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Prevalence and Clinical Associations of Hemorrhoids at Screening Colonoscopy

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Abstract

Introduction: The reported prevalence of hemorrhoids detection during colonoscopic examination range between 4.4-86%. Available prevalence studies have a range of shortcomings with population-related bias depending on whether patients are derived from the general population or from colonoscopy clinics. Furthermore, there is limited information concerning the prevalence and correlative clinical risk factors for the incidental diagnosis of hemorrhoids in an asymptomatic, endoscopically-screened adult population. Aims: To determine the prevalence of endoscopically-diagnosed hemorrhoids and correlative clinical and biochemical associations specifically with this diagnosis in asymptomatic patients. Methods: Retrospective case-controlled study that included all patients followed by the Institute of Medical Screening undergoing colonoscopy between 2006-2011 as part of routine screening or surveillance of moderate-risk colorectal cancer (CRC) or with a positive family history of CRC. Clinical and anthropometric data as well as laboratory results were correlated to the diagnosis of hemorrhoids. Results: Three thousand one hundred and seventy five patients were included in the study. Hemorrhoids were diagnosed in 507 patients (16%).On multivariate analysis, only a prior history of hypertension was positively associated with the endoscopic diagnosis of hemorrhoids (OR 1.43, CI 1.12-1.82; P=0.004) whilst BMI (OR 0.967, CI 0.94-0.99; P=0.015) showed a small but significant inverse correlation with this diagnosis. Colonic diverticulosis and angiodysplasia were unassociated with the diagnosis of hemorrhoids, whilst the presence of colonic polyps showed a minimal negative correlation with this diagnosis. Conclusions: Hemorrhoids are frequently detected in asymptomatic population. Arterial hypertension can be regarded as a risk factor for hemorrhoids, while high BMI has a protective power.

KEYWORDS: Hemorrhoids; colonoscopy; epidemiology

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Introduction:

The literature pertaining to hemorrhoidal prevalence is surprisingly sparse [1] with a very variable incidence of reported hemorrhoids (both symptomatic and asymptomatic) ranging between 4.4-86% detected during colonoscopic examination [2-5]. Although symptoms of rectal bleeding, perineal itching, and anal pain are associated with hemorrhoids, (or attributed by patients to hemorrhoidal disease), they are frequently detected without specific anal complaints [6], where often they are classified as Grade I or Grade II disease [7]. Available prevalence studies have a range of shortcomings with population-related bias depending on whether patients are derived from the general population [4] or from colonoscopy clinics [3]. In the latter group, potentially greater grades of hemorrhoidal disease are likely to be diagnosed where there is some variability in the graded classification between observers [8] as well as in the use of colonoscopic retroflexion for the diagnosis of internal hemorrhoids [9]. A recently published study [1] demonstrated a correlation between hemorrhoidal occurrence and body mass index (BMI) in a mixed cohort of a symptomatic and asymptomatic population. However, there is limited information concerning the prevalence and correlative clinical risk factors for the incidental diagnosis of hemorrhoids in an asymptomatic, endoscopically-screened adult population. The aims of the current study were to determine the prevalence of endoscopically-diagnosed hemorrhoids and correlative clinical and biochemical associations specifically with this diagnosis in asymptomatic patients.

Methods:

This retrospective case-controlled study included all patients followed by the Institute of Medical Screening (IMS) affiliated to Chaim Sheba Medical Center, Tel Hasomher, undergoing colonoscopy between 2006-2011 as part of routine screening or surveillance of moderate-risk colorectal cancer (CRC) or with a positive family history of CRC. Patients were excluded if they were younger than 40 or older than 85 years of age, if referred for reasons other than CRC screening, if they had a history of a chronic colorectal disorder or if they had undergone a previous colonoscopy with reported pathological endoscopic findings. The study was approved by the local Institutional Review Board.

