LEEDS Institute for Data Analytics

BCI Bowel Cancer Intelligence
Using information to improve bowel cancer care nationwide

Post-colonoscopy colorectal cancer in inflammatory bowel diseases.

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BOBBY MOORE FUND
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Outline

- Background
  - CRC in IBD
  - Surveillance in IBD
  - PCCRC in IBD
    - WEO definitions of interval cancers
- Results
  - 1 year, 3-year
  - Comparison of characteristics and rates – TP v FN
  - Comparison of outcomes – detected v PCCRC
    - Stage
    - Emergency presentation

Colorectal cancer in inflammatory bowel disease

- Incidence of IBD increasing
- CRC is a serious complications
- Patients worry about developing cancer *(de Rooy 2001)*
- There is uncertainty about current risk:
  1. Stable risk over time – 60% increase from general population. *(Herrington 2012)*
  2. Similar pooled risk to general population, 50% increased risk for selected individuals. *(Jess 2012)*
- Methods to improve outcomes
  - Colonoscopic surveillance
  - Surgery

Comparing non-IBD and IBD associated CRC

- UK population datasets (2005 – 2013):
  - Cancer Registry (NCRAS)
  - HES (IBD admission codes)
- ~130, 000 CRC
- 2% with admission code for IBD (CD or UC)
- Comparisons
  - Mean age of 65yrs for IBD and 70yrs for sporadic
  - Increase in emergency presentations for IBD: 19% versus 9%
  - Reduced unadjusted survival for IBD cancer 118 versus 148 months
- No differences for location and stage

Colorectal cancer surveillance in IBD

- Detect pre-cancerous lesions, early cancers and reduce mortality
- British Society of Gastroenterology guidelines *(Cairns, 2010)*

- Individuals with IBD advised not necessary to participate in the national bowel cancer screening programme
- Low uptake of surveillance guidelines
  - 54% in French population *(Vienne 2011)*
- Is there a benefit?

Surveillance

- Purpose of surveillance is to reduced mortality from CRC
- Good for detecting dysplasia
  - SCENIC 2015.
  - Chromoendoscopy better than white light.
    - Increased RR 1.8 (95% CI 1.2 – 2.6)
- Low grade dysplasia associated with nine-fold increase in CRC risk *(Systematic review, Thomas 2007)*
- Low overall progression of dysplasia to cancer:
  - 5% at 4 years low grade dysplasia to CRC. *(Zisman 2012)*
- Low risk of CRC for those who defer surgery
  - 2% risk of node negative CRC amongst 175 patients deferring surgery for median of 5 months. *(Murphy 2016)*
- CRC Incidence Rate in pts undergoing CE significantly lower than in those not having CE
  - (2.2 vs 4.6 per 1,000 patient-years); (P =.02). *(Choi, AJG, 2015).*

Benefit of surveillance?

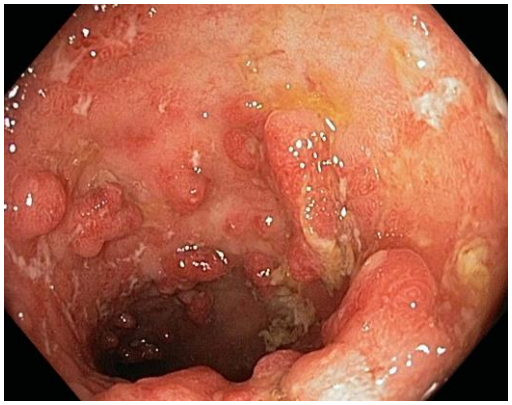
- Cochrane review 2006.
  - No clear survival benefit
  - Earlier stage cancers in the surveillance population.
    - Better prognosis but subject to lead time bias.
- Colonoscopy within 36 months. *(Ananthrakrishnan 2014)*
  - Reduced CRC incidence. OR 0.56 (95% CI 0.39 – 0.80).
  - Reduced mortality rate for those CRC. OR 0.34 (95% CI 0.12 – 0.95).
- Surveillance is not without cost or risk
  - High burden to the patient and healthcare services.
  - Small risk of damage during the procedure.
  - Potential for harm from unnecessary investigations and endoscopic or surgical resections.
  - No cost-effectiveness analyses.

