

Etiology of thrombosed external hemorrhoids: results from a prospective cohort study

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Abstract

Objective To find out causes of thrombosed external hemorrhoids (TEH). **Subjects and Methods** Prospective cohort study of individuals with and without TEH with comparison of answers to a questionnaire. **Results** One hundred forty-eight individuals were enrolled, 72 patients with TEH and 76 individuals without TEH but with alternative diagnoses, such as a screening colonoscopy or colonic polyps. Six independent variables were found to predict TEH correctly in 79.1% of cases: age of 46 years or younger, use of excessive physical effort, and use of dry toilet paper combined with wet cleaning methods after defecation were associated with a significantly higher risk of developing TEH; use of bathtub, use of the shower, and genital cleaning before sleep at least once a week were associated with a significantly lower risk of developing TEH. **Conclusions** Six hypotheses on the causes of TEH should be considered in future studies on etiology and prophylaxis of TEH.

INTRODUCTION

Etiology of thrombosed external hemorrhoid (TEH) is unknown despite numerous hypotheses (1-7). There are two common clinical presentations of the disease: as a circular thrombosis of external hemorrhoids or as thrombosis of a single external pile occasionally with bleeding. We limited our study to single TEH using Hancock's definition of "an acute localised thrombosis which may affect the external plexus" (8). Synonyms are acute thrombosed external hemorrhoid (2,9), acute hemorrhoidal disease (10), anal hematoma (11,12), perianal hematoma (13,14), thrombosed hemorrhoid (15), hemorrhoidal thrombosis (3,12), and perianal thrombosis (16). We were interested to learn more about causes of the disease since it is a common anorectal disorder (10,17,18,19), prophylaxis is needed and optimal therapy debatable.

SUBJECTS AND METHODS

RESEARCH LITERATURE

We searched the MEDLINE database (December 1958 to January 2004) using all synonyms for TEH. One hundred eighty-seven papers were collected. Papers were reviewed as well as journal reference lists and standard textbooks, and we applied our existing knowledge in this area (21).

PATIENTS WITH AND WITHOUT TEH

Individuals of both genders, aged 16 – 80 years old, who entered consecutively into our office from March 18 2004, to August 18 2005 were enrolled referred from general practitioners, physicians, urologists or gynecologists for anal (i.e. pain, bleeding) and/or abdominal complaints (i.e. flatulence). Proctologic assessment in the knee-chest position (21) included inspection of the perianal area, anoscopy and digital examination if possible.

QUESTIONNAIRE

Patients with and without TEH completed a questionnaire that focused on published hypotheses of TEH etiology (table 1). Data from the questionnaires were collected, and the answers of patients with TEH were compared to those individuals without TEH.

Figure 1

Table 1: Patients' questionnaire with given answers

gender,
age,
weight,
height,
nationality
professions:
employee
worker
housewife
self-employee
trainee
civil servant
retirement

Do you assume to have hemorrhoids? (no, yes, unknown)
Did you have previous anal surgery? (no, yes, unknown)
Did you have diarrhoea? (no, yes, unknown)
Did you have laxative use? (no, yes, unknown)
Did you have hard bowels? (no, yes, unknown)
Did you have straining at defecation? (no, yes, unknown)
Did you sit on cold surfaces? (no, yes, unknown)
Did you lift a heavy load? (no, yes, unknown)
Did you have coughing or sneezing? (no, yes, unknown)
Did you have an excessive physical effort? (no, yes, unknown)
Did you have engagement in sports? (no, yes)
Did you have spicy meals (no, yes, unknown)
Did you have recent alcohol intake? (no, yes)
Are you pregnant? (no, yes, unknown)
Do you currently have your menses? (no, yes)
Did you have anoreceptive sex? (no, yes)
Do you use shower or wet wipes after defecation? (no, yes)
How often do you take a shower? (never, 1-3x/week, daily)
How often do you take a bath tube? (never, 1-3x/week, daily)
Do you perform genital cleaning before sleep? (rare, 1x/month, 1-3x/week, daily)
Do you use dry toilet paper after defecation combined with wet cleaning? (no, yes)
Do you use gels or soaps after defecation? (no, yes)
Do you use dry toilet paper only after defecation? (no, yes)

STATISTICS

At each step during the analysis we tried to enhance the significance of the statistical calculations. Initially we determined which of the 38 dichotomously coded variables (demographic, history) might have a significant bivariate relationship with TEH. To decipher this we used Fisher's exact test with a significance level of 5%. We then computed the odds ratio with a 95% confidence interval for each variable and searched for strong correlations.

A Pearson correlation coefficient above 0.36 was defined as strong. If a strong correlation between variables was found, only one of the correlating factors was retained. The factors of age, trainee, and retirement are naturally highly correlated. To prevent multivariate analysis from being biased by multi-collinearity, we decided to retain only one of these three variables. Age was considered to be the most general underlying factor and was therefore retained for further calculations. "Use of dry toilet paper exclusively after defecation" was also retained since it was determined to be a more concise fact than "Use of dry toilet paper combined with wet anal cleaning types". The strong correlation between these two variables justified the decision to keep only one for multivariate analysis.

For each of the remaining factors the variance inflation factor (VIF) was computed to ensure that multi-collinearity

did not affect further evaluations. Finally a stepwise logistic regression analysis was performed to determine which of the remaining variables also had multivariate significance with TEH. We used SPSS 15.0.1.1, 2007, SPSS Inc. Chicago, IL, USA.