Patients followed up by the IMS are invited for an annual visit. During each visit, all patients complete a structured questionnaire concerning their medical history and lifestyle habits. Following completion of the survey, all patients undergo a medical history update with complete physical examination by a physician. Screening blood tests are performed including a full blood count, basic blood chemistry and lipid profile and additional tests are ordered at the discretion of the physician in charge. All of the data are recorded and stored on an electronic medical data database. Patients were referred for

screening colonoscopy in accordance with CRC screening guidelines issued by the American College of Gastroenterologists [10]. All examinations included anal inspection and digital examination, followed by total colonoscopy whenever possible with colonoscopies being performed by an experienced gastroenterologist in the endoscopy suite of a tertiary referral center with reports recorded and stored on a specialized electronic database. Hemorrhoids were diagnosed endoscopically as dilated vascular channels in the proximal anal canal , mainly during retroversion in the rectum or during the final step of the withdrawal of the colonoscope from the anal canal. Thus the results consist mainly of internal hemorrhoids. Data pertaining to failed colonoscopies, (insufficient preparation and failure to achieve cecal intubation) were excluded from analysis (total of 156 examinations, 4.7%).

Statistical analysis

Statistical analysis was performed using SPSS Statistics 17.0.1 (IBM) software. Tested variables were correlated with the endoscopic diagnosis of hemorrhoids. Categorical and quantitative valuables were evaluated by the Chi Squared test and the students *t*-test, respectively with P values <0.05 being considered significant. Multivariate analysis was conducted to detect independent variables using backwards logistic regression with recording of statistically significant P values after ascertaining their significance in a preliminary univariate analysis. Correlation of the risk of diagnosis of colonic polyps, diverticular disease or colonic angiodysplasia with hemorrhoids was evaluated by the Spearman's rank coefficient.

Results:

Three thousand one hundred and seventy five patients were included in the study. The mean age was 58.1± 7.2 years (40-85 years). The study cohort consisted of 2464 males (77.6%) and 711 females (22.4%). Most of the patients were screened because of moderate CRC risk (2726 patients, 85.9%), however 449 patients (14.1%) were screened because of a positive family history of CRC. Hemorrhoids, (both external and internal), were diagnosed in 507 patients (16%) in accordance with the standard hemorrhoidal classification [8]. The demographic associations for the diagnosis of hemorrhoids are displayed in *Table 1* showing an inverse correlation with BMI levels and a near statistically significant positive correlation with a history of systemic hypertension. On multivariate analysis, only a prior history of hypertension was positively associated with the endoscopic diagnosis of hemorrhoids (OR 1.43, CI 1.12-1.82; P=0.004) whilst BMI (OR 0.967, CI 0.94-0.99; P=0.015) showed a small but significant inverse correlation with this diagnosis. The percentage prevalence of hemorrhoids in accordance with BMI subcategories levels is shown in *Table 3* where the highest prevalence is in the mid-range BMI groups**.** Colonic diverticulosis and angiodysplasia were

unassociated with the diagnosis of hemorrhoids, whilst the presence of colonic polyps showed a minimal negative correlation with this diagnosis (*Table 4*).

Discussion:

The present study revealed an overall prevalence of 16% for hemorrhoids in an asymptomatic population over the age of 40 years where a history of systemic hypertension was a significant associated feature of endoscopic hemorrhoidal diagnosis. There was a slight inverse correlation with elevated BMI levels along with a negative correlation with the presence of colonic polyps.

Epidemiological data are of great importance as they reflect the burden of a disease. Very few attempts have been made to assess the prevalence of hemorrhoids. The most effective way to perform an epidemiological study on hemorrhoids is to include a large sample of the general population, as preformed in this study. The prevalence of hemorrhoids we found was relatively low by comparison with previous studies where populations were relatively heterogeneous, [3-5] although it was similar to previously reported prevalence of 16.4-22% in asymptomatic patients referred for screening or surveillance colonoscopy [1, 11]. It is potentially possible that the prevalence of hemorrhoids in our study population may be even higher, since grade I hemorrhoids, which are more common in asymptomatic patients, [1, 4] were not specifically recorded by the examiners. The aim of our study was to assess asymptomatic cases and to differ from other studies where both symptomatic and asymptomatic patients were included, where it is accepted that an increasing hemorrhoidal grade is generally associated with more symptomatic bleeding [1]. This issue is complicated since other symptoms such as perianal itch may show an inverse correlation with grade and be more dependent upon the separation between internal and external hemorrhoids.

