

Laparoscopic Colorectal Surgery Course & Master Class

Dates: 28th and 29th September 2011

Venue: Prince Charles Hospital, Merthyr Tydfil, Wales

Course Manual

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Welcome



Dear Colleague,

Welcome to the Laparoscopic Colorectal Course & Masterclass at Prince Charles Hospital in Merthyr Tydfil. We have designed this course aimed at surgical trainees as well as consultants who wish to develop these services.

This two day event is structured to provide plenty of exposure to live operations for a range of conditions such as diverticular disease, colorectal cancer and inflammatory bowel disease. In addition to the live links, there will be structured lectures/ presentations covering various aspects of the speciality, delivered by a faculty of experienced laparoscopic colorectal surgeons. We aim to provide an interactive experience in a comfortable and friendly environment.

Looking forward to meeting up with you during the course, which, I hope you will find both instructive and enjoyable.

Best wishes,

Prof. P. N. Haray
Course Convenor

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CANDIDATE LIST

Mr Sudeep Thomas	Specialist Registrar	Worcester Royal Hospital
Mr Narasimhaiah Srinivasaiah	Specialist Registrar	Eastbourne District General Hospital
Mr Jasim Amin	Associate Specialist	Inverclyde Royal Hospital, Glasgow
Mr Heman Joshi	Specialist Registrar	Whittington Hospital, London
Mr Vivek Gupta	Specialist Registrar	Princess of Wales Hospital, Bridgend
Mr Mansel Leigh Davies	Specialist Registrar	Singleton Hospital, Swansea
Mr Simon Wood	Specialist Registrar	University Hospital Wales, Cardiff
Mr Khalid Canna	Consultant General/Colorectal Surgeon	Ysbyty Gwynedd Hospital, Bangor
Mr Paul Stonelake	Consultant General/Colorectal Surgeon	Russells Hall Hospital, Midlands
Mr Ramakrishna Boddu	Specialist Registrar	King George Hospital, Ilford
Mr Afaq Mohamed Siddiqui	Specialist Registrar	University Hospital of Wales, Cardiff
Ms Lucy Satherley	Specialist Registrar	University Hospital of Wales, Cardiff
Mr Paul Froggatt	Specialist Registrar	University Hospital Coventry
Ms Jolene Witherspoon	Specialist Registrar	Royal Glamorgan Hospital
Mr Gordon Pereira	Specialist Registrar	Heartlands Hospital, Birmingham
Mr Lourdusamy Arul Selvam	Consultant General/Colorectal Surgeon	Hywel Dda Health Board, Pembrokeshire
Mr Aman Babar	Consultant General/Colorectal Surgeon	Milton Keynes Hospital, Buckinghamshire
Mr Bashar Zeidan	Academic Clinical Fellow	Basingstoke and North Hampshire Hospital
Mr Syed Hyder	Specialist Registrar	Royal Berkshire Hospital, Reading
Mr Kumarswamy	ThippeswamySpeciality Doctor	Prince Charles Hospital, Merthyr Tydfil
Ms Nuha Yassin	Specialist Registrar	Russells Hall Hospital, Dudley
Mr Jagannathan	PadmanabhanAssociate Specialist	Princess of Wales Hospital, Bridgend
Mr Suhail Aslam Khan	Senior Clinical Fellow	Our Lady of Lourdes Hospital, Ireland

CORE COMMITTEE AND FACULTY

Professor P N Haray Consultant Colorectal Surgeon Course Convenor	Prince Charles Hospital, Merthyr Tydfil
Mr Parin Shah Associate Specialist, Colorectal Surgery Chief Course Organiser	Prince Charles Hospital, Merthyr Tydfil
Mr Ashraf Masoud Consultant Colorectal Surgeon	Prince Charles Hospital, Merthyr Tydfil
Mr Barry Appleton Consultant Colorectal Surgeon	Princess of Wales Hospital, Bridgend
Mr Gethin Williams Consultant Colorectal Surgeon	Royal Gwent Hospital, Newport
Mr Umesh Khot Consultant Colorectal Surgeon	Singleton Hospital, Swansea

LOCAL ORGANISERS AND HOSPITALITY

Mr Abozed Ben-Sassi Speciality Doctor in Surgery	Royal Glamorgan Hospital
Mr Nader Naguib Associate Specialist General Surgery	Prince Charles Hospital, Merthyr Tydfil
Mrs Kanchana Sundaramurthy Speciality Doctor in Surgery	Prince Charles Hospital, Merthyr Tydfil
Mr Mahmud Al-Dayem Speciality Doctor in Surgery	Prince Charles Hospital, Merthyr Tydfil
Dr Kristof Nemeth Core Trainee in Surgery	Prince Charles Hospital, Merthyr Tydfil
Miss Sarah Winstanley Core Trainee in Surgery	Prince Charles Hospital, Merthyr Tydfil
Dr Dafydd Evans Foundation Year 1 Trainee	Prince Charles Hospital, Merthyr Tydfil

Day 1**8.30 – 8.45****Coffee & Registration**

8.45 – 8.50

Welcome & Introduction to the Course

8.50 – 9.10

Overview of Laparoscopic Colorectal Surgery

9.10 – 9.20

Case Presentation of 1st live link case

**Laparoscopic Anterior Resection
Live link to Operation Theatre**

Presentations by Moderators:

- o Theatre Set Up
- o Relevant anatomy
- o Port Positioning
- o The Stepwise Approach to Anterior Resection
(Videos/ discussion around specific steps)

9.20 – 12.30

12.30 – 13.15 Lunch

13.15 – 13.25

Case Presentation of 2nd live link case

**Laparoscopic Right Hemicolectomy
Live link to Operation Theatre**

Presentations by Moderators:

- o Relevant anatomy
- o Port Positioning
- o The Stepwise Approach to Right Hemicolectomy
(Videos/ discussion around specific steps)

13.45 – 15.15

15.15 – 15.30 Coffee

15.30 – 15.45

Laparoscopic Colorectal Surgery – Pain Relief & Anaesthetic Implications

15.45 – 16.00

Enhanced Recovery Concepts

16.00 – 16.15

Value of Laparoscopic Colorectal Fellowships

16.15 – 17.00

Role of Laparoscopy in Emergency Surgery - Debate

19.00

Course Dinner at the Ty Newydd Country House Hotel

Day 2**8.30 – 8.45 Coffee**

8.45 – 9.00

Case Presentation of 3rd live link case

Laparoscopic Left sided Resection
Live link to Operation Theatre

Presentations by Moderators:

9.00 – 12.30

- o Splenic flexure mobilisation
- o Ileal pouch
- o ERP high's and low's
(Videos/ discussion around specific steps)

12.30 – 13.15 Lunch

13.15 – 14.30

- o Transanal Balloon Port for Low Anterior Resection
- o Laparoscopic Extra-levator APER - Prone
- o Setting up a Laparoscopic Colorectal Service
Presentations & Discussion

14.30 – 15.15

Tips, Tricks and Potential Hazards
(Video and Discussion)

15.15 – 15.30

Formal Feedback
Education Centre Manager + IT**15.30 – 16.00 Coffee
Certification and Close**

Live Operating will be carried out by Prof. P. N. Haray with interactive moderating by experienced laparoscopic colorectal surgeons.

During Live Link – the moderators will give PowerPoint presentations/ video presentations on different aspects of laparoscopic colorectal surgery.

Selected Reading Material and Relevant Publications

Steps for Laparoscopic Anterior Resection of Rectum

1. Port positions and patient positioning
2. Omentum to supracolic compartment & small bowel stacking.
3. Identify right ureter.
4. Start medial dissection at the promontory.
5. Identify left ureter, then left gonadal, pelvic nerves.
6. Protect left ureter with surgicel® and Pedicle dissection.
7. Identify ureter through both windows of mesentery either side of pedicle.
8. Transect pedicle, confirm haemostasis.
9. Left lateral dissection, identify left ureter and proceed up to peritoneal reflection; IMV high tie and splenic flexure mobilisation, if required.
10. Mesorectal Dissection - Prepare Rectum for Division
11. Intra-corporeal cross stapling of rectum at appropriate level protecting lateral and anterior structures & Grasp stapled end of specimen.
12. Left iliac fossa transverse incision for specimen delivery; protect wound and deliver specimen by the stapled end.
13. Complete mesenteric ligation, proximal bowel division and prepare proximal bowel for anastomosis.
14. Close wound, re-establish pneumoperitoneum
15. Intra-corporeal bowel anastomosis with no tension, no twist and vital structures protected.
16. Close incisions.
 - 10.a. Right mesorectal dissection up to peritoneal reflection.
 - 10.b. Posterior dissection (presacral plane down to levator), keep left ureter in view.
 - 10.c. Divide peritoneal reflection anteriorly and dissect till seminal vesicles/ vaginal fornix.
 - 10.d. Complete both lateral dissection, identify the ureters all the way.
 - 10.e. Anterior dissection keeping to the plane just posterior to the vesicles/ vagina
 - 10.f. Cross stapling deep pelvis
 - 10.g. Laparoscopic APER

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Steps for Laparoscopic Right Hemicolectomy

1. Port positions and patient positioning.
2. Omentum to the supracolic compartment and small bowel stacking.
3. Identify ileocolic pedicle.
4. Start dissection at the lower leaf of ileocolic pedicle.
5. Identify duodenum through mesenteric window.
6. Protect duodenum with surgicel®.
7. Dissect upper leaf of ileocolic pedicle.
8. Identify duodenum through both mesenteric windows.
9. Transect pedicle.
10. Mobilise right colon & hepatic flexure from medial to lateral aspect. Protect Duodenum with surgicel®.
11. Start lateral mobilisation at distal ileum, then caecum and then ascending colon.
12. Mobilise hepatic flexure & confirm full mobilisation of the segment to be resected
13. Free up proximal transverse colon towards hepatic flexure protecting gallbladder & duodenum.
14. Free up omentum from transverse colon at planned site of resection.
15. Midline transumbilical incision for specimen delivery.
16. Protect wound, deliver specimen, complete mesenteric ligation.
17. Side to side ileo-transverse anastomosis and specimen resection.
18. Close incisions.

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The Merthyr Coaching Tool for Laparoscopic Colorectal Surgery

Professor P. N. Haray, Mr. P. R. Shah

Abstract

Laparoscopic surgery is being increasingly offered to patients across the world for benign and malignant colorectal disease. National Training programmes are being developed in some countries to improve standards and train surgeons. Meanwhile, many surgeons have been and continue to be trained through a variety of mechanisms. Currently there appear to be no publications in the international literature suggesting a standard format for the provision of such training. We present here a coaching tool that we have developed and used effectively to provide targeted training for laparoscopic colorectal surgery.

Introduction

Laparoscopic surgery for colorectal disease is becoming increasingly used across the world following the publication of the results from the CLASICC trial as well as NICE guidance (1, 2). In the UK, more and more surgeons are beginning to be trained through a variety of channels to undertake these procedures. National training programmes are being set up in some countries and it is envisaged that training will be imparted through regional centres (3). In addition, there are a considerable number of experienced surgeons providing training informally as well as formally through structured preceptorship programmes (3, 4). There is, therefore, an urgent need for a standard format for the provision of this training.

Aim

To develop a coaching and assessment tool to aid the provision of training in laparoscopic colorectal surgery.

Methods

We have been undertaking laparoscopic colorectal surgery at our Hospital in Merthyr, South Wales, UK since 1998 (5). Our initial experience was with benign disease and participation in the CLASICC trial. Since 2006, our range of laparoscopic procedures has expanded to include the majority of elective colorectal surgery for both benign and malignant pathology. To support this training, we have developed a simple tool (appendix I), which we have used very effectively over the past 1 year.

Results

This tool has been used initially in self assessment by the two authors over 40 cases. Subsequently, it has been used on 4 trainees of varying levels of experience and 5 consultant colorectal surgeons over a total of 38 cases to assess the performance as well as provide targeted feedback.

Discussion

Unlike laparoscopic cholecystectomy, the laparoscopic colorectal operation has a higher level of complexity because of several factors including multiple quadrant working, several intra-corporeal instruments (some of which will be out of the field of vision), care during bowel handling, the use of high energy devices for dissection and a rapidly expanding range of instrumentation etc (6). Furthermore, the majority of such procedures involve resections for malignancy and it is imperative that good technique and adherence to oncological principles are adopted.

Laparoscopic surgery lends itself very well for a structured approach to training because of the fact that the trainee and the trainer have the same view of the procedure and the trainer can be actively involved without even being scrubbed in as an assistant. Like all surgical procedures, the laparoscopic colorectal operation can be conveniently broken down into individual components and training imparted either for the entire procedure or for specific sections, depending on the expertise of the trainee.

