bowel taken for histology. This process typically takes 30 minutes to an hour for each specimen. It is crucial because the final staging of the tumour is based on samples removed from the main specimen at this stage. The tissue samples are then processed to make slides, which takes a further 24 hours. All in all, it takes a minimum of three, and more usually four, working days to turn a surgical bowel specimen into histological slides. Reporting the histology slides is relatively quick process in comparison to cutting up the specimen, typically taking 15 to 20 minutes. The histopathologists examines the tumour cells to see how aggressive they look (Tumour Grade) and to determine how far the tumour has spread – both direct local spread into surrounding tissues and metastatic spread into the lymph nodes (Tumour Stage). This information is all included in the final histopathology report, which is sent to members of the multidisciplinary team looking after the patient. Based on these findings the surgeons are able to tell if they have managed to completely remove the primary tumour and to access the quality of their surgery. The oncologist is able to provide the patient with a long-term prognosis and to discuss further treatment options (if any further treatment is required). The data also allows the radiologists to audit their reporting practice.

Histopathology is central to the clinical management of cancers. The histopathologist should no longer be considered a dark shady character who lives in the mortuary, but should be seen as an integral member of the multidisciplinary teams looking after cancer patients.

Surgical resection remains the treatment of choice for most patients who are medically fit and have a respectable tumour with no evidence of metastases.

Virtual Colonoscopy

Colorectal cancer is the second commonest cause of cancer-related death in the UK and the commonest cause of cancer-related death amongst non-smokers [1]. Most colorectal cancers evolve from small adenomas through a process known as the adenoma-carcinoma sequence [2]. This involves a series of genetic then molecular and finally morphological changes, which may take 10–15 years. Therefore, colorectal carcinoma is a preventable disease if polyps are detected and removed before they become malignant. The risk of developing an adenocarcinoma is directly related to polyp size [3] (figure 1).

Dr James Bell – FRCR, MRCP, BSc, MBBS, Consultant Radiologist

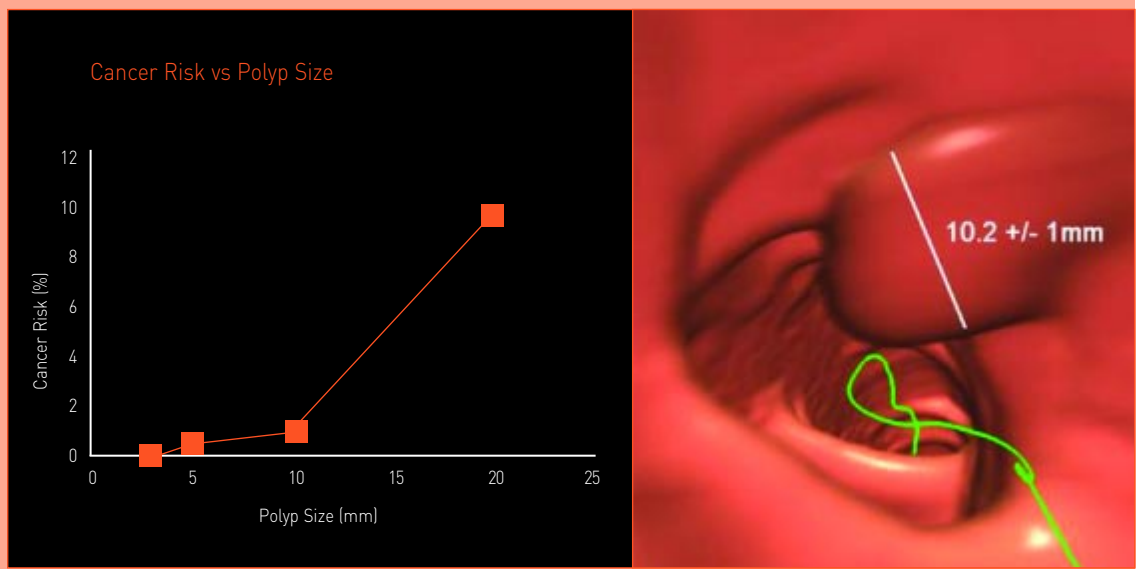


Figure 1: Relationship between polyp size and cancer risk.

Fibre-optic colonoscopy is considered the gold standard for colon evaluation [1]. However, it is not without limitations which include the need for sedation and its attendant risks such as aspiration, failure to complete the examination in up to 15% of cases, variable patient compliance, high cost and potential risk of perforation and bleeding [4]

Virtual Colonoscopy (also known as CT colonography and CT pneumocolon) is an evolving non-invasive technique for complete colorectal examination, which uses volumetric CT data combined with specialised imaging software. Since its advent, continual developments have allowed this technique to progress from a research tool to a viable option for colorectal polyp and cancer detection and possibly screening.

Its advantages over optical colonoscopy include no requirement for sedation, a lower morbidity and zero mortality rate, more complete colonic visualisation and a higher completion rate and the ability to identify pathology outside of the colon.

In order to facilitate polyp detection during Virtual Colonoscopy, it is important to differentiate between faecal material and polyps. In order to achieve this, patients must undergo bowel preparation similar to that used for optical colonoscopy. One refinement is that in addition to cathartic agents (e.g. Picolax) they also take a combination of Barium and Gastrografin in order to 'tag' any remaining faecal material. This 'tagging' allows the advanced Virtual Colonoscopy software to electronically cleanse the colon of any remaining faecal material by automatically removing from the images any colonic contents containing barium or gastrografin.

Immediately before acquiring the Virtual Colonoscopy images, room air or carbon dioxide are insufflated into the colon via a small rectal catheter and then images are acquired with the patient in supine and prone positions using a multi-slice CT. Images are obtained in the supine and prone positions to allow optimal bowel distension, the redistribution of residual fluid and the differentiation of residual faeces from polyps due to their gravity-dependent mobility.

Having obtained these thin-section CT images the Virtual Colonoscopy software creates a 3-D fully-interactive model of the distended colon (figure 2) through which one can 'fly' using an endoluminal view which simulates the view seen by the endoscopist during conventional optical colonoscopy (figure 3).

Its advantages over optical colonoscopy include no requirement for sedation, a lower morbidity and zero mortality rate, more complete colonic visualisation and a higher completion rate and the ability to identify pathology outside of the colon.

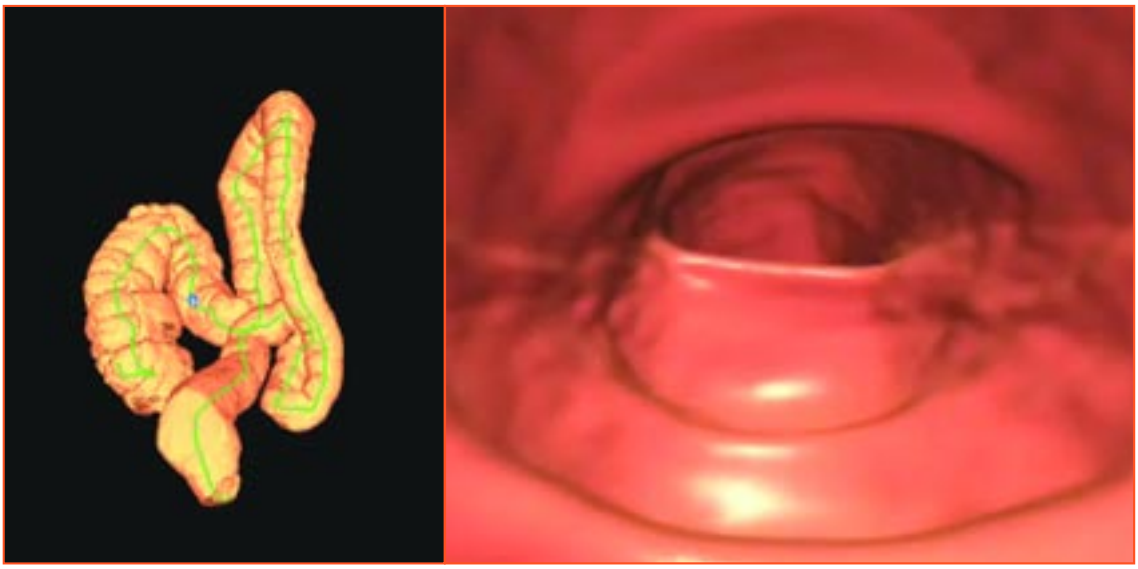


Figure 2: 3-D Model of Colon.

Figure 3: Endoluminal View of Colon shows normal colonic mucosa.

Virtual Colonoscopy continued...

Multi-detector CT scanners have revolutionised the acquisition of Virtual Colonoscopy data, with their faster acquisition times almost eliminating motion artefacts from respiration and peristalsis. Their improved spatial resolution also allows the acquisition of data, which can be viewed, with no loss of resolution, coronally, sagittally and endoluminally in addition to conventional axial images, thus improving differentiation between polyps, folds and faecal residue.

It is worth briefly commenting on the techniques of image review. Studies comparing optical colonoscopy with Virtual Colonoscopy roughly fall into two camps. Those using conventional review of the 2-D CT images, be they axial, sagittal or coronal and those in which the colon has been assessed using an endoluminal view similar to optical colonoscopy. It is only with the latter technique that Virtual Colonoscopy has performed as well at polyp detection as optical colonoscopy. This form of image review requires state-of the art 3-D software, such as that provided by the Viatronix V3D system, and results in a computer-generated centreline path allowing endoluminal navigation through the colon, with the radiologist able to stop at any point and look sideways or backwards, which is essential when looking for small polyps hiding behind haustral folds. The software also calculates the amount of colonic mucosa visualised during the endoluminal fly-through. Interestingly, a single passage through the colon from rectum to caecum results in visualisation of approximately only 80% of the colonic mucosa (in other words a fifth of the mucosa is not seen) but the addition of the return journey from caecum to rectum increases this figure to 95%. The software also collates all the non-visualised areas, which can at the end of the examination be individually assessed, meaning that routinely it is possible to visualise well over 99% of the colonic mucosa during Virtual Colonoscopy. This is one possible reason why the technique performs so well in polyp and carcinoma detection (figures 4 & 5) with 94% detection rates for polyps over 8mm and 100% detection rates for colorectal cancer [5].

It is worth noting that although patients may present with what are felt to be symptoms referrable to the colon, often the true cause of the patient's presentation lies outside the colon; clinically significant extra-colonic pathology (figures 5 & 6) has been seen in up to 25% of cases in some series but averaged 14% in one meta-analysis [6].

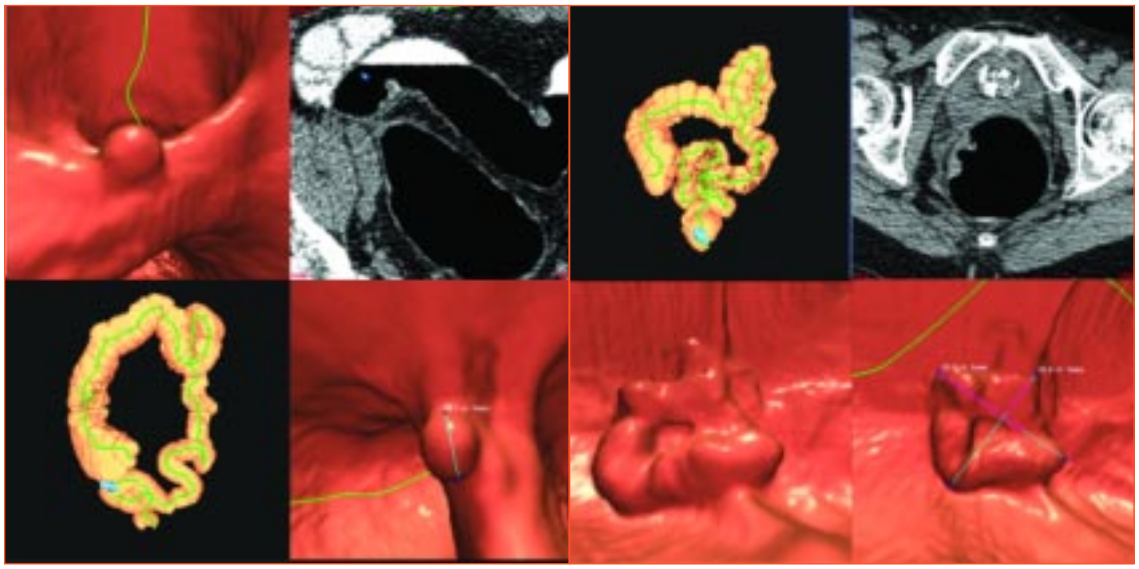


Figure 4: Endoluminal image, axial image and shaded surface display in a 64 year old male. A 9 x 7.5 mm polyp was demonstrated in the sigmoid. Histologic evaluation showed a low grade dysplastic tubulovillous adenoma.

