Colonic Tattooing: An overview

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Polyp Symposium 2016

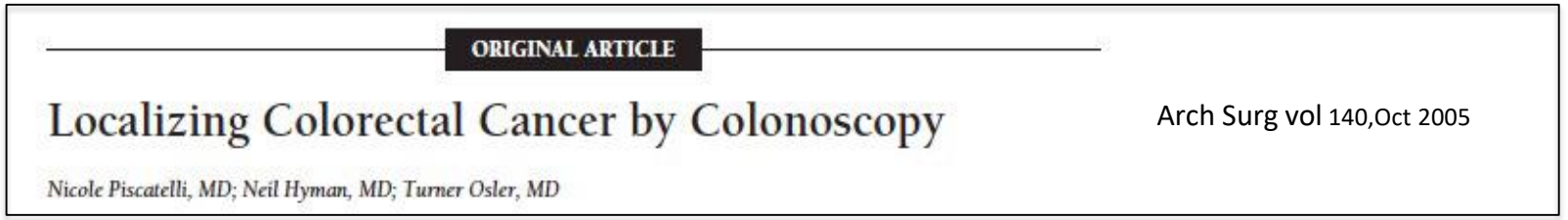
Why do it ?

1. Localize an obvious tumour that is going to be resected

2. Provide localization for a suspicious endoscopically resected polyp at the site of the EMR

Why do it ?

Localizing tumours



ORIGINAL ARTICLE

Localizing Colorectal Cancer by Colonoscopy

Nicole Piscatelli, MD; Neil Hyman, MD; Turner Osler, MD

Arch Surg vol 140,Oct 2005

- Colonoscopy has a *considerable error* rate for localization of colorectal cancers.
  - 236 patients with complete endoscopic, operative & pathology records
  - Colonoscopy inaccurate in 21%
  - 11% required a different procedure to what was planned

Colonoscopy alone is inadequate; tattooing should be strongly considered

  - Especially important for laparoscopic resections

Why do it ?

Suspicious polyps undergoing EMR

- Subsequent resectional surgery is deemed necessary after histological assessment
- Assists in the subsequent resection as there is no palpable, visual or residual lesion after the EMR
- Informs surgeon which segment of bowel to resect

Which polyps are suspicious?

- British guidelines – larger than 1cm

Consequences of poorly or non-localized cancers or polyps

- Inaccurate incisions, trocar placement and patient positioning
  - Longer operating times, exposure to anaesthetic, all-round frustration

- Change in operative approach
  - In the colon
  - In the rectum
    - Colonoscopic assessment – Mid-sigmoid lesion planning a sigmoid colectomy
    - Intra-Operative assessment– Mid-or low rectal requiring LAR or even an APR
    - Results in an unplanned pelvic operation when a straight-forward abdominal procedure was anticipated

- Resection of incorrect segment
  - Inaccurate staging
  - Leave cancer in situ

What to use ?

- Many dyes have been tried…
  - Methylene blue
  - Indigo carmine
  - Indocyanine green
    - All disappear within a few days
    - Rapidly absorbed
    - Inappropriate for localization

What to use ?

- India ink
  - Has been made by various cultures for 1000's of years
    - Lamp black – soot residue from oil lamps
    - Bone and wood char – burnt wood and cow bones
    - Vine char – burnt grape vines and stems
  - Very fine soot
  - Combined with water
  - May have colloid with it like gelatin or shellac to keep it in suspension

India Ink preparations

Commercial products

Non-commercial

How reliable is tattooing ?

Original article

doi:10.1111/j.1463-1318.2010.02423.x

Leaving a mark: the frequency and accuracy of tattooing prior to laparoscopic colorectal surgery

P. J. Conaghan, C. A. Maxwell-Armstrong, M. V. Garrioch, L. Hong and A.G. Acheson

Department of Surgery, Queen's Medical Centre, Nottingham University Hospitals NHS Trust, Nottingham, UK

- 54 tattoo's in 81 patients with colonic lesions
- All patients underwent laparoscopic resection
  - Tattoo visualized and accurate in 70%
  - Visible but inaccurate in 7%
  - Not visible in 15%

Technique is important to achieve reliable localization

- At least 3 tattoo's close to the lesion
- Raise a submucosal bleb before injecting ink

Alternatives and adjuncts to Tattoo

- CT Colonography
  - Usually would be a second CT after initial staging investigation.
  - Radiation exposure risks
- Intra-operative ultrasound
- Intra-operative colonoscopy with serosal clipping or suturing

How safe is it ?

Technical note

doi:10.1111/j.1463-1318.2008.01706.x

Colonic tattooing in laparoscopic surgery – making the mark?