The tool that we have developed (Appendix 1) has been invaluable as a coaching aid in identifying specific areas for targeted training and for providing constructive feedback. It has also been an effective tool for self assessment. There are several publications outlining different ways of assessing and evaluating laparoscopic cholecystectomies. Some of these have detailed weighted scoring systems which have been carefully developed (7, 8) and have been found to be useful mainly in trainees (9). However, because of the complexity of laparoscopic colorectal procedures and the fact that the majority of surgeons being trained in this technique are likely to be either consultants or senior trainees, we feel that such an approach with a graduated scoring system would not be suitable. We have therefore, deliberately adopted a simpler approach and each step that is assessed is marked simply as either 'needing improvement' or 'competent'. We have used this effectively as a coaching tool in over 60 cases for self assessment, for surgeons in training as well as for consultants who are being preceptored.

Conclusion

This paper has demonstrated an easily reproducible tool for standardising the assessment and providing feedback for laparoscopic colorectal surgery. Preliminary results have been encouraging though formal validation has yet to be completed. In due course, this tool can be developed into a weighted scoring system for accreditation and revalidation.

References

1. NICE, Colorectal cancer - laparoscopic surgery (review). <http://www.nice.org.uk/Guidance/TA105>, 2006.
2. Guillou PJ, Quirke P, Thorpe H, et al., Short-term endpoints of conventional versus laparoscopic-assisted surgery in patients with colorectal cancer (MRC CLASICC trial): multi centre, randomised controlled trial. *Lancet*, 2005. 365(9472): p. 1718-26.
3. ACPGBI, National Training Programme in Laparoscopic Colorectal Surgery. http://www.acpgbi.org.uk/assets/documents/Newsletter_June_2008.pdf, 2008.
4. ALS, Laparoscopic Colorectal Surgery Preceptorship Programme. <http://domain1686280.sites.fasthosts.com/index.php?page=preceptorship-programme>, 2008.
5. Shah PR, Joseph A, and Haray PN, Laparoscopic colorectal surgery: learning curve and training implications. *Postgrad Med J*, 2005. 81(958): p. 537-40.
6. Hubner M, Demartines N, Muller S, et al., Prospective randomized study of monopolar scissors, bipolar vessel sealer and ultrasonic shears in laparoscopic colorectal surgery. *Br J Surg*, 2008. 95(9): p. 1098-104.
7. Taffinder N, Sutton C, Fishwick RJ, et al., Validation of virtual reality to teach and assess psychomotor skills in laparoscopic surgery: results from randomised controlled studies using the MIST VR laparoscopic simulator. *Stud Health Technol Inform*, 1998. 50: p. 124-30.
8. Grantcharov TP, Bardram L, Funch-Jensen P, et al., Assessment of Technical Surgical Skills. *The European Journal of Surgery*, 2002. 168(3): p. 139-144.
9. Torkington J, Smith SG, Rees BI, et al., Skill transfer from virtual reality to a real laparoscopic task. *Surg Endosc*, 2001. 15(10): p. 1076-9.

Appendix I: Coaching Tool for Laparoscopic Colorectal Surgery

Date:	Procedure:	Trainee:	Trainer:
1.	Case Selection	N/A	Needs Improvement Competent
2.	Safe Access	N/A	Needs Improvement Competent
3.	Exposure		
	Port positioning	N/A	Needs Improvement Competent
	Patient positioning	N/A	Needs Improvement Competent
	Small bowel stacking	N/A	Needs Improvement Competent
	Use of retraction	N/A	Needs Improvement Competent
4.	Vital Structures		
	Awareness of.....	N/A	Needs Improvement Competent
	Identification of	N/A	Needs Improvement Competent
	Protection of	N/A	Needs Improvement Competent
5.	Vascular Pedicle		
	Dissection of vascular pedicle	N/A	Needs Improvement Competent
	Division of vascular pedicle	N/A	Needs Improvement Competent
	Protection of vital structures	N/A	Needs Improvement Competent
	Selection of appropriate instruments	N/A	Needs Improvement Competent
6.	Bowel Mobilisation		
	Bowel handling	N/A	Needs Improvement Competent
	Handling of pathology	N/A	Needs Improvement Competent
	Medial dissection	N/A	Needs Improvement Competent
	Lateral dissection	N/A	Needs Improvement Competent
	Superior dissection	N/A	Needs Improvement Competent
	Combination.....	N/A	Needs Improvement Competent
7.	Bowel Division – Intra-Corporeal/ Extra-Corporeal		
	Appropriate instrumentation	N/A	Needs Improvement Competent
	Dissection of mesentery	N/A	Needs Improvement Competent
	Protection of vital structures	N/A	Needs Improvement Competent
	Division of bowel	N/A	Needs Improvement Competent
8.	Anastomosis – Intra-Corporeal/ Extra-Corporeal		
	Technique	N/A	Needs Improvement Competent
	Instrumentation	N/A	Needs Improvement Competent
9.	Use of Energy devices		
	Appropriate settings	N/A	Needs Improvement Competent
	Spatial awareness of instruments	N/A	Needs Improvement Competent
	Awareness of residual energy	N/A	Needs Improvement Competent
10.	Extra- corporeal component	N/A	Needs Improvement Competent
11.	Team Working & Communication	N/A	Needs Improvement Competent
12.	Overall Performance	N/A	Needs Improvement Competent

Preceptorship Programme for Laparoscopic Colorectal Surgery

Prof Haray has established a structured programme to train other consultant surgeons in Wales since May 2008. This includes demonstration 'Master Classes' to consultant surgeons and their teams at Prince Charles Hospital and then visiting them at their base hospitals to provide on site (outreach preceptorship) training. Though often challenging, this has proved an excellent programme, imparting advanced surgical skills to senior colleagues.

To date, this service has facilitated either the commencement of a laparoscopic service for colorectal cancers or extended existing levels of service at a total of seven hospitals across South and West Wales. Eleven Consultants have been trained across these hospitals and several more have attended Masterclasses. 2/3 consultants are currently still in the programme and 2 more have expressed an interest in joining soon.

Structured Preceptorship Programme for Consultant Surgeons:

1. Mr. A. Masoud Consultant Colorectal Surgeon, Prince Charles Hospital, Merthyr Tydfil - January to June 2008.
2. Mr O. Umughele, Consultant Colorectal Surgeon, Withybush Hospital, Haverfordwest – May to October 2008.
3. Mr S. McCain, Consultant Colorectal Surgeon, Royal Gwent Hospital, Newport – September 2008 – Feb 2009.
4. Mr K. Swarnkar, Consultant Colorectal Surgeon, Royal Gwent Hospital, Newport – September 2008 – Feb 2009.
5. Mr. C. Arun - Consultant Colorectal Surgeon, Nevill Hall Hospital, Abergavenny – Jan - October 2009.
6. Mr.W. Sheridan, Consultant Colorectal Surgeon, West Wales General Hospital, Carmarthen – November 2009 – on going.
7. Mr A. Woodward, Consultant Colorectal Surgeon, Royal Glamorgan Hospital, Llantrisant – November 2009 – March 2010.
8. Mr J. Mathias, Consultant Colorectal Surgeon, Withybush Hospital, Haverfordwest – January to May 2010.
9. Mr. A. Joseph, Consultant Surgeon, Prince Charles Hospital, Merthyr Tydfil – September 2010 - January 2011.
10. Mr. A. Saklani, Locum Consultant Colorectal Surgeon, Princess of Wales Hospital, Bridgend – November 2010 – on going
11. Mr. G. Pritchard, Consultant Colorectal Surgeon, Princess of Wales Hospital, Bridgend – December 2010 – on going.
12. Mr. S. Harries, Consultant Surgeon, West Wales General Hospital Carmarthen – February 2010 – Masterclass only.
13. Mr. M. Henwood, Consultant Surgeon, West Wales General Hospital Carmarthen – February 2010 – Masterclass only.
14. Preceptorship for Mr O. Nur, Locum Consultant Surgeon, Withybush Hospital, Haverfordwest – Masterclass completed, Preceptorship to be booked.
15. Ms D. Clements, Consultant Colorectal Surgeon, Royal Glamorgan Hospital, Llantrisant – to be booked.
16. Mr A. Selvam, Consultant Surgeon, West Wales General Hospital Carmarthen – to be booked.

The entire programme has been funded through educational grants from Johnson & Johnson (Ethicon Endosurgery®) Ltd.

Laparoscopic Colorectal Surgery Training/ Research

Contributions of Prince Charles Hospital, Merthyr Tydfil

Faculty Member/ Course Convenor:

- European Surgical Institute – Hamburg, Laparoscopic Colorectal Training Course: Prof Haray has been on the faculty since 2008
- Prof Haray is a registered preceptor for Laparoscopic Colorectal Surgery, ALS and Ethicon Endosurgery® Ltd
- Laparoscopic Colorectal Surgery Course and Masterclass, PCH–Convenor-annual since 2010
- Laparoscopic Left Side Resection Course–Wales Deanery
- Association of Laparoscopic surgeons of Great Britain and Ireland, Annual Meeting in Cardiff – November 2011 – faculty for laparoscopic colorectal surgery workshop
- Several Masterclasses at Prince Charles Hospital for consultant surgeons; many live-linked demonstrations to Surgical Registrars, Junior Doctors, Medical & Nursing students etc.
- Minimal Invasive Course for surgical care practitioners– Convenor – 2010, due again in 2012
- Colorectal Cancer Course–Nurses & Jr Doctors, PCH- Convenor-2010, due again Oct 2011
- Faculty at various international conferences - India and Ghana 2003 – 2011
- Teaching Day for Surgical and Gastroenterology SpRs – Convenor (several 2005-2011)

Laparoscopic Colorectal Surgery teaching DVD

A highly specialized teaching aid has been developed by Prof Haray and his team at PCH in the form of an interactive training DVD. This has been designed to assist senior trainees or established consultants wishing to undertake laparoscopic colorectal surgery. Colorectal resections have been broken down into modules offering the option of either watching the procedure in its entirety or of selecting individual 'steps' to view. Many of the steps have additional video clips highlighting challenges/ potential hazards/ technical tips/ alternative approaches etc. A PDF button provides access to a printable summary of the steps.

Other Training/ Teaching Audio-visual Aids

- Anaesthetic techniques in Laparoscopic Colorectal Surgery – Spinal opioid & TAP blocks Film for anaesthetic education.
- Laparoscopic Abdomino-Perineal Excision of the Rectum Film for nurse education.
- Training the Trainer in Laparoscopic Colorectal Surgery Film aimed at helping consultants become good trainers. In progress.

Peer Reviewed Referenced Publications (Laparoscopic Colorectal Surgery only) **Dept of colorectal surgery – Prince Charles Hospital**

Original Articles

A Tool-kit for the Quantitative Assessment of Proficiency in Laparoscopic Colorectal Surgery

P R Shah, P N Haray, *Colorectal Disease*, 2011; 13(5): 576–582.

A Unique Approach to Quantifying the Changing Workload and Case Mix In Laparoscopic Colorectal Surgery

P R Shah, V Gupta, P N Haray, *Colorectal Disease*, 2011; 13(3): 267 – 271.

Laparoscopic Colorectal Surgery: Learning Curve and Training Implications

P R Shah, A Joseph, P N Haray, *Postgraduate Medical Journal*, 2005; 81: 537 – 540

Laparoscopic Colorectal Surgery in Great Britain and Ireland – Where Are We Now?

G Harinath, P R Shah, P N Haray, M E Foster, *Colorectal Disease*, 2005; 7, 86 – 89.

Preceptorship in Laparoscopic Colorectal Surgery – a Single Surgeon Experience

A Saklani, P R Shah, M D Rees, P N Haray, *Colorectal Disease* – submitted, awaiting review

The Merthyr Coaching Tool for Laparoscopic Colorectal Surgery

P R Shah, P N Haray, *Journal of Minimal Access Surgery* – submitted, awaiting review

Case Reports

Laparoscopic drainage of retroperitoneal abscess secondary to pyogenic sacroiliitis

D Chan, A Saklani, P R Shah, P N Haray, *Annals of Royal College of Surgeons of England*, 2010; 92(4): W32-34

Technical Tips

Use of uterine manipulator in laparoscopic colorectal surgery

P R Shah, J Rogers, S Chawathe, P N Haray, *Journal of Minimal Access Surgery*, 2010; 6(4): 125

Port site closure after laparoscopic surgery.

P Shah, Naguib N, Thippeswammy K, Masoud, *J Min Access Surg* 2010;6:22-3.

Transanal division of the anorectal junction followed by laparoscopic low anterior resection and coloanal pouch anastomosis: A technique facilitated by a balloon port.