We found that the prior diagnosis of systemic arterial hypertension was associated with the endoscopic detection of hemorrhoids which as far as we are aware has not been previously reported. This association may reflect an increase in resting anal tone in the development of hemorrhoids [12, 13] and may physiologically reflect the finding in hypertensive rats of an increase in internal anal sphincter tone [14] along with changes in the biosynthesis of Angiotensin II and control by Angiotenstin II receptors of basal myogenic internal anal sphincter tone [15,16]. It is suggested that a hypertensive anal tone may correlate with systemic arterial hypertension and contribute to the development of hemorrhoids, although this theory requires further epidemiologic study based on larger population analyses, separating symptomatic from asymptomatic cases. Differences may also be noted in analysis of different age groups where symptoms traditionally attributed to hemorrhoids may be due to other sporadic colorectal conditions associated with increasing age [17]. Although some have suggested that hemorrhoids

may increase with age (1) due to a weakening of the supportive anal connective tissue incorporated in the anal cushion complex, [18, 19] other studies have shown that the prevalence of hemorrhoids actually decreases with advancing age, where the peak prevalence is between 45-65 years of age [4]. Possible explanations for this finding may include the age-related decrease in anal pressure and the increased use of laxatives by older patients that probably decreases symptomatic hemorrhoidal prolapse during defecation.

Limited data is available concerning the prevalence of hemorrhoidal disease in obese patients [20, 21] although these populations in some studies have been biased towards bariatric cases rather than assessing the general obese population as a whole [22].This may partially explain conflicted literature where some have demonstrated a higher incidence of symptomatic hemorrhoids in obese patients although the differences are marginal[1] and others no specific association, [20, 21] with some actually reporting aggravation of hemorrhoidal symptoms following significant weight loss [23]. The finding of a reduced resting anal manometric tone with a higher incidence of fecal incontinence in obese people compared with an age-matched non-obese population [24, 25] may suggest a mildly protective effect of extreme weight reducing the risk for hemorrhoid development with increasing BMI as suggested in our study. Further manometric studies in wider obese and non-obese populations with and without anorectal symptoms is required to answer this question conclusively.

In the current study we did not find any substantive association between the endoscopic diagnosis of hemorrhoids and other colonic pathologies with a slight inverse correlation with colonic polyps. The reverse of our finding has previously been reported, [1] however, this may be partially an age-related phenomenon of patients where older patient cohorts with hemorrhoids diagnosed on colonoscopy have previously been associated with diverticular disease and angiodysplasia [17, 26]. Further differences in populations may exist where the indication for colonoscopy is related to a family history of colorectal neoplasia.

Our study has several limitations. Our cohort was comprised of patients who underwent a yearly screening procedure in a facility that delivers paid services which are complementary to the regular free health care normally provided in Israel. The patients participating in this program are characterized by a relatively high income and education level where many are employed by major technological and financial corporations and government offices providing this service as a "bonus" for employees. In addition, these patients often are health-conscious and engage in health-seeking behavior which may be illustrated by a very low prevalence of smoking uncharacteristic of the general Israeli population. In this regard, a higher prevalence of hemorrhoids has been demonstrated in patients with a higher socioeconomic status [4]. This kind of participation bias where screened adults are more likely

to have a higher education level may not of course represent a random sample of the general population and further studies to assess potential differences need to be conducted. Additional epidemiologic studies also need to be performed assessing the prevalence of hemorrhoids and its correlation with prior hemorrhoidal symptoms during pregnancy [27]. A further weakness of the study is the lack of data pertaining to hemorrhoidal grade made by gastroenterologists during colonoscopy, [28] where the diagnosis is generally made during retroflexion before scope withdrawal [9,29] and where additional studies need to be conducted comparing hemorrhoidal grade between flexible and rigid anoscopy [30]. However, as stated priorly, the study population consisted of only asymptomatic patients who underwent screening colonoscopy. Whether patient underreported clinically relevant symptoms as perianal itching or descent of hemorrhoids is not known; however this seems to be less likely due to the meticulous medical workup the patients go through.