Figure 5: Shaded surface display, axial image and endoluminal views in a 66 year old female showing a lateral rectal wall lesion which was a moderately differentiated adenocarcinoma on histologic evaluation.

One of the early criticisms of Virtual Colonoscopy was that it involved irradiating the patient. As the test has evolved the radiology community has started to appreciate that thanks to the inherently high contrast between polyps and the adjacent intraluminal air, it is possible to use much lower doses than would be required for a conventional CT or barium enema. Most Virtual Colonoscopy protocols now result in a dose to the patient of no more than 5mSv, which is equivalent to 2 years of natural background radiation. Using established radiation formula (IRCP60) the calculated risk of developing a cancer as a direct result of this examination is approximately 1 in 5,500. This additional risk must be seen in context, everyone in the UK has a 1 in 3 lifetime risk of developing cancer whilst the risk of a serious complication from optical colonoscopy can be as high as 1 in 750 & risk of death as high as 1 in 1500.

In conclusion, Virtual Colonoscopy is a powerful diagnostic technique for the detection of colorectal polyps and carcinoma. It is safe, well tolerated and when 3-D image review is utilised it has equalled and even outperformed Optical Colonoscopy in detection of polyps over 6mm. Whilst optical colonoscopy is still considered the gold-standard in polyp detection and characterisation because of its ability to perform biopsy, Virtual Colonoscopy definitely has an enlarging role in this area. Perhaps it should be the first-line test in certain situations such as anticipated difficulty at optical colonoscopy e.g. previously failed optical colonoscopy, hysterectomy, known diverticular, immobility, cardiorespiratory contraindications, anticoagulation, patients unkeen on optical colonoscopy, known stenosing carcinoma through which scope won't pass (completion colonoscopy) or where there is doubt about whether the symptoms are genuinely from the colon.

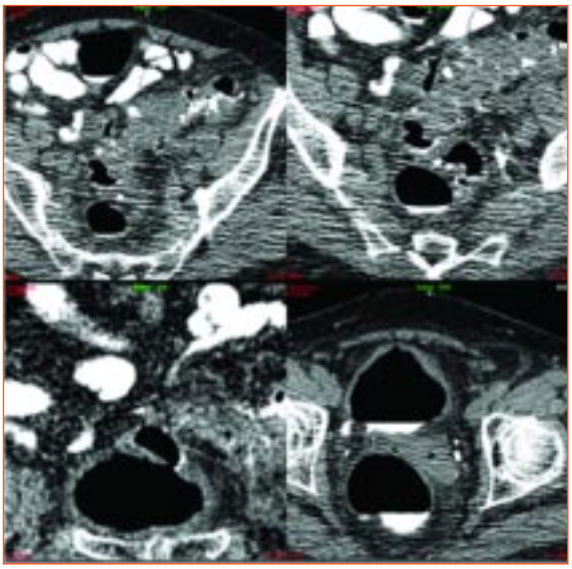


Figure 6: Axial CT images in an 84-year old lady who underwent virtual colonoscopy showing a colovesical fistula secondary to extensive sigmoid diverticular disease.

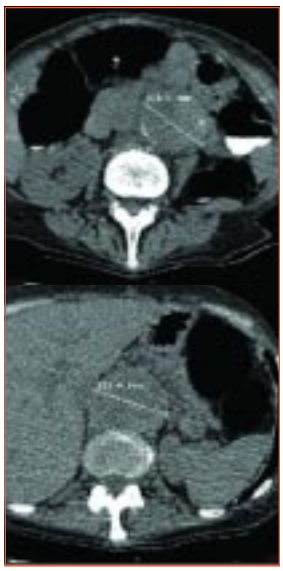


Figure 7: Axial CT images in a 66-year old lady who underwent virtual colonoscopy showing an aortic aneurysm.

The Hospital of St John and St Elizabeth now offer a Virtual Colonoscopy service using the same Viatronix software that generated the images above.

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Colorectal cancer [screening]

Colorectal cancer is the second commonest cause of cancer deaths in the United Kingdom with 34,000 new cases and nearly 20,000 deaths per annum. The overall survival from this disease in the UK is about 44% and compares less favourably to 50% and 60% in France and Germany respectively. Some of the reasons for this disparity in survival are debatable and include previous poor funding from health officials, aggressive tumour biology, late presentation of patients and the absence of a National colorectal cancer screening programme.

Mr Austin Obichere – MBBS, MD, FRCS, FRCS (Gen) Consultant Colorectal Surgeon and Honorary Senior Lecturer at University College London Hospital. He has a sub-specialty interest in colorectal cancer treatment & screening, laparoscopic colorectal surgery and benign diseases and disorders of the anus, rectum and pelvic floor.

People aged 60–69 years who test positive for PFOBT will be invited to undergo a colonoscopy at one of several national screening centers.

What is the genetic basis of colorectal cancer?

It is now widely accepted that most bowel cancers arise from benign polyps, adenomas, that have undergone various genetic mutations possibly triggered by some as yet undetermined environmental factor. The adenoma-carcinoma sequence (figure 1) is a model of colorectal carcinogenesis that was first described by Bert Volgelstein comprising a series of mutations, deletions and suppression of cancer genes at the molecular level.

Why should we screen for colorectal cancer?

The rationale for screening in colorectal cancer is that most cancers arise from benign adenomas (figure 2a) which can be easily removed or destroyed endoscopically before they become cancerous (figure 2b). Screening therefore provides a unique opportunity to prevent cancer developing and to improve prognosis by treating the pre-malignant or early stage of the disease.

What is the evidence?

There is good Level I evidence from randomised clinical trials (Nottingham & Denmark) that screening for colorectal cancer using faecal occult blood testing saves lives, amounting to a 15–18% reduction in cumulative mortality in the screened population. Furthermore, preliminary data from the United Kingdom Flexible Sigmoidoscopy Screening Trial (UK FSST) has been proven to be an equally effective screening tool. In this study nearly 5000 (12%) adenomas and 131 (0.3%) cancers were diagnosed in 40,000 people between 55 and 64 years of age who were screened with the flexible sigmoidoscope. Over 60% of these distal cancers were early disease (Duke's A) and potentially curable by surgery alone. Following 2131 colonoscopies in those found to have a distal adenoma or cancer, 386 (19%) adenomas and 9 (0.4%) cancers were found proximally (beyond the reach of the flexible sigmoidoscope).

Although survival data from UK FSST is still awaited, the recent success of the English Colorectal Cancer Screening Pilot with Postal Faecal Occult Blood Testing (PFOBT) has led the Department of Health to formulate plans for a National screening programme in the summer of 2006. People aged 60–69 years who test positive for PFOBT will be invited to undergo a colonoscopy at one of several national screening centers.

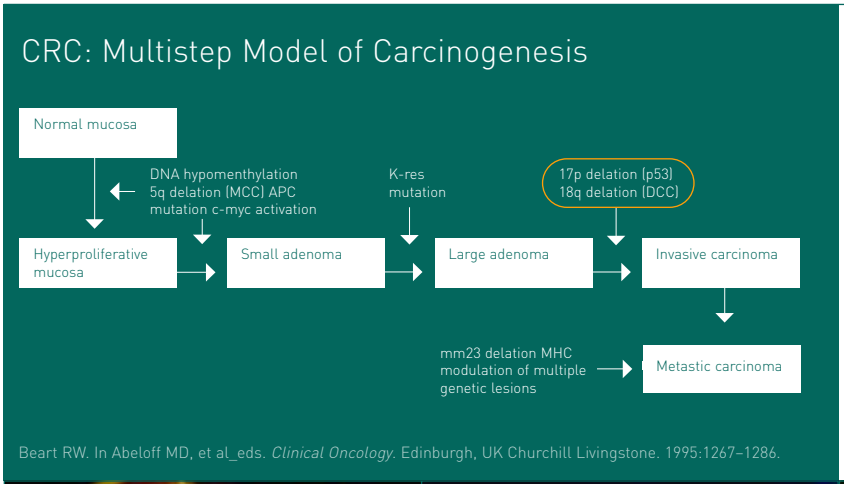
What are the arguments against the benefits of screening?

The biases inherent in the screening process are:

Selection bias – generally, more health conscious persons will tend to take up screening and therefore do not accurately represent the population as a whole.

Lead-time bias – screening appears to lengthen survival time (time from diagnosis of disease to dying) as it brings the date of diagnosis forward without altering the date of death when compared with the non-screened population.

Figure 1: Adenoma-carcinoma sequence

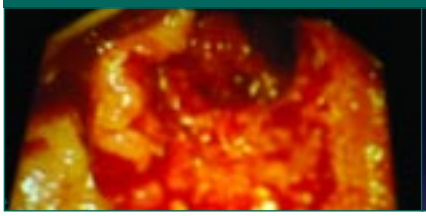


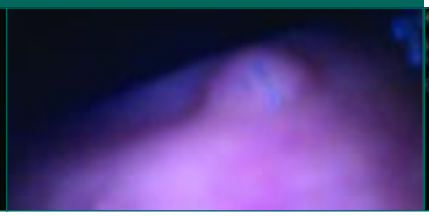
Beart RW. In Abeloff MD, et al_eds. *Clinical Oncology*. Edinburgh, UK Churchill Livingstone. 1995:1267–1286.

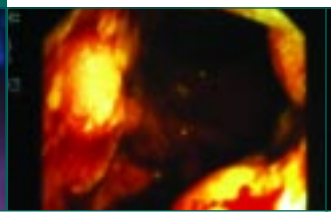
Table 1

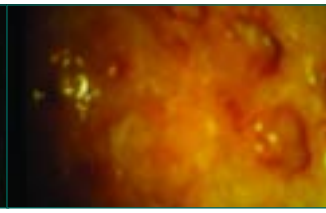
Family History	Lifetime risk colorectal cancer
Average risk patient	1 : 50
1 x 1st degree relative more than 50 yrs	1 : 17
1 x 1st and 1 x 2nd degree relative	1 : 12
1 x 1st degree relative less than 50 yrs	1 : 6
Polyposis (dominant) gene	1 : 2

Generally if risk is more than 1:12, screen every 5 years.









(Left to right): Figures 2a, 2b, 3a, 3b.

Length bias – screening detects more early or slow growing cancers which have relatively good prognosis.

Who should be screened?

Symptomatic patients:

Bowel symptoms for more than 6 weeks in accordance with the Department of Health guidelines for suspected colorectal cancer in primary care (Two Week Target Rule) should be referred.

Hereditary cancer:

A family history or expression of FAP gene mutation (Familial Adenomatous Polyposis Coli), and mis-match repair genes causing microsatellite instability (Hereditary Non-Polyposis Colorectal Cancer) confer a 100 percent risk of developing bowel cancer. These people should be referred to a specialist for screening.

Inflammatory bowel disease:

Patients with ulcerative colitis or Crohns disease for more than 10 years are at an increased risk of developing malignancy. This can occur in disease limited to the left colon, but is more common where disease extends proximal to the splenic flexure.

Family history:

It is often difficult dealing with the asymptomatic, anxious and usually young patient with a family history of bowel cancer. Generally those people with a risk equal to or greater than 1:12 should be referred for screening as outlined in Table 1.

Previous history of bowel cancer:

Patients who have been treated for colorectal cancer require intensive follow-up with regular screening colonoscopies every three years or sooner should they develop new symptoms. Screening colonoscopy is discontinued in the elderly or those with severe co-morbid conditions where the risks of colonoscopy outweigh the potential benefits of screening.

Ureterosigmoidostomy:

Long term (more than 10 years) urinary diversion in the form of ureterosigmoidoscopy is associated with dysplastic changes and development of invasive cancer where urine makes contact with the bowel. Cancer arising in the colon proximal to the site of diversion is rare so that screening with a flexible sigmoidoscopy is adequate in the absence of worrying bowel symptoms.

Conclusion

Colorectal cancer is a major cause of cancer deaths in the UK and improved surgical outcome or cure is dependent upon diagnosis and treatment of early stage disease.

Figure 2a: Benign adenoma.

Figure 2b: Rectal cancer.

Figure 3a: Severe ulcerative colitis with pseudopolyp formation.

Figure 3b: Typical apthous ulceration of the colon in Crohn's disease.

Service profile [Critical care]

John and Lizzie's deputy theatre manager Erin Foss explains the day-to-day function of the hospital's high dependency and intensive care unit.

Why does John and Lizzie's need intensive care and high dependency beds?

The Hospital's medical and surgical services have developed rapidly over recent years. For example, patients with existing medical conditions are now undergoing surgery which previously would have put them in a group where the risk of complications post-operatively would have been seen as too high a risk.