Saklani AP, Shah P, Naguib N, Tanner N, Mekhail P, Masoud AG. *J Min Access Surg* 2011;7:195-9

Abstract Publications

A Unique Tool-kit for Quantitative Proficiency Assessment in Laparoscopic Colorectal Surgery

P R Shah, P N Haray, Colorectal Disease, 2011; 13(s4):31

Quantifying the Changing Workload and Case Mix in Laparoscopic Colorectal Surgery

P R Shah, V Gupta, P N Haray, Colorectal Disease, 2011; 13(s4):31

Laparoscopic Rectal Excision Made Easy: A stepwise Approach – Video Presentation

P R Shah, P N Haray, Surgical Endoscopy, 2011; 25(s1):S167

Laparoscopic Restorative Proctocolectomy with Ileal Pouch Anal Anastomosis

P R Shah, A Saklani, K Thippeswamy, D Chan, P N Haray, Surgical Endoscopy, 2011; 25(s1):S167

Laparoscopic Rectal Excision Made Easy: A stepwise Approach – Video Presentation

P R Shah, P N Haray, Surgical Endoscopy, 2010; 24(S1):S189

Laparoscopic Restorative Proctocolectomy with Ileal Pouch Anal Anastomosis

P R Shah, A Saklani, K Thippeswamy, D Chan, P N Haray, Surgical Endoscopy, 2010; 24(S1):S189

Complex Colorectal Operations are Feasible Laparoscopically

P R Shah, J Cowland, V Gupta, P N Haray, Colorectal Disease, 2009; 11(s2):38

Developing Parameters for Assessing Proficiency in Laparoscopic Colorectal Surgery

P R Shah, J Cowland, V Gupta, P N Haray, Colorectal Disease, 2009; 11(s2):39

Learning Curve in Laparoscopic Colorectal Surgery – Single Surgeon Experience

P R Shah, J Cowland, V Gupta, P N Haray, Colorectal Disease, 2009; 11(s1):24

Training in Laparoscopic Colorectal Surgery – Potential Problems

P R Shah, A Joseph, P N Haray, Colorectal Disease, 2004; 6(s2):23

Laparoscopic Colorectal Surgery – Is All The Effort Worthwhile?

P R Shah, A Joseph, P N Haray, Colorectal Disease, 2004; 6(s2):23

A Survey of Laparoscopic Colorectal surgery in the UK and Ireland

P R Shah, G Harinath, P N Haray, M E Foster, Colorectal Disease, 2004; 6(s2):23

Patience, Not Just Patients in Laparoscopic Colorectal Surgery: An Extended Learning Curve

P R Shah, A Joseph, P N Haray, Colorectal Disease, 2003; 5(S2):47

A 12-year experience of laparoscopic colorectal surgery (LCS): Does more experience mean better results?

M D Rees, P R Shah, P N Haray, Colorectal Disease, 2011, 13(S4):6

Surgicel® to protect vital structures during laparoscopic colorectal surgery

P Mekhail, P R Shah, A Saklani, P N Haray, Surgical Endoscopy, 2011; 25(s1):S167

A Survey of Laparoscopic Colorectal surgery in the UK and Ireland

G Harinath, P R Shah, P N Haray, M E Foster, Colorectal Disease, 2004; 6(s1): 82-83

Patient Expectations during the Learning curve of Laparoscopic Colorectal Surgery.

N Naguib, V Gupta, P R Shah, P Mekhail, L Dafydd and A G Masoud, Colorectal disease 200; 11(S2): P069.

A comparative study between the outcomes of laparoscopic versus open colorectal surgery.

N. Naguib, P. Mekhail, P. Shah, N. Tanner, A. Masoud, British Journal of Surgery 2010; 97(S2): 144

Laparoscopic versus open colorectal resections: comparing short term outcomes over a nine years period: non-randomized cohort study

N Naguib, V Gupta, P Shah, P Mekhail, A Saklani, N Tanner, AG Masoud, Surgical Endoscopy, Volume 24, Supplement 1, April 2010, pp. 182-191

Laparoscopic colorectal surgery is expensive for hospitals; fact or fiction?

N Naguib, A Saklani, P Mekhail, N Tanner, M Dyffed, AG Masoud, Surgical Endoscopy, Volume 25, Supplement 1, March 2011, pp. 186-190(5)

Rapid recovery programme and laparoscopic approach as a cost-effective alternative to the Enhanced Recovery programme.

N Naguib, A Saklani, P Mekhail, N Tanner, AG Masoud, Surgical Endoscopy, Volume 25, Supplement 1, March 2011, pp. 186-190(5)

Postoperative adhesive intestinal obstruction in laparoscopic versus open colorectal surgery.

N Naguib, N Tanner, P Mekhail, A Saklani, A Masoud, Surgical Endoscopy, Volume 25, Supplement 1, March 2011, pp. 54-148(95).

Evaluation of laparoscopic versus open colorectal oncologic resection.

N Naguib, N Tanner, P Mekhail, A Saklani, A Masoud, Surgical Endoscopy, Volume 25, Supplement 1, March 2011, pp. 54-148(95).

Effect of previous abdominal surgery on laparoscopic colorectal procedures.

N Naguib, AG Masoud, Surgical Endoscopy, Volume 25, Supplement 1, March 2011, pp. 1-53(53)

Laparoscopic perineo-abdomino-perineal excision of rectum and vicryl mesh repair for low rectal cancers. A new technique in selected cases.

N Naguib, AG Masoud, Surgical Endoscopy, Volume 25, Supplement 1, March 2011, pp. 149-185(37)

Transanal division of the ano-rectal junction followed by laparoscopic low anterior resection and colo-anal pouch anastomosis.

N Naguib, AG Masoud, Surgical Endoscopy, Volume 25, Supplement 1, March 2011, pp. 149-185(37)

Laparoscopic total colectomy and ileorectal anastomosis in a patient with multiple previous surgeries; a surgical strategy.

N Naguib, AG Masoud, Surgical Endoscopy, Volume 25, Supplement 1, March 2011, pp. 149-185(37)

DVD Presentations

Laparoscopic Rectal Excision Made Easy: A stepwise Approach – Video Presentation

P.R. Shah, P.N. Haray

- Welsh Surgical Society, Saundersfoot, May 2009
- Association of Laparoscopic Surgeons of Great Britain & Ireland, Kent November 2009
- European Association of Endoscopic Surgery, Geneva, June 2010

Laparoscopic Restorative Proctocolectomy with Ileal Pouch Anal Anastomosis

P R Shah, A Saklani, K Thippeswamy, D Chan, P N Haray

- Association of Laparoscopic Surgeons of Great Britain & Ireland, Kent November 2009
- European Association of Endoscopic Surgery, Geneva, June 2010

Surgicel® to protect vital structures during laparoscopic colorectal surgery

P Mekhail, P R Shah, A Saklani, P N Haray

- Welsh Surgical Society, Wrexham, November 2009
- European Association of Endoscopic Surgery, Geneva, June 2010

Perineo-abdomino-perineal excision for low rectal cancers. A new technique in selected cases

P R Shah, A Saklani, N Naguib, K Thippeswamy, A G Masoud

- Association of Laparoscopic Surgeons of Great Britain & Ireland, Kent November 2009
- European Association of Endoscopic Surgery, Geneva, June 2010 (2nd author)

Laparoscopic Total Colectomy And Ileorectal Anastomoses (Tc And Ira) In A Patient With Multiple Previous Surgeries: A Surgical Strategy.

A Saklani, P R Shah, N Tanner, P Mekhail, N Naguib, A G Masoud

European Association of Endoscopic Surgery, Geneva, June 2010

Trans-Anal Division Of The Ano-Rectal Junction Followed By Laparoscopic Low Anterior Resection And Colo-Anal Pouch Anastomosis.

A Saklani, N Tanner, P R Shah, N Naguib, P Mekhail, A Masoud

European Association of Endoscopic Surgery, Geneva, June 2010

Malignant colo-vesical fistula is not a contraindication for laparoscopic colorectal resection.

N Naguib, J Morgan, CE Davies, S Moorhouse, M Abdeldayem, AG Masoud.

EAES, Turin, June 2011

Laparoscopic right hemicolectomy; the flexible approach.

N Naguib, A Saklani, N Tanner, CE Davies, S Moorhouse, AG Masoud

EAES, Turin, June 2011

In laparoscopic ultra-low anterior resection and sutured colo-anal anastomosis, a coloplasty may be more suitable for the narrow male pelvis.

N Naguib, A Saklani, N Tanner, M Farag, CE Davies, AG Masoud

EAES, Turin, June 2011

Surgical strategy for complex multi-segmental colo-rectal resections

N Naguib, P Mekhail, A Saklani, M Farag, J Morgan, AG Masoud, EAES, Turin, June 2011

Course Presentations

LAPROSCOPIC vs OPEN COLORECTAL SURGERY

AG MASOUD

LAPAROSCOPIC vs
OPEN COLORECTAL
SURGERY

A G MASOUD

LCS vs. OCS

- Evidence from CLASICC Trial
- Evidence from RC Trials
- Main advantage of LCS
- Is it really expensive
- AGM database

MRC CLASICC Trial

- Design
 - 2:1 allocation of laparoscopic to open resection
 - Stratified by:
 - surgeon
 - proposed site of operation
 - presence of liver metastases
 - pre-operative radiotherapy administration
- Uniqueness of the trial
 - Central pathology analysis & pathological endpoints
 - Inclusion of rectal cancer cases

Endpoints

- **Primary**
 - Circumferential, longitudinal & high tie mesenteric resection margins (central review)
 - 30-day mortality
 - Local recurrence rate (3 years)
 - Disease-free & overall survival (3 years)
- **Secondary**
 - Disease-free & overall survival (5 years)
 - Port-site & wound-site recurrences
 - Complication rates
 - QOL and cost-effectiveness
 - Loco-regional, anastomotic & distant metastases
 - Blood transfusion requirements

Participating Centres

Airedale General	Princess Elizabeth, Guernsey
Bedford General	Queens Medical Centre
Bristol RI	Royal Gwent
Castle Hill	Royal Liverpool
Colechester General	Royal United
Daront Valley	RVI, Newcastle
Edinburgh RI	St James's, Leeds
Freeman	St Peter's, Chertsey
Leeds General Infirmary	Stepping Hill
Leicester General	University Hospital, Wales
Mayday	Whipps Cross
Medway Maritime	William Harvey
Ninewells	Yeovil District General
Prince Charles	


Recruitment Summary

- 794 patients randomised
- 83% patients recruited by surgeons with >20 patients randomised
- Average no. of patients per surgeon = 25
- Ratio of Open: Laparoscopic
268 : 526
1 : 1.96

Surgical Details 3

- Intra-operative conversions to open surgery


	Total	Colon	Rectum
Lap procedures attempted	478	240	238
No. of patients converted (%)	139 (29%)	58 (24%)	81 (34%)



Summary


CLASICC represents a large scale, pragmatic, multicentre, multidisciplinary, randomised clinical trial, which includes:

- high quality surgery
- high quality pathology
- good data collection



Conclusion

CLASICC short-term results suggest that in the UK the laparoscopic-assisted technique for colorectal cancer appears to be no different to open surgery in terms of the pathological resection margins, intra-operative morbidity, 30-day operative mortality and 30-day morbidity.



Long Term Results

- Equal oncological outcome
 - Survival
 - DFS
 - Local recurrence
- Equal quality of life

Why LCC if equal outcome

- High conversion in CLASICC
 - 24% colon
 - 34% rectum
- Better short term outcome in recent trials

Evidence from RC Trials

- 652 publications
- 12 RC Trials
- 2/3 with long term outcome

Advantages of LCS

- Less pain, 37% less analgesic
- Better pulmonary function and recovery
- Cosmetic benefit
- Faster return to N diet 37%
- Early bowel function 33%
- Shorter hospital stay 20%
- Less blood loss

LCS Equal to OCS

- Safety
- Morbidity
- Mortality
- Cancer related mortality
- Local recurrence
- Port/scar metastases

Disadvantages of LCS

- 14-87 minutes longer
- Cost cost effective
- Steep learning curve
- Debate about rectal cancer
 - especially in males

Conversion

- Colonic 7 - 25%
- Rectal 12% - 50%
- Worse outcome
- >30% unacceptable
 - economic
 - organisation disruption
 - worse outcome

Learning curve

- Swiss ALS database 1995 - 2006
- 3000 lap sigmoid colectomies for DD
- Conversion trends from 27.3% - 8.6%
- Local complications 23.6% - 6.2%
- General complications 14.6% - 4.9%
- Re-operation rate 5.5% - 2.6%
- Hospital stay 11% - 7%

Sub Group Short Stay Benefit

- < 60 1 or 2 days
- Elderly - no decrease in hospital stay
- 60 - 80 - most benefitted
- Australian colon study
 - 300 cases
 - benefit for over 70

Difficulties in Lap TME

- Narrow pelvis, gun at acute angle
- Most flexible 65
- Zigzag staple line and ischaemic zone
- Difficult tumour localisation
- Less resection from side and more from left side

Options and Alternatives

- Be selective or accept
 - APR rate
 - conversion rate
 - morbidity rate
- Alternative techniques
 - colo-anal hand sewn
 - Pfannensteil and Contour
 - open surgery