J. M. C. Yeung, C. Maxwell-Armstrong and A. G. Acheson

Department of General Surgery, Queens Medical Centre, Nottingham, UK

Received 16 July 2008; accepted 21 July 2008

No evidence of severe complications in 55 patients
Resected specimens showed chronic inflammatory changes
No dysplasia or malignancy
No evidence that carbon exposure to lung or other organs was carcinogenic
Sterilized commercial india ink was safe

Scenarios

1. Caecal lesions

2. Rectal lesions
   - Below 10cm
   - Endoscopically resected polyps in upper ⅓

1. EMR done of a colonic polyp without tattooing and histology comes back positive for malignancy

Scenarios

Cancer or suspicious polyps in the Caecum

- Confidently localized
  - Appendix orifice visualized
  - TI has been intubated

No need to tattoo → Right hemicolectomy

Scenarios

Cancer or suspicious polyps in the Rectum

- Essential to measure height of lesion accurately; use a rigid sigmoidoscope for this
- Flexible sigmoidoscopic measurements of lesion heights in the rectum are inaccurate
- Lesions < 10cm from anal verge
  - LAR or APR.
  - Tattoo may distort TME dissection plane and does not aid resection – the lesion is already localized

Don't tattoo lesions in the lower ⅔ of the rectum

Scenarios

Endoscopically resected lesion in upper ⅓ of rectum (between 10 and 15cm from anal verge on rigid sigmoidoscopy)

- Issues are
  - The lesion needs to be localized – HAR vs. LAR
  - The TME dissection plane should not be distorted by large transmural tattoo's

? small tattoo on the base

Scenarios

EMR done of a colonic polyp without tattooing and histology comes back positive for malignancy

- Endoscopic resection site usually detectable for a few days

Repeat C-scope immediately and tattoo the site

What protocol should be used

Indications

- Prior to surgery to localise pathology
- To mark lesions for endoscopic surveillance
- There is no need to tattoo for:
  - ➢ Lesions in the caecum
  - ➢ Rectal lesions up to 10cm

  However, if in doubt, then place a tattoo

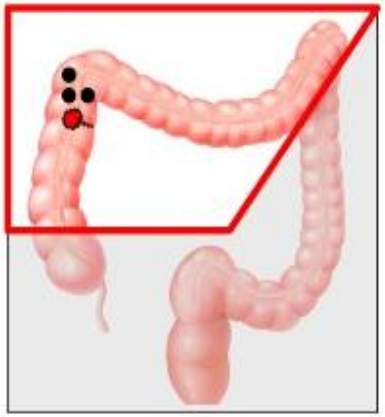
Equipment

- Primed variceal injection needle with 10ml syringe filled with normal saline
- 5ml syringe filled with Spot® (or 0.9ml sterilised Black (India) Ink made up to 5ml with normal saline)

Procedure

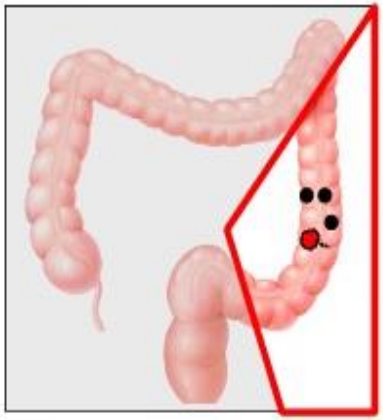
- Direct needle at an angle to mucosa
- Raise a bleb using 1-2ml of saline
- Swap to syringe filled with Spot® or India Ink
- Inject 1ml into the bleb to create tattoo
- Swap to syringe filled with saline and flush ink out with 1ml saline before removing needle

PROXIMAL lesions (caecum to splenic)



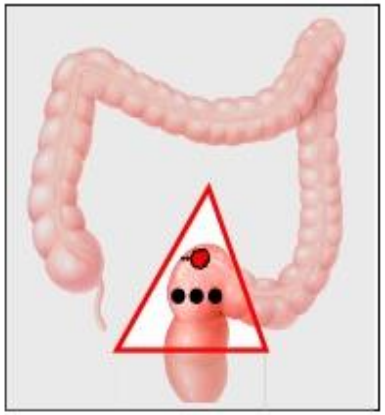
Place 3 tattoos 3cm **DISTAL** to lesion

DISTAL lesions (splenic to rectosigmoid)



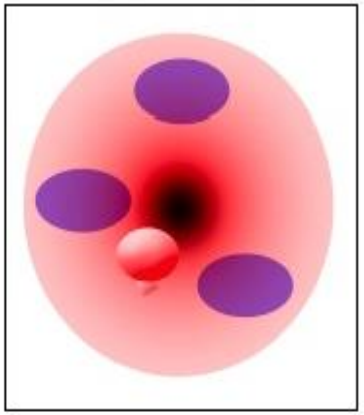
Place 3 tattoos 3cm **PROXIMAL** to lesion

RECTOSIGMOID lesions (25cm to 10cm)



Place 3 tattoos 3cm **DISTAL** to lesion

Tattoo positioning



Place 3 tattoos at 120° 3cm from lesion