RESEARCH COMMUNICATION

Screening Colonoscopy from a Large Single Center of Thailand - Something Needs to be Changed?

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Abstract

Background: Results of screening colonoscopy from Western countries reported adenoma detection rates (ADRs) of 30-40% while those from Asia had ADR as low as 10%. There have been limited data regarding screening colonoscopy in Thailand. The objectives of this study were therefore to determine polyp and adenoma detection rates in Thai people, to evaluate the incidence of colorectal cancer detected during screening colonoscopy and to determine the endoscopic findings of the polyps which might have some impact on endoscopists to perform polypectomy. Materials & Methods: This study was a retrospective electronic chart review of asymptomatic Thai adults who underwent screening colonoscopy in our endoscopic center from June 2007 to October 2010. Results: A total of 1,594 cases were reviewed. The patients had an average age of 58.3±10.5 years (range 27-82) and 55.5% were female. Most of the cases (83.8%) were handled by staff who were endoscopists. A total of 488 patients (30.6%) were reported to have colonic polyps. Left-sided colon was the most common site (45.1%), followed by right-sided colon (36.5%) and the rectum (18%). Those polyps were removed in 97.5% of cases and 88.5 % of the polyps were sent for histopathology (data lost 11.5%). Two hundred and sixty three cases had adenomatous polyps, accounting for 16.5 % ADR. Advanced adenomas were detected in 43 cases (2.6%). Hyperplastic polyps were mainly located distal to the splenic flexure of the colon whereas adenomas were found throughout the large intestine. Ten cases (0.6%) were found to have colorectal cancer. Four advanced adenomas and two malignant polyps were reported in lesions ≤ 5 mm. Conclusion: The polyp detection rate, adenoma detection rate, advanced adenoma detection rate and colorectal cancer detection rate in the screening colonoscopy of Thai adults were 30.9%, 16.5%, 2.6% and 0.6% respectively. Malignant transformation was detected regardless of the size and location of the polyps. Therefore, new technology would play an important role indistinguishing polyps.

Keywords: Screening - colonoscopy - adenoma detection - polyp detection - colon cancer -Thailand

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Introduction

Colorectal cancer (CRC) is a leading cause of cancer death worldwide (Wilkins et al., 2009). It is the second most common cancer in most Western countries. There has also been a rapid increment of CRC incidence in many Asian countries including Thailand (Taber et al., 2010). The way to reduce the incidence of advanced CRC and cancer-related mortality is to screen for it. The current international practice guidelines and expert consensus statements recommend CRC screening for average-risk people aged ≥ 50 years (Segnan et al., 2005; Taber et al., 2010). Although there are many options for CRC screening, the most effective way is colonoscopy. There was evidence that the prevalence and incidence of CRC between Western and Asian population was different. The adenoma detection rate (ADR) and CRC detection rate during screening colonoscopy of Western population were reported to be about 30-40% and 1.7% respectively (Segna et al., 2005; Liou et al., 2007; Sanaka et al., 2009; Wilkins et al., 2009; Taber et al., 2010). The CRC detection rate could be as high as 4% if patients underwent colonoscopy because of positive fecal occult blood test (Segnan et al., 2005). In contrast, screening colonoscopy in Taiwanese revealed the ADR of 9.9%. The Taiwanese investigators therefore suggested to perform screening colonoscopy in people aged ≥ 60 years, not at the age over 50 years as recommended by the American Society of Gastroenterologists (Tracy et al., 1976).

In Thailand, there has been limited data about colorectal cancer screening and particularly in screening colonoscopy. Our Endoscopy Center is one of the World Gastroenterology Organization Training Centers in Asia Pacific, established in March 2005. So, we conducted this study in order to identify the polyp detection rate, adenoma detection rate, advanced adenoma detection rate

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and CRC detection rate in Thai population who underwent screening colonoscopy at our institute. This information would provide the basic knowledge and also benefit for CRC screening policy in Thailand which might represent the data of South East Asian population.

Materials and Methods

After obtaining approval from the Siriraj Institutional Review Board (SIRB), a total of 1,594 asymptomatic Thai adults, both average and high risk groups, who underwent screening colonoscopy in our center, from June 2007 to October 2010, were reviewed. Written informed consent was given by all the patients before they underwent colonoscopy. Patients'characteristics, details of colonoscopy procedures, endoscopic findings and pathology results were extracted from prospectively collected electronic reports. The patients' demographic data were additionally reviewed from their medical records. In this study, the definition of polyp was abnormal tissue protruding from mucosal membrane identified during colonoscopy. Polyps were endoscopically removed and sent for pathological diagnosis at an endoscopist's discretion. The study design in Figure 1 showed the numbers of the population enrolled in the present study.

