

Colorectal polyps: when should we tattoo?

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Abstract

Background Current guidelines recommend tattooing of suspicious-looking lesions at colonoscopy without a reference to the size of the polyp. However, the endoscopist has to make a judgement as to which lesion may be malignant and require future localisation based on the appearance and size of the polyp. The aim of this study was to determine the relationship between endoscopic polyp size and invasive colorectal cancer so as to inform tattooing practice for patients taking part in the national bowel cancer screening programme (BCSP).

Methods Data of BCSP patients who had undergone a polypectomy between October 2008 and October 2010 were collected from a prospectively maintained hospital endoscopic database. Histology data were obtained from electronic patient records.

Results A total of 165 patients had undergone 269 polypectomies. Their median age was 66 years and 66 % were men. The mean endoscopic polyp size was 10.7 mm (SD = ±8 mm). Histologically, 81 % were neoplastic with 95 % showing low-grade and 5 % high-grade dysplasia. Eight patients were found to have invasive malignancy within their polyp. The risk of invasive malignancy within a polyp was 0.7 % (1/143) when the endoscopic polyp size was <10 mm; the risk increased to 2.4 % (2/83) when the polyp size was 10–19 mm and 13 % (5/40) when the polyp was >20 mm. This trend was statistically significant ($p = 0.001$). About 23 % of the patients had the

site of their polyp tattooed; the mean size of the tattooed polyps was 21 mm (range = 15–50 mm). Consequently, 25 % of malignant polyps and 63 % of polyps with high-grade dysplasia were not tattooed.

Conclusion The risk of polyp cancer among BCSP patients increases significantly when the endoscopic polyp size is ≥ 10 mm. We recommend that all polyps ≥ 10 mm be tattooed.

Keywords Polyps · Tattoo · Colorectal · Screening · Colonoscopy

Screening programmes enable the detection of early asymptomatic cancers [1]. Among cancers detected in the second round of the English bowel cancer screening pilot, 17.7 % were polyp cancers. However, cancer risk stratification in bowel cancer screening programme (BCSP) patients based on endoscopic polyp size has not been reported [2]. Accurate marking (tattooing) of lesions suspected of malignancy at colonoscopy is recommended [3, 4]. This is increasingly important as patients requiring surgical treatment are frequently offered laparoscopic surgery and the lack of tactile feedback can prevent tumour localisation, increasing the potential risk of resection of the wrong bowel segment [5]. Furthermore, if a polypectomy has been performed, there may be no obvious abnormality left to aid detection at surgery except for a tattoo. Where tattooing was not performed, a repeat colonoscopy preoperatively may become necessary adding to the overall cost.

Current guidelines recommend tattooing of suspicious-looking lesions without reference to the size of the polyp [3, 4]. The endoscopist has to judge which lesion may be malignant and require future localisation based on the appearance and size of the polyp.

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The aim of this study was to determine the relationship between endoscopic polyp size and invasive colorectal cancer in order to inform tattooing practice for patients taking part in the national BCSP.

Patients and methods

Data were collected retrospectively from a prospectively maintained database of BCSP patients who had undergone polypectomy between October 2008 and October 2010. All patients were asymptomatic with a positive faecal occult blood (FOB) test. Histology was obtained from electronic patient records. Data were analysed using SPSS ver. 15.0 (SPSS, Inc., Chicago, IL). Spearman's correlation coefficient and the χ^2 test were used for statistical analysis.

Results

During the study period, 269 polypectomies were performed in 165 BCSP patients. The mean age was 66 years and 66 % were men. At colonoscopy, polyps appeared sessile in 67 % (182/269) and pedunculated in 33 % (87/269). The risk of malignancy and high-grade dysplasia was similar for the two types (Table 1).

The majority of the polyps were left-sided (56 %, 151/269), 30 % (81/269) were right-sided, and 14 % (37/269) were in the rectum. Histologically, 81 % (219/269) of the polyps were neoplastic (Fig. 1). The dysplastic grade was low in 95 % (210/219) and high in 5 % (11/219). Two of the 11 polyps with high-grade dysplasia were right-sided. Eight polyps were found to contain invasive malignancy and most of them (75 %, 6/8) were situated in the left hemicolon or rectum. The proportion of cancer and high-grade dysplasia was higher in polyps found on the left side of the bowel compared to the right side, but this difference was statistically not significant (Table 2; $p = 0.447$). The mean (\pm SD) endoscopic polyp size (10.7 ± 8 mm) was greater than that at histological assessment (9.6 ± 6 mm). The endoscopic and pathological polyp size correlated well (Spearman's $\rho = 0.736$; $p < 0.001$).