**Laparoscopic colorectal surgery
 is expensive for hospitals;
 fact or fiction?**

Introduction

- NICE Guidelines 2006
- Laparoscopic Colorectal Surgery (LCS) cost difference of zero cf Open Colorectal Surgery (OCS) provided:
 - conversion rate <10%
 - Hospital stay 4 days shorter than OCS

Cost Analysis

- Costs for LCS and OCS were estimated with assistance from the Trust's Finance Department and theatre database
 - General theatre costs
 - Length of stay
 - Critical care
 - Theatre time
 - Disposable instruments
 - Re-operation
- Fisher's exact & "t" tests were used for statistical analysis

Results

	LCP	OCP	P Value
Mean Operative Time	212 minutes (60-544)	163 minutes (38-354)	<0.001
HDU/ITU Admissions	31 days	131 days	NA
Median post operative stay	5 days (1-44) 46% ≤ 4 days	10 days (2-104) 5% ≤ 4 days	<0.001
Re-operation rate for	4.76% (6/126)	4.83% (10/207)	NS

Cost Analysis

- **Average extra-time per case: 49 min**
(= 0.2 Theatre session)
20% of £1,131.75 cost = **£226.35**

Based on a 4 hour session, top of the scale	Normal working week
1 x Consultant surgeon	256.98
1 x Consultant anaesthetist	256.98
1 x SPR surgeon	172.66
1 x Band 7	113.37
1 x Band 6	96.03
2 x Band 5	76.87
1 x Band 4	60.84
3 x Band 3	51.66
2 x Band 2	46.36
Total	1131.75

Cost Analysis

- **Cost of lap. instruments = £957.23**
£431.66 harmonic scalpel
£305.57 gun + cartridge (average)
£140 ports
£80 Hassan port

Cost of reoperation for complications
No significant difference (4.76% V's 4.83%)

Cost Analysis

	LCS	OCP
General theatre	Similar	
Critical Care	£350.80	£907.60
Theatre time	+ £226.35	-
Lap Instruments	+ £957.23	-
Reoperation	Similar	
Total	£1,534.38	£907.60

- £631.49 difference = 1.3 days hospital stay

Conclusion

- If we exclude the length of hospital stay, LCS is more expensive by £631.49; equivalent to 1.3 days of hospital stay.
- Providing a Laparoscopic Colorectal Service should be cost effective provided that the hospital stay is shorter by 1.3 days.

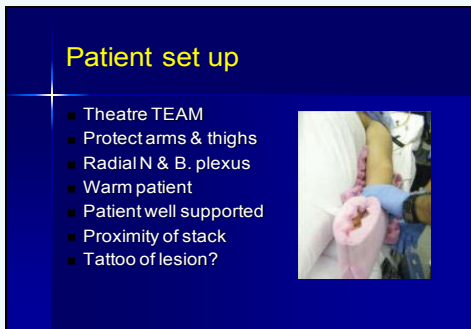
Theatre set up and relevant anatomy

Gethin Williams MCh FRCS(GenSurg)

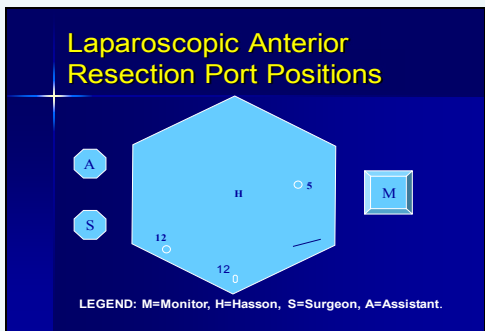
Laparoscopic Colorectal Masterclass

Merthyr, September 28th 2011









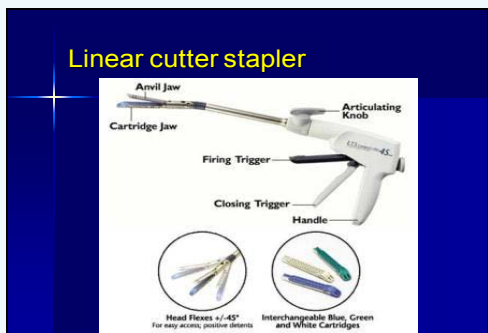


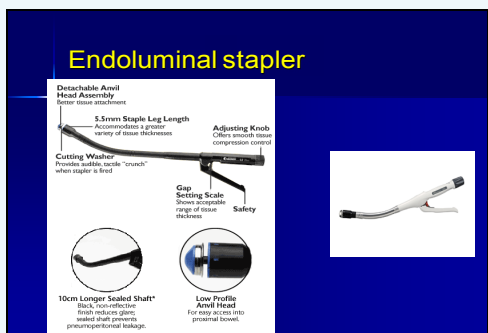
Essential Equipment

- High flow insufflator
- 30° angled 10mm scope & 5mm scope
- Good quality 5 and 12mm ports
- Atraumatic grasping forceps
- Harmonic scalpel / Ligasure / diathermy
- Endoscopic linear cutter stapling equipment
- Endoluminal circular stapler

Graspers











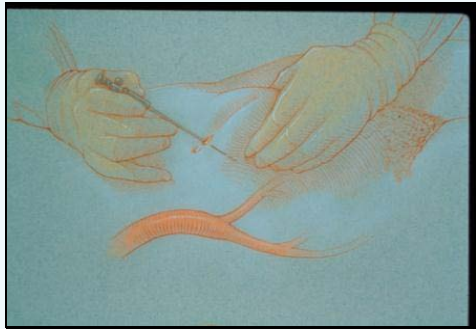






- Problems!**
- | | |
|---|---|
| <ul style="list-style-type: none"> ■ Respiratory ■ Atelectasis ■ Worsens compliance ■ Decreases FRC | <ul style="list-style-type: none"> ■ Cardiovascular ■ Increases CVP ■ Increases C.O ■ Increases cerebral circulation <ul style="list-style-type: none"> - Increases ICP - Increases IntraOcular Pressure |
|---|---|





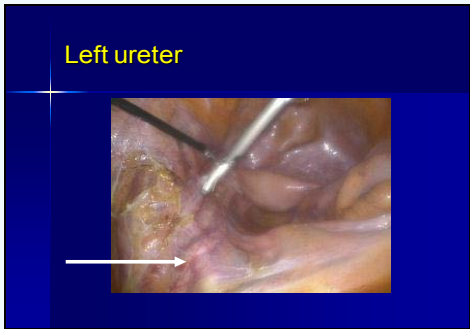
Ureter: key facts

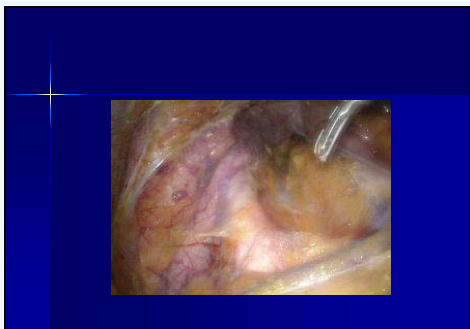
- Crosses bifurcation of CIA at pelvic brim
- Gonadals are antero-lateral
- Covered by Toldt's fascia
- IMV medial
- Lateral pelvic side-wall to ischial spine

Stent all ureters?!

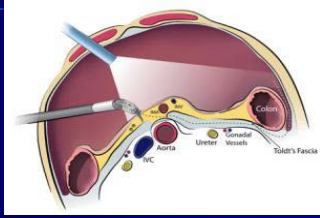
A laparoscopic view of the pelvic region showing the ureters and the placement of stents. The ureters are highlighted in red, and the stents are shown as thin, dark lines.



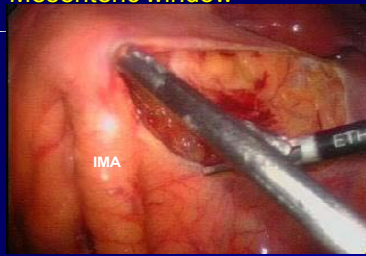




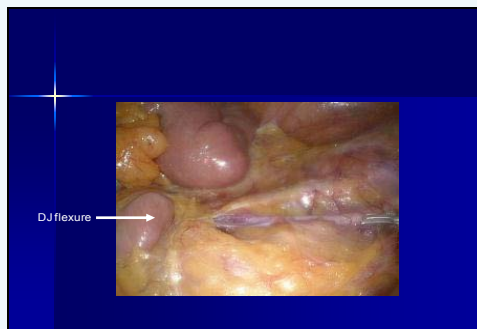
Medial to lateral approach

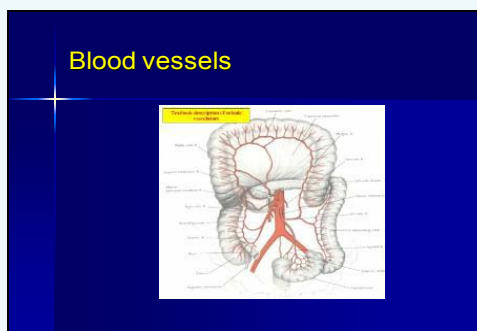


Mesenteric window







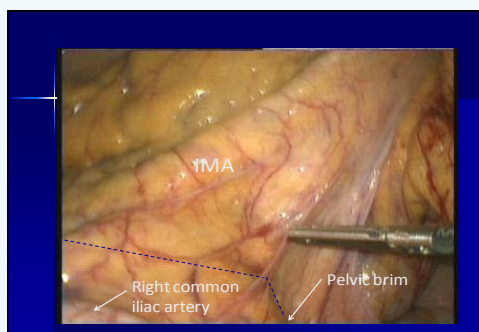


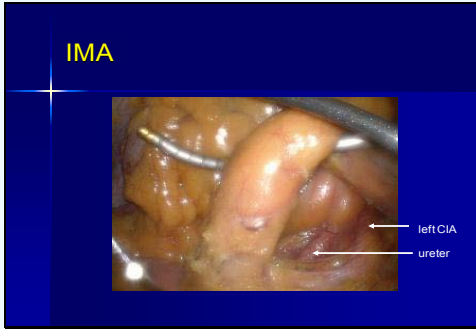
- ### IMA: key facts
- Supplies hindgut
 - Crosses left CIA
 - Becomes superior rectal artery
 - Left colic – ascending & descending
 - Sigmoid branches



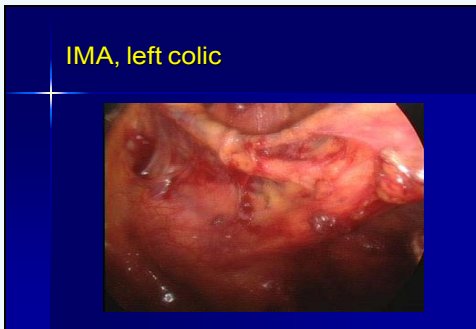
- Marginal artery
- Single arterial trunk
- Begins @ IC junction
- Joins Sup. Rectal artery
- Vital for anastomosis

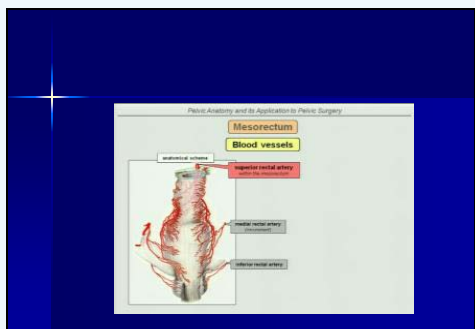
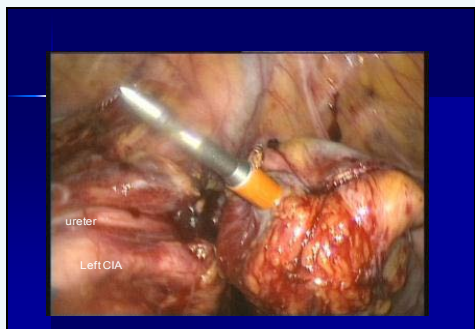
 A diagram showing the arterial supply to the sigmoid colon. It labels the inferior mesenteric artery, sigmoid artery, and marginal artery. Other labels include the ileocolic junction, sigmoid branch, and left colic artery.