Based on pathological findings, polyps were classified into three groups: hyperplastic polyp, adenomatous polyp and malignant polyp. Hyperplastic polyp revealed serrated appearance with papillary infoldings in the tall crypts. The altered crypts were lined by a mixed population of absorptive and goblet cells with basal bland nuclei. Meanwhile, adenomatous polyp was sub-classified based on WHO classification into three subgroup8: tubular adenoma, tubulovillous adenoma, and villous adenoma. If the adenomatous polyp contained cancerous cell invading muscularis mucosae, it was classified as a malignant polyp or invasive CRC. We defined the advanced adenoma as an adenoma with significant villous features (both tubulovillous and villous adenoma), size of 1.0 cm or more, high-grade dysplasia, or early invasive CRC.

All data were prepared and compiled using the Statistical Package for the Social Sciences program version 11.3 for Windows (SPSS Inc, Chicago, IL). Continuous variables are expressed as mean ± standard deviation or mean (range) and were compared using the Mann-Whitney U test or the Student t test. Categorical data were tabulated as percentages and were compared using the Pearson Chi-square test or Fisher exact probability test. A P-value of less than 0.05 was considered statistically significant.

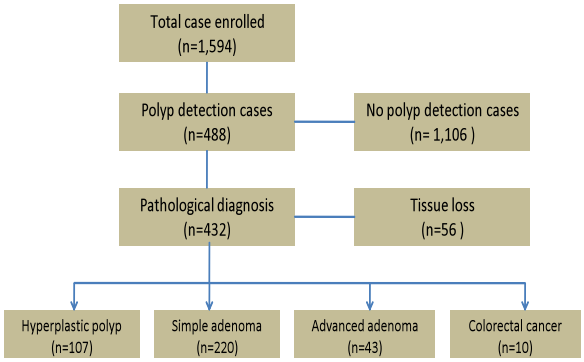

Figure 1. The Study Design Showed the Numbers of the Study Population

Results

A total of 1,594 cases were enrolled in this study, the mean age was 58.3±10.5 years, 885 (55.5%) of whom were female. Seventy-nine percent of the procedures were carried out in the morning and eighty-four percent of the colonoscopy were performed by the expert endoscopists. The polyps were detected in 488 cases which resulted in 30.6% of polyp detection rate. Regarding the baseline characteristics, time of colonoscopy, the experience of colonoscopist and colon preparation, there was no statistical difference between the patients who do and do not have polyps. The baseline characteristics of the patients who do and do not have polyps and the p value were shown in Table 1.

From 488 polyp detected cases, the pathology was indentified in 432 cases(88.5%) while missing data, which

Table 1. The patients' Demographic Data and Baseline Characteristics

	Total Cases	Total case N=1,594		P value
	n = 1,594	Cases with polyp detection n= 488	Cases without polyp detection n= 1,106	
Sex : Female	885 (55.5%)	223 (45.7%)	662 (59.9%)	NS
Age (mean ±SD)	58.3 ±10.5	60.8 ±9.9	57.2±10.6	NS
Time of the procedure: Morning				NS
Afternoon	1,252 (78.5%)	395 (81%)	857 (78%)	
	342 (21.5%)	93 (19%)	249 (23%)	
Performed by expert endoscopist				
	1,335 (83.8%)	398 (82%)	937 (85%)	NS
Achievement of total colonoscopy				
	1,535 (96.3%)	477 (98%)	1058 (96%)	NS
Bowel preparation quality:				NS
Good	1,462 (92%)	458 (94%)	1104 (91%)	
Poor	132 (8.3%)	30 (6.1%)	102 (9.2%)	
Polyp detection	488 (31%)	488 (100%)	0 (0%)	N/A
Interventions:				N/A
None	1,117 (70%)		0 (0%)	
Cold biopsy	176 (11.0%)			
Hot biopsy	80 (5.0%)			
Cold snare	14 (0.9%)			
Hot snare	206 (12.9%)			
EMR	1 (0.1%)			
Complication	0 (0%)	0 (0%)	0 (0%)	NS

*Abbreviation: NS –No statistical significant, N/A _not analyzed

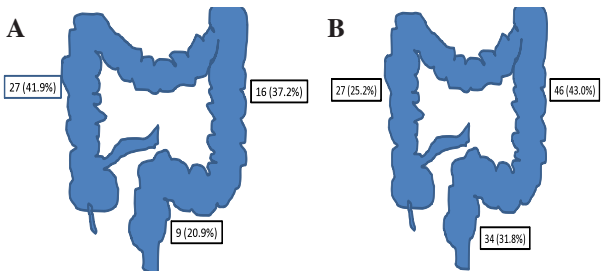

Figure 2. Describe the Distribution of the Advanced adenoma: (A), Hyperplastic Polyps Group: (B)