The risk of malignant change within a polyp was 0.7 % (1/143) when the endoscopic polyp size was <10 mm; the risk increased to 2.4 % (2/83) when the polyp size was 10–19 mm and was 13 % (5/40) when >19 mm. This was

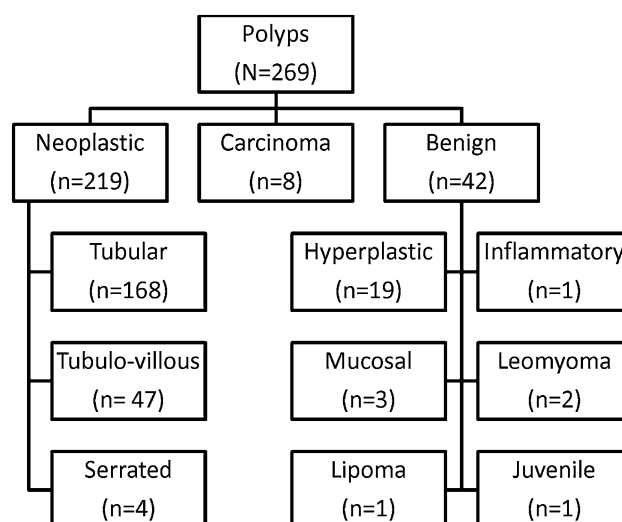


Fig. 1 Types of polyps

statistically significant ($p = 0.001$). A similar trend was noted for high-grade dysplasia and size (Table 3).

Overall, 23 % (38/165) of the patients had a colonic lesion tattooed; the mean size of the polyps in this subgroup was 21 mm (range = 15–50 mm). Therefore, 25 % of the malignant polyps and 63 % of the polyps with high-grade dysplasia were not tattooed.

Discussion

Precise localisation of colonic lesions is important for their identification at repeat examination or subsequent surgery. The colonic lesions of up to 21 % of patients may be erroneously localised at endoscopy and use of tattooing techniques has been recommended to avoid this [6, 7]. Identifying lesions that may need further treatment or monitoring, thus requiring a tattoo, is an imprecise science and based on appearance and size of the polyp.

Various techniques and markers have been used to mark colonic lesions for subsequent examination or surgery [8, 9]. Submucosal injection of India ink is an inexpensive, safe, and an effective method for tumour localisation in laparoscopic colorectal surgery [10]. The European guidelines for cancer screening recommend that India ink tattooing should be performed distal to the lesion, and should include at least three quadrants of the bowel [3].

Table 1 Cancer/high-grade dysplasia risk stratification according to polyp type

Type	High-grade dysplasia (%)	Cancer (%)	Combined (%)	Significance
Sessile (182)	4 (2.1)	6 (3.2)	10 (12)	$p = 0.14$
Pedunculated (87)	7 (8)	2 (2.2)	9 (10)	

Table 2 Risk of cancer/high-grade dysplasia according to site

Site (no. of polyps)	Cancer (%)	High-grade dysplasia (%)	Combined (%)	Significance
Right hemicolon (81)	2 (2.5)	2 (2.5)	4 (5)	$p = 0.447$
Left hemicolon (151)	5 (3.3)	8 (5.3)	15 (8)	
Rectum (37)	1 (2.7)	1 (2.7)		

Table 3 Cancer/high-grade dysplasia risk stratification according to endoscopic size

Endoscopic polyp size (mm)	% Cancer (cancer/all polyps)	% High-grade dysplasia	Combined (%)
<10	0.7 (1/143)	– (0/143)	0.7
10–19	2.4 (2/83)	8.4 (7/83)	11
≥20	13 (5/40)	10 (4/40)	22
χ^2 Test	$p = 0.001$	$p = 0.001$	$p < 0.001$

Not all patients who undergo a polypectomy have the site tattooed. This may be for a number of reasons, including concerns about longer procedure time, risk to the patient, and the increased cost of the procedure. One study reported that only 65 % of the BCSP patients who underwent laparoscopic resection had their colonic lesion tattooed [11]. About 23 % of the patients in this study received a colonic tattoo, with the smallest polyp size being 15 mm. Consequently, 25 % of the malignant polyps and 63 % of polyps with high-grade dysplasia were not tattooed.

