

Polyps and diverticula of the large intestine: a necropsy survey in Hong Kong

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SUMMARY The study is based on a prospective survey of 200 necropsies, to determine the prevalence of colonic polyps and diverticula in Hong Kong. Adenomatous polyps were found in 34% of men and 19% of women. The corresponding figures for hyperplastic polyps were 22% and 15%. When compared with European countries having similar rates for colorectal cancer, the polyp pattern by type, prevalence, and distribution is very similar. For diverticula the prevalence rate in this study was only 5%; most of these were situated in the caecum. This is at marked variance to the European pattern.

Adenomatous polyps have been established as the usual precursor of carcinomas of the large intestine. The incidence rates for colorectal carcinoma and the distribution pattern within the large intestine have been well documented for many countries, including Hong Kong,^{1,2} a population at intermediate risk. More recently, detailed information on the prevalence and distribution of adenomatous polyps has emerged from a number of prospective autopsy studies,³⁻¹³ but this information is still not available on a world wide basis.

Methods

NECROPSIES

Colons from 200 necropsies were collected at the Department of Pathology, Queen Mary Hospital, Hong Kong. This government hospital serves a population predominantly from lower socio-economic groups. All cases were Chinese subjects. As far as possible the colons were collected consecutively from all patients over 10 years of age but excluding any with previous colonic surgery. A few intervening cases were not available for examination for a variety of reasons.

The colons were collected by complete removal down to the pectinate line. They were opened, flushed with normal saline from a large tank, pinned out flat on polystyrene boards and fixed in 10% formalin for a minimum of 48 hours. Later, after

rewashing, all the colons were examined by one observer (YTC). The length from the caecal pole to the pectinate line was measured. After careful naked eye examination the size of all polypoid lesions and diverticula was measured and their distance from the caecal pole recorded. All lesions were excised and at least one haematoxylin and eosin stained slide prepared for microscopic examination.

The slides were independently examined by two of us (PEC and KWC). Using previously defined criteria the polyps were classified as adenomatous¹⁴ or hyperplastic.¹⁵ The adenomatous lesions were graded on a scale of 1 to 3, of which grade 3 was the equivalent of severe dysplasia.¹⁶ Autolysis was present in many cases and only lesions showing advanced autolysis were classified as such. In spite of autolysis there was good correlation between the two observers. Mucosal tags and inflammatory polyps confirmed by histological examination, were excluded.

Results

In the total of 200 necropsy examinations there were 146 men and 54 women. A total of 201 polypoid lesions was recorded (Table 1). There were no special types of polyps - no juvenile polyps or Peutz-Jeghers polyps and no cases of polyposis coli. Schistosomiasis is an important cause of colonic carcinoma in some areas of China,¹⁷ but the disease is uncommon in Hong Kong. There were no cases of schistosomal polyposis. In one case only, calcified

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Table 1 Total number and types of polypoid lesions in 200 colons

Tubular adenoma	114
Tubulovillous adenoma	9
Villous adenoma	0
Adenocarcinoma	0
Hyperplastic polyp	62
Autolysed polyps	16
Total	201

schistosome ova were detected in the mucosa adjacent to an adenomatous polyp. Invasive carcinoma was not found in any instance. A single minute submucosal carcinoid tumour was noted.

Polypoid lesions of all types (adenomatous, hyperplastic, and autolysed) were detected in 92 of the 200 colons. There were 51 cases with a single polyp. The highest number of polyps recorded was 10 (two cases). There was a trend towards larger numbers of polyps in the older age groups (Table 2).

The prevalence rates for adenomatous and hyperplastic polyps are given in Table 3. For adenomas the prevalence is significantly higher for men than for women, and the rise in prevalence with age more apparent. For hyperplastic polyps there is no clear correlation with age.

The distribution of adenomas within the colon, for both sexes, is given in the Figure. Adenomas are more frequent towards the opposite ends, with the highest number in the caecum and adjacent segment. Hyperplastic polyps were distributed more evenly. (Not illustrated.)

In a total of 123 adenomas, 72% were classified as grade 1, 24% as grade 2, and 4% as grade 3. The larger adenomas which showed more severe dysplasia, were more common in the older age groups (Table 4).