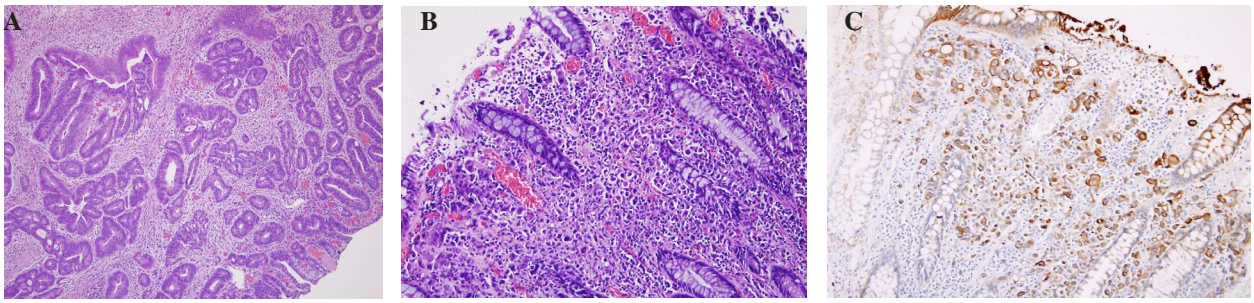

Figure 3. A: Histologic section shows dysplastic colonic glands and moderately differentiated adenocarcinoma. Tumor demonstrates abnormal architecture including complex branching and back-to-back glands in submucosal layer. Malignant cells show moderate dysplasia and increased mitosis. Inflammatory cells infiltrate laminar propria**. B-C: Histologic section shows single dysplastic cells infiltrated in laminar propria of dysplastic mucosa.** Infiltrated malignant cells show hyperchromatic nuclei, irregular nuclear membrane, and vacuolated cytoplasm. Mucicarmine stain reveals intracytoplasmic mucin. Immunostaining demonstrates that neoplastic cells mark with AE1/AE3. These results support adenocarcinoma.

Table 3. Description of 10 Individuals with Colon Cancer Detected by Screening Colonoscopy.

No.	Age, Sex	Location	Character of the Lesion	Cancer grading of adenocarcinoma	AJCC TNM staging
1	78, male	Rectum	Polypoid mass	Moderately differentiated	T3 N2 M0(IIIc)
2	80, male	Rectum	Circumferential mass	Well differentiated	Loss to follow up
3	66, male	Rectum	1.5 cm Pedunculated polyp	Well differentiated	TIS N0 M0(0)
4	57, male	Rectum	0.5 cm Sessile polyp	Well differentiated	TIS N0 M0(0)
5	68, male	Descending colon	Half circumferential mass	Moderately differentiated	T3 N0 M0(IIa)
6	66, female	Cecum	Circumferential mass	poorly differentiated	T3 N1M0(III b)
7	76, male	Sigmoid colon	Cauliflower mass	Moderately differentiated	T3 N0 M0 (IIa)
8	63, male	Ascending colon	Circumferential mass	Moderately differentiated	T3 N0 M0 (IIa)
9	57, female	Cecum	1.5 cm Pedunculated polyp	Moderately differentiated	T3 N0 M1(IV)Liver metastasis
10	62, male	Rectum	0.5 cm Sessile polyp	poorly differentiated	The patient refused surgery, at 2.5 years follow-up showed no local recurrence

Table 2. The Characteristics of the Adenomatous, Hyperplastic and Advanced Adenoma Groups.

	Simple adenoman= 220	Advanced adenoman*=43	Hyperplastic polypn=107	P value
Age	61.0±9.6	63.5±9.5	59.4±9.1	NS
Sex : female	100(45.5%)	14 (32.6%)	54(50.5%)	NS
Location				< 0.001
Left. Side	121 (55.0%)	25 (58.1%)	80 (74.8%)	
Right side	99 (45.0%)	18 (41.9%)	27 (25.2%)	
Interventions:				<0.001
None	3(1.4%)	0 (0%)	3 (2.8%)	
Cold biopsy	58 (26.4%)	1 (2.3%)	54 (50.5%)	
Hot biopsy	47 (21.4%)	1 (2.3%)	19(17.8%)	
Cold snare	8 (3.6%)	1 (2.3%)	4 (3.7%)	
Electrical snare	104 (47.3%)	40 (93.0%)	27 (25.2%)	
Other	0 (0%)	0 (0%)	0 (0%)	
Size of polyp				< 0.001
< 6 mm	171 (77.7%)	4 (9.3%)	90 (84.1%)	
6-9 mm	49 (22.3%)	19 (44.2%)	17 (15.9%)	
> 9mm	0 (0.0%)	15 (34.9%)	0 (0%)	
> 20 mm	0 (0.0%)	5 (11.6%)	0 (0%)	