Tattooing of lesions suspected of malignancy is recommended in order to facilitate easy localisation at surgery or endoscopic follow-up. Failure to do so will lead to uncertainty which may result in patient harm [12]. Furthermore, polyps that do not lift at the time of tattooing are likely to be advanced in nature and potentially not suitable for endoscopic resection [13].

The factors that guide the endoscopist's decision to tattoo are the appearance and size of the polyp. Most malignant polyps have a benign appearance at endoscopy [14] so a decision has to be based on polyp size. Whilst the majority of polyps detected in this study were <10 mm and benign, the risk of malignancy was 5.6 % (7/123) in polyps >10 mm. These results are similar to those found in the French screening programme [15]. The risk of polyp cancer among BCSP patients increases significantly when the endoscopic polyp size is ≥10 mm. Based on this study we recommend that all polyps ≥10 mm should be tattooed.

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References

- Goodyear SJ, Stallard N, Gaunt A, Parker R, Williams N, Wong L (2008) Local impact of the English arm of the UK Bowel Cancer Screening Pilot study. *Br J Surg* 95:1172–1179
- Weller D, Moss S, Butler P, Campbell C, Coleman D, Melia J (2006) English Pilot of Bowel Cancer Screening: an Evaluation of the Second Round. Final Report to the Department of Health. <http://www.cancerscreening.nhs.uk/bowel/pilot-2nd-round-evaluation.pdf>. Accessed 11 Aug 2011
- European Commission (2011) European guidelines for quality assurance in colorectal cancer screening and diagnosis. <http://www.europacol.com>. Accessed 11 Aug 2011
- Atkin WS, Saunders BP (2002) Surveillance guidelines after removal of colorectal adenomatous polyps. *Gut* 51(Suppl 5):V6–V9
- Beretvas RI, Ponsky J (2001) Endoscopic marking: an adjunct to laparoscopic gastrointestinal surgery. *Surg Endosc* 15:1202–1203
- Piscatelli N, Hyman N, Osler T (2005) Localizing colorectal cancer by colonoscopy. *Arch Surg* 140:932–935
- Stanciu C, Trifan A, Khder SA (2007) Accuracy of colonoscopy in localizing colonic cancer. *Rev Med Chir Soc Med Nat Iasi* 111: 39–43
- Askin MP, Wayne JD, Fiedler L, Harpaz N (2002) Tattoo of colonic neoplasms in 113 patients with a new sterile carbon compound. *Gastrointest Endosc* 56:339–342
- Ellis KK, Fennerty MB (1997) Marking and identifying colon lesions. Tattoos, clips, and radiology in imaging the colon. *Gastrointest Endosc Clin N Am* 7:401–411
- Park JW, Sohn DK, Hong CW, Han KS, Choi DH, Chang HJ (2008) The usefulness of preoperative colonoscopic tattooing using a saline test injection method with prepackaged sterile India ink for localization in laparoscopic colorectal surgery. *Surg Endosc* 22:501–505
- Conaghan PJ, Maxwell-Armstrong CA, Garrioch MV, Hong L, Acheson AG (2011) Leaving a mark: the frequency and accuracy of tattooing prior to laparoscopic colorectal surgery. *Colorectal Dis* 13:1184–1187
- Wexner SD, Cohen SM, Ulrich A, Reissman P (1995) Laparoscopic colorectal surgery—are we being honest with our patients? *Dis Colon Rectum* 38:723–727
- Ishiguro A, Uno Y, Ishiguro Y, Munakata A, Morita T (1999) Correlation of lifting versus non-lifting and microscopic depth of invasion in early colorectal cancer. *Gastrointest Endosc* 50(3): 329–333
- Winawer SJ, O'Brien M (2004) Management of malignant polyps. In: Waye J, Williams C, Rex D (eds) *Colonoscopy*, chap 5. Blackwell, Oxford
- Bretagne JF, Manfredi S, Piette C, Hamonic S, Durand G, Riou F (2010) Yield of high-grade dysplasia based on polyp size detected at colonoscopy: a series of 2295 examinations following a positive fecal occult blood test in a population-based study. *Dis Colon Rectum* 53:339–345