We have developed a safe, efficient and comprehensive critical care service to support these developments.

Around 60% of the unit's admissions in 2006 were emergencies from the operating theatre, the nursing floor or the outpatients department. The remaining 40% were booked by consultants to deliver post-operative care for their patients.

Where is the HDU/ITU service?

The critical care unit is on the first floor, adjacent to St Elizabeth's acute surgical orthopaedic ward. It is within easy reach of the operating theatre suite via an allocated lift.

What facilities does the unit offer?

The unit has three Level 2 intensive care beds for the care and observation of patients with a single failing organ, those requiring postoperative care or being transferred from a Level 3 intensive care bed.

Our excellent team are complimented by the best possible facilities and support services. These include:

- An isolation room for patients under the care of our infection control teams
- Datex Ohmeda monitors at each bed enabling invasive and non-invasive monitoring of the patient
- Puritan-Bennett ventilators and a Marquet Servoi Ventilator for invasive and non-invasive ventilation as appropriate
- A GEM Premier 3000 blood gas analyser for unit based pathology, with analysis and servicing available from the on-site pathology team
- 24-hour on-call access to physiotherapy, pharmacy, radiology and pathology services
- Cardiology and renal services.

In the rare instance that patients require transfer to a Level 3 intensive care unit arrangements are in place to transfer them to an appropriate unit.

Who are the unit's key members of staff?
The unit is staffed by qualified and experienced ITU and HDU nurses, who also work in the post-operative recovery area. They are supported by a pool of experienced nurses from other departments, who regularly update their skills and knowledge and can be called on in the case of emergency.

The on-call theatre team provides 24-hour cover. They include:
- An on-site resident medical officer and anaesthetist
- Two consultants in intensive care and anaesthesia on a weekly rotational basis.

Our intensivists (Dr Adrian Steele, intensive care consultant at Hammersmith Hospitals NHS Trust and Dr Simon Ashworth, intensive care consultant at St Mary's Hospital), are available for advice at all times and take an active role in patient management on the request of the referring Consultant Surgeon and Anaesthetist.

What is your role?
I joined the Hospital of St John & St Elizabeth in November 2005, having worked in the private sector for several years in the areas of post-operative and critical care. My role within the hospital encompasses both of these areas, co-ordinating the management of staff and patients within these areas.

How are patients admitted to the unit?
In an ideal world, admissions to the unit are planned. They are booked through the admissions office by the individual consultants for either ITU or HDU following elective surgery. Information regarding treatment, investigations required, the date and time of surgery and formal confirmation requesting unit facilities are all documented on the individual patient booking form.

The reality is that the majority of the admissions are unplanned admissions coming from the operating theatres and the nursing floors at any time of the day or night. They are accommodated as quickly as possible on a case-by-case basis.

What is the secret of a successful intensive care unit?
First and foremost, you absolutely must have the best people. Our staff are exceptionally well-trained, but their unique asset is a commitment to caring that goes beyond patients' physical comfort, to their psychological and spiritual wellbeing.

Stress and anxiety is often unavoidable for patients and families who come into contact with us, and also for the doctors who entrust us with their care. We recognise this, and do everything we can to alleviate concerns and maintain the peaceful and caring environment that is conducive to a speedy recovery.

How do you maintain staff knowledge in an area of medicine where things change so rapidly?
All of our nursing staff under-go continuous professional development to maintain and develop their knowledge and skills, including:
- Regular training in-house in paediatric and adult advanced life support
- The Resuscitation Council's approved three-day course, Advanced Life Support, run by St Mary's Hospital, Paddington.

The quality of John & Lizzie's internal training programmes was recognised in our latest Healthcare Commission inspection report.

The quality of John & Lizzie's internal training programmes was recognised in our latest Healthcare Commission inspection report.

Does the unit carry the seal of approval from an external regulator?
Yes, the unit has been approved by the Healthcare Commission for Level 2 care.

Does the unit provide a service for patients from the Birth Unit?
Yes. There are patients admitted to Hospital for care. Should any patient from the birth unit require closer monitoring during the ante or post natal stage of their pregnancy, their care would be managed in conjunction with the birth unit team, the consultant and the intensive care/high dependency team, as appropriate.

Irritable bowel syndrome

How to diagnose and manage it

Irritable bowel syndrome (IBS) is a common chronic condition that is seen in up to 15% of the population in Britain. It typically affects young women. It is characterised by abdominal pain, bloating and altered bowel function. There is no single cause for IBS but the symptoms can be divided into central and end organ components which has been called the brain-gut axis. Central processing (patient perception), genetics, neurotransmitters, psychological factors (stress, affective disorder) and dysfunction of the gut (disorders of motility, visceral hypersensitivity, dietary factors) can be responsible for the symptoms.

Dr Deepak Suri – BSc, MD, MRCP, Consultant Gastroenterologist

How do I diagnose IBS?

A detailed history is the key. These are the clinical features of IBS.

- Abdominal pain or discomfort for at least 12 weeks out of the previous 12 months. These 12 weeks do not have to be consecutive. The abdominal pain or discomfort has two of the following three features:
  - It is relieved by opening bowels
  - At onset of pain there is a change in
    - frequency of bowel movements
    - form or appearance of the stool
- Unpredictable bowel habit – diarrhoea, constipation, or alternation between the two.
- Feelings of urgency
- Difficulty or inability to pass stool
- Mucus in the stool
- Abdominal bloating
- Flatus – this may be exacerbated by the high fibre diets patients have been recommended
- Previous history of enteric infection (post-infective IBS)
- Non GI symptoms include urinary disorders, gynae symptoms, lethargy, sexual dysfunction, poor quality of life. In women IBS symptoms are often worse during a period.

Examination may reveal some mild abdominal tenderness.

What tests are needed?

There is no single test that confirms or refutes IBS. Investigations are aimed at excluding organic disease. However, not all patients need or should have exhaustive investigations. The following are usually considered to be sufficient in most patients

- Full blood count and ESR – if abnormal suggests IBD
- Tissue transgluatimase to exclude celiac disease
- Colonic imaging – especially if new on set of symptoms or older. In younger patients a flexible sigmoidoscopy may be adequate but in those over 45 consider colonoscopy to image the entire colon. Biopsies are needed to exclude microscopic colitis.

There is no single test that confirms or refutes IBS. Investigations are aimed at excluding organic disease.

Exclusion of organic disease is needed in those who present with new bowel symptoms. In particular 'red flag' symptoms (rectal bleeding, anaemia, weight loss, more than aged over 45, family history of bowel cancer or inflammatory bowel disease) warrant investigation.

What treatments are there?

Non-pharmacological

Both pharmacological and non-pharmacological treatments can be helpful. Once the diagnosis has been made reassurance, lifestyle advice, and dietary manipulations can be very useful for many patients. Others respond to drug treatment and some require psychological support.

Irritable bowel syndrome – How to diagnose and manage it continued...

Wheat, dairy (not yoghurt), caffeine, chocolate, alcohol, carbonated drinks, and fatty foods can all exacerbate symptoms. It is worth excluding these for a short period to see if symptoms improve.

Dietary:

Careful eating can reduce IBS symptoms. In some cases, simply eating a large meal will trigger symptoms and patients should try eating several small meals rather than 2–3 large ones. Wheat, dairy (not yoghurt), caffeine, chocolate, alcohol, carbonated drinks, and fatty foods can all exacerbate symptoms. It is worth excluding these for a short period to see if symptoms improve. In some cases it is worth asking patients to keep a diary noting the foods that cause distress and consider a dietitian referral for advice on an exclusion diet.

Fibre:

Care is needed in the use of fibre in IBS. In constipation-predominant IBS then fibre (especially soluble fibre found in fruits) can be helpful. In many patients however consuming large quantities of insoluble dietary fibre (bran, roughage) can make matters worse by exacerbating pain or bloating.

Is stress the cause of IBS?

40–60% of patients with IBS who seek medical advice have psychological symptoms of depression or anxiety, or both. The colon is partly controlled by the autonomic nervous system, which responds to stress. Stress will not cause a person to develop IBS but can exacerbate symptoms. Therefore stress management can play an important role in treating IBS. Options include:

- Stress reduction (relaxation) training and relaxation therapies such as meditation
- Counselling and support
- Regular exercise such as walking or yoga
- Changes to the stressful situations in the patient's life
- Adequate sleep.

Pharmacological treatments

No single drug uniformly works in everyone with IBS. Treatment aims to alleviate symptoms with drugs acting on pain, constipation, and diarrhoea. 'Central' treatment (anti depressants, hypnotherapy, psychotherapy) should be considered in patients with associated affective disorders

Antispasmodics:

These can be particularly useful if abdominal pain is the predominant symptom. There are two main groups:

- Anticholinergics – hyoscine and dicyclomine
- Smooth muscle relaxants – alverine, mebeverine, peppermint oil capsules.

Patients respond to different drugs and sometimes combining anti-cholingerics with anti-spasmodics can be helpful. Patients should take them as required or for short periods to reduce tachyphylaxis.

Anti-diarrhoeals:

- Loperamide
- Codeine phosphate.

Loperamide increases the tone of the anal sphincter and therefore is useful in patients with incontinence/urgency as well as diarrhoea. Caution is required with codeine as it can be addictive. Once again these drugs should be used as required.

Laxatives:
If dietary fibre supplementation is not indicated or unsuccessful then senna, bisacodyl, polyethylene glycol or sodium picophosphate can be considered. These drugs should be used carefully to help with bowel emptying rather than aiming for a complete clearout. Patients can be reassured that there is no likelihood of bowel damage as a result of laxative use.

Antidepressants:
Low dose tricyclic antidepressants can be very effective especially in diarrhoea predominant IBS. In placebo controlled trials the number needed to treat is only 3–4. These are started at much lower doses than is used in depression (amitryptiline 10–25mg/od) and increased over several weeks.

For constipation predominant IBS selective serotonin reuptake inhibitors can be useful as one of their side effects is diarrhoea.

New treatments:
- Pro-biotics – lactobacilli and bifidobacteria have shown some benefit and are often favoured by patients as they are natural treatments
- Type 4 Serotonin receptor agonists
- Serotonin is important in the normal functioning of the gut and drugs aimed at the 5HT3 (Alosentron and Cilansetron) have been developed for diarrhoea predominant IBS. They are available in the USA but their therapeutic gain is relatively small and their use has been complicated by the development of ischaemic colitis.

Tegaserod has been developed for constipation predominant IBS. It is licensed in the USA but not available in Britain.

Conclusion
- IBS is common
- The history is key to making the diagnosis but judicious use of investigations should be considered to exclude organic disease
- Treatment should be holistic and individualised comprising of changes in patients' lifestyle, dietary manipulations and pharmacological therapies.

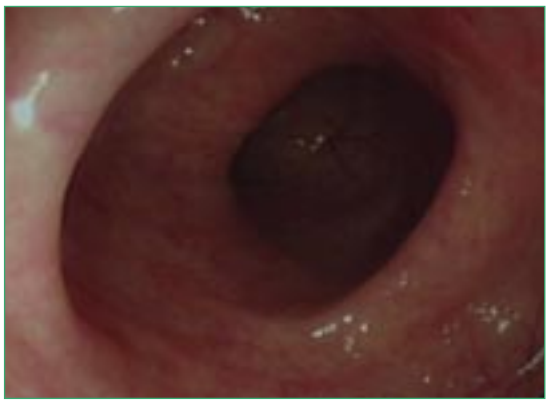
A management guide to

Inflammatory bowel disease (IBD)

Inflammatory Bowel Disease (IBD) is a chronic relapsing and remitting non-infectious inflammatory condition affecting either part or the whole of the gastrointestinal tract. It affects about 1 person in every 400 in the UK. It affects mainly young adults between 20 and 40 but 15% of people at the time of diagnosis is above 60.

Dr Voi Shim, Wong – Bsc, MB, CH, MD, FRCP, Consultant Physician and Gastroenterologist

There are two main types of IBD: Ulcerative Colitis (UC) and Crohn's Disease (CD). The exact aetiology is unknown but there probably is an interaction between some genetic susceptibility coupled with some environmental triggers. Men and women suffer equally. In 10–15% of cases, UC and CD may be difficult to distinguish. The severity of the symptoms fluctuates unpredictably over time. Patients are likely to experience flare-ups in between intervals of remission or reduced symptoms.



Normal colon.

Diagnosis

Patients with suspected IBD need careful clinical evaluation. The precise diagnosis is a combination of clinical evaluation, endoscopic, histological and radiological investigations.

Differential diagnosis should include:

- Infectious colitis
- Pseudomembranous colitis
- Ischaemic colitis
- Diverticulitis
- Colonic tumours.