*Advance adenoma : polyp larger than 10 mm, composed of villous component and high grade dysplasia was seen

due to tissue lost during the procedure(9.0%) or the polyps were left without removal (2.5%), was about 11.5%. The adenomas were detected in 263 cases (16.5%) and from this numbers, a total of 43 cases (2.6%) were classified as advanced adenoma. Ten cases (0.6%) were found to have colorectal cancer. The baseline characteristics of the patients who had hyperplastic polyp, adenomatous polyp and advanced adenoma were shown in Table 2. There was no significant difference among the three pathological groups in terms of age and sex of the patients. Given the mean size of the polyps in advanced adenoma and adenoma groups were larger than the hyperplatic polyp group, the polypectomy technique were also different. The distribution of hyperplastic, adenomatous polyps and advanced adenoma detected by screening colonoscopy in this study were shown in Figure 2.

There were 10 cases of colorectal cancer in this study. Two of the cases were the cases that the polyps showed malignancy pathology while the size of the lesions were less than 6 mm. All the malignancy cases were summarized as Table 3. And the pathology of those two cases were shown as Figure 3 A, B and C.

Figure 2 A Histologic section shows dysplastic colonic glands and moderately differentiated adenocarcinoma. Tumor demonstrates abnormal architecture including complex branching and back-to-back glands in submucosal layer. Malignant cells show moderate dysplasia and increased mitosis. Inflammatory cells infiltrate laminar propria

Figure 2 B-C Histologic section shows single dysplastic cells infiltrated in laminar propria of dysplastic mucosa. Infiltrated malignant cells show hyperchromatic nuclei, irregular nuclear membrane, and vacuolated cytoplasm. Mucicarmine stain reveals intracytoplasmic mucin. Immunostaining demonstrates that neoplastic cells mark with AE1/AE3. These results support adenocarcinoma.

Discussion

Regarding all the results mentioned above, we learnt that the polyp detection rate and adenoma detection

rate of colon cancer screening in the setting of hospital based in Thailand was 30.9% and 16.5% respectively. This data was compatible with the results from previous studies in many countries (Liou et al., 2007; Parente et al., 2009; Wilkins et al., 2009; Strnad and Sonogoric, 2010; Taber et al., 2010; Diamon et al., 2011; Leung, 2011; Long et al., 2011) which reported 25-48% of adenoma detection rate and recommended colon cancer screening in average-risk people over 50 years old. However, it is different from Taiwanese study (Tracy et al., 1976) which stated only 13% of polyp detection rate. They recommended colorectal cancer screening in average-risk people over 60 years old. The colorectal cancer detection rate was 0.6% which was lower than the data from other countries which reported 1.0%, 1.7% and 5.9% of cancer detection rate from Taiwan, Canada and Croatia (Strnad and Sonogoric, 2010). Of the 423 cases of polyp detection which pathology achieved, majority of polyps in the present study were not clinically significant, accounted for hyperplastic polyp 24.8% and simple adenoma 63.2% (more than three fourth of them were low risk for malignant transformation), while the advanced adenoma was found 9.5%. Even though three-fourth of hyperplastic polyps were detected significantly on left sided colon, on the contrary, advanced adenomas located throughout the colon. So, the location of polyps were not benefit for distinguishing between non-neoplastic and neoplastic polyps. If we considered the size of polyps, we observed that the hyperplasic polyps and non-significant adenoma were always smaller than 10 mm. So, we should remove all the polyps which are larger than 10 mm. For small polyps, half of advanced adenoma was smaller than 10 mm even some of them were smaller than 5 mm. in diameter could be also advanced lesions and cancer. From the reason mentioned above, CT colonography and sigmoidoscopy might not be good enough for significant polyps detection, including small sized cancer. Therefore, colonoscopy was still be the best tool for colorectal cancer screening. To maximize the benefit of colorectal cancer prevention, all the polyps must be removed regardless of size and location. However this strategy would be time consuming and might not be cost effective (Hassan et al., 2010; Yeoh et al., 2011). In our opinion, new endoscopic technology such as image enhanced endoscopy, especially NBI, would help the endoscopist in making a decision to resect only all significant polyps. A prospective study should be done in the future.

In conclusion, polyp detection rate, adenoma detection rate, advanced adenoma detection rate and colorectal cancer detection rate for screening colonoscopy in Thai were 30.9%, 16.5%, 2.6% and 0.6%, respectively. Apart from considering only the size and location of polyps, in the future, new endoscopic technology such as image enhanced endoscopy should be applied to have the endoscopists perform the polypectomy more appropriately.

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