RESULTS

One hundred forty-eight individuals were enrolled: 72 patients with TEH and 76 patients without TEH but with alternative diagnoses such as screening colonoscopy (22), stomach ache (21), IBD (9), colonic polyp (7), gastric ulcer (4), constipation (3), liver cirrhosis (1), cholelithiasis (1), pruritus ani (2), hemorrhoids (2), fissure-in-ano (2), rectal prolaps (1) or proctitis (1). Demographic data of both groups differed concerning age and BMI (table 2).

Figure 2

Table 2: Demographic variables of patients with and without TEH

	Patients with TEH (N = 72)	Participants without TEH (N = 76)	p-values (t-test)
Males (%)	61,1	60,5	
Age (mean +/- standard deviation, years)	42,7 (+/-15,0)	49,4 (+/-15,9)	p<0.05
Body Mass Index (mean +/- standard deviation, kg)	24,3 (+/-4,3)	25,5 (+/-4,6)	p<0.001

Out of 38 possible etiological, 20 factors showed no significant bivariate correlation to TEH like the assumption to have hemorrhoids, previous anal surgery, diarrhoea, laxative use, hard bowels, straining at defecation, sitting on cold surfaces, lifting a heavy load, coughing and sneezing, having had a spicy meal, use of shower or wet wipes after defecation, pregnancy, and current menses. They were no longer traced.

The remaining factors showed a significant bivariate relationship to TEH: age, trainee, civil servant, retirement, pregnancy, anoreceptive sex, an excessive physical effort, sports, recent alcohol intake, frequency of bathtub use, frequency of shower use, frequency of genital cleaning before sleep, use of dry toilet paper after defecation combined with wet cleaning, use of gels/soaps after defecation, and use of dry toilet paper only after motions.

After excluding three factors because of multi-collinearity and disregarding the female-specific factor of pregnancy, the remaining 12 potential risk factors proved to be suitable for overall multivariate analyses. Six independent variables were found to be able to predict TEH correctly in 79.1% of cases. A high risk hold individuals below the age of 46 years (p = 0.006, OR=3.824 [1.468; 9.961]), persons with an excessive physical effort in their history (P=0.008,

OR=6.448 [1.622; 25.628]), and those who use dry toilet paper combined with wet cleaning methods after defecation (P=0.007, OR=3.785 [1.451; 9.875]). Three factors were found to be associated with a significantly lower risk for TEH: use of the bathtub (P=0.015, OR=0.259 [0.088; 0.767]), use of the shower (P=0.001, OR=0.036 [0.008; 0.154]), and cleaning genitals before sleep at least once a week (P=0.001, OR=0.184 [0.072; 0.470]).

A second multivariate analysis was performed using female patients only (N = 58) to determine whether pregnancy is a significant multivariate risk factor. Upon analysis, it was determined that risk of TEH is not related to pregnancy. Sports contribute to a high risk in the female population (P=0.005, OR=28.328 [2.745; 292.295]), whereas use of a bathtub (P=0.021, OR=0.081 [0.010; 0.683]), use of a shower (31) (P=0.041, OR=0.102 [0.011; 0.912]), cleaning genitals before sleep at least once a week (P=0.018, OR=0.109 [0.017; 0.681]), and use of dry toilet paper after defecation (P=0.012, OR=0.023 [0.001; 0.435]) were all demonstrated to decrease the risk of TEH.

DISCUSSION

Numerous ideas about the etiology of TEH have been published (1-7) but only few adduced evidence (1, 22). Recurrence rates are high (4, 22, 23), prophylaxis is unknown, and optimal therapy is debated (2, 24, 25). One disadvantage of our study may be the small number of individuals used to gather data (148 in total). One advantage is that data were gathered prospectively unlike other studies about TEH which are retrospective (2, 13, 18, 22, 24, 26).

Out of the 38 possible factors related to TEH, six factors were able to correctly predict TEH in approximately 80% of individuals. Some of these factors are common such as young age (1, 2, 22, 27), while others are almost unknown like an excessive physical effort (23). Straining with defecation (2, 4), because of hard stool (2), or sphincter spasm (7) might lead to temporarily high intravenous pressure in the anal veins, possibly involving stretching and rupturing of the endothelial lining, initiating the thrombosis (6). Common assumption of a causal connection between internal hemorrhoids and TEH (12) or an activator effect of anoreceptive sex (4), recent alcohol intake (4, 5), having had spicy meals (4) to induce TEH remain unproven (27). In females multivariate analysis showed no significant relationship of TEH to pregnancy which contrasted to published reports (4, 5) with the exception being during childbirth (1) whereas sports (4, 5, 23) contribute to a high

risk.

Our results concerning use of bathtub, shower, and cleaning genitals before sleep in males and females did not support the suspicion that local irritation of anal skin may lead to TEH (28) with the exception of males who used dry toilet paper combined with wet cleaning methods after defecation. Ointments (5, 17, 28) and suppositories (5) have been shown to be able to induce local inflammation at anal skin. Detergents within soaps and/or shower gels irritate anal skin destroying the epidermal water barrier (29). Thus a combination of dry and wet cleaning methods may induce TEH by irritation of anal skin through an addition of factors like shower in the morning and routine moist or wet cleaning of the anus after motions (30).

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