It is important to exclude infection by sending stool samples for microscopy and culture including clostridium difficile toxin at first presentation or subsequent relapses. Laboratory investigations should include full blood count (FBC), C-reactive proteins (CRP) erythrocyte sedimentation rate (ESR) and biochemistry profiles. Plain abdominal X-ray is essential in the initial assessment of suspected severe IBD as it can exclude colonic dilatation or assess disease extent or proximal constipation. The gold standard for establishing the nature and extent of inflammation is by flexible sigmoidoscopy and biopsy and/or total colonoscopy. Small bowel radiology may be necessary in suspected CD. Sometimes, it is difficult to establish whether the diagnosis is UC or CD. It may be several years after presentation that the clinical evolution allows a firm decision to be made. Fortunately, unless surgery is contemplated the management of colonic CD is broadly similar to that of UC.

Pathology

The macroscopic and microscopic features can be used to define the type of IBD and to exclude other co-existent diseases. The distinguishing features are listed in Table 1.

Ulcerative Colitis (UC)

UC is characterised by diffuse mucosal inflammation involving only the colon (see figure 1). In UK, the annual incidence is around 10–20 cases per 100 000 population. The rectal mucosa is invariably affected. Confluent inflammation and shallow ulceration extend proximally from the anal margin. In adults at presentation,

- 55% have proctitis
- 30% left sided colitis (the proximal limit being below the splenic flexure)
- 15% pan colitis (involving the whole colon).

At any point in time, 50% of patients are asymptomatic, 30% have mild symptoms, and 20% have moderate to severe symptoms. Many patients have long periods of complete remission, but 50% have a relapse in any one year. Later relapses generally affect the same region of the colon as previous episodes.

Clinical features of UC

The majority of patients present with typical symptoms as shown in Table 2. There are usually few physical signs to find on examination besides those listed below. However there are extra-intestinal manifestations which may include peripheral arthritis, erythema nodosum, iritis, uveitis, sclerosing cholangitis, ankylosing spondylitis, sacroileitis and pyoderma gangrenosum.

Laboratory investigations should include full blood count (FBC), C-reactive proteins (CRP) and erythrocyte sedimentation rate (ESR).

	CD	UC
Extent	Affects any part of the gut	Affects only the colon Extends proximally from rectum
Endoscopic pattern	Discontinuous deep ulcers 'cobblestone appearance'	Continuous Red mucosa which bleeds easily
Histology	Transmural inflammation Presence of granulomata	Mucosal inflammation No granulomata but goblet cell depletion & crypt cell abscesses

Table 1: Comparison of UC and CD.

General	Bowel symptoms
Tiredness, weight loss	Diarrhoea with blood and mucus
Malaise, low grade fever	Urgency of defaecation, tenesmus
	Lower abdominal cramps and pain with defaecation

Table 2: Summary of the common clinical presentations of UC.

A management guide to inflamatory bowel disease (IBD) continued...

Management

An appropriate management plan involving the clinicians (general practitioners and consultants) and patients should be agreed from the outset to improve compliance. This must be tailored to the patient's current anatomical, functional, and symptomatic disease activity status as well as social-psychological profiles. Nutrition, and coexistent diseases should be considered. Educational and dietary information should be offered to patients and are readily available on various websites (www.nacc.org.uk and www.digestivedisorders.org.uk). In a hospital setting, a multidisciplinary team approach involving medical and surgical gastroenterologists, dieticians, and nurse practitioners is essential for the best outcome. Symptoms are the best guide towards disease activity and their relief is the main treatment aim.

Surgery offers excellent results of, effectively curative, surgical treatment and should always be taken into account when deciding whether to prolong medical treatment.

Medical treatment

In clinical practice, newly diagnosed cases or relapses, rectal and systemic derivatives of 5-aminosalicylic acid (5-ASAs) and corticosteroids form the basis of medical treatment.

Topical steroids or 5-ASAs (either in suppository or enema preparations) is usually both effective in relieving symptoms and inducing remission in proctitis although the latter has been shown to be more effective. Patients may need to be taught how to use formulations given through the rectum.

Mild to moderate UC should respond to the newer oral 5-ASA therapies (eg: mesalazine) which are better tolerated than sulphasalazine. There are various 5-ASAs available but there is little to choose between the various 5-ASA preparations available (Asacol, Pentasa, Salofalk). However, even mesalazine may cause minor side effects such as rash, headache, nausea, diarrhoea, as well as pancreatitis, blood dyscrasias and interstitial nephritis. So patients would need to be warned of these potential side effects and monitor appropriately. Sometimes, a short course of oral steroids is necessary to achieve clinical and endoscopic remission.

For severe colitis high dose oral steroid (40 mg prednisolone) or IV preparations form the mainstay of treatment and is very effective in inducing remission. Azathioprine (though less effective than in CD) may be used as a steroid sparing agent. Surgery offers excellent results of, effectively curative, surgical treatment and should always be taken into account when deciding whether to prolong medical treatment (see figure 2).

Surgery

About 20–30% of patients with pancolitis come to colectomy.

Surveillance

The risk factors for patients with UC developing colorectal cancer are longstanding disease of more than 8 years, pan-colitis, sclerosing cholangitis and family history of colon cancer. Currently, screening for

Extent / severity	Drugs used
Proctitis	Topical 5-ASA or steroids
Mild-moderate	5-ASAs +/- oral steroid
Severe	Oral steroid +/- azathioprine +/- surgery (stoma or ileo-anal pouch)
Failed medical treatment	Surgery (stoma or ileo-anal pouch)

Table 3: Summary of Treatment for UC.

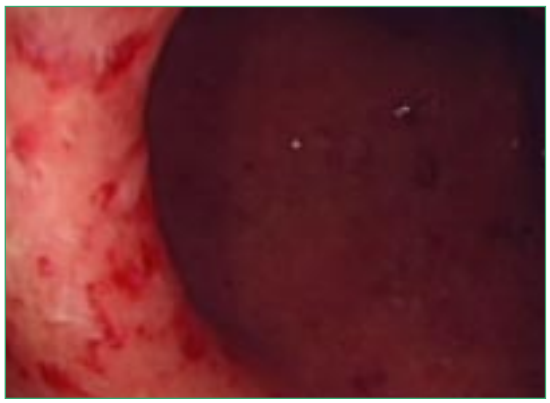


Figure 1: Colonoscopic picture of the rectum showing proctitis with mucosal bleeding, and inflammation and mild ulceration.

dysplasia by colonoscopy at regular intervals (every 1–2 years) in at risk patients remains the only feasible method for surveillance.

Crohn's disease (see fig 3)

In UK, the annual incidence is around 5–10 cases per 100 000 population with around 2,650 new cases diagnosed each year. Patients with CD suffer recurrent attacks with acute flares of the disease interspersed with periods of spontaneous remission. The disease can be complicated by the development of obstructions, fistulae and perianal disease. Fistulae are seen to develop in about 1/3 of patients.

Clinically, it is useful to define the clinical entity by:

- Location as terminal ileal, colonic, ileo-colonic, upper GI tract
- Or by pattern of disease (inflammatory, structuring or fistulating). CD tends to cause greater disability than UC with only about 75% of patients capable to work full time one year after the diagnosis is made and 15% of patients unable to work 5–10 years after diagnosis.

Clinical features

The symptoms of CD are more heterogeneous. However, abdominal pain, diarrhoea and weight loss are common presenting symptoms. There are usually few physical signs besides general ill-health, apthous mouth ulcers and occasional right iliac fossa tenderness. Per rectum examination may reveal anal tags, fissures or perianal abscesses. There may be other extra-intestinal features as in UC.

Management

As in UC, a comprehensive management strategy should be individualised and preferably through a multidisciplinary approach depending on the extent, severity and location of the active disease. The summary below is for patients with typical active ileo-caecal disease.

CD is currently neither medically or surgically curable. Overall treatment aims are to reduce symptoms and maintaining or improving quality of life whilst minimising toxicity over the short or long term complications.

The major principles of treatment are listed below:

- General
  - Multidisciplinary care with educational and nutritional support
  - Support given to stop smoking as it has an adverse effect on CD
  - Replacement of any vitamin deficiencies
  - Avoid non-steroidal anti-inflammatory drugs.
- Drugs
  - Symptomatic: Cautious use of antidiarrhoeal agents (e.g Codeine phosphate and loperamide) and cholestyramine (by binding bile salts)
  - Specific pharmacological options
  - mesalazine
  - Oral prednisolone (40mg daily with tapering regime) or budesonide
    - Metronidazole alone or with ciprofloxacin
    - Azathioprine or 6-mercaptopurine (steroid non-responders)

CD tends to cause greater disability than UC with only about 75% of patients capable to work full time one year after the diagnosis is made and 15% of patients unable to work 5–10 years after diagnosis.

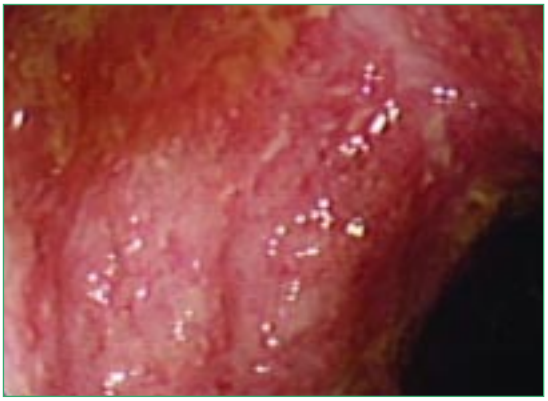


Figure 2: Colonoscopic picture showing severe colitis.

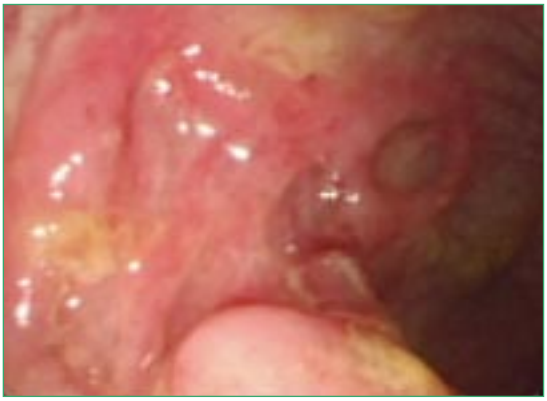


Figure 3: Colonoscopic picture showing deep punch-out ulceration.

A management guide to inflamatory bowel disease (IBD) continued...

  - Methotrexate (thiopurine and steroid non-responders)
  - Antitumour necrosis factor antibody such as Infliximab
- Nutritional therapy: Liquid formula diet
- Endoscopic treatment: Balloon dilatation of strictures
- Surgery: Resection or stricturoplasty.

5-ASA

The pH dependent delayed release (Asacol, Salofalk) and, particularly, slow release (Pentasa) mesalazine preparations release 5-ASA more proximally in the gut than sulphasalazine making them useful in small bowel disease as well as colitis. High dose oral mesalazine (Pentasa 2 g twice daily, Asacol 1.2 g three times daily) given for up to 4 months induces remission in about 40% of patients with moderately active ileocaecal Crohn's disease.

Steroids

In active CD, oral steroids provide the quickest and most reliable response in about 70% of patients improve within 4 weeks. The major side effects of steroid are:

1. Short term use: Acne, moon face, sleep or mood disturbance, dyspepsia, glucose intolerance
2. Prolonged use (12 weeks): Cataract, osteoporosis, susceptibility to infections, myopathy.

Budesonide, (Entocort or Budenofalk), 9 mg/day, with its pH sensitive coating, poor absorption and rapid first pass metabolism a new steroid with high topical potency causes less adrenocortical suppression than prednisolone, is equivalent in efficacy to oral prednisolone (40 mg/day) although comparatively expensive. It is a useful option for patients in whom minimisation of steroid induced side effects is particularly important.

Antibiotics

Metronidazole alone or with ciprofloxacin is moderately effective in active CD. Treatment is given for up to 3 months but may be complicated by nausea, an unpleasant taste, alcohol intolerance, and a peripheral neuropathy, which can be irreversible.

Immunosuppressive drugs

There are a number of options available. Azathioprine (2-2.5 mg/kg/day) or 6-mercaptopurine (1-1.5 mg/kg/day) remain invaluable as steroid-sparing drug. The speed of onset may take several weeks and response up to 4 months. These potent drugs should be used by gastroenterologists after careful explanation has been given to patients of their potential side effects (bone marrow depression, acute pancreatitis, chronic hepatitis). Measurement of the levels of thiopurine methyltransferase (TPMT), the enzyme responsible for the safe metabolic disposal of purine analogue's is important prior to starting therapy as homozygous deficiency of this enzyme occurs in about 0.2% of people and may predispose to azathioprine's occasionally serious side effects. In addition, FBC and LFTs are advisable before initiating therapy and 4 weeks afterwards. Thereafter, monthly FBC is essential for monitoring of the development of neutropenia. Long term data on the safety of thiopurines is reassuring and they can be used up to 3–4 years. Other drugs including methotrexate and cyclosporine have also been used in CD with variable success.