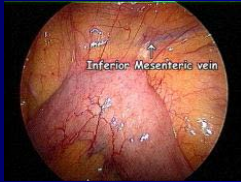






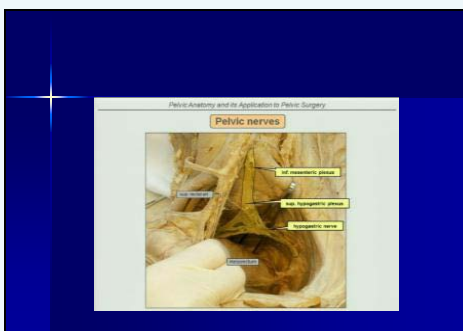
- IMV: key facts**
- Begins as superior rectal vein
 - Lies on posterior abdominal wall
 - On left side of IMA and D-J junction
 - Joins splenic v. behind pancreas

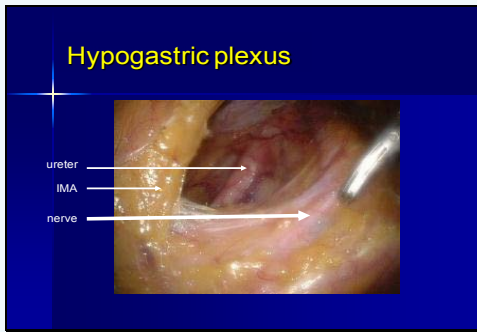
**IMV - inferior edge of pancreas,
ligament of Treitz**

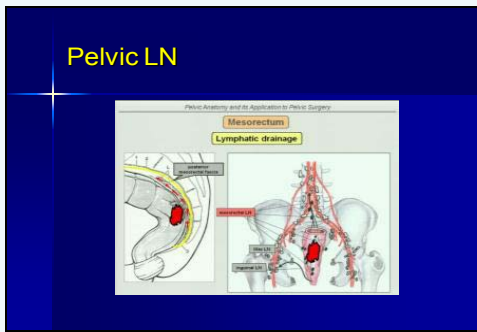


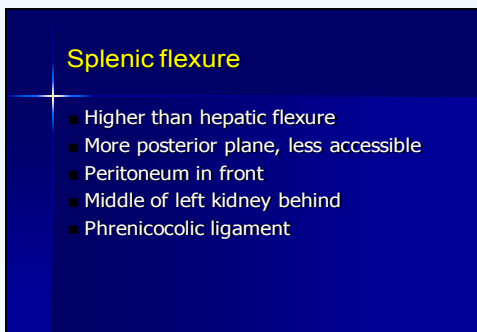
Pelvic nerves: key facts

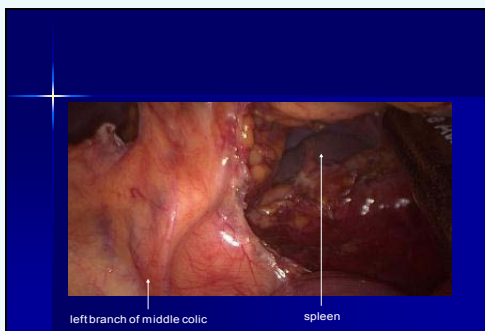
- Autonomic fibres - Inferior mesenteric plexus
- Superior hypogastric plexus
- L & R hypogastric nerves ('erigant pillars') (S1)
- Joined by pelvic splanchnic nerves
- Outside of mesorectal plane







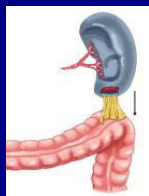




Fully mobilised splenic flexure



Mechanism- undue traction

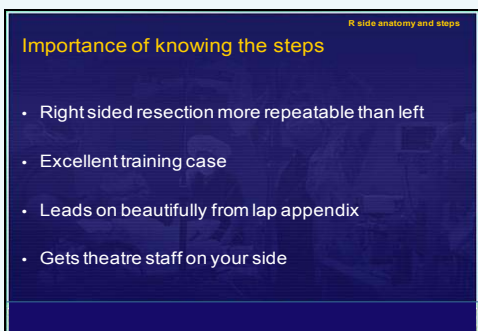
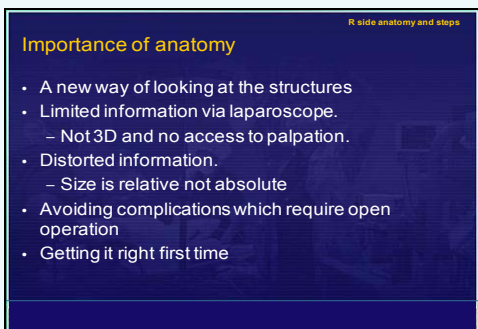
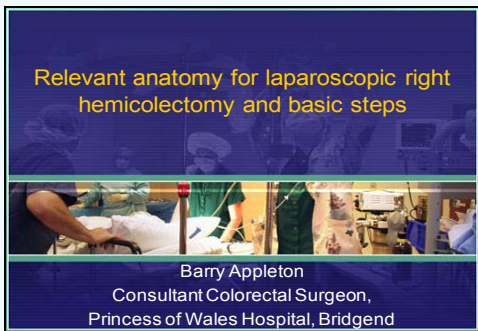


Splenic trauma

- 1-8% of left hemicolectomies
- Poor exposure, inadequate visualisation
- Obesity
- Capsular tears, avulsions, lacerations
- Lower pole usually

Relevant anatomy for laparoscopic right hemicolectomy and basic steps

Barry Appleton
Consultant Colorectal Surgeon,
Princess of Wales Hospital, Bridgend



R side anatomy and steps

Anatomy

- Intestinal / embryological
- Vascular
- Surrounds
- (Radiological)

R side anatomy and steps

Intestinal anatomy



R side anatomy and steps

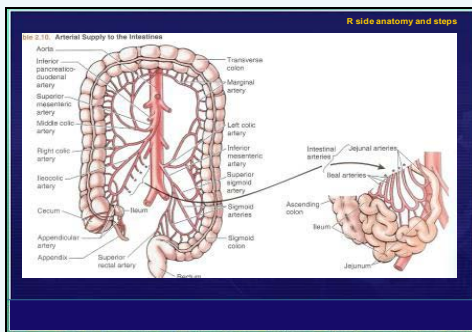
Intestinal important points

- Terminal Ileum
- Caecum
- Vermiform Appendix
- Ascending Colon
- Hepatic flexure
- All these intestinal structures are mid gut and hence supplied from the superior mesenteric artery. Venous drainage and lymphatics similar.

R side anatomy and steps

Vascular – important bits

- Aim for high tie on IC pedicle
 - Nearly always higher than open
 - Lymphovascular package
- R colic artery variable
- Care with middle colic artery, can be v. close
- Terminal ileal arcade

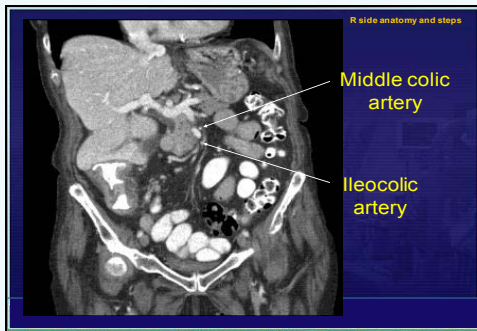


R side anatomy and steps

Surrounds

- Ureter only a problem in T4 tumours
 - Sometimes seen at laparoscopy, seldom sought
- Duodenum
 - Views brilliant
- Liver / GB and fossa
 - Can be most difficult bit
- Gynae organs
 - Esp. in Crohn's disease (SB)
- Nerve and vascular injury rare (extremely)



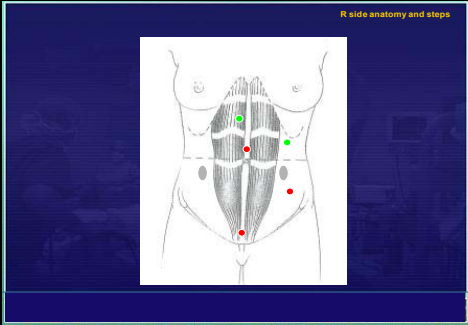
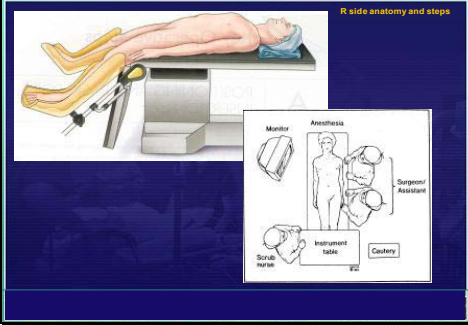




Preoperative workup

- Localisation
- Bowel preparation
- Thromboembolic prophylaxis
- Epidural or not
- Antibiotics



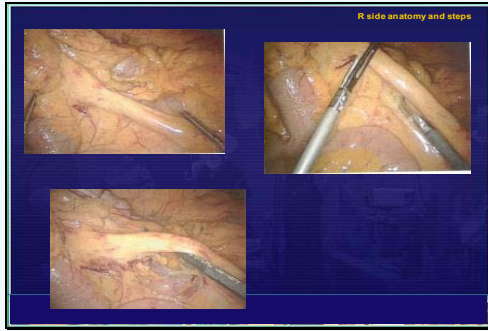


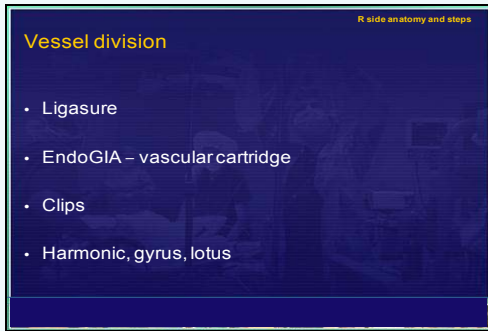
Identifying ileocolic vessel

R side anatomy and steps

- Small amount head down
- Left side down
- Leave small bowel in pelvis
- Move rest to left hand side
- Move omentum over transverse colon
- Tent up appendix or ileocaecal junction with left hand





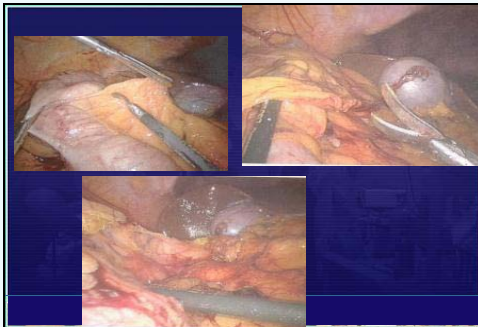




R side anatomy and steps

Hepatic flexure or lateral dissection


- Depends on changing tilt
- Usually do hepatic flexure first – always do it!!



R side anatomy and steps

Exteriorisation

- Option 1 intracorporeal division of bowel
- Option 2 extracorporeal
- Wound protector
- Stapled vs handsewn

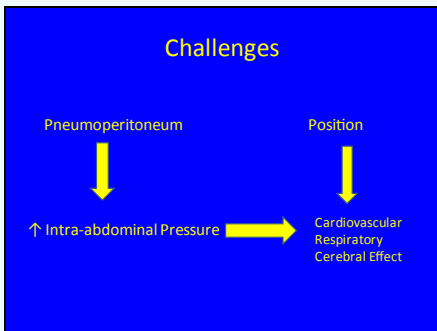


Laparoscopic Colorectal Surgery Anaesthetic Implications

Dr Moayed Aziz
Consultant Anaesthetist
Prince Charles Hospital

Laparoscopic Colorectal Surgery
Anaesthetic Implications

Dr Moayed Aziz
Consultant Anaesthetist
Prince Charles Hospital



Peri-operative Management

- Fluid Management
- Pain Relief

Fluid Management

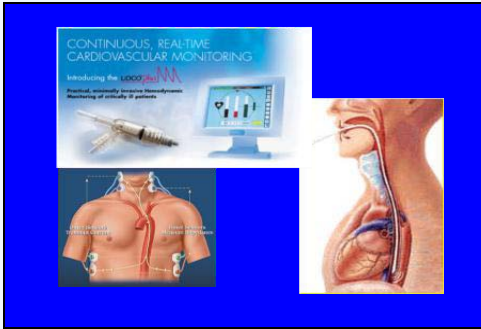
- preoperative or operative hypovolaemia should be diagnosed by flowbased measurements wherever possible.
 - Doppler
 - LiDCO (Lithium Dilution Cardiac Output)

British Consensus Guidelines on Intravenous Fluid Therapy for Adult Surgical Patients

Fluid management

Intraoperative oesophageal Doppler guided fluid management shortens postoperative hospital stay after major bowel surgery

H.G. Wakeling, M.R. McFall, C. S. Jenkins, W.G.A. Woods, W.F.A. Miles,
Br. J. Anaesth. (November 2005) 95 (5): 634-642.



Epidural Analgesia

Respiratory effects:

- Epidural opioids and local anaesthetic infusions have been shown to:
 - Reduce the incidence of postoperative atelectasis
 - Reduce pulmonary infection
 - Improve postoperative oxygenation.

Epidural Analgesia

Cardiovascular effects:

- reduce postop.MI, improve demand/supply ratio through:
 - reduction of sympathetic activity;
 - improved postoperative pulmonary function;
 - reduced thrombotic tendency.

Epidural Analgesia

GIT effects:

- limiting systemic opioid use and
- improving intestinal motility by blocking nociceptive and sympathetic reflexes,
- reduces the duration of postoperative ileus, permitting earlier enteral feeding.
- This in turn has a beneficial effect on postoperative catabolism.

Epidural Analgesia

- MASTER study
- no difference in overall mortality between the groups. However, they did show:
 - a reduced incidence of pulmonary complications
 - Reduced thromboembolic events
 - significantly better analgesia in the epidural group.