In conclusion we found that hemorrhoids are frequently detected in asymptomatic population. Arterial hypertension can be regarded as a risk factor for hemorrhoids, while high BMI has a protective power.

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Conflict of interest statement

No conflict of interests .

Parameter	Hemorrhoids	No Hemorrhoids	P
Number	557.0	2668.0	
Age (years)	58.2±6.9	58±7.2	0.630
Gender (male;female)	399;108	2065;623	0.500
CRC risk (moderate;high)	335; 172	1830; 838	0.200
BMI(kg/m2)	26.5±3.6	26.9±3.7	0.038
Smoking (Percent)	6 (1.2%)	18 (0.7%)	0.271
History of hypertension (percent)	103(20.3%)	413(15.5%)	0.007
History of hyperlipidemia (percent)	59(11.6%)	237(8.9%)	0.051
History of hypothyroidism (percent)	10(2%)	45(1.7%)	0.700
History of diabetes	30(5.9%)	120(4.5%)	0.115
History of ischemic heart disease(percent)	11(2.2%)	56(2.1%)	0.876
SystBP(mm/hg)	128.3±16.7	127.3±16.4	0.172
DiastBP(mm/hg)	80.3±9.1	79.8±9.1	0.224
Hemoglobin(gr/dl)	14.5±1.1	14.5±1.1	0.683
MCV(fl)	88.8±4.1	89.2±4.4	0.103
Iron(ng)	81.3±27	87.3±30.7	0.308
Ferritin(ng/dl)	66.5±54.6	71.1±66.6	0.720
Urea(mg/dl)	34.2±8.6	34.4±8.5	0.742
Creatinine(mg/dl)	1.1±0.2	1.1±0.2	0.819
HbA1C(%)	6.8±0.8	6.9±1	0.249
Fasting Glucose(mg/dl)	95±18.1	95.1±21.1	0.882
Calcium(mg/dl)	9.6±0.4	9.6±0.4	0.017
SGPT(IU/ml)	23.8±11.5	24.7±12.7	0.114
AlkPhos(IU/ml)	68.8±18.8	68.3±18.1	0.634
Triglicerides (mg/dl)	121.5±57.6	125.3±67.9	0.231
LDL cholesterol (mg/dl)	117.6±27.3	117.3±27.5	0.844
HDLcholesterol (mg/dl)	50.2±12.1	49.1±12.1	0.061
TSH (mIU/l)	2.3±1.8	2.2±1.6	0.743
CRP(mg/l)	2.4±2.7	3.1±5.4	0.291

Table 1: **Demographic, anthropometric and laboratory associations with the diagnosis of hemorrhoids in a cohort of 3175 patients undergoing colonoscopy**

Parameter	OR	95%CI	P
BMI (mg/kg)	0.967	0.94-0.99	0.015
Hitory of hypertention	1.43	1.12-1.82	0.004

Table 2: Multivariate analysis of demographic correlations with the endoscopic diagnosis of hemorrhoids.

OR- Odds ratio

CI-Confidence interval

BMI	Hemorrhoids (%)	No Hemorrhoids (%)	P value
15 - 22.9	14	12.9	0.5
23 - 24.9	22.9	18.8	0.03
25 - 29.9	46.9	51	0.098
30 - 34.9	14.4	14.6	1
35 - 39.9	1.8	2.1	0.8
40 +	0	0.6	0.1

Table 3: Prevalence of hemorrhoids in accordance with BMI subcategories.

	Prevalence	Correlation	p
Diverticulosis	0.174	0.115	<0.001
Polyps	0.248	-0.085	<0.001
Angiodysplasia	0.009	0.082	<0.001

Table 4: Prevalence of colonic findings and their correlations to the diagnosis of hemorrhoids.