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Anti-tumour necrosis factor (anti-TNF) antibody

Infliximab, an anti-TNF antibody represents a major therapeutic breakthrough in IBD. It is a mouse-human chimeric antibody (cA2) to tumour necrosis factor and is the first specific cytokine related therapy used in the treatment of moderate-severe active CD. The National Institute of Clinical Excellence (NICE) has approved its use in April 2002 in severe CD, those refractory to standard immunosuppressive therapies and those unsuitable for surgery.

In patients with CD refractory to steroids or conventional immunosuppressive drugs a single IV infusion of infliximab given in hospital setting at 4 weeks produced improvement in 64% of patients and remission in 33% (cf 17% and 4% respectively after placebo). Relapse tended to occur in the ensuing months: repeated infusions at 4–8 weeks may produce more lasting remissions.

It can be give as a regular interval infusion to achieve and maintain remission.

Infusion reactions occur in up to 20% of patients. Common minor side effects include headache, nausea, and upper respiratory tract infections. Serious, although not opportunistic, infections including salmonella enterocolitis, pneumonia, and cellulitis have been reported. The production of human antichimeric antibodies may cause delayed hypersensitivity reactions (arthralgia, fever, rash) in patients given a repeat infusion after an interval of 2 or more years; anti-double stranded DNA and cardiolipin antibodies may cause a lupus syndrome. Rapid healing and fibrosis of intestinal strictures may precipitate obstruction. Lastly, there are reports of lymphoma in patients given infliximab for CD and rheumatoid arthritis, although it is not yet clear if these are a complication of the disease or due to the drug.

Surgery

Overall surgery will be required by 50–80% of patients with CD at some stage. Main indications are strictures causing obstructive symptoms, failure to respond to medical therapy and complications such as fistulae

Overall surgery will be required by 50–80% of patients with CD at some stage.

Maintenance of remission in CD

- Remission achieved medically
  - Stop smoking
  - Azathioprine or 6-mercaptopurine (patients dependent on steroids)
- Remission achieved surgically
  - Stop smoking
  - Mesalazine
  - Metronidazole (3 months only).

Conclusion

The management of IBD patients involving a multi-disciplinary approach with modern drug therapy and surgical advances have improved greatly the mortality and morbidity of IBD. It remains for us to work closely with our GP colleagues and patients to make early diagnosis and design individualised comprehensive management strategies to reduce symptoms, improving their quality of life and preventing future complications.

A common problem in general practice

Rectal bleeding

Rectal bleeding is a common clinical problem. It refers to passage of bright red blood from the anus.

It is therefore very important to determine the source of the bleeding so that appropriate treatment can be started and the problem corrected. It is wrong to assume that the cause of the bleeding may not be serious; in some cases there may be an underlying sinister cause.

Mr Ayo Oshowo – MS, FRCS, FRCS (Gen), Consultant General/ Colorectal Surgeon Hon. Senior Lecturer

Evaluation of causes of rectal bleeding

The rectum lies immediately above the anus and although the bleeding indeed may be coming from the rectum, it may occur from any part of the gastrointestinal tract. Rectal bleeding is a common presentation to general practice and it affects people of all ages. This can be very alarming to patients even when there are no other associated symptoms.

It occurs in up to 15% of adults but only about a third seek advice. Most episodes are mild and about 80% of acute rectal bleeding episodes will resolve without treatment. Consequently, the overall mortality rates are low, ranging from 2–4%. Occasionally, the bleeding may be so severe to necessitate an emergency admission but this occurs in less than 1% of emergency surgical admissions. In all cases of rectal bleeding, re-bleed is common.

Generally, bright red bleeding tends to come from lower down in the gastrointestinal tract.

The colour and the amount of blood often give an indication to the source of bleeding. Generally, bright red bleeding tends to come from lower down in the gastrointestinal tract. Thus, bleeding from conditions affecting the anus, rectum and the right colon (sigmoid and descending colon) tend to be bright red. Bleeding from the transverse and the left side of the colon (descending colon and caecum) tend to be darker or even black.

The colour of the blood also depends on the rate and the amount lost. Massive blood loss suggests diverticular disease or angiodysplasia. It may also mean that the rapid transit time through the gastro-intestinal tract results in bright rectal bleeding. This may be the case in massive bleeding from the stomach e.g an ulcer. On the other hand, blood loss may not be visible to the naked eye if it is chronic and bleeding slowly (occult blood loss). This usually results in anaemia of iron deficiency type.

Generally, small amount of blood indicate source is distal in the anal canal or rectum. Painless, small amount of bright red bleeding on the toilet paper or dripping into toilet suggest haemorrhoids. This is perhaps the commonest reason why a patient present to a colorectal clinic. Occasionally, haemorrhoidal bleed can be considerably large. Painful bleeding on defaecation is associated with fissure-in-ano or anal carcinoma. Rectal carcinoma may present with blood streaked on stool associated with tenesmus and change in bowel habit. Conditions such as colitis, infective diarrhoea and other inflammatory conditions are usually associated with abdominal pain and other constitutional symptoms. The following is a list of causes of rectal bleeding we commonly encounter in clinical practice:

Conditions such as colitis, infective diarrhoea and other inflammatory conditions are usually associated with abdominal pain and other constitutional symptoms.

- Perianal conditions: Haemorrhoids ('piles'), fissure-in-ano, perianal haematoma, pruritic anal skin conditions
- Diverticular disease
- Inflammatory bowel disease such as ulcerative colitis; Crohns
- Infective bowel disease such as pseudomembranous colitis; infections due to Salmonella, Shigella, Campylobacter etc
- Colon and rectal polyps
- Colon, rectal and anal carcinomas
- Angiodysplasia and other vascular malformations
- Trauma
- Faecal imparction and chronic constipation
- Foreign bodies
- Bleeding from upper gastrointestinal tract such as peptic ulcer, oesophageal varices, Meckel's diverticulum, Intussusception (in children) etc
- General medical causes especially in patients on drugs such as warfarin, blood coagulation disorders.
- Other causes (uncommon): Endometriosis, aorto-enteric fistula, small bowel infarction, vascular ectasia and malformations.

Diagnosis

History and examination

Making a diagnosis is very important although many patients are too embarrassed or worried to discuss bleeding. In most cases, diagnosis will be for reassurance or to provide simple treatment to prevent further episodes which are quite common. For the small number of patients who are found to have a bowel cancer, there is a much greater chance of cure if it is found early.

Diagnosis is based on symptoms as discussed above. Furthermore, a thorough physical examination is undertaken which will include digital rectal examination. 90% of rectal carcinoma can be diagnosed on rectal examination. Other tests which are necessary at the initial consultation are proctoscopy and rigid sigmoidoscopy. Anorectal conditions are the commonest causes of rectal bleeding and can be diagnosed at this stage.

A common problem in general practice – Rectal bleeding continued...

Investigation

Blood tests:

Simple blood tests may be necessary especially in patients who have experienced chronic or large blood loss. Full blood count (FBC) with iron levels may help to determine whether bleeding is large and significant, or chronic over many weeks to months. Other blood tests such as clotting profile, electrolytes and urea, liver function tests etc will depend on clinical suspicion of the cause and effect of the bleeding.

Endoscopic tests:

Proctoscopy and rigid sigmoidoscopy can easily be performed in the outpatient clinic without any need for bowel preparation. These tests are now an integral part of a colorectal specialists consultation. Apart from determining the cause of the bleeding, some conditions can also be treated at once during the procedure. For instance, haemorrhoids can be treated with injection or rubber banding. It also allows biopsy to be taken in inflammatory or neoplastic conditions. In about 20% of cases, it is difficult to manipulate the rigid sigmoidoscope beyond the rectosigmoid junction.

Flexible fibreoptic sigmoidoscope allows easier passage along the bowel and the entire left colon (splenic, descending and sigmoid colon) can be visualised in addition. This requires an enema to clear the lower part of the bowel of its contents but sedation is not usually needed.

Colonoscopy is now regarded as the mainstay of accurate investigation of the whole colon. Any patient in whom a definite source of bleeding has not been found by anorectal examination and sigmoidoscopy should undergo colonoscopy. Colonoscopy is more than just a diagnostic tool; it can also be used to stop bleeding by removing bleeding polyps (polypectomy), by cauterising bleeding vessels, and, by removing foreign bodies. It is extensively used for taking biopsies from various conditions affecting the colon so that further laboratory tests can be performed. Patients with iron deficiency anaemia and occult blood loss (positive faecal occult blood test, FOB) should also undergo colonoscopy to exclude a colonic lesion.

Other forms of endoscopy, especially, oesophagogastroscopy may be indicated if upper gastrointestinal tract is suspected as the source. This is often used in chronic anaemia or in emergency situation where active massive bleeding is suspected.

Patients with iron deficiency anaemia and occult blood loss (positive faecal occult blood test, FOB) should also undergo colonoscopy to exclude a colonic lesion.

Special procedures

Very rarely when the source of the bleeding cannot be identified by the measures as listed above, further tests can be arranged as appropriate. Although, colonoscopy is the most widely used in the diagnosis and treatment of rectal bleeding, it has limitations. The colon may be filled with blood and visualisation becomes impossible. Small, bleeding angiodysplasias may be difficult to see and may be missed in a colon filled with blood. This is when a selective mesenteric angiogram or a tagged red cell scan may be helpful. When a bleeding site is identified by angiogram, drugs can be infused into, or a coil inserted to plug (embolise) the bleeding blood vessel and stop the bleeding. Bleeding Meckel's diverticulum can be localised by a special nuclear (Meckel's) scan.

Few patients will require surgery for the control of their rectal bleeding. This is now less than 5% of emergency bleeding cases. If operation is needed, every effort is made at accurate preoperative localisation of the bleeding source. This will allow a directed, segmental resection of the colon, with reduced rebleed rate and overall mortality. Occasionally, this may not be possible and a total colectomy and an end ileostomy is performed.

Few patients will require surgery for the control of their rectal bleeding. This is now less than 5% of emergency bleeding cases.

Key points for clinical practice

- Rectal bleeding is a common problem which can affect people of all ages
- If you develop rectal bleeding do not panic even though it is a sign that there is something wrong. In the majority of cases, this will be due to a minor disorder which can easily be diagnosed and treated in the outpatient and you can be reassured
- For the small number of patients who are found to have bowel cancer, there is a much greater chance of cure if it is found early
- Any patient who may be at risk of colorectal cancer should have colonoscopy
- Several specialised non-surgical and surgical measures are available in very few difficult cases.

A brief overview of

Haemorrhoidal disease

Haemorrhoids are a very frequent and troublesome condition, in both men and women. In essence they are abnormal enlargements of a normal part of the anal canal, the anal cushions. The blood vessels within these become tortuous and dilated and bleed easily due to trauma during defaecation. With time they become so enlarged that they may prolapse through the anus, at first during defaecation and in extreme cases permanently.

There are usually three haemorrhoids, at the 3,7 and 11 o'clock positions which mark the normal location of the anal cushions and the point of entry into anal canal of the haemorrhoidal artery (see illustrations).

Mr Stuart W T Gould – FRCS, Consultant Gastrointestinal and Laparoscopic Surgeon
Hospital of St John and St Elizabeth

Who suffers from haemorrhoids?
Anyone can suffer from haemorrhoids, but they are more common in Western countries. A low fibre diet, constipation and habitual straining on the toilet for long periods are also to blame. They are common in the later stages of pregnancy.

What are the symptoms?
They may be present and cause no symptoms, but commonest are bleeding, prolapse, itch and leakage of mucus. Pain is not generally a feature of haemorrhoids.

Bleeding is typically bright red blood which drips into the toilet bowl at the end of defaecation, and is often also on the toilet paper used for wiping. It may be heavy and there may be clots. It is NOT mixed in with the motions; the presence of blood in this situation suggests the possibility of bleeding from higher up in the colon or rectum. Bleeding tends to occur in episodes lasting a few days to a few weeks, but may be continuous.

There may be lumps that prolapse ('come down') out of the anus during defaecation. These normally go back in by themselves, but sometimes need to be pushed back in by the patient, or indeed may be permanently prolapsed.

Itching around the anus is common with prolapsing haemorrhoids and is due to mucus leaking onto the perianal skin and irritating it. Indeed the mucus leak can be quite substantial, especially with permanently prolapsed haemorrhoids, and can cause soiling of the undergarments.