Epidural Analgesia

- Why?
 - Firstly, as a result of current surgical, anaesthetic and intensive-care practice, mortality rates from major surgery, even in high-risk patients, are small. Therefore, the use of mortality as an endpoint may not be appropriate.

Epidural Analgesia

- Why?
 - Secondly, to provide the beneficial effects, epidurals have to work.
 - Technical problems (e.g. leaks, catheters falling out)
 - Lack of facilities to care for patients with epidurals.
 - Lack of acute pain management team

Complications of Epidural Analgesia

- Related to catheter insertion
 - Dural puncture 0.32–1.23
 - Neurological damage (usually transient) 0.016–0.56
- Related to catheter in situ
 - Epidural haematoma 0.0004–0.03
 - Epidural abscess 0.01–0.05
 - Catheter migration 0.15–0.18
- Related to epidural drugs
 - Drug errors Not known
 - Respiratory depression 0.13–0.4
 - Hypotension 3–30
 - CNS toxicity 0.01–0.12
 - Motor block 3

Intrathecal Opioid

- The physicochemical properties of intrathecal opioids determine their
 - onset time,
 - duration of action,
 - and potency.

Intrathecal Opioid

- In 1968, Melzack and Wall put forward their 'gate control theory' proposing that the spinal cord was a potential target site for modulation of pain signals.
- This led to the discovery of opioid receptors by Pert and Snyder in 1973
- Wang was the first to describe the intrathecal administration of morphine

Intrathecal Opioid

Site of action:

- Intrathecal opioids bind to a family of G-protein-linked pre- and postsynaptic opioid receptors in Laminae I and II of the dorsal horn.

Intrathecal Opioid

- Diamorphine is a lipid soluble prodrug with an octanol:water coefficient of 280 (Fentanyl 860, Morphine 1.4)
 - Slower to act than Fentanyl but longer duration of action
 - Shorter duration of action than Morphine

Intrathecal Opioid

- The side-effects of intrathecal opioids are:
 - sedation,
 - sweating,
 - delayed gastric emptying,
 - urinary retention,
 - pruritus,
 - nausea and vomiting,
 - and respiratory depression.

**Patient Controlled Analgesia
PCA**

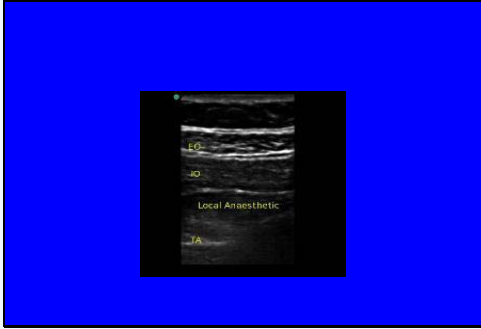
- Opioid analgesia, Morphine most commonly used
- Provide a steady state plasma level of opioid used.
- Self administration of IV opioid
- Safety features integrated in the PCA pump

PCA

- Side effects:
- nausea and vomiting,
 - pruritus, sedation,
 - respiratory depression,
 - confusion.

**The Transversus Abdominis Plane
Block**

- TAP Block:
 - Petit Triangle
 - Needle inserted perpendicular to skin
 - 2 pops
 - Local anaesthetics injected in TAP, between Internal Oblique and Transversus Abdominis muscle
 - High volume, low concentration LA for eg. Chirocaine 0.25% 30 ml each side



TAP Block

- In a small cadaveric study, T11, T12 and L1 were most consistently present in the transversus abdominis plane, while T10 was present in 50% of the cases
- It is reasonable to expect a good analgesic effect in the region between T10 and L1 following a single posterior injection.

Intrathecal opioid Vs Epidural analgesia

- Short-term outcomes with intrathecal versus epidural analgesia in laparoscopic colorectal surgery
 I. Virlos, D. Clements, J. Beynon, V. Ratnalikar, U. Khot
 British Journal of Surgery volume 97, issue 9, pages 1401–1406, September 2010
- Patients who had intrathecal analgesia had:
 - a reduced median postoperative pain score
 - and a shorter hospital stay (4 versus 5 days; P < 0.001).
 Return to normal gut function and postoperative nausea and vomiting were similar in the two groups.

Post-operative Pain Relief

- Regular simple analgesics
- Multimodal
- Local anaesthetics techniques for all patients (infiltration, TAP block) excluding Epidural analgesia (toxicity) or contraindications
- The choice of post-operative plan tailored to patients need.
- Spinal opioid provide superior analgesia compared with PCA and Epidural

Post-operative Pain Relief

- Pain management team
- Regular audit
- Patient education

THANK YOU

Any Questions
?

Anaesthetic implications of laparoscopic colorectal surgery

Laparoscopic surgery offer major benefits for the patient. Minimised incision size and trauma with reduced postoperative pain shortens recovery period and associated with lower wound infection rate. These factors lead to shorter hospital stay and reduced morbidity. Many surgical procedures that once required long hospital stay such as Anterior Resection of Rectum are now performed as laparoscopic approach with significantly reduced morbidity and hospital stay.

Laparoscopic surgery is not without risks. These risks (in addition to the risks associated with the individual procedure) associated with the physiological change caused by pneumoperitoneum and positioning of the patient.

A report by the National Patient safety agency (NPSA) has identified 48 serious incidents associated with laparoscopic surgery in 7 years period, including 11 deaths.

Table 1: Benefits and Risks of Laparoscopic Surgery.

Benefits

Reduced wound infection
Shorter recovery time
Decreased morbidity
Less postoperative pain
Shorter hospital stay

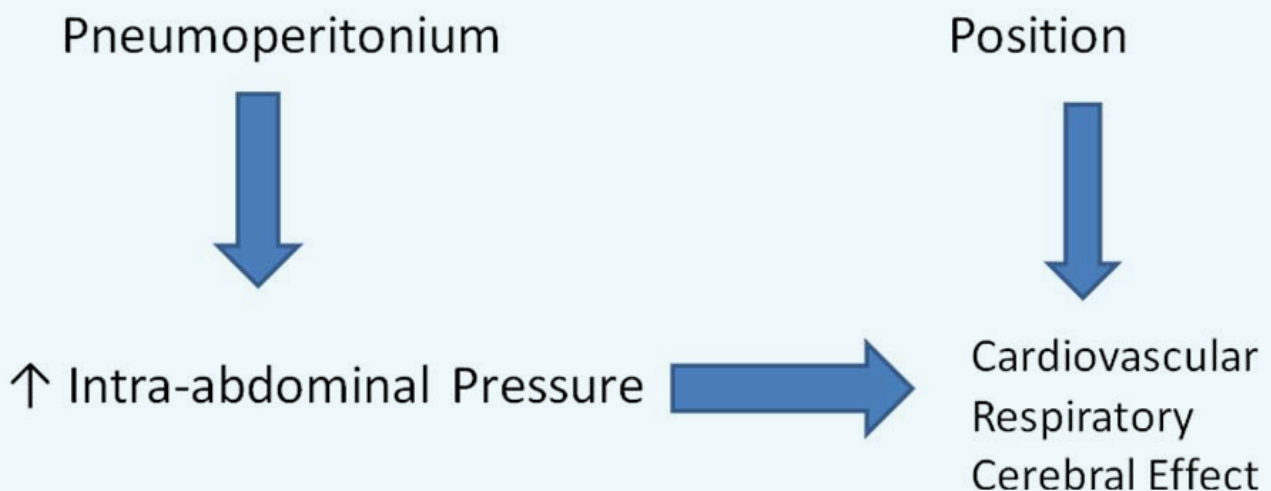
Risks

Vascular and visceral injury
Positioning
Cardiovascular instability
Respiratory insufficiency (atelectasis)
Gas embolism
Lower limb compartment syndrome

Challenges

The main challenges that are associated with colorectal laparoscopic surgery are:

- 1/ Pneumoperitoneum
 - 2/ Positioning
- Figure 1: challenges.



Positioning

Patient positioning represent an important part of laparoscopic procedure, as it facilitate and optimise surgical access. It often involves the extremes of Trendelenburg or reverse Trendelenburg position with significant physiological effects. Meticulous attention should be paid to securing the patient on the table, as peri-operative changes can put the patient at risk of movement on the table. Pressure points should be protected meticulously, to prevent pressure points during a prolong surgery.

Prolonged steep Trendelenburg position increase the risk of cerebral oedema, in addition to risk of pneumoperitoneum, and upper airway oedema which may cause stridor and difficulty in breathing postoperatively

Functional residual capacity and ventilation perfusion (V/Q) mismatch are worsened, and with cephalad movement of the lungs, the tracheal tube may migrate endobronchially.

Another rare but devastating complication of Trendelenburg position is the onset of **“well leg compartment syndrome”** induced by the combination of impaired arterial perfusion to raised lower limb, compression of venous vessels by lower limb supports, and reduced femoral drainage due to the pneumoperitoneum. The compartment syndrome presents after the operation with severe lower limb pain, rhabdomyolysis, and potentially myoglobin-associated acute renal failure leading to significantly increased morbidity and mortality.

Risk factors include surgery more than 4 hours duration, musculat lower limb, obesity, peripheral vascular disease, and steep Trendelenburg positioning.

Risks can be mitigated by avoiding intermittent compression stockings, moving patient's legs at regular intervals, and the use of heel/ankle support inetead of calf/ankle supports (Lloyd-Davies stirrups). For prolong operations, the risks can be reduced by returning the patient to horizontal position every 2 hours with lower limbs massage for 10 minutes. The placement of pulse oximetry on the big toe through the surgery can be used to assess the perfusion and pulsatile flow of distal areas of the lower limb.

In the reverse Trendelenburg position, the extreme head up position results in reduced venous return, leading to hypotension and potentially myocardial ischemia and cerebral ischemia. Particularly vulnerable are the elderly, hypovolaemic patients, and those with pre-existing ischemic heart disease and cerebrovascular disease.

Table 2: Cardiovascular and respiratory changes associated with positioning.

	Trendelenburg	Reverse Trendelenburg
Cardiovascular		
• VR	↑	↓
• CO	↑	↓
• BP	↔	↓
Respiratory		
• Lung volumes	↓	↔
• V/Q mismatch	↑	↔
• Atelectasis	↑	↔

Pneumoperitoneum

Pneumoperitoneum is created using insufflated carbon dioxide to enable sufficient visualisation for the procedure to be performed. As the volume of the abdomen increases, abdominal wall compliance decreases and intra-abdominal pressure (IAP) climbs. When IAP exceeds physiological thresholds, individual organ systems become compromised, potentially increasing patient morbidity and mortality, particularly in Patients with relevant co-morbidities.

Cardiovascular effects:

As IAP increases, systemic vascular resistance (SVR) is increased due to both mechanical compression of the abdominal aorta and production of neurohumoral factors such as vasopressin and activation of the renin–angiotensin–aldosterone axis. Compression of the inferior vena cava reduces preload and may lead to a decrease in cardiac output and subsequent decrease in arterial pressure, particularly if the patient is hypovolaemic. This may be exacerbated by the cephalad displacement of the diaphragm which raises intra-thoracic pressure with further reduction in blood flow through the inferior vena cava, and compression of pulmonary parenchyma which increases pulmonary vascular resistance, further reducing cardiac output.

Reverse Trendelenburg positioning may also result in hypotension due to the reduction in preload by venous pooling in the lower limbs and pelvis which in turn is exacerbated by reduced femoral venous flow secondary to raised IAP.

Respiratory effects

Respiratory changes occur due to raised IAP and Trendelenburg positioning. As the abdomen is distended by CO₂, diaphragmatic excursion is limited resulting in raised intra-thoracic pressure, reduced pulmonary compliance, and reduced functional residual capacity which in turn leads to pulmonary atelectasis, altered V/Q relationships, and hypoxaemia. During surgery, insufflated CO₂ is absorbed, causing an increase in PCO₂ which is further exacerbated by V/Q mismatch.

Splanchnic effects

Blood flow to the kidney and liver is significantly compromised with increasing IAP and this should be an important consideration in patients with existing disease when determining suitability for laparoscopic surgery.

Persistent IAPs over 20 mm Hg will cause a reduction in mesenteric and gastrointestinal mucosal blood flow by up to 40% with progressive tissue acidosis developing as pressure increases.

The renal effects of pneumoperitoneum are significant and raised IAP is recognized as an independent cause of acute kidney injury. An IAP of 20 mm Hg will reduce GFR by 25%. The mechanism for this is postulated to be an impaired renal perfusion gradient secondary to the combined effect of reduced renal afferent flow due to impaired cardiac output and reduced efferent flow due to raised renal venous pressure.

Neurological effects

An elevated IAP causes an increase in intra-cerebral pressure (ICP) by limiting cerebral venous drainage as a consequence of raised intra-thoracic pressure. While clinical studies have suggested that cerebral perfusion pressure is maintained by the increase in mean arterial pressure that occurs with elevated IAP, the increase in ICP may lead to cerebral oedema. This contributes to the temporary neurological dysfunction that patients often experience on emergence from prolonged laparoscopic procedures, particularly those requiring extended periods of steep Trendelenburg positioning.

