

Table 1

Characteristics of patients, colonoscopies and polyps in the cohort

Variable	N (%)
Patients	207 (100%)
Age, years	
Median (SD)	64.5 (6.7)
50-54 years	20 (9.7%)
55-59 years	27 (13.0%)
60-64 years	46 (22.2%)
65-69 years	56 (27.1%)
70-74 years	58 (28.0%)
Gender	
Men	135 (65.2%)
Women	72 (34.8%)
Malignant polyps	
Morphology	
Sessile	103 (49.8%)
Pedunculated	104 (50.2%)
Polyp size, mm	
Mean size (DS)	24.5±13.1
<20 mm	73 (35.3%)
20–29 mm	80 (38.6%)

≥30 mm	54 (26.1%)
Location	
Proximal colon	16 (7.7%)
Distal colon	144 (69.6%)
Rectum	47 (22.7%)
Colonoscopy	
Nonmalignant adenomatous polyps in addition to cancer	
No polyp	62 (30.0%)
1-9 polyps	136 (65.7%)
≥ 10 polyps (polyposis)	9 (4.3%)
Year of colonoscopy	
Before 2007	91 (44.0%)
After 2007	116 (56.0%)
Delay between screening testing and colonoscopy, days Mean (DS)	65.6±74.2
Centres where colonoscopies were performed	
Private	177 (85.5%)
Public hospitals	30 (14.5%)
Number of gastroenterologists who performed the colonoscopies over the 13 years-period	49
Number of colonoscopies harbouring pT1 cancer per gastroenterologist, median (range)	4.2 (1-14)
< 10	125 (60.4%)

≥ 10	82 (39.6%)
-----------	------------

Accepted manuscript

Table 2

Histopathological features of pT1 carcinomas according to the treatment strategy

	Primary endoscopic resection n = 126 n (%)	Primary surgery n = 81 n (%)	Total n (%)
Differentiation			207
Well differentiated	100 (79.4)	64 (79)	164 (78.7)
Moderately differentiated	11 (8.7)	7 (8.7)	18 (8.7)
Low differentiated	1 (0.8)	1 (1.2)	2 (1)
Poor differentiated	2 (1.6)	0 (0)	2 (1)
Not specified	12 (9.5)	9 (11.1)	21 (10.1)
Submucosal invasion or Haggitt classification			
Submucosal invasion, μm	<i>n = 42</i>	<i>n = 61</i>	<i>n = 103</i>
< 1000 μm	10 (23.8)	4 (6.6)	14 (13.6)
\geq 1000 μm	16 (38.1)	12 (19.7)	28 (27.2)
Not specified	15 (35.7)	45 (73.8)	60 (58.2)
Invaluable	1 (2.4)	0 (0)	1 (1)
Haggitt classification (level)	<i>n = 84</i>	<i>n = 20</i>	<i>n = 104</i>
Level 1	11 (13.1)	2 (10.0)	13 (12.5)
Level 2	7 (8.3)	0 (0)	7 (6.8)
Level 3	13 (15.5)	2 (10.0)	15 (14.4)

Not specified	53 (63.1)	16 (80.0)	69 (66.3)
Budding			
Yes	14 (11.1)	1 (1.3)	15 (7.3)
No	4 (3.2)	1 (1.3)	5 (2.4)
Not specified	108 (85.7)	79 (97.5)	187 (90.3)
Vascular invasion			
Yes	13 (10.3)	3 (3.7)	16 (7.7)
No	113 (89.7)	78 (96.3)	191 (92.3)
Lymphatic invasion			
Yes	5 (4.0)	2 (2.5)	7 (3.4)
No	121 (96.0)	79 (97.5)	200 (96.6)
Perineural neoplastic invasion			
Yes	2 (1.6)	1 (1.2)	3 (1.4)
No	124 (98.4)	80 (98.8)	204 (98.6)
Resection margin			
> 1mm	70 (55.6)	65 (80.2)	135 (65.2)
Involved or unsafe	48 (38)	2 (2.5)	50 (24.2)
Invaluable	7 (5.6)	3 (3.7)	10 (4.8)
Not specified	1 (0.8)	11 (13.6)	12 (5.8)
Width of submucosal invasion, μm			
$\leq 4000\mu\text{m}$	2 (1.6)	1 (1.2)	3 (1.4)