Perianal pain is often attributed to haemorrhoids, but in fact they are usually responsible for no more than a vague discomfort. Severe pain on defaecation is more likely to be due to an anal fissure. However haemorrhoids can become acutely prolapsed and thrombosed (strangulated), which is a very painful condition, but fortunately fairly rare.

Symptoms tend to come and go in episodes. For example there may be bleeding for a few weeks and then no further symptoms for some time, until another bleeding episode starts. However in more severe haemorrhoidal disease there may be continuous symptoms.

How are they treated?

Simple over the counter remedies such as Anusol and Preparation H may help relieve some of the symptoms of discomfort and itching, but will not cure the underlying problem. The following treatments are available:

1. Conservative measures

Curing constipation and avoiding straining at stool will be enough to reduce or eliminate the symptoms in many patients. This is done by increasing the fibre in the diet and/or using bulk-forming laxatives or stool softeners. Plenty of fluid should also be taken in addition to these methods. Stimulant laxatives should be avoided. It is important not to remain on the toilet straining for long periods.

2. Outpatient methods

If conservative measures are not sufficient, there are a number of procedures that can be performed painlessly in the outpatient setting. These include phenol injection, rubber band ligation, infrared coagulation or cryotherapy. All of these techniques are designed to cause thrombosis of the dilated vessels and scarring of the tissue to hold the haemorrhoids back in the anal canal and prevent further prolapse. More than one treatment episode may be required. These methods tend to shorten attacks of bleeding and prolapse, but may not permanently cure the problem. These techniques are generally safe but may in rare cases cause pain or heavy bleeding some days after treatment.

3. Surgery

If these methods fail or are not suitable (permanently prolapsed haemorrhoids or large external components) a surgical solution is required. The most established is formal haemorrhoidectomy, where the haemorrhoidal masses are excised and the resulting wounds left to close. The problem with this procedure is that there may be considerable post-operative pain for 1–2 weeks, and discharge and bleeding (although mild) for several further weeks as the wounds heal. However the end result is excellent and, competently performed, recurrence is rare.

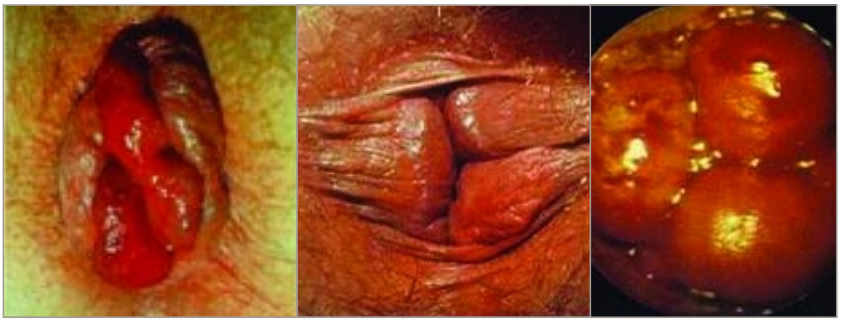
Newer techniques, not yet fully established, include stapled anopexy and haemorrhoidal artery ligation. These procedures are designed to reduce the post operative pain but still cure the haemorrhoids. They will not cure large external components, which will have to be removed at the same time, resulting in external wounds. Also stapled anopexy is associated with rare, but serious, complications not seen in conventional haemorrhoidectomy.

4. Strangulated haemorrhoids

These are normally treated with a combination of bed rest, systemic analgesics, topical local anaesthetics and ice packs. These measures should rapidly control the symptoms and the haemorrhoids should shrink quickly. Following this it is frequent to find there are few residual symptoms and further treatment may not be necessary. However the patient may be left with anal skin tags that can cause difficulty with perianal hygiene and may require surgical excision. Occasionally emergency surgery is indicated but this can be a difficult operation and is rarely performed.

Who to refer?

If the diagnosis is clear we would recommend a trial of conservative management and if this fails we would be happy to see the patient for further management. Patients with strangulated haemorrhoids should be referred as they may need hospital admission for pain relief. If there is rectal bleeding or other symptoms not typical of haemorrhoids, especially in the older patient, we would like to see them as they will need more extensive colorectal investigation to ensure no serious underlying condition is missed.



Large permanently prolapsed haemorrhoids (left).

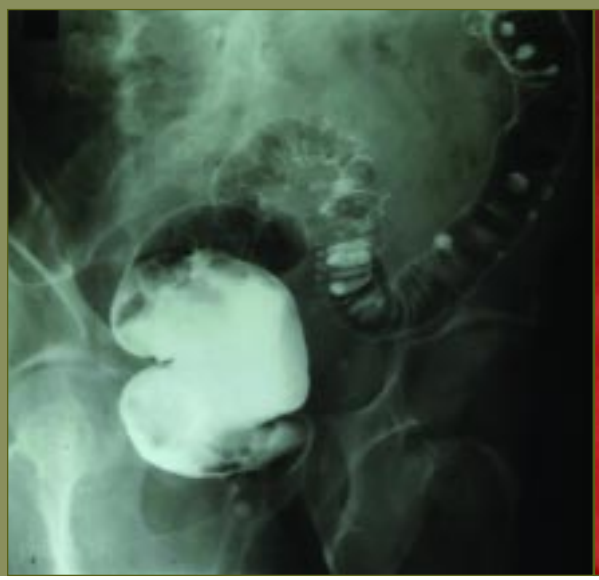
Smaller Haemorrhoids, typical external appearance (middle) appearance through a proctoscope (right).

Diverticular disease

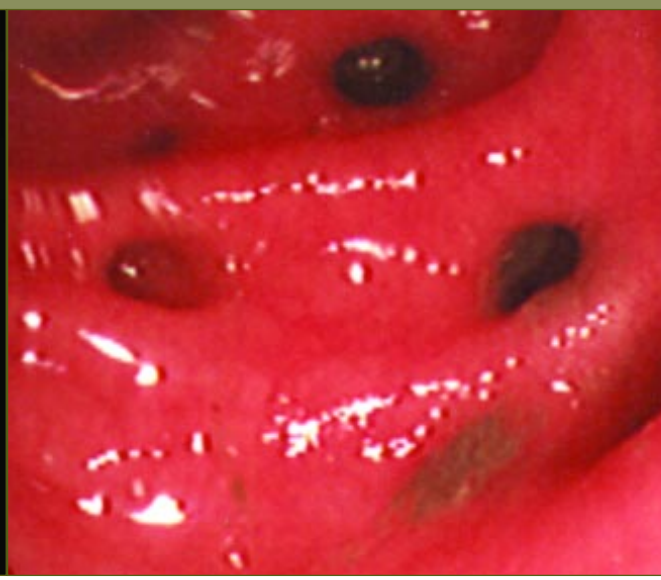
Definition and incidence – This is an acquired condition resulting in sac-like protrusions through the muscle wall of the bowel due to mucosal herniation at sites of weakness due to the penetration of the supplying blood vessels.

The prevalence of diverticulosis is highest in the western world affecting approximately 60% of people aged 60 years or more [1]. The most common site is the sigmoid colon with 90% of patients having sigmoid colon involvement and only 15% having right-sided diverticula. They may be solitary as with right sided diverticulum, but typically are multiple sometimes exceeding a couple hundred.

Mr Paul Ziprin – MD, FRCS (Gen), General and Colorectal Surgery



Barium enema demonstrating sigmoid diverticular disease.



Colonoscopic view of diverticular disease.

Pathophysiology

The precise process that leads to the formation of diverticular disease is not fully understood. It has been hypothesised that low dietary fibre results in decreased intestinal contents and, hence, decreased size of the lumen, which results in the transmission of muscular contraction pressure to the wall of the colon rather than to the contents of the lumen. The result of increased force (pressure) on the wall is the formation of a diverticulum at the weakest point in the wall: the sites of penetration by blood vessels. Other theories postulated are: alterations in colonic wall resistance, disordered colonic motility, and uncoordinated muscular contractions resulting in raised intraluminal pressure.

Investigations

- Colonoscopy, CT colonography and Barium Enemas are generally used in diagnosing diverticular disease
- Conventional contrast enhanced CT scan is used in the acute setting to identify areas of inflammation and to exclude complications of acute diverticulitis such as intra-abdominal abscess or perforation
- Radio-isotope studies, colonoscopy, and arteriography are helpful in patients presenting with diverticular bleeding.

Presenting symptoms

Depend on degree of disease:

1. Diverticulosis: Change of bowel habit, colicky lower abdominal pain
2. Diverticulitis and/or abscess: Constant LIF or lower abdominal pain with localised tenderness, fever, occasionally a palpable mass
3. Perforation: Frank peritonitis or localised peritonism
4. Complicated diverticular disease: Fistulae (colo-vesical, colo- vaginal), Colonic stricture resulting in large bowel obstruction.

Differential diagnosis

1. Left sided colonic cancer
2. Other forms of colitis: Pseudomembranous, Amoebic colitis, Crohns colitis, Ulcerative colitis
3. In women: Ruptured ovarian cyst, ovarian torsion, pelvic inflammatory disease, ectopic pregnancy.

Treatment:

1. Diverticulosis: Conservative management with dietary manipulation, fibre supplements
2. Diverticulitis: Fluid resuscitation, intravenous antibiotics, CT scan to exclude complications
3. Diverticulitis with abscess formation: CT guided percutaneous drainage with delayed surgery
4. Perforation: Surgery.

Diverticular disease continued...

Indications for surgery

1. Recurrent attacks of diverticulitis especially in younger patients. Some reports suggest that elective resection is indicated after two attacks of complicated diverticulitis [2,3,4].
2. Complications of diverticular disease:

- Perforation
- Abscess formation not amenable to radiological drainage
- Stricture formation
- Bleeding.

Types of surgery

Recurrent attacks of diverticulitis:

Single stage resection and anastomosis of the diseased segment. Laparoscopic surgery for diverticular disease can be done safely with low conversion and complication rates when performed properly in select patients [5].

Perforation or abscess formation not amenable to radiological drainage:

Little or no contamination: Single stage resection of the diseased segment and primary anastomosis. Sometimes a defunctioning loop ileostomy is used.
Gross purulent or faecal peritonitis: Hartmanns procedure with an end colostomy

Stricture formation:

Strictures in which malignant disease cannot be excluded should undergo surgical en bloc resection. A trial of endoscopic balloon dilatation can be attempted in patients in whom malignancy is sufficiently excluded [6,7,8]. Colonic metal stents may have a role in providing temporary decompression in patients presenting with large bowel obstruction, thus allowing bowel preparation and subsequent single-stage resection without diversion as in malignant obstruction[9,10].

A trial of endoscopic of balloon dilatation can be attempted in patients in whom malignancy is sufficiently excluded [6,7,8].

Bleeding:

Angiography may identify the source of bleeding which may then be amenable to embolisation [11]. Unprepared colonoscopy may also aid in the diagnosis. Surgery (single stage resection anastomosis) only reserved in those patients when endoscopic and angiographic intervention fails to control bleeding. Subtotal colectomy is indicated in patients with persistent bleeding when bleeding site cannot be identified by arteriography or endoscopy. If the site of bleeding is identified, then a segmental resection can be performed.

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Anal problems

Anal fissure – Minor anal problems can cause a disproportionate amount of pain, discomfort and worry. Such problems may be continuous, or intermittent, flaring up from time to time usually at times of the greatest inconvenience. Frequently the patient does not seek advice as they may be embarrassed or the symptoms are fleeting but recurrent and they are unable to see somebody at relatively short notice. Occasionally minor symptoms such as bleeding may be an indicator of a more serious problem and although the symptom may be a minor one, thorough discussion and outpatient assessment are necessary to be certain of a definite and clear diagnosis.

Mr Russell Lock – FRCS, General & Colorectal Surgery

There are a plethora of minor anal conditions which when diagnosed and treated appropriately can be relieved by simple procedures and cured often by minor day case surgery. Amongst these I would include for special mention:

Fissure in ano
A condition which not infrequently has an intermittent basis over many years and causes the patient pain and some bleeding. Modern treatments include highly effective healing local medical therapies and, if these fail a simple anal procedure tailored to the individual patient's needs will cure the problem in nearly 100% of cases. Not infrequently there are associated minor anal deformities, which can be corrected at the same time to further enhance the patients' post-operative recovery and comfort.

Modern treatments include highly effective healing local medical therapies and, if these fail a simple anal procedure tailored to the individual patient's needs will cure the problem in nearly 100% of cases.

Anal fistula
Not as common as anal fissure, anal fistula is more likely to be a continuous problem which, if left untreated, can worsen and become a complex perirectal problem. Inflammatory bowel disease and occasionally anal carcinoma may also present with an apparent fistula. The appropriate and expert assessment of patients is most rewarding in the early diagnosis and treatment of such problems.