Table 3: Physiological changes associated with pneumoperitoneum.

Cardiovascular:

- IAP < 10 mm Hg \uparrow VR \rightarrow \uparrow CO
- IAP 10–20 mm Hg \uparrow IAP \rightarrow \downarrow VR \rightarrow \downarrow CO
 \uparrow IAP \rightarrow \uparrow SVR
 $BP = \downarrow CO \times \uparrow\uparrow SVR \leftrightarrow \uparrow BP$
- IAP > 20 mm Hg

Respiratory:

- Lung volumes esp FRC \downarrow
- Airway resistance \uparrow
- Pulmonary compliance \downarrow
- Airway pressure \uparrow
- Risk of barotrauma \uparrow
- V/Q mismatch \uparrow

Renal:

- Renal function \downarrow

Gastrointestinal:

- Risk of regurgitation \uparrow

Neurological:

- ICP $\leftrightarrow \uparrow$
- CPP $\leftrightarrow \downarrow$

Enhanced Recovery Concepts

Parin Shah

Enhanced Recovery Concepts

Parin Shah

Traditional Recovery



Dubious benefit. Potential harm

Traditional Pre-op Care

Pre-op Care

- Admit Day prior to surgery
- Bowel preparation
- Fasting

Intra-op Care

- Laparotomy
- opiates
- NG tube / Drain

Post-op Care

- ?Reintroduce diet
- opiates
- Immobilisation
- Prolonged catheter
- Remove drains & catheter
- Obsession urine
- Social services
- Discharge

What is Fast Track Surgery?



synonyms:

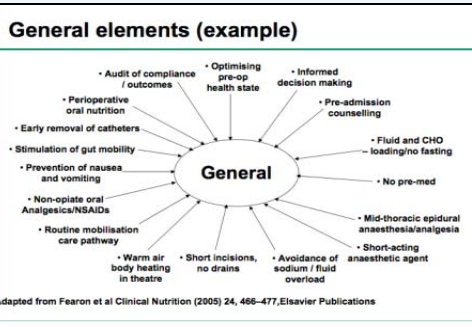
- accelerated recovery program
- ERAS: enhanced recovery after surgery
- Prof Henrik Kehlet, Copenhagen, DK; 1989

Definition:

multimodal comprehensive programme aimed at enhancing postoperative recovery and outcome

Objectives of Enhanced Recovery

- Patient education about the 'proposed' surgery
- Pre-operative optimisation
- Improved anaesthetic techniques
- Reduction of surgical 'stress'
- Advancements in post-operative analgesia
- Meticulous 'after-surgery' care
- Less operative morbidity and mortality
- Early discharge and return to normal activities



Patient Education

- Staff training on procedural aspects and patient care
- Clinical evaluation
- Counselling / psychological prep
- Smoking cessation
- Consent
- Liaison team worker (CNS)
- Information leaflets

Pre-operative Optimisation

- Full assessment with maximal optimisation of medical co-morbidities - guidelines
- Anaesthetic assessment (ASA I, II, ?III)
- Dietary advice / pre-op nutrition
- Avoidance of bowel preparation
- Thromboprophylaxis
- Pre-medication
- Anticipate 'discharge & social issues'

Improved Anaesthetic Techniques

- Use of rapid short acting
 - Volatile anaesthetics (*Desflurane, Sevoflurane*)
 - Opioids (*Remifentanyl*)
 - Muscle relaxants (*Atracurium, Vecuronium*)
- Maintenance of normothermia during surgery
- Regional neurogenic blockage (e.g. Epidural)

Reduction of Surgical Stress

- Choice of abdominal incisions
- Operative techniques – Open Vs MIS
- Minimal and meticulous tissue handling
- Minimise blood loss
- Operative time
- Fluids

Individualise Fluid Therapy



Fluids pre-op
Wet versus Dry
Avoid excessive fluids

Non – Invasive Goals



Post-operative Medication

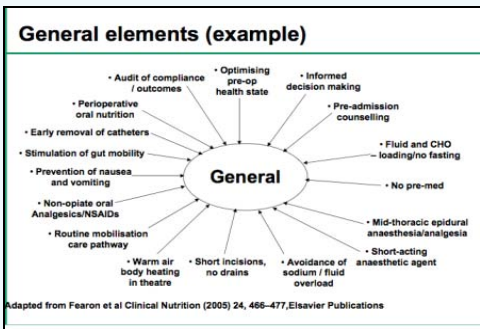
- Recommence normal medications on Day-1
- Effective prophylaxis for PONV
- Thoracic epidural (?PCA) / Spinal – single shot
- Oral analgesics (*WHO Pain Ladder*)
- Gut pro-kinetics
- Laxatives

Meticulous Surgical 'After Care'

- Sit out/spot walk same day
- Avoidance of 'routine' NGT
- Early enteral feeding – same day
- Use of high calorie / high protein drinks
- Drains & catheters
- Early mobilisation
- Stoma care – Pre-op training
- **Patient & Staff Motivation**

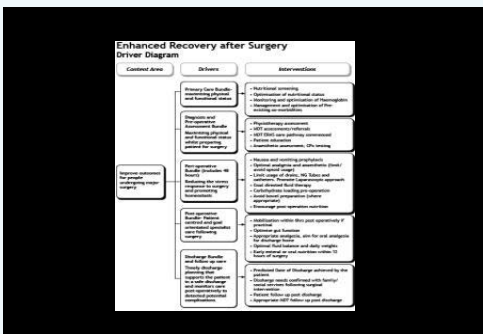
Early Hospital Discharge

- Reduced hospital costs
- Minimising hospital acquired infections
- Early return to normal activities
- Providing vital contact details in case of emergency
- Strict discharge & follow-up protocols



Review of Literature

- Early oral feeding after elective colorectal surgery is *safe* and *tolerated* by majority of patients
- *No benefit* in keeping patients 'nil by mouth' after GI surgery
- Septic complications and length of stay *reduced* in patients fed early
- Use of NGT may *slow recovery* and *increase risk* of some post-operative complications



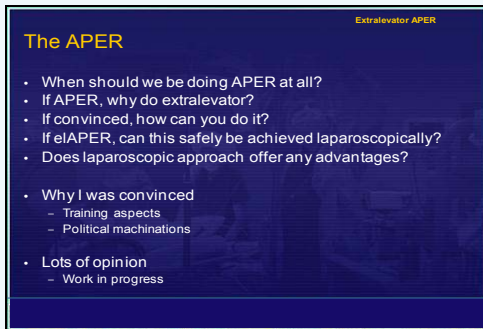


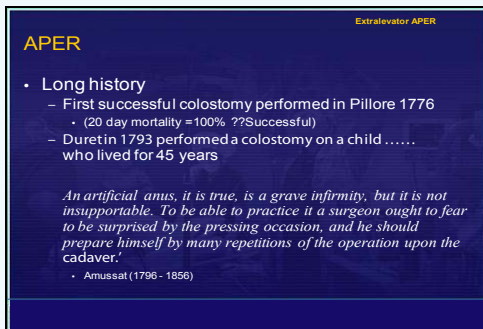
Laparoscopic eIAPER

Barry Appleton

Consultant Colorectal Surgeon,
Princess of Wales Hospital







Extralevator APER

The Contribution of Miles 1908 (Lancet)


The study of the spread of cancer from the rectum has led me to formulate certain essentials in the technique of the operation which must be strictly adhered to if satisfactory results are to be obtained- namely:

- (1) that an abdominal anus is a necessity;
- (2) that the whole of the pelvic colon, with the exception of the part from which the colostomy is made, must be removed because its blood-supply is contained in the zone of upward spread;
- (3) that the whole of the pelvic mesocolon below the point where it crosses the common iliac artery, together with a strip of peritoneum at least an inch wide on either side of it must be cleared away;
- (4) that the group of lymph nodes situated over the bifurcation of the common iliac artery are in all instances to be removed; and lastly
- (5) that the perineal portion of the operation should be carried out as widely as possible so that the lateral and downward spread may be effectively extirpated.**

Extralevator APER

Cylindrical resection

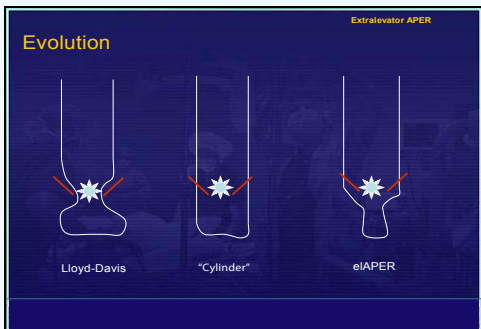
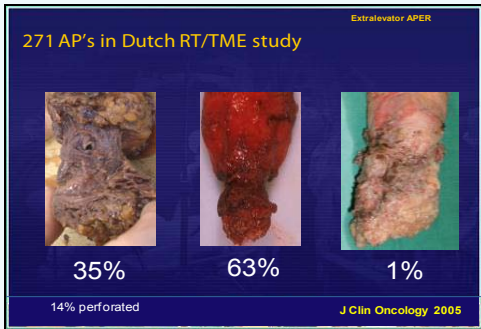
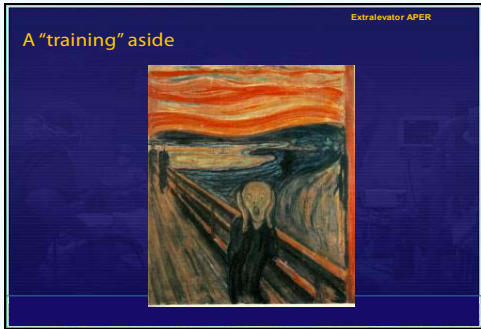
- WE Miles specimen 1939 'memoirs'



Extralevator APER

So why do APER?

- Ballpark figures
 - Local recurrence
 - >20% APER
 - ~5% low anterior resection
- Good operation performed poorly
- Good operation with impossible pathology
- Imperfect operation, performed well or poorly



What about the data 1?

Extralevator APER

- CRM involvement, local recurrence and survival by operation AP's and AR's only (n=536)

	AP's (n=181, 34%)	AR's (n=355, 66%)	p value
CRM positive	66 (36.5%)	79 (22.3%)	0.002
Local Rec	43 (23.8%)	48 (13.5%)	0.002
Cancerspec 5 yr survival	52.3%	65.8%	0.003

Leeds data: Marr et al/Ann Surg. 2005;242(1): 74-82.

Leeds / Stockholm data

Extralevator APER

- 1997 - 2007 Leeds and Stockholm
- Compared cylindrical vs. historical
- CRM +ve rate 14.8% vs 40.6%
- Perforations 3.7% vs 22.8%

• "Cylindrical technique has the potential to improve patient outcomes substantially if appropriate surgical education programs are developed"

West et al/J Clin Oncol. 2008 Jul 20; 26(21): 3517-22

What about the data 2?

Extralevator APER

- European Extra-levator APE Study Group
 - 176 extra-levator APE cases from 11 European colorectal surgeons were compared to 124 standard excisions from one UK centre.
 - Reduction in CRM +ve 50% - 20% and IOPs 28% - 8%
 - Increase in perineal wound complications 20% - 38%

British Journal of Surgery 2010; 97: 588-599

Extralevator APER

Wounds?

- Precious little
 - No real controlled comparative trials to date
- Failure of perineal wound healing from conventional APES between 35% and 65%.
 - Bullard *et al*/ Dis Colon Rectum. 2005 Mar; 48 (3):438-43
 - Chadwick *et al*/ Colorectal Dis. 2006; 8:756-61
 - Kim *et al* Int J Radiat Oncol Biol Phys. 1997 Jul 1; 38 (4): 777-83
- 17% of perineal wounds not healed at 6 months.
 - Kapoor *et al*/ Am Surg. 2005 Feb; 71 (2): 117-22
- "Given the extra tissue removed during eAPE it is reasonable to assume that the rate of failure with eAPES will be at least that of previous studies."
 - National Training Programme in Extra Levator Abdominoperineal Excision
 - Advisory document from Clinical Services Committee, Fozard *et al* 2010

Extralevator APER

So what about laparoscopic

- Pure data theft
 - Apologies to WSS, Swansea and Umesh!
- Singleton Hospital
 - Spectacularly good CRM rates
 - Historically far better than anybody in Wales (?UK)
 - Lloyd-Davies cylindrical excision
 - Would doing abdominal bit laparoscopically affect margin positivity rate?