One or more diverticula were present in 10

Table 3 Prevalence of polyps by age and sex

Age	Colon examined (no)	Colons with adenomas (no: rate)	Colons with hyperplastic polyps (no: rate)
Men			
50	17	3 0.18	3 0.18
50-59	33	7 0.21	8 0.24
60-69	44	16 0.36	11 0.25
70-79	45	22 0.49	9 0.20
80+	7	2 0.29	1 0.14
Total	146	50 0.34	32 0.22
Women			
50	10	1 0.10	1 0.10
50-59	3	—	—
60-69	14	2 0.14	4 0.29
70-79	12	3 0.25	—
80+	15	4 0.26	3 0.20
Total	54	10 0.19	8 0.15
Men + women	200	60 0.30	40 0.20

patients (prevalence rate 5%). This group consisted of seven men and three women. Allowing for the numbers in the survey the prevalence is almost the same for both sexes. With the exception of two patients aged 46 and 68 years, all of these cases were aged more than 70 years. Five patients had a single diverticulum and five multiple diverticula, with a total of only 22 diverticula in the whole study. Of these 22 diverticula, 11 were situated in the 0-10% colonic segment (caecum) with a further three in the adjacent segment. The remaining diverticula were spread throughout the large intestine but with none in the rectum.

Discussion

In 1981, Restrepo¹¹ in an analysis of international data noted a close correlation between prevalence of

Table 2 Multiplicity of polypoid lesions (all categories)

Sex	Age	Polyps per colon (no)				
		Colons examined 0	1	2-4	5-9	10
Men	50	17	12	3	1	—
	50-59	33	20	7	6	—
	60-69	44	19	15	7	3
	70-79	45	20	9	13	2
	80+	7	4	2	1	—
Women	50	10	8	1	1	—
	50-59	3	2	1	—	—
	60-69	14	8	3	3	—
	70-79	12	7	5	—	—
	80+	15	8	5	1	1

The sample of men aged 80+ is small

Table 4 Adenoma rate by age, sex and size (expressed as the mean number of adenomas per intestine)

Age	All sizes	5mm and over	10mm and over
Men			
50	0.35	0.24	—
50-59	0.30	0.06	0.03
60-69	0.79	0.50	—
70-79	1.07	0.49	0.13
80+	0.43	0.14	0.14
Women			
50	0.10	—	0.10
50-59	—	—	—
60-69	0.14	0.07	0.07
70-79	0.25	0.08	—
80+	1.00	0.4	0.20

The sample of men aged 80+ is small

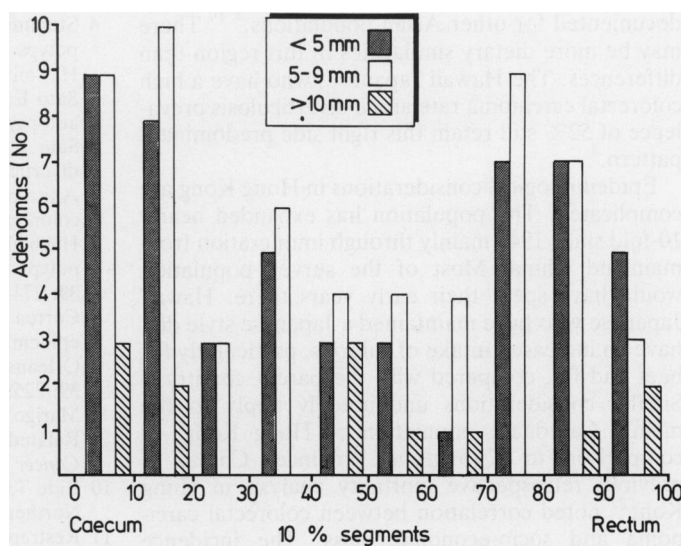


Figure Number of adenomas of the colon in 200 patients, per 10% lengths of the large intestine, by size

adenomatous polyps and the incidence of colonic cancer. It has become apparent, however, that such clear cut relationships are only likely to be seen when populations with widely disparate cancer rates are compared. Hong Kong has an intermediate rate for colorectal carcinoma. Age standardised rates for some other selected populations are listed for comparison. (Table 5).