The surgery for anal fistula, if caught in the early stages, is relatively simple and straightforward. Sometimes it is advisable in the more complex case to have pre-operative MRI assessment especially in a recurrent case to determine the exact nature and position of the fistulating disease.

Pruritis ani
An itchy bottom is a curse to the affected patient. Socially embarrassing and difficult to deal with; yet persistent in the extreme. Many sufferers have simple local anal problems which are easily dealt with by appropriate simple remedies and attention to diet. Close liaison with the London Clinic of Dermatology ensures that patients with skin diseases can be assessed jointly with a highly experienced Dermatologist to provide a full assessment of anal problems and localised manifestations of skin disease.

Faecal incontinence
Minor degrees of faecal incontinence are frequently due to localised anal problems which can be easily eradicated, often by day case surgery. Meticulous attention to the precise nature of the incontinence, the patient's diet, other medications and lifestyle are simple and effective. Frequently simple modification of these parameters produces a dramatic lessening in the patient's difficulties with corresponding greater continence.

Less frequently, more major faecal incontinence may be accompanied by Recal Prolapse and the full assessment of such patients by anorectal physiology and ultrasound needs to be done. In rectal prolapse there are a number of surgical procedures both minor and major which will reduce the prolapse and help to control the incontinence. In pure faecal incontinence, especially following childbirth, there are clear demonstrable anatomical changes which may be corrected by perineal operations.

Less frequently, more major faecal incontinence may be accompanied by Recal Prolapse and the full assessment of such patients by anorectal physiology and ultrasound needs to be done.

In summary the assessment and treatment of symptoms which we may consider as minor problems can both reveal occult serious disease or lead to a considerable improvement in a patient's persistent discomfort. The judicious assessment and treatment of such problems in a sympathetic and straightforward manner is most reassuring and helpful for patients with these frequent embarrassing 'little problems'.

Laparoscopic colorectal surgery

Laparoscopic surgery is now a well-established procedure for removal of gall bladders and open operations for removing the gall bladder in planned or emergency situations is a rare event. Laparoscopic colorectal segmental resection has been described well over a decade, but in the UK most of the surgeons still perform open procedures for removal of colorectal disease despite a large number of colorectal resections in Europe carried out laparoscopically. All described open abdominal procedures for colorectal disease can be performed laparoscopically, either laparoscopic-assisted or complete laparoscopic excision with intracorporeal anastomosis.

Mr Hasan Mukhtar – BSc, FRCS, FRCS (Gen), Consultant Colorectal & General Surgeon

Advantages	Disadvantages
1. Less post-operative pain	Learning curve
2. Less time until recovery duration	Longer intra-operative
3. Reduced length of hospital stay	Higher cost
4. Favourable cosmetic result	

Figure 1: Table to show Advantages/Disadvantages of Laparoscopic Resection.

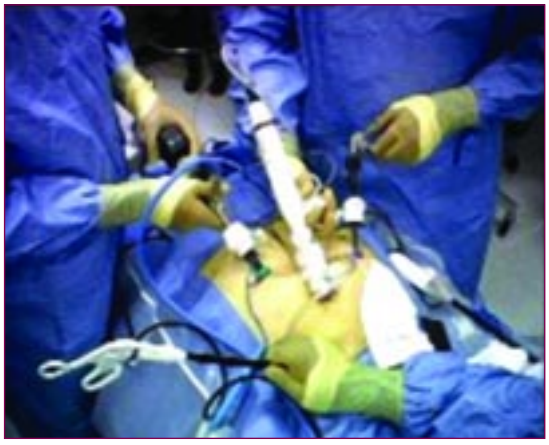

Figure 2: Laparoscopic colorectal surgery.

There are numerous potential reasons for operating on patients with colorectal disease laparoscopically (minimal invasive approach) than conventional (open approach). Advantages of laparoscopic surgery are reduction in the amount of post-operative pain, less time until recovery and less length of hospital stay, but the most obvious advantage is a more favourable cosmetic result. The disadvantages in colorectal surgery are that it is technically demanding and challenging for many colorectal surgeons who do not have experience in performing other laparoscopic procedures, i.e. cholecystectomy, hernia repair and fundoplication. There are also some technical challenges with converting from three-dimensional to two-dimensional view, and laparoscopic surgery is associated with a learning curve. Different studies have confirmed up to at least thirty cases may be required for the trainee surgeon, and as many as seventy to eighty cases required in self-educated before a surgeon reaches a steady state of performing laparoscopic surgery without conversion. Some initial studies have also shown that laparoscopic procedures performed take longer than open procedures, but after a steady state is reached the time required to perform standard laparoscopic resection is not significantly more than open procedures. There were also initial concerns about a longer intra-operative period. Apart from a longer intra-operative period, the blood loss at the time of laparoscopic surgery is more than open surgery, but again recent trials have shown much more improvement and blood loss is comparable to the conventional open surgery for colorectal resection. (See fig.1)

Laparoscopic surgery for benign colorectal disease

All described open transabdominal operations on the colon, rectum and small intestine have been performed laparoscopically. There is no absolute contraindication to perform laparoscopic surgery for benign disease, but there are relative contraindications, i.e. adhesions, obesity, which may make the surgery more challenging. Inflammatory masses and fistulae may be impossible to dissect laparoscopically with safety, and few patients tolerate prolonged pneumoperitoneum and this should be taken into account when planning surgery.

Benefits of laparoscopic surgery in benign disease

In diverticular disease of the colon, minimum access (laparoscopic surgery) can be performed for symptomatic diverticular disease, with a very small incision in the left ileac fossa or suprapubic region (4–5cm in length) to remove the diseased colon after mobilisation laparoscopically. Intracorporeal anastomosis is also carried out.

Recent meta-analysis published has shown the clear benefit of less length of stay and reduced blood loss in favour of laparoscopic surgery. Laparoscopic surgery is also successfully used for the reversal of Hartman procedures, which is carried out as an emergency operation for removal of perforated diverticular disease, with early discharge and return to normality. Laparoscopic surgery has limited benefit in patients with complex diverticular disease, i.e. large diverticular mass associated with fistulation into the bladder or small intestine. At times it is impossible to perform a safe resection in these patients, and in view of the extremely large size of the mass, a large abdominal excision is required to remove the specimen, which obviates the advantage of a small abdominal incision, i.e. 4–5cm in length.

Laparoscopic surgery in inflammatory bowel disease

Surgical procedures commonly performed in the management of both Crohn's and ulcerative colitis are achievable using minimal invasive techniques, including segmental and total colectomies, formation of ileal pouch after panproctocolectomy.

Laparoscopic resection is a well-established procedure for ileo-caecal Crohn's disease, where a 4–5cm incision is made in the right ileac fossa or in the midline to remove the specimen. It also enables the surgeon to perform an extracorporeal anastomosis. There is little doubt that patients undergoing laparoscopic resection for Crohn's disease or Inflammatory Bowel Disease have less post-operative pain, consume less opiate analgesia, mobilise earlier, benefit from early return of bowel function and are fit to be discharged from hospital earlier. There is increasing evidence of lower risk of

Laparoscopic colorectal surgery continued...

wound infection and complications such is as infection, incisional hernia formation and post-operative blood loss. Early mobilisation may reduce complications like pulmonary embolism, DVT and chest infection. In initial studies, it was considered to be a lengthy operation and costing more, but recent studies have shown early discharge of the patient from the hospital is important to patients, as it is associated with early return to work and normal activities. There is also mixed evidence towards the reduced stress response and reduction in impact on the patient's immunity after laparoscopic surgery compared to the open surgery in benign colorectal resection for Inflammatory Bowel Disease. Laparoscopic surgery can also be attempted in patients who have had previous colorectal resection for inflammatory bowel disease, and has been shown to be a clear benefit of using minimal access surgery for performance in formation of defunctioning ileostomy in patients with severe anal Crohn's disease. There is increasing evidence that laparoscopic-assisted panproctocolectomy can be carried out safely with small lower suprapubic incision to carry out formation ileal pouch anal anastomosis for severe ulcerative colitis not responding to medical treatment, and in patients with previous sub-rectal colectomy carried out as an emergency for acute toxic megacolon and acute severe colitis.

Laparoscopic surgery for colorectal cancer

Colorectal cancer is one of the most common cancers worldwide, with surgery being the most important treatment modality. There are numerous potential benefits in performing a resection laparoscopically than with a conventional open procedure. The short term benefits are less post-operative pain, less time until recovery and length of hospital stay have already been confirmed in benign as well as for colorectal cancer resections carried out laparoscopically. There are concerns about long operating time and more blood loss, and long-term urinary and sexual dysfunction, and to carry out a safe oncological resection with compatible outcomes after laparoscopic surgery for colorectal cancers. Some of the important questions during the development of laparoscopic surgery for malignant disease have now been answered. Port site metastasis is not an issue and has been attributed to inadequate surgical technique with learning curve. Numerous studies have been published and shown less than 1% port site metastasis. This is comparable to recurrence of tumour in incision after open surgery. A further important question is the concern that laparoscopic surgery is less radical, has also been answered by comparing the number of lymph nodes harvested carrying out laparoscopic oncological procedures to the open operation, and no difference has been found if strict adherence is kept to the oncological principles during laparoscopy resection. The first randomised controlled trial for laparoscopic surgery was published in 2002, which showed significant advantages regarding blood loss, intestinal motility, overall morbidity and duration of hospital stay and these were seen to be better in the laparoscopic surgery group than comparing it with the open surgery, but open surgery was always considered to be faster to carry out. This initial study also showed significantly better cancer-related survival advantage in the laparoscopic group comparing it with the open surgery. A further study published in the New England Journal of Medicine in 2004 (COST study), which was a multi-centric and randomised with a total number of 833 patients with colorectal cancer into laparoscopic-assisted or a conventional open operation. This confirmed the overall reduced use of analgesia, shorter length of stay and better post-operative recovery in the laparoscopic group, and it also showed that about 80% of resections can be carried out laparoscopically with 21% conversion to open for laparoscopic procedures. Multi-centric CLASSIC trial of 794 patients, which was carried out in Europe and published recently in Lancet 2005, and multi-centric COLOUR study, which randomised 1248 patients with colonic cancer, showed a significant advantage of less blood loss and confirmed better further short-term outcomes such as time to first bowel movement, mobility, post-operative analgesic use, and length of hospital stay were all significantly

better in the laparoscopic group. However, there was a longer intraoperative time and slightly more cost to perform laparoscopic procedures. In rectal cancer surgery, performing laparoscopic surgery is less well-defined compared to colonic cancers associated with a long learning curve to carry out safe pelvic resection, adhering to the strict oncological principles, i.e. total mesorectal excision associated with a minimum of blood loss and post-operative erectile dysfunction, especially for very low rectal cancers associated with ultra-low anterior resections and excision of the whole of the rectum with colo-anal anastomosis.

Conclusion

Laparoscopic surgery is increasingly accepted as the treatment of choice for patients with benign colorectal disease and colon cancers with the clear advantages of shorter hospital stay, less post-operative pain, early return to work, and the most important of all, better cosmetic result for the patient with small intra-abdominal incisions of 4–5cm. It is still more advantageous to carry out laparoscopic procedures for rectal cancers, especially for upper and middle rectal cancers, but the advantages are less clear to carry out minimally invasive surgery for lower rectal cancer. In the future, better evolving techniques and the use of robotics will overcome, at least technically, these problems as well.

Further reading

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Reissfelder C, Buhr HJ, Ritz JP. Can laparoscopically assisted sigmoid resection provide uncomplicated management even in cases of complicated diverticulitis?, Surgical Endoscopy, Vol.20, No.7, pp.1055–1059, July 2006.

Tilney HS, Constantinides VA, Heriot AG et al. Comparison of laparoscopic and open ileocecal resection for Crohn's disease: a metaanalysis, Surgical Endoscopy, Vol.20, No.7, pp.1036–1044, July 2006.

Lacy AM. Colon cancer: laparoscopic resection, Ann Oncol 2005; 16:ii88–92.

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Veldkamp R, Kuhry E, Hop WC et al. Laparoscopic surgery versus open surgery for colon cancer: short-term outcomes of a randomised trial, Lancet Oncol 2005; 6:477–484.

Consultant [profiles]

Mr Austin Obichere

MD, FRCS, FRCS (Gen)

Consultant
Colorectal Surgeon

Specialist areas of interest
Coloproctology and Laparoscopic Colorectal Surgery.