Extralevator APER

Swansea slide re: limited comparison evidence

Open v Lap APER

- Lap-assisted v Open APER for low rectal cancer: A prospective randomised trial (Ng *et al*. Ann Surg Oncol 2008)
 - CRM +ve in 5.9% of lap group (n=51) vs 4.2% of open group (n=41).
- Feasibility of lap APER for large-sized anorectal cancers: a single-institution experience of 59 cases (Shukla *et al*, Indian J Med Sci 2009)
 - CRM +ve in 20.7% of lap APER
- **MRC CLASICC trial (Jayne *et al*, BJS 2010) of lap v open surgery for colorectal cancer:**
 - 5 yr local rec. rate higher in APER (17.7%) compared to AR (8.9%)
 - **No difference in local recurrence between lap and open APER**

Extralevator APER

Swansea data

	Lap (n= 20)	Open (n=27)
CRM +ve	0	1
Median LN (range)	12 (2-33)	12 (1-31)
Median LOS (range)	6 (3-12)	13 (8-40)
Closure: Primary	13	15
: Flap	2	4
: Mesh	5	8

- Extralevator APER
- ### Swansea conclusions
- A laparoscopic assisted APER can achieve comparable oncological outcome.
 - A cylindrical excision of the perineal part of the APER is crucial to achieve clear CRM.
 - A laparoscopic approach is associated with a shorter length of stay.

- Extralevator APER
- ### Summary of my reading of data
- We're not as good as we think we are at AP
 - Bad disease
 - eIAPER probably better cancer operation than "standard" Lloyd -Davis
 - Perineal wound complications probably more common in the more radical perineal excision
 - ? Cylindrical vs. eIAPER

So what did I do?



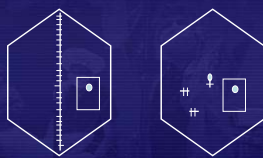
Me

- Certain I would not do Lloyd-Davies well
- Certain I could not teach to others

- Thought I might be able to "go prone"
- Adopted "2 consultant – share the blame" approach
- Felt laparoscopically achievable

- Found:-
 - Far better views (incomparable)
 - Virtually no bleeding (not my previous experience)
 - ?Chance of better clearance.....probably
 - Laparoscopic approach beneficial

?lap APER the "best" colorectal procedure



Problems re: prone

Extralevator APER

- Anaesthetics
 - Atelectasis, eyes, brachial plexus injury, epidural dislodgement, general moaning
- Turning
- Kit
- Long procedure
- When to stop abdominal part of the operation
- Pelvic floor defect
 - Anticipated significant pelvic floor complications
 - Plastic surgery not really an option

Our (properly audited) results in Bridgend 1

Extralevator APER

- 26 cases 8/9/2006-9/11/2010
- 2 consultants, 4 years, 5 performed not prone in same time (not included below)
- Median age 64 (48-81)
- 10 female, 16 male
- 25 adenocarcinomas, 1 melanoma

Our results 2

Extralevator APER

- 17 (65%) preop radiotherapy (45Gy), 16 chemo
- 15 open, 8 lap, 3 converted
- 2 proctocolectomies for synchronous tumours
- Med. time abdo 240 mins (135-310), (includes GA) prone 120 mins (90-210), (includes turning)
- All pelvic floor reconstruction with Permacol porcine collagen implants
- Median length of stay 8 days (6-15)

Extralevator APER

Complications

- posterior vaginal pain x1 (required two EUAs, no satisfactory explanation)
- erectile dysfunction x1
- urinary incontinence x1
- chronic urinary retention x1
- respiratory acidosis x1 (resolved completely with ITU care)
- small bowel obstruction @1 month-cons treatment x1
- colostomy prolapse-operated x1
- abdominal wound dehiscence needed resuturing
- Urethral injury (healed [and perineum] at 16/52)

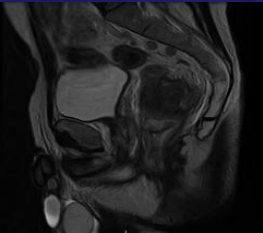
Extralevator APER

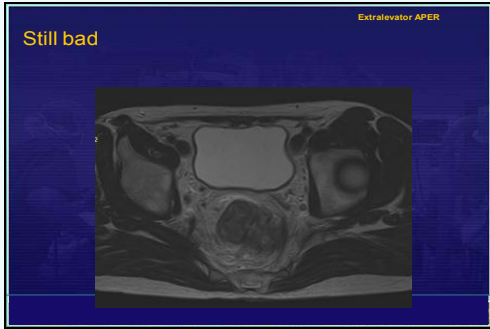
Mortality

- 1 30d mortality (4%) (patient died of bleed from DU, same patient that dehiscd, mentioned above)
- 3 other deaths, one of metastases from synchronously diagnosed aggressive breast cancer, one from colorectal cancer metastases and the other from metastases from the melanoma excised at eIAPER. All three died with no evidence of local recurrence.

Extralevator APER

Bad MDT decision





- Extralevator APER
- So what has happened since!**
- 2 local recurrence from the 23 (both T4, both >24/12 post-op)
 - 1 30 day death (general debility)
 - 1 further death from metastases
 - 11 further eIAPER, 8 laparoscopic
 - 0/11 CRM +ve
 - Patient with urethral disruption had stitch identified at cystoscopy, removed and leak recurred!
 - 2 complete dehiscence
 - 1 closed with permacol intact (patient went on to die)
 - 1 without
 - 1 further perineal sinus, not healed at 19/12
 - 1 ureteric injury (most recent case!)

- Extralevator APER
- How we do it (dissection)**
- Stop abdominal dissection early
 - Swab behind rectum
 - Turn prone
 - Teardrop incision
 - Perisphincteric dissection
 - Clear levator plate
 - Usually take coccyx, don't hurry to remove swab
 - Divide levators at white line, uni- or bilateral
 - Deliver specimen
 - Anterior or anterolateral dissection last

Extralevator APER

How we do it (reconstruction)

- Permacol closure
- Suture ischiorectal fat to implant
- Usually no drains
- Interrupted mattress closure of skin, braided polyester
- Expect serous discharge for a few days
- ROS 3/52

Extralevator APER

VIDEO

Extralevator APER

Summary

- At least consider eIAPER for your patients
 - Easier to do
 - Easier to train
 - Probably better cancer operation
 - Definitely less blood loss
 - Acceptable perineal wound healing with permacol
 - Achievable in DGH
- Try to perform laparoscopically, when possible
- If I can do it, anybody can
 - Suggest do it with another colleague
- Watch the politics

Accommodation

Ty Newydd Country offers tranquillity, comfort and excellent food - and some of the most beautiful scenery in Wales! It provides every modern convenience, while retaining the character and style of a fine Georgian country house. With 28 beautifully appointed bedrooms to unwind in, hot bath, free broadband connection in every room, a fantastic restaurant, log fires, a nice ambience, a welcoming bar and lovely gardens with magnificent views of the Beacons and Neath Valley, the hotel is an excellent place for a nice and relaxing stay.

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Notes

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Notes

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DIRECTIONS TO PRINCE CHARLES HOSPITAL

Travelling to Prince Charles Hospital

By Rail: The nearest main line station is Merthyr Tydfil, which is only a 5 minute walk to the bus station or a 10 minute taxi journey to the Hospital, and has regular service connections to Cardiff. For details of local and national rail enquiries please call the Traveline on: 0870 608 2 608.

By Bus: From outlying areas you are advised to travel to the Merythr Tydfil bus station and then take the number 27 bus which travels to the Hospital. The service runs on the hour and then every 15 minutes with a journey time of 10 minutes.

By Road: Merthyr Tydfil is situated north of Cardiff on the A470 and A465 making it easily accessible via the UK road network.

From Cardiff: Take the A470 heading north for Pontypridd and Merthyr Tydfil. Go straight ahead at the Abercynon roundabout. Go straight ahead at the next two roundabouts and at the third roundabout you will leave the A470 by taking the third exit from the left, (effectively turning right) which is also signposted to Cyfarthfa Castle. Go straight ahead until you reach a set of traffic lights. Turn left at the traffic lights and travel up a twisty road until you reach a T-junction. You will see Cyfarthfa Castle immediately ahead of you. Turn left at the T-junction, also signposted to Cefn Coed y Cymmer. Take the next right turn which is signposted to Prince Charles Hospital. Follow the signs for the hospital.

From Brecon: Travel south along the A470. Approaching Merthyr Tydfil you come to a roundabout which is the junction of the A470 and A465. Take the first left for Abergavenny and then proceed as if coming from Neath above.

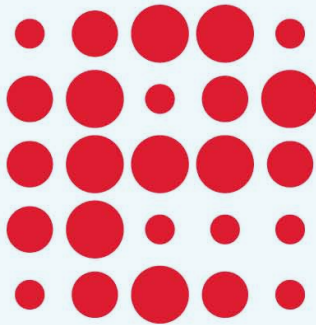
From Abergavenny: Take the A465 for Merthyr Tydfil. Approaching Merthyr Tydfil you come to a roundabout which exits to Cardiff, Merthyr Tydfil, Neath and Asda/ MFI/Allied Carpets. Take the Neath turnoff and continue along the A465 for about 1 kilometre where there is a slip road to the left marked H(A&E) in red and Merthyr Industrial Estate. Follow the slip road to a T-junction and turn right up a hill to a roundabout. Take the third exit off the roundabout. Follow this road past a School and housing estate. The road dips down a small gradient and at the bottom turn left for Prince Charles hospital. This is the fourth left turn after coming off the roundabout (approximately 1 kilometre). The entrance to the hospital is up a small hill and on the left.

From Neath: Take the A465 for Merthyr Tydfil. Approaching Merthyr Tydfil you pass the Baverstock Hotel on your left and, proceeding down a hill you come to a roundabout. Take the second left (effectively straight ahead for Abergavenny). Almost immediately (about 150 yards) turn left, signposted to Prince Charles Hospital, onto a steep and twisty road. You will come to a T-junction at which you will turn right into Cefn Coed y Cymmer. On leaving the village you will drive straight on at the mini roundabout. Take care here as the junction is slightly off-set and the road narrows into a left hand bend. As the bend straightens out, take the next turning left which is signposted to Prince Charles Hospital. The road almost doubles back on itself up a steep hill. As you turn into this road you will see a lake on your right which is set in the grounds of Cyfarthfa Castle. Continue up the hill, and follow signs for the hospital.

On Arrival: Car parking is readily available around the hospital site. Visitors are then requested to report to the reception of the ward or department they are attending.

ACKNOWLEDGEMENTS

We are pleased to acknowledge the generous support of Ethicon Endo-Surgery, the co-organiser and principal sponsor of the event, who provided 20 scholarship places.



Ethicon Endo-Surgery

PART OF THE *Johnson & Johnson* FAMILY OF COMPANIES

We also thank Karl Storz Endoscopy for providing a few scholarship places.

STORZ

KARL STORZ — ENDOSKOPE



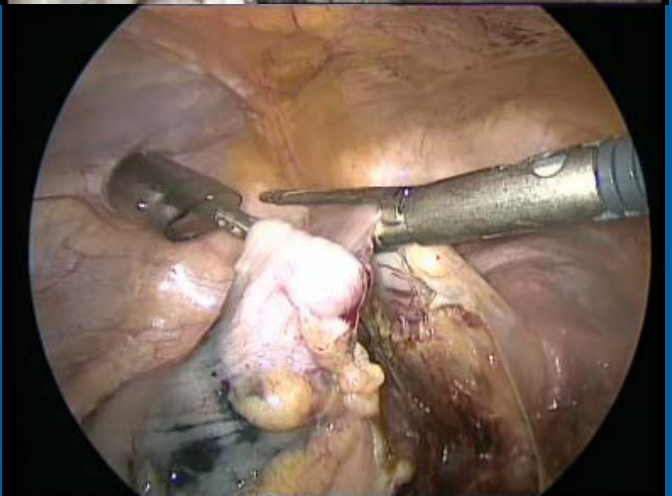
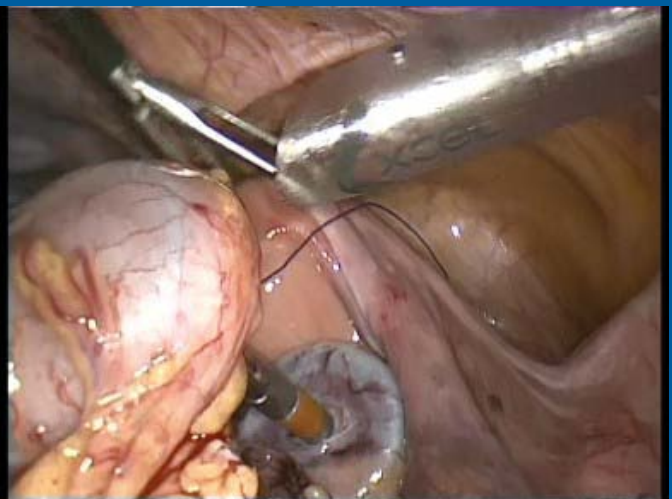
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Laparoscopic Colorectal Surgery Course & Master Class

Dates: 28th and 29th September 2011

Venue: Prince Charles Hospital, Merthyr Tydfil, Wales



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