Current innovations in colorectal surgery

KS Chapple

Consultant Colorectal Surgeon
Sheffield Teaching Hospitals NHS Trust
- Do we need more innovations?
- What innovations are there and are they worthwhile?
Do we need innovations?
Innovations

- **Surgical**
  - TME
  - Liver resection
  - Laparoscopic surgery
  - Robotic surgery
  - Complete Mesocolic Excision
  - APER
  - Colonic stents

- **Non-surgical**
  - Radiotherapy
    - IMRT
  - Anaesthetic
  - Pre-operative assessment
    - CPET
  - Nutritional
  - Radiological
Have these innovations made any difference?

- Very difficult to say
- TME most evidence but even for that high-quality evidence is lacking
- Unlikely to be any single technique which makes a significant advance
- Concept of marginal gains
MARGINAL GAINS

Aggregation of Marginal Gains

- 1% Improvement
- 1% Decline

Time
Innovations

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Laparoscopic surgery

- Laparoscopic/MIS
  - Minimally invasive surgery
- HALS
  - Hand-assisted laparoscopic surgery
- SILS
  - Single-incision laparoscopic surgery
- TAMIS
  - Trans-anal minimally invasive surgery
HALS
SILS
TAMIS
Laparoscopic surgery

- Intuitively sounds better and an advance in surgery
- For colorectal surgery
  - Quicker recovery (in and out hospital)
  - Smaller incisions
  - Less morbidity
    - Wound infections
    - Respiratory complications
    - Adhesions
Laparoscopic surgery

- Does it treat colorectal cancer better?
Laparoscopic surgery

- Does it treat colorectal cancer better?
- Several large studies have addressed this
- Data is conflicting
Laparoscopic surgery

- Several (non-oncological) short term outcomes better with laparoscopic surgery

- Most accept that long term outcomes for both open and laparoscopic surgery are broadly equivalent
Laparoscopic surgery

- Any difference between colon and rectal cancer?
Rectal cancer

- Total mesorectal excision now standard of care for rectal tumour excision
Rectal cancer

- Technically demanding especially for laparoscopic surgery

- Ongoing concerns that laparoscopic TME may not be as oncologically effective as open surgery
Rectal cancer

- Cochrane review
  - 2014

- 14 Randomised Controlled Trials
  - 3528 patients
Rectal cancer

- For laparoscopic surgery
  - Conversion rate 15%
  - 2 day shorter hospital stay (laparoscopic)
  - Defecation 1 day sooner (laparoscopic)
  - Less wound infection
  - Less bleeding complication
Rectal cancer

- For both techniques
  - 30-day morbidity same
  - No difference in quality of life
    - Recovery
    - Bladder function
    - Sexual function
Rectal cancer

- Oncological outcomes
  - Number of lymph nodes
  - Surgical margins same

- Similar disease-free and overall survival at 3 and 10 years
  - Weak evidence
Rectal cancer

- So why is everyone in the colorectal field still concerned about laparoscopic rectal cancer surgery?
Recent rectal cancer trials

- 2 major studies published in last year
  - ALaCaRT
    - Australasia
  - ACOSOG Z6051
    - USA

- Non-inferiority trials
  - Aim to show newer technique (laparoscopic surgery) was not inferior (ie it was equal) to open technique
Recent rectal cancer trials

- **ALaCaRT**
  - 475 patients
  - Randomised to either laparoscopic or open rectal cancer surgery
  - Investigated whether resection was successful in terms of pathological specimen
ALaCaRT

- Conversion rate 9%
- Successful oncological resection in
  - 82% (laparoscopic)
  - 89% (open)
- Could not demonstrate that laparoscopic surgery was non-inferior (ie equal) to open surgery
ALaCaRT

• “these findings do not provide sufficient evidence for the routine use of laparoscopic surgery” (in rectal cancer surgery)
ACOSOG Z6051

- Similar methodology to ALaCaRT study
- 486 patients
- 35 centres
- Randomised to either laparoscopic or open rectal cancer surgery
ACOSOG Z6051

- Conversion rate 11.3%
- Longer operating time with laparoscopy
- Similar
  - Length of stay
  - Readmission rate
  - Severe complications
ACOSOG Z6051

- Adequate oncological resection in
  - 81.7% (laparoscopic)
  - 86.9% (open)

- “these findings do not support the use of laparoscopic resection in these patients”
ROBOTIC SURGERY
Potential benefits

- More precise dissection
- Less blood loss
- Expensive
- Training

- But is it of benefit?
Evidence

- 1 RCT
  - ROLARR
  - Compared laparoscopic to robotic resection for rectal cancer

- Not published in peer-reviewed journal

- No benefit to robot resection
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CME

- **Complete Mesocolic Excision**
- More radical resection technique for colon cancers
- Based on principle of TME (Total Mesorectal Excision)
- Pioneered by Prof Hohenberger in Erlangen, Germany
CME
Concept

- 3 features
  - Meticulous dissection along embryological planes
  - Extensive lymphadenectomy
  - Ligation of feeding vessels at their origin
CME

Mesocolon is usually divided somewhere between these lines in standard resections.

D1

Lymphatic node

D2

Lymphatic node metastasis

D3

Mesocolon is divided at this line in CME as CVL is performed.

Source: Louise Bork & Claus Anders Bertelsen
CME
CME - disadvantages

- Longer operative time
- More difficult to perform
- Bleeding risk
CME - evidence

- Erlangen, Germany
  - Historical series
  - 2009
  - Increased disease-free survival using CME

- Sydney, Australia
  - Historical series
  - 2016
  - High 5 year overall survival rates with CME
CME - evidence

- Large retrospective study
  - Lancet December 2014
  - Denmark
  - 4 hospitals in Copenhagen
    - 1 performs CME for all resections
    - 3 perform ‘standard’ surgery

- Survival data analysed for all patients undergoing potentially curative resection
CME - evidence

- 3.5 year period
  - 364 patients in CME arm
  - 1031 in control arm
- 4 year disease-free survival improved by 10% in patients undergoing CME
- Improvements most marked for early tumours (Stage I and II)
CME EVIDENCE

A

Disease-free survival (%)

Number at risk

B

Number at risk

CME
Non-CME

p=0.0010

p=0.046
CME

- Oncological improvement exceeds that of adjuvant chemotherapy

- Main criticism of study is different follow-up protocols
CME

- Should CME now be the standard of care for all colonic cancer resections?
- If it is the standard of care, can outcomes be improved even further by performing this laparoscopically?
CME

- Many reports demonstrating feasibility of laparoscopic/robotic CME

- Danish study
  - 50% laparoscopic (22% converted)
CME

- One centre has shown similar pathological specimen quality between laparoscopic and open CME.

- Certain parts of the open CME operation are not performed laparoscopically:
  - Marginal gains.