Career highlights

- Specialist Registrar training in General Surgery North West Thames and Hammersmith Hospital (1995–2001)
- Colorectal Fellow (2001–2002) at St. Mark's Hospital, Harrow and The Mount Sinai Hospital, Toronto Canada
- Awarded MD(Doctor of Medicine) degree by University of London for a thesis that explored the quality of life of patients following surgical excision of their rectum for cancer and benign disease
- Appointed Consultant Colorectal Surgeon, University College Hospital London in 2003
- Colorectal cancer Lead at University College Hospital London.

Approach
A patient centred approach in a multidisciplinary setting remains crucial in delivering a high quality effective service.

Background
Completed specialist training in general surgery in London. Developed a sub-specialist interest in diseases of the colon & rectum and laparoscopic colorectal surgery as a Colorectal Fellow at St. Mark's Hospital and The Mount Sinai Hospital Toronto, Canada. He has numerous research papers in peer reviewed international journals and has expertise in the screening and surgical treatment of colorectal cancer, laparoscopic colorectal surgery and other benign disorders of the anus and pelvic floor.

Appointments
Thur 8.30am–10.30am
T: 020 7034 8669 or 07958 219990
F: 0207 299 9404
E: austin.obichere@uclh.nhs.uk

Mr Ayo Oshowo
MS, FRC, FRCS (Gen)

Consultant General/ Colorectal Surgeon

Memberships
- Association of Surgeons of Great Britain and Ireland
- Royal Society of Medicine
- European Association of Coloproctologists
- Editorial Board Archives of Ibadan Medicine
- Review Editor, Annals of Surgery.

Background
Mr Oshowo's basic surgical training was at the University Hospital of Wales, Cardiff while his higher surgical training was in London. He holds specialist registration with the GMC and sub-specialist interests in colorectal and laparoscopic surgery. He was also a Travel Fellow at the Cleveland Clinic Foundation, Ohio, USA, where he underwent further sub-specialty training in colorectal diseases in 2002.

He obtained a Master of Surgery from the University of London by thesis in 2000 and has since maintained an active interest in research and teaching. He has published many papers and given international presentations and guest lectures.

His NHS practice at the Whittington Hospital, include colonoscopy; colorectal diseases including cancer; laparoscopic surgery especially for hernias, gall bladder and bowel.

Appointments
Wed 6.30pm–8pm
T: 020 7288 5411 / 020 7806 4000 or 020 7390 8432
F: 020 7390 8448
E: ayo.oshowo@whittington.nhs.uk

Dr Deepak Suri
BSc, MD, MRCP (UK)

Consultant Gastroenterologist

Specialist areas of interest
- Dyspepsia and irritable bowel syndrome
- GI malignancy
- Liver disease (especially viral hepatitis)
- Inflammatory bowel disease
- Endoscopy (including therapeutic colonoscopy and ERCP).

Approach
My philosophy is to offer a holistic approach and solutions to patient's problems.

Background
I am a Consultant Gastroenterologist and Honorary Senior Lecturer in Medicine at the Whittington Hospital, London. My undergraduate training was at University College London and my postgraduate training in general medicine and general gastroenterology was throughout London including St George's, Guys, The Middlesex and Royal Free Hospitals. I am academically and clinically trained in hepatology having written my MD thesis in viral hepatitis at UCL and worked as a senior registrar on the Royal Free liver unit.

Appointments
Endoscopy: Monpm
Outpatients: Thur 1.30pm–6pm
T: 020 8341 6989
F: 020 83487205
E: yvonnebaillie@btconnect.com

Mr Stuart W T Gould
FRCS

Consultant Gastroenterologist & Laparoscopic Surgeon

Specialist areas of interest
Perianal disease, especially anal fistula and haemorrhoids, obstructed defaecation, hernia surgery of all types and laparoscopic surgery, particularly laparoscopic cholecystectomy. For the latter I have set up the first one-stop cholecystectomy clinic in the country, based at the ACAD centre at Central Middlesex.

Background
I qualified from St.Mary's Hospital Medical School in 1989, having taken an intercalated BSc in Infection and Immunity. I passed my FRCS and then worked at Wexham Park as Surgical Registrar for a year before moving to the North West Thames Registrar Rotation. My research was into the application of Interventional MRI into Surgical Practice, an area I was very fortunate to explore as St Mary's had the only Interventional MRI machine in the country. This resulted in some unique and pioneering work with presentations and lectures throughout the world, and a Visiting Professor Appointment to the University of Kentucky.

My higher surgical training focussed on Gastrointestinal Surgery, particularly colorectal, with an extensive experience of laparoscopic surgery.

I was appointed as Senior Lecturer and Honorary Consultant Surgeon to Imperial College and St Mary's NHS Trust in May 2000.

I moved to NWLH NHS Trust in November 2004. My current post involves gastrointestinal, laparoscopic and daycase surgery and a very strong commitment to teaching.

Appointments
Tue 2.30pm–4.30pm
T: 020 7806 4061 or 020 7886 2124
E: stuart.gould@nwlh.nhs.uk

Dr James Bell
FRCR, MRCP, BSc, MBBS

Consultant Radiologist

Specialist areas of interest
Abdominal and Pelvic Imaging with a particular interest in the GI Tract and Virtual Colonoscopy.

Career highlights
Consultant Radiologist at the Royal Free since 2002 and Hospital of St John and St Elizabeth since 2005. First centre to use Virtual Colonoscopy in the UK and completed study in Summer 2005 showing that Virtual Colonoscopy as accurate as optical colonoscopy at detecting clinically relevant polyps.

Approach
Strong believer in the use of minimally invasive tests such as virtual colonoscopy to investigate potential colonic problems.

Background
Qualified from Charing Cross Medical School in 1993 before completing MRCP in 1996 and started radiology training at Chelsea and Westminster Hospital in February 1997. Underwent one year Abdominal Imaging Fellowship in Vancouver, Canada between 2001 and 2002.

Appointments
Appointments can be made via J & E radiology reception desk on:
T: 020 7806 4000
or CT/MR on 020 7078 3845

Appointments can be made any day of week but preferably Tuesday afternoons.

Mr Russell Lock
FRCS

General & Colorectal Surgery

Specialist areas of interest
General surgery including hernia surgery. Specialises in anorectal surgery, anorectal problems and rectal bleeding.

Career highlights
Qualified from Westminster Medical School, London 1069. Trained in general surgery at Westminster Hospital (lecturer in surgery) Southend General and Bournemouth Hospitals as Senior Registrar and Lecturer in Surgery. Colorectal surgery trained at St Marks Hospital, London and the Clevelend Clinic, Ohio, USA. Appointed Consultant Surgeon and Honorary Senior Lecturer at the London University at the Whittington & Royal Northern Hospitals, London 1982.

Approach
Appropriate inter referral to specialists within the colorectal surgery and general surgical group, depending on their specialised interests. Close liaison with physicians and the imaging department for full assessment and treatment of more complex problems.

Background
Very broad general surgical background and experience of general surgical and colorectal problems. He has published and lectured widely in this country and abroad on general and colorectal surgery. He has now reduced his previous heavy NHS commitment and concentrates on less major surgical problems, allowing him to work in undeveloped countries where he is involved in surgical training.

Appointments
Woolaston House, 25 Southwood Lane, Highgate, London, N6 5ED

Tue 2pm–5pm
T: 020 8341 3422 / 020 8348 6900
or 020 8341 4400
F: 020 8340 1376
E: info@woolastonhouse.com

Mr Hasan Mukhtar
BSc, FRCS, FRCS (Gen)

Consultant Colorectal & General Surgeon

Background
Mr Hasan Mukhtar qualified from Punjab Medical College, Faisalabad, Pakistan in 1989. He trained in general surgery and colorectal surgery at the Oxford Deanery, including Northampton General Hospital and John Radcliffe Hospital, Oxford.

He was appointed to the consultant staff of the Whittington Hospital, London in 2001. Privately he practices at the Hospital of St John & St Elizabeth and Wellington Hospitals in St John's Wood and the Highgate Private Hospital in Highgate. His practice consists of all types of surgical and colorectal problems.

He has a special interest in the surgical management of piles, anal fissures, inflammatory bowel disease and colorectal cancers. His practice also includes minimal access surgery and colonoscopic management of colorectal benign and malignant disorders and also includes the management of routine general surgical problems i.e. hernias and gallbladder disease.

Career highlights
He has published and presented widely in international and national meetings and journals on various aspects of general and colorectal disease.

Appointments
Fri 6.30pm–8pm
T: 020 8341 3422 or 020 8348 6990
E: info@woolastonhouse.com

Mr Romi Navaratnam

MSc, Ms, FRCS (Lon), FRCS (Gen)

Consultant Colorectal & Laparoscopic Surgeon

Career profile

- Qualified Nottingham University Medical School, 1990
- Basic Surgical Training (Addenbrookes & St Georges Hospitals, 1991–1994
- FRCS (London), 1994
- Higher Surgical Training (North West Thames London), 1995–2002
- MSc Thesis (The physiological assessment of symptomatic GORD), 1998
- MS Thesis (The evaluation of non acidic reflux & its relevance to GORD & Barrett's oesophagus) Royal Free Hospital, 2001
- FRCS Intercollegiate Specialty Exam (General & Colorectal), 2002
- Consultant Colorectal & Laparoscopic Surgeon (North Middlesex Hospital) Hon. Senior Lecturer in Surgery (Royal Free Hospital), 2002.

Specialist areas of interest

- Colonoscopy (Diagnostic & therapeutic) & Endoscopy (GORD & Barrett's)
- Laparoscopic surgery Benign & malignant colorectal disease
- Cholecystectomy, Appendicectomy, Herniae, GORD
- Colorectal Surgery Screening for Colorectal Cancer – (management of ultra low rectal cancer)
- Sphincter saving surgery for ultra low rectal cancer.
- Inflammatory Bowel Disease (Crohns anus) Benign perianal disease (haemorrhoids, fissures,fistulae)
- Education & Research – Course director Postgraduate MRCS course.

Approach

Traditional management of complex colorectal and general surgical conditions has changed considerably from unilateral decision making, to a more evidence based multi disciplinary team approach, which is more patient orientated.

Appointments

Wed 5pm–8pm
T: 020 7806 4060 or 020 7806 4000 (X 3879)
F: 0207 078 3877

Dr Voi Shim, Wong

Bsc, MB, CH, MD, FRCP

Consultant Physician and Gastroenterologist

Specialist areas of interest

- Dyspepsia
- Bowel Diseases and Cancer screening
- Liver Diseases
- Endoscopy
- General Gastroenterology.

Career highlights

- BSc – St Andrews University, 1981–84
- MB CHB – Victoria University of Manchester, 1994–87
- MRGI, 1991
- MD Thesis – Addenbrooke's Hospital, Cambridge
- FRCP – Fellow of Royal College of Physician, 2004
- Gastroenterology and Hepatology training – Leeds, Cambridge, Liverpool
- Consultant Physician/ Gastroenterologist and Honorary Senior Lecturer – Appointed at Whittington Hospital, 1999.

Approach

A holistic and multidisciplinary team approach is the key to effective clinical diagnosis and treatment of patients with gastroenterological conditions particularly those with complex problems. Accessibility and prompt communication with patients, relatives and their general practitioners are also important aspects of their management.

Background

I have received comprehensive training in Gastroenterology and Liver diseases.
I am fully trained in all aspects of diagnostic and therapeutic gastroscopy, flexible sigmoidoscopy and colonoscopy as well as ERCP.

Appointments

Mon 6pm–8pm or others by arrangement
T: 020 8341 3422 or 020 8348 6990
F: 020 8340 1376
E: info@woolastonhouse.com

Mr Paul Ziprin

MD, FRCS (Gen)

General and Colorectal Surgery

Specialist areas of interest

Colorectal and laparoscopic surgery

Career highlights

- Qualified University of Wales College of Medicine 1992
- Specialist Training 1997–2004 North Thames Region and St Mary's Hospital
- MD Thesis Imperial College 2003
- Appointed Senior Lecturer and Consultant Surgeon, Imperial College and St Mary's Hospital in 2004
- Lead Clinician for Colorectal Cancer Services St Mary's Hospital.

Approach

All complex cases should be managed in the context of a multidisciplinary team, in particular, patients with malignant disease and inflammatory bowel disease, should be managed jointly by radiologists, gastroenterologists, pathologists oncologists and specialist nurses where appropriate.

Background

Trained in general surgery with a subspecialist interest in colorectal surgery and, in particular, laparoscopic surgery for general surgical conditions such as inguinal and incisional hernias as well as gallstone disease, and for both benign and malignant colorectal conditions. I also perform diagnostic and therapeutic colonoscopy.

Any questions or worries please contact me on:

020 7806 4089 or 020 7806 4000 bleep 11

Appointments

Thur 5.30pm onwards
T: 020 7886 1110
E: p.ziprin@imperial.ac.uk

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