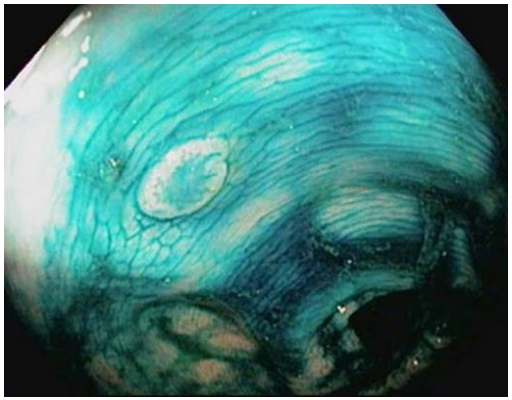
Post-colonoscopy colorectal cancer - PCCRC

- Colorectal cancer occurring after a “negative” colonoscopy
- ~ 7% in England in 2007 for the whole population *(Morris 2014)*
- Key performance indicator of colonoscopy
- PCCRC rate in IBD is high
  - 30% of those in a dedicated surveillance programme. *(Mooiweer 2015)*
  - 39% in a population dataset. *(Le Clercq 2015)*
  - Up to 54% in UC in latest Swedish data. *(Stjärngrim 2017)*

Reasons for PCCRC in IBD

- Lesions:
  - Missed
  - Incomplete resection
  - Rapidly growing
- Patient / procedure:
  - Patient biology
  - Inadequate bowel preparation
  - Endoscopy technique
- IBD
  - Flat lesions
  - Disease activity and inflammation
  - Pseudopolyps





Taxonomy of PCCRC in IBD

- Interval cancers
  - Cancer is identified before the next recommended surveillance examination
- Non-interval cancers
  - Type A – Cancer identified at the recommended surveillance interval
  - Type B – Cancer identified after the recommended surveillance interval
  - Type C - No subsequent screening was recommended up to 10 years after the index colonoscopy.
- Type A could be a surveillance success
  - but may also have been a missed opportunity at the earlier test.
- Interval cancers could be considered a surveillance failure and therefore an indicator of poor quality surveillance
- The non-interval cases may indicate recommended surveillance intervals need to change

4 case examples in IBD

	Interval type	Non-interval type		
		Type A	Type B	Type C
	Detected before recommended interval	**Detected at recommended interval**	**Detected after recommended interval**	**No interval recommended**
Clinical scenario	Quiescent pan-UC.	Pan UC & inflammatory polyps.	Pan-UC & PSC.	Proctitis.
Recommendation	Surveillance in 5 y.	Surveillance in 3 y.	1 year surveillance.	No surveillance booked.
Outcome	4 y later anaemia develops; colonoscopy reveals CRC	CRC is found at the repeat test.	Patient misses this, Returns 3 y later with CRC.	Attends 7 years later with weight loss CT reveals CRC
Possible verdict	The recommended screening/surveillance interval may be too long	The recommended screening/surveillance interval may be too long	Reinforces importance of adherence to recommended screening/surveillance intervals	Review whether subsequent screening/surveillance may have been appropriate

Aims

- Determine PCCRC rates in those with IBD
- Examine potential risk factors
- Explore outcomes for PCCRC and detected cancers.

Methods

- Data sources
  - Colorectal cancer – National Cancer Registration and Analysis Service
  - Colonoscopies – Hospital Episode Statistics
- Cancers diagnosed between 2006 and 2016
- Colonoscopies before the CRC diagnosis
  - True positive test - cancer diagnosed within 6 months
  - Falsely negative test – cancer diagnosed 6 – 36 months
- PCCRC – 3 year rate calculated as:

false negative / (true positive + false negative) %

- PCCRC-1yr also calculated by varying the intervals above
- We explored factors associated with PCCRC.

Conclusions

- PCCRC rates are high in those with IBD
  - True interval cancers and potentially missed lesions
  - Non-interval cancer which may include successful surveillance tests
- High numbers of stage 4 PCCRC-3yr, which are likely to reflect missed lesions
- Need to investigate avoidable reasons for cancers in IBD
- Further research needed to investigate the efficacy of surveillance in IBD.
  - Who to survey?
  - How often?
  - Which method?

Problems with assessing the efficacy of surveillance

- Unethical to randomise to colonoscopy or not
  - Added to that would need follow up of ~ 10 years
- Retrospective studies
  - Limited by lack of appropriately matched control groups.
  - Surveillance adherence will be associated with “healthy behaviour” and engagement with services. May over estimate the efficacy of surveillance.

What are the key questions/issues?

- Can IBD related CRC be prevented with optimal treatment and surveillance techniques?
- In what way does this data help us optimise our approach?
- What is the optimal management strategy?
  - Who, what and how?
- How can the process be quality assured?
- What role can the WEO play?

Collaborators

- Professor Eva Morris
- Dr Roland Valori
- Professor Matthew Rutter
- Andy Smith
- Simon Whalley
- Jon Shelton
- Clare Pearson

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