In general terms, the results of this study when compared by polyp type, prevalence and distribution, are similar to those of three recent European studies from Troms,¹⁰ Oslo,¹² and Liverpool¹³ (Mersey district). The respective rates for adenomatous polyps in men are, Hong Kong 0.34, Troms 0.40, Oslo 0.34, and Liverpool 0.37. For women the Hong Kong rate is low at 0.19, compared with

Troms 0.33, Oslo 0.32, and Liverpool 0.29. (Our study is open to the criticism that the sample size for women is small.)

The distribution of adenomatous polyps by colonic segment, as illustrated in the Figure is also close to the Norwegian reports.^{10 12} In this context the segmental distribution of colorectal carcinoma in Hong Kong² is essentially as for western countries.

Yet there are clear anomalies. The adenoma prevalence of Hong Kong and Oslo are similar, but Oslo has almost twice the cancer rate. Troms with a similar cancer incidence to Hong Kong has a significantly higher adenoma prevalence. The distribution of polyps within the colon, in the Liverpool study was almost uniform, without the polarisation to opposite ends that has been described by others. Vatn¹² in a detailed comparison of the Oslo and Troms results has used these apparent discrepancies to support the multistep theory of carcinogenesis, in which adenoma formation is only the first step.

The exact relationship between adenomatous and hyperplastic polyps is not known, although hyperplastic polyps are not generally considered to have any malignant potential. Anomalies in the adenoma/hyperplastic polyp ratio have been described before. The prevalence of hyperplastic polyps in Hong Kong is very close to that for Troms and Oslo, but only about half that for Liverpool.

In Hong Kong clinical complications of diverticulosis are practically unknown. This study found a diverticulosis prevalence of 5% for both sexes, as compared with a prevalence of 25% for men and 43% for women in Troms.¹⁸ The peculiar predominance of caecal diverticula we noted has been

Table 5 Aged standardised incidence rates for colonic and rectal carcinoma

	Colon		Rectum	
	M	W	M	W
Norway, Oslo*	38.6	30.7	21.1	13.0
New York State	31.4	26.3	16.8	10.4
Hawaii, Chinese	29.4	20.7	16.7	8.8
Norway, Troms*	16.8	21.2	13.4	8.9
UK, Mersey	16.3	15.8	14.9	8.9
Hong Kong	15.0	11.6	11.6	8.7
Norway (overall)	14.3	14.5	11.7	8.0
China, Shanghai	6.7	6.0	9.0	5.7
Colombia, Cali	4.5	5.4	3.4	2.3

The data, except where indicated, are derived from *Cancer Incidence in Five Continents*, vol. 4¹.

* quoted from Vatn *et al*¹².

documented for other Asian populations.^{4 19} There may be more dietary similarities in this region than differences. The Hawaii Japanese, who have a high colorectal carcinoma rate and a diverticulosis prevalence of 52% still retain this right side predominant pattern.⁴

Epidemiological considerations in Hong Kong are complicated. The population has expanded nearly 10-fold since 1945 mainly through immigration from mainland China. Most of the survey population would have spent their early years there. Hawaii Japanese who have maintained a Japanese style diet have an increased intake of calories, particularly for beef and fat, compared with the parent country.²⁰ Similar considerations undoubtedly apply to the mainly Cantonese population of Hong Kong, in comparison to Kwangtung Province, China. A previous retrospective mortality analysis in Hong Kong²¹ noted correlation between colorectal carcinoma and socio-economic class. The incidence quoted in Table 4 may overestimate the risk for the survey population, a low income group. No invasive carcinomas were recorded in the present series, compared with three carcinomas in 280 colons in Troms,¹⁰ seven in 445 colons in Oslo¹² and eight in 365 in Liverpool.¹³

It is difficult to reconcile the polyp pattern in Hong Kong, which is similar to Europe, with a diverticulosis pattern that is so different. Although we have no adequate explanation, there appears to be a genuine difference between these populations. One of the central observations that lead Burkitt to his theory of colonic carcinogenesis,²² was that high fibre diets protect both against colonic cancer and diverticulosis. One should expect a group with a low level of diverticulosis to have a low incidence of carcinoma. Yet continuing epidemiological studies, especially between populations with similar colorectal carcinoma rates have shown many apparent anomalies. These anomalies imply a complex interaction of many different factors in the aetiology of this disease.

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