> 4000µm	4 (3.2)	3 (3.7)	7 (3.4)
Not specified	120 (95.2)	77 (95.1)	197 (95.2)
Lymph node metastasis risk			
Low-risk	52 (41.3)	57 (70.4)	109 (52.7)
High-risk*	74 (58.7)	24 (29.6)	98 (47.3)

* presence of at least one of the following criteria notified in the pathological report: poor differentiation, venous or lymphatic invasion, tumour budding, submucosal invasion depth $\geq 1,000$ µm for sessile polyps or Haggitt level of invasion ≥ 3 for pedunculated polyps, and margin involvement with a clearance of 1 mm or less

Accepted manuscript

Table 3. Description and complications of endoscopic and surgical procedures

Treatment strategy	N (%)
Primary endoscopic resection	126 (60.9)
Type of procedure	
Snare polypectomy	90 (71.4)
Endoscopic mucosal resection	36 (28.6)
En-bloc resection	111 (88.1)
Piecemeal resection	15 (11.9)
Post-endoscopic complications	
Total	13 (10.3)
Bleeding	11 (8.7)
Perforation	1 (0.8)
Hypoxia	1 (0.8)
Severity grade*	8/3/2
Mild/moderate/severe	
Primary surgical resection	81 (39.1)
Operation	
Low anterior resection	28 (34.6)
sigmoid colectomy	16 (19.8)
left hemicolectomy	14 (17.3)
right hemicolectomy	13 (16)
Transanal excision	6 (7.4)
Total or subtotal colectomy	2 (2.5)
Others	2 (2.5)
Post-operative complications**	
Total	18 (22.2)

Grade 1	9 (11.1)
Grade 2	6 (7.4)
Grade 3	3 (3.7)
Subsequent surgical resection including 4 cases after primary surgery	86
After endoscopic therapy only	82 (64.3)
Operation	
left colectomy	29 (34)
sigmoid colectomy	28 (33)
low anterior resection	17 (20)
proctectomy	6 (7)
right hemicolectomy	3
others	3
Post-operative complications**	
Total	23 (26.7)
Grade 1	9 (10.5)
Grade 2	5 (5.8)
Grade 3	9 (10.5)

* according to ASGE classification [14]

** according to Clavien-Dindo classification [16]

Table 4.

Distribution of treatment strategies, disease recurrences and cancer-related deaths according to cancer site.

(ER = endoscopic resection, PS = primary surgery, ERSS = endoscopic resection followed by subsequent surgery)

Cancer site	Patients n	Treatment strategy			Cancer recurrence local/distant n	Cancer-related death n
		ER n	PS n	ERSS n		
Rectum	47	24	23	16	3/3	2
Distal colon	144	99	45	63	1/4	3
Proximal colon	16	3	13	3	0/0	0
Total	207	126	81	82	4/7	5

Table 5

Univariate and multivariate analysis of factors associated with primary surgical resection rather than primary endoscopic resection

Variable	Univariate analysis			Multivariate analysis		
	Odds ratio	95% CI	P Value	Odds ratio	95% CI	P Value
Characteristics of the malignant polyp						
Morphology						
Pedunculated	ref		< 0.0001			< 0.0001
Sessile	6.1	3.3 - 11.4		9.6	4.2 - 21.8	
Size, mm						
< 20 mm	ref		< 0.0001			< 0.0001
20 – 29 mm	11.1	4.1 - 30.5		21.5	6.8 - 67.8	
≥ 30 mm	38.8	13.0 - 115.9		49.6	14.5 - 169.2	
Location						
Distal colon	ref		0.0007			
Proximal colon	9.5	2.6 - 35.1				
Rectum	2.1	1.1 - 4.1				
Patient and procedure characteristics						
Age			0.92			
Sex			0.73			
Number of polyps at colonoscopy			0.5			

Gastroenterologist (GE)						
GE who performed more than 10 colonoscopies harbouring pT1 cancer	ref		0.040			
GE who performed less than 10 colonoscopies harbouring pT1 cancer	1.85	1.03 - 3.3				
GE1	ref		0.034			
GE2	2.6	0.2 - 32.9				
GE3	30.3	2.6 - 348.9				
GE4	13.0	1.3 - 133.3				
GE5	4.3	0.39 - 48.6				
GE6	8.7	0.79 - 95.1				
GE7	2.6	0.21 - 32.9				
Others	10.5	1.3 - 83.1				
Year of the diagnostic colonoscopy						
After 2007	ref		0.017			0.007
Before 2007	2.00	1.1 - 3.5		2.94	1.